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Seasonable Fire Precautions

The Fourth of July this year falls on Sunday, so that there will be two consecutive holidays following the usual half-day on Saturday of this week. This means a large amount of excursion traffic. In providing the equipment and men to care for this service, railroad managers should not omit to remember the extra fire hazard which is always present on the Fourth of July. Exploding firecrackers are apt to be thrown and rockets and bombs to fall in most unexpected places, and it is well to be prepared to extinguish incipient fires. A little care in looking over the condition of the hose and in seeing that it can be unreeled quickly, an examination of the water and sand pails and of the fire extinguishers to ascertain whether they are filled and ready for service, and the stationing of a few men at strategic points to look out for fire, may prevent serious damage to car houses and their equipment. At this time such precautions are especially desirable, because the height of the summer season is just beginning, and the destruction of any considerable number of cars will mean a far greater loss than could be covered by the insurance.

The Convention in Denver

Interest in the coming convention at Denver continues to grow. The trip to the Far West offers so many opportunities for pleasurable sightseeing and acquirement of information from the electric roads in that territory relating to their many unique methods of construction and operation that railway officers in the East should not fail to take advantage of them. The promise of new and unusual things to be seen, which is contained in the article by Mr. Beeler, printed elsewhere in this issue, is indeed inviting. Those who go to Denver may expect a royal reception, and those who stay away because the distance seems great will make the mistake of a lifetime. The convention program of all of the associations, judged by preliminary announcements of the various committees, will be better this year than ever before. With a large attendance promised from the Western States, manufacturers will have an excellent chance to interest new customers in a new field.

Discontinuing Obsolete Reports

In a paper describing the operating organization of the Harriman lines, read last month before the New York Railroad Club, Julius Kruttschnitt, director of maintenance and operation, described the purposes of a few of the many reports which are sent to his office, there to be condensed, combined and finally forwarded to Mr. Harriman and the boards of directors for their information in deciding on the policies to be followed in the management of the vast network of railroad lines bearing the name of the Harriman system. Mr. Kruttschnitt emphasized the importance of having fresh, simple and accurate reports and statistics. He also pointed out the necessity of lightening the labor of those charged with the collection of statistics and the preparation of reports by promptly discontinuing any report when it has served its useful purpose. His test was, Does the report make money or does it save money for the company? If it does neither it is discontinued, to be revived at some future time if necessary, or permanently laid on the shelf. A large part of the work of the office force of every department head consists in the collection

and preparation of operating statistics and reports. Every change of administration introduces new requirements in this direction, and it frequently happens that much labor is added and none cut off. A certain amount of statistical information is essential for the intelligent conduct of any business, but, like many other things, it can be overdone. We would suggest that every department head of an electric railway system apply Mr. Kruttschnitt's test to this detail of the work of the organization under him.

The Third Avenue Reorganization

A clear statement of the arduous conditions which investors in street railway properties have had to face during the past 15 years is given in the petition of the receiver of the Third Avenue Railroad Company to the Public Service Commission, outlining the company's plan of reorganization. The petition says:

Twice within a generation the progress of science has necessitated the entire reconstruction of the Third Avenue Railroad—first by installation of the cable system, and, second, by electrification, and that process may possibly be repeated. Property of this class is also specially sensitive to the exercise of taxing powers, and it may at any time be imperiled by State regulation, and, in addition, we have to face the popular delusion that while in all other departments of life the purchasing power of a nickel has during the last generation nearly been cut in two, and the price of everything proportionately raised, the people still have transportation at prices which prevailed in 1870.

The condition here outlined could have been truthfully shown to be even worse than that stated, because while the length of ride given for a single fare has vastly increased since 1870, the average fare paid is very much less than that received by the companies 40 years ago. It is true that the changes from horse to cable and from cable to electricity were justified at the time by sound economic reasons. If horses had been retained on the north and south lines, as they have been on many of the crosstown lines in New York, conditions would be much worse than they are now. The plan of reorganization outlined for the Third Avenue Railroad Company recognizes this obsolescence as a legitimate charge. The assessment of $25 per share on the capital stock, to paid in in cash, is to be charged to capital account as a liability through the issue of new stock to shareholders. The $4,000,000 of additional cash capital to be raised in this manner will be used largely in making immediate improvements and paying for those already carried out under the receivership.

During the past few years the increased cost of providing the added service given and the reduced purchasing power of the average fare have more than offset the benefits gained by the changes in motive power. Most legislators and many social economists have ignored this fact. The increase in the gross business of the street railway companies has made more impression than the conditions under which it was being secured, and the railway companies have seemed fit subjects for added taxation, until now there is little incentive left for the investment of new capital. Any diminution of the progressive development of city transportation systems with the reasonable demands of the public and the increase of population would be unfortunate, but it is certain that but little further investment can be expected in city railway enterprises while present conditions continue.

The Accounting Association and Conference

President Wallis and the executive committee of the American Street & Interurban Railway Accountants' Association have given official expression to their desire to promote the work of the Central Electric Accounting Conference for the extensive interurban interests in the Central States. There can be no doubt that the smaller conference will supplement in an advantageous manner the efforts of the national association.

By reason of its wider scope, the national association is obliged to extend its activities generally for the benefit of all of the electric railway properties of the country; it cannot well subordinate the properties of one class to the interests of another group of lines, nor can it fail, if it is to continue to be successful, to act so far as possible for all the roads. At the same time it should be recognized that the managements of the Western interurban properties feel that their accounting problems, leaving out of consideration the questions of executive interpretation of the accounts or matters of operation, differ in various respects from those of the urban roads. Outside of the cities and towns, some of the large interurban companies of the Central West, by reason partly of their extensive mileage and comprehensive plans for the future, have many of the physical and operating characteristics of the older steam lines. Local conditions will determine largely the measure of the relative increase in their freight and passenger traffic, but if the interurban passenger business is regarded as in its infancy, the interurban freight business may fairly be considered as having just passed through the dangers attendant upon birth.

Whatever points of difference in practice, if any, develop in the future, it is clearly to the advantage of all the electric railways to unite harmoniously on all matters of national importance. The Central Electric Accounting Conference, as an organization covering a limited territory, has been able to meet frequently for the purpose of discussion by its members of various subjects relating to the work of the auditor, and if its influence will be extended by the proposed direct affiliation with the Central Electric Railway Association the amalgamation will be in the interest of the properties affected.

Specializing in the Control of Traffic

As an electric railway system grows, the importance of watching the movement of traffic in close detail increases by leaps and bounds. On a small road it is, of course, desirable to keep in close touch with the travel, but the schedule is generally less flexible where only a few cars are run, and the opportunity to save money through the reduction of platform labor and other expenses of the car mileage is very limited. On the small system it is not difficult for the superintendent to follow the traffic requirements, in addition to numerous other duties associated with the office, but as the number of cars on the lines increases a point is reached where some one skilled subordinate official needs to spend most of his time in the personal control of the service. In some cities this is done by the appointment of an assistant superintendent; in others a special office is established in the heart of the congested district, where a close watch can be kept on the regularity

of the service and untoward conditions are overcome by telephonic instructions to the division headquarters.

A recent development in Boston in connection with the specialized study of traffic conditions suggests what may be done with little additional cost to improve the service conditions on a large system. A few weeks ago an office filled by a so-called "Superintendent of the Day" was established for the purpose of concentrating at a single central point the authoritative handling of the entire elevated, subway, tunnel and surface system of the Boston Elevated Railway Company, upon which are operated nearly 52,000,000 revenue car-miles per year. The general operation of the car service in Boston is under the immediate jurisdiction of a superintendent of transportation, and the car schedules are prepared by a branch of his department; but, aside from the hour-to-hour handling of the service through the different divisions of the system, many questions of administration and discipline, service economy and public relations fall within the jurisdiction of the head of the transportation department. The establishment of the office of superintendent of the day immediately relieved the head of the department of many minute details which, while they are of the greatest combined importance, interfere with the broadest administration of other matters if handled by a general operating officer.

In the Boston arrangement each division superintendent fills the office of superintendent of the day approximately once in 11 days, the work being taken up in rotation. In this way the detailed operation of the system is placed in charge each 24 hours of an experienced official, who remains on duty from the morning of one day to the morning of the next. During this time he is in constant and immediate touch by telephone with every part of the company's property and service, and keeps special watch of the weather conditions, traffic movements, condition of the rail, occurrence of all delays of over three minutes caused by defective cars. He also has charge of the operation of sand cars in winter weather, relief of traffic congestion, promptness of special car movements and previous arrangement of pilotage through foreign divisions, accidents, fires and other emergencies. The occurrences reported are kept on a log sheet, and in general the duties of this official correspond somewhat to those of the superintendent of power distribution in the same company, or to the post of officer of the day in the army. The work is entirely distinct from that of a train dispatcher, since it very largely consists of remedying conditions which are out of the ordinary, and does not concern itself particularly with normal or routine matters which would be handled in natural course by division superintendents.

A primary advantage of this arrangement is the location at a fixed point of an official to whom any division head or inspector can report anything unusual, but who is not obliged to give any time to consider the question of car or train movements which are on schedule. The existence of such an officer enables the widest variety of help to be given in times of emergency and tends to stimulate the efficiency of the service as a whole. The filling of the position in rotation tends to increase the efficiency of the incumbents through the broader knowledge of the system and closer mutual acquaintance which they gain, and, as well, relieves the company from the cost and annoyance of manipulation by men of less practical experience. Although it is almost impossible to express the value of such organization in terms of money, there is no doubt that the taking up of many loose ends, which is continually being done, tends to save the company money which would otherwise be lost, and, in addition, produces a better service for the same expenditure.

Rapid Transit Conditions in Berlin

Those who have had to confront obstacles in the development of rapid transit lines in this country will read with interest the account of how similar projects are conducted and controlled in Germany. Mr. Kemmann, the author of the article in this issue on the Berlin rapid transit situation, has long been associated with the transportation development in that city, and his article indicates that in many respects the conditions in Berlin resemble those which are found in practically every American city. As here, there is a tremendous demand on the part of residents in the suburban districts for the most expensive form of high-speed transportation, and little regard for the cost of providing it. Every section of the city wants the maximum which can be furnished in the way of speed, comfort and frequency of trains, but is unwilling to contribute more to secure improved transit facilities than a minimum in the way of fares. The existing rapid transit company in Berlin is earning but little more than the legal rate of interest, but is expected to build extensions which would be enormously expensive and would be of problematical financial merit.

In some respects the situation in Berlin is worse than that in this country. The metropolitan district of that city is composed of an aggregation of communities which are politically separate from each other. The craze for municipal consolidation, which is so common in American cities, perhaps because of the American pride in bigness, does not seem to have had its counterpart in Germany. Consequently, there is no central political authority in Berlin to which broad and comprehensive schemes of rapid transit development can be referred. On the other hand, progress in the direction of subsidizing extensions of rapid transit lines has gone further in Germany than here.

It is true that occasionally in this country, more often, however, in the past than recently, short sections of track have been built as extensions to some surface railways by people interested in the real estate which would be served, and these extensions have then been leased at a nominal charge to the local railway company. But elevated or subway extensions to such roads vary greatly from those which can be included in this category. The first suggestion that a district in New York which would be benefited by a rapid transit extension should be assessed for part or all of the cost of its construction was made by the City Club, and the principle has since received the partial indorsement of the New York Chamber of Commerce, although the legal status of the plan yet remains to be determined. The plan of subsidizing extensions of this kind has been carried much further in Berlin. One such line has been built. Others are being favorably considered, and some of them will probably be constructed, if the antag-

onistic interests of the various sections of the city can be reconciled.

We are somewhat skeptical of the practicability of the zone system for American rapid transit lines, as suggested by Mr. Kemmann, unless it is very much simpler than that used abroad. We believe, for instance, that a satisfactory system of double or triple fares might be worked out with 5 cents as a basis, but see no advantage under most conditions in any subdividing of the nickel. American custom is so used to the nickel fare and the currency in this country is so well adapted to that rate of fare as a minimum that the conditions differ greatly from those in Germany, where a fare with many gradations is undoubtedly the most desirable to use.

Another interesting point made in the article is that all transfers issued in Germany, even by the surface lines, are in no sense "free transfers," as that term is understood in this country. They simply form part of a system of through fares for which a charge is made according to the distance traveled. In other words, the company sells a through ticket at a price based on the length of ride, and where one car will not carry the passenger to his destination it gives him the privilege of transferring to another.

Mr. Linn's Paper

The paper by Mr. Linn read before the meeting of the Street Railway Association of the State of New York, this week, under the broad title, "Electric Railway Accounting," is presented as a study based on usage of "a practical application of the uniform system of accounts for street railroad corporations prescribed by the Public Service Commission of the Second District." As the information and discussion by the author concerning features of the classification are based on actual experience with the three schedules during the first six months of 1909, the point of view possible is different from that of companies which introduce the accounts only as required by the orders of the commission. These orders directed the installation of the capital accounts as of Jan. 1, 1909, and of the income and expense accounts and traffic statistics as of July 1, 1909. The advantage of a preliminary experience for six months of the accounts other than those which pertain to capital is obvious.

In the discussion of the capital accounts, reference is made to the requirement of the New York Commission that discount on securities issued shall not be charged to property account, and to the provision of the Wisonsin classification permitting discount on bonds and the expenses incurred in connection with their issue to be capitalized. This, in fact, is in accordance with the law of Wisconsin, which recognizes discount on bonds as part of the cost of raising the capital.

While the opposition mentioned concerning the determination of the probable liability on account of casualties has some justification in the necessary inaccuracy of the result, it is plain that accrued liability of some extent is inevitable in the average property. It is good accounting practice to make some provision for this liability from the current revenues, and while it may develop that the allowance is inadequate or excessive, the outcome will be a nearer approach to the exact requirements than if no effort had been made to estimate this expense.

On the subject of depreciation it is maintained by the author that inspection of the dividends paid by electric railways, if such corporations have not charged the proper amounts to depreciation in the past, indicates not that profits have been distributed too generously, but that rates of fare have been too low. Recent events have demonstrated that rates of fare have been too low in many instances; where the density of population, and therefore the traffic, is light, low fares will not stimulate travel materially, and the fare may have to be high if a desired service is to be maintained and a reasonable profit assured.

Mr. Linn apparently assumes that the corporations will receive fair and impartial treatment from the State commission on these questions of public relations, and discusses the tendency toward avoidance, under commission regulation, of hasty legislation.

The paper merits the attention of all who are interested in the accounting and financial problems of electric railways.

Assigning Motors to Car Houses

The proper distribution of equipment in relation to traffic is always a problem on a large system. Closely associated with it is the assignment of railway motors to different car houses. When a number of new cars are purchased fully equipped for service, the traffic conditions generally dictate where the motors shall be placed, or, rather, where the cars in complete condition shall be assigned. The initial selection of motors, when properly made, takes into consideration the character of routes, grades, car weights required, stops per mile, and other points which need not be repeated here. These conditions are to some degree permanent on any given division of a large system for any fixed set of routes; but as traffic requirements change, the runs have to be altered, and it often happens that a motor which is the best for the purpose on a given division having one set of runs becomes either seriously overloaded or else has more or less excess capacity with another set of runs.

Large systems frequently use upward of a dozen different types of railway motors in all stages of condition, varying from the outfit just in from the factory to the old-time forms of equipments with one foot in the scrap heap. The plan of confining motors of one or two types to independent service, or keeping down the variety of motors housed at any given car station, therefore, has much to commend it. Where it is possible to use but one or two types of motors at a single car house, the number of spare parts, and notably armatures, that have to be kept on hand is greatly reduced, and the crew of the house tends to become expert in the handling of minor repairs and adjustments of this small number of varieties. At the central storehouse a smaller number of spare units will meet the situation, where the motors are well centralized in service. The supply of spare armatures and brushes, field coils, and other parts proceeds in such cases from the central stores department, resulting in a closer check on the number of replacements required than in cases where armatures and other fittings are transferred indiscriminately from one car house to another. There is less chance of a shortage of important

parts where the car houses are dependent upon the central store department rather than each other. This does not mean that it is inadvisable for adjacent car houses to co-operate with each other in the interchange of equipment but when such things are done, a full and complete record should be transmitted to the officer responsible for the rolling stock's detailed service.

Closer study of the behavior of motors in actual service is desirable, with particular reference to the ability of given equipments to meet the traffic requirements without excessive temperature rise and with the minimum number of breakdowns or partial failures in service. There is also much more opportunity to analyze motors and their performance through the installation of test recording wattmeters than is generally appreciated. In the search for economy which has been so prominent among progressive companies in the past two or three years the failures of equipment have received well-deserved attention from operating men, but less consideration appears to have been given to the relative value of motors for specific divisional service, after that service has departed somewhat from the requirements in force when the apparatus was purchased. Practical investigations with the thermometer and the recording wattmeter are inexpensive; capacity costs money if it is not utilized; and the fitness of given motors for specific service is well worth ascertaining. Obviously, with all the severe conditions which surround railway motor operation in the city street, one cannot expect to fit the motor to the changing schedule with perfect accuracy, but at least one can find out whether it is more desirable to retain a given type on a given division, to substitute another type or to increase the number of varieties in a given car house. With the simple and effective means of analysis now at hand there is no reason why motor distribution should not receive scientific study in a wider field than has previously been cultivated.

A Correspondence Course in Electric Railway Engineering

Attention has been directed from time to time in these columns to the work of the committee on education of the American Street & Interurban Railway Association. When this committee was appointed last year there was no distinct idea in the minds of its members as to its exact functions. The first duty was to determine the lines of work which were feasible and which would be of greatest service to the member companies of the association. As the individual members of the association had previously shown great interest in a study of methods for recruiting the executive and engineering forces of their companies, this subject was considered first. The time between the appointment of the committee and the date of the convention of 1908 was so short that it was only possible to obtain incomplete information from a few companies which were known to have successfully inaugurated definite plans for educational work. No recommendations were made in the 1908 report, as the data were not complete enough to enable the committee to draw conclusions.

During the past year the committee has been accumulating a large amount of information, which probably will result in the formulation of several important recommendations to be presented to the association. The graduate apprentice plan has had a gratifying development and the member companies are regarding with increasing favor the systematic recruiting and training of technical graduates in electric railway work. It will be a number of years before the results of the application of this plan will be evident, but one confidently expected result is an increase in the number of technically trained men occupying positions of executive responsibility.

In addition to the work on the apprentice scheme, the committee has devoted attention to the problem of helping the large body of young men who can never hope to secure a college training. These young men must educate themselves while holding their present positions. Many of them only need encouragement and guiding in this commendable educational process. It is the intention of the committee on education to formulate a plan to supply the incentive to study and to suggest lines of profitable application to student employees. The committee believed the establishment of a correspondence course under the auspices of the association would bring about the desired end, but had some doubt as to whether such a plan would meet with the approval of the member companies. Since the replies have been received to a circular letter sent out on April 10, asking the member companies their opinion as to the value and need of such a correspondence course, all doubts have been removed. With practical unanimity the plan has been endorsed. One company writes:

> We feel that anything which can be done to increase the knowledge of employees must not only benefit them, but also the company, in making it possible for the company to secure a higher standard of efficiency of the work of the men. If there is any organized movement of this character it will raise the standard of efficiency of street railway employees in general.

Replies from other companies have been equally encouraging, and it now remains to ascertain the practicability of such a plan by putting it into effect.

It is understood that the committee will recommend that a correspondence course be established by the association, with the stipulation, however, that a financial plan be devised by which no additional burden shall be placed upon the treasury of the association. It is probable that it would be necessary to appoint an assistant secretary, who would have charge of the educational work and devote his entire time to it. No doubt such a plan would cost a considerable sum of money annually to maintain, but if those in favor of the scheme can demonstrate that it will produce the desired results the money will be forthcoming.

There is no agency which can do this work more efficiently than the association as at present organized. The general secretary is in a position to give to the suggested new department his advice and general oversight. If a man with the proper qualifications can be secured to manage the details there is no question as to the ultimate success of the plan. He must be a practical railway man, who is in hearty sympathy with the desire of young men for advancement and education. He will need tact and patience, and will find it necessary to frequently visit his pupils and their employers in order to maintain a close personal interest in them. He must be one who has worked in the shops and car barns as a boy, and who can think and feel as boys do.

FREIGHT HANDLING ON THE METROPOLITAN DIVISION OF THE TORONTO & YORK RADIAL RAILWAY

The Toronto & York Radial Railway owns the interurban lines which radiate from Toronto north, east and west. These roads are operated as separate divisions under the names Metropolitan, Scarboro and Mimico, but are controlled from the main office at Toronto. The passenger service of all three lines is substantially alike, but the Metropolitan division also does a heavy freight and delivery business, the development of which has been so remarkable that it offers the opportunity for a special article on the several features which have contributed to it. The importance of this division's freight business may be gaged by the fact that in 1907 its gross earnings were $33,896, or over 23 per cent of the total gross earnings of the Metropolitan line.



Fig. 1.—Metropolitan Division, Toronto & York Radial Railway—Later Type of Motor Express Car with Side Windows

PHYSICAL CHARACTERISTICS OF THE METROPOLITAN DIVISION

The Metropolitan division is an odd combination of the early and present types of electric interurban railway. It consists in all of 52 miles of single track, of which the first 25 miles out of North Toronto follow the highway to Newmarket over almost all the ups and downs of a rolling country, while the remaining section of later construction is built on graded right-of-way to Jackson's Point, on Lake Simcoe. The older portion of the line was taken over in 1904 by the present owners, who have since made many betterments in track, line and rolling stock. In general, the track, which is of 4-ft. 8½-in. gage, is of 60-lb. rails laid on cedar or tamarack ties spaced 2 ft. centers in gravel or cinder ballast. The respective mechanical and electrical connections are four or six-hole angle joints with electric brazed bonds. The turnouts on the highway section average about ¾ mile, to accommodate the hourly schedule, but on the Jackson's Point section they are about 2½ miles apart.

The overhead line is of the bracket type, with 30-ft. to 35-ft. cedar poles spaced 100 ft. The old line to Newmarket is No. 00 trolley, with 500,000 cir. mil feeders and No. 0000 in proportion to the load, arranged on the ladder system of feeding from different power plants. The new line from Newmarket to Jackson's Point is No. 0000 trolley, with feeder construction similar to the old line. Feeder taps are made every 1000 ft. The pole line carries telephone wires in connection with the Stromberg-Carlson system of dispatching. The high-tension line, which is also carried on the trolley poles, is a three-phase, 60-cycle, 16,000-volt system. One power house is at Bond Lake, 18 miles from Toronto, and contains one 300-kw, GE d.c. generator and two Westinghouse 150-kw, combination a.c. and d.c. generators, with the necessary step-up transformers. The substation is located at Newmarket, 27 miles from Toronto, and contains two 150-kw Westinghouse rotaries with necessary transformers. The additional power for the new extension is obtained from a steam plant at Keswick, where two 150-kw GE generators are installed. The company is finding this power equipment inadequate for its growing needs, and in the near future will convert its steam plants into rotary substations, using Niagara power, which will be supplied from Toronto.

PASSENGER BUSINESS

The company operates 18 passenger cars in winter and 20 in summer on this division, with specials on Saturdays, Mondays and holidays. Illustrations are presented of the combination passenger and baggage cars. The baggage compartment is used for carrying small freight, such as dogs, baby carriages and bicycles, for the flat rate of 25 cents any distance. During the winter the company operates passenger cars to Newmarket every hour in the busy parts of the day, but the service to Jackson's Point and Sutton is less frequent. In the summer, however, there is a great deal of pleasure travel to the company's park at Bond Lake, and also to Morton Park and Jackson's Point, which are popular fishing, boating and bathing resorts on Lake Simcoe.



Fig. 2.—Metropolitan Division, Toronto & York Radial Railway—Standard Passenger Car

Bond Lake Park contains 200 acres, and, with its lake, forms an ideal place for excursionists who want the quiet

of a natural grove. The boats and merry-go-round are operated by the company, and the refreshment stands, etc., by a single concessionaire. Special attention has been given to developing traffic for this park from Sunday school organizations and other large societies. The regular rate to individuals is 65 cents, but when picnic organizations guarantee 200 or more attendants the rate is only 30 cents for a total ride of 36 miles.

THE FIELD FOR FREIGHT BUSINESS

The territory through which the Metropolitan division operates is principally a well-developed farming country, growing produce, which formerly reached Toronto and other towns through long wagon hauls. The company's freight solicitor in beginning his campaign made a house-to-house canvass, familiarized himself with the details of the farm shipments and pointed out to the farmers the great saving in time that would result in having their produce go by electric railway. The railway has located sidings at points other than stations, where sufficient traffic has been guaranteed to cover the cost of installation and at other points where annual switch or siding rental is paid.

All express or freight is handled, using the standard Canadian steam railroad classification. The rates of the company compare favorably with steam road tariffs, of which it receives the regular pro rata on interchange shipments just like a steam railroad. Special schedules are arranged to take shipments at the time most convenient to the farmers and merchants. In four of the towns served it is customary to have weekly markets—in Sutton on Monday, in Newmarket on Saturdays, in Aurora on Thursdays, and in Schomberg on Wednesdays. At first the farmers had the habit of riding to market on the passenger cars, bringing with them a few baskets of eggs or small quantities of vegetables. This practice was not very profitable to the railway company, and by arranging to have freight cars take the shipments to market just before or immediately after the passenger cars this was eventually turned into a paying proposition.

By keeping track of fairs and horse markets, the company secures a considerable number of live stock shipments, as it sends letters and rate cards to solicit this business from the merchants and farmers before they have decided how they will ship the animals. A spirited campaign has been conducted among the farmers to induce them to take up the grain elevator question. There are now two grain elevators at Schomberg Junction, and it is expected that at least three more will be erected by the farmers between Newmarket and Sutton. Hay shipments have been secured in a rather unusual way. The company raises its own hay for its delivery horses, and owns a baling press. This press is rented to other farmers, who then ship the baled hay via the electric railway.

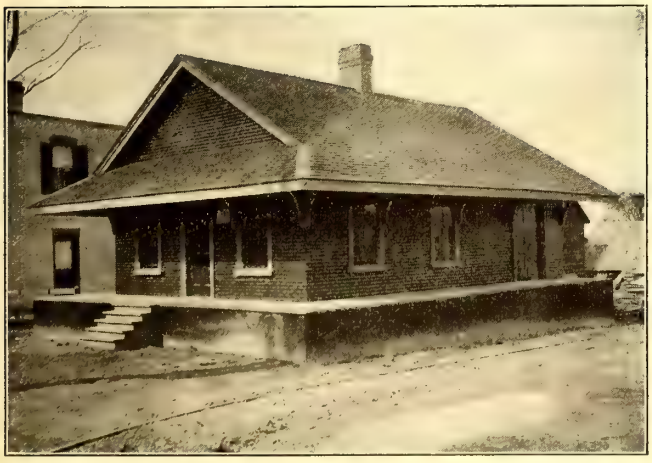


Fig. 3.—Metropolitan Division, Toronto & York Radial Railway—Freight House at North Toronto

Besides the agricultural and live stock shipments, attention has been given to other kinds of freight business. Newmarket, for instance, is the Canadian manufacturing headquarters of the Office Specialty Manufacturing Company, or American firm of Yawman & Erbe, office furniture. The electric railway now handles the goods of this factory, from the rough lumber to the finished product. Of course, this class of traffic calls for interchange with steam roads. At North Toronto connection is made with the Canadian Pacific Railroad, at Richmond Hill with the Canadian Northern Ontario Railway, and at Schomberg Junction with the Schomberg & Aurora Railway. The latter is a 15-mile road owned by the electric interests, and it gives a connection with the Grand Trunk Railway.



Fig. 4.—Metropolitan Division, Toronto & York Radial Railway—Early Type of Motor Express Car Without Side Windows

FREIGHT ROLLING STOCK

Aside from foreign cars, all of the freight traffic is carried by 18 freight cars and four motor express cars. These motor express cars have separate vestibuled cabs for the motorman, but the bodies have grilled or wired windows in addition to the center and end side doors. Quite an interesting feature of the express cars is the neat appearance of the ends, which tends to make them look more like the passenger cars. For convenience in handling milk cans, all of these motor cars are furnished with chain-hung shelves, which are folded against the sides at other times. All classes of rolling stock are stored either in a



Fig. 5.—Metropolitan Division, Toronto & York Radial Railway Gasoline Motor Truck for City Freight Handling

sheet-iron shed at Newmarket or brick houses at Bond Lake and Deer Park.

Careful check of the whereabouts of the freight cars is kept by the dispatcher, who controls their movements by telephone. As it is important that this control should be as direct as possible to prevent interference with the passenger schedule, some of the heavy freight is moved at night to avoid such difficulties.

Freight stations are maintained at North Toronto, Newmarket and other important places on the line. The building illustrated is one of the brick freight stations at North Toronto. The freight agents also act as canvassers and are paid fixed salaries.

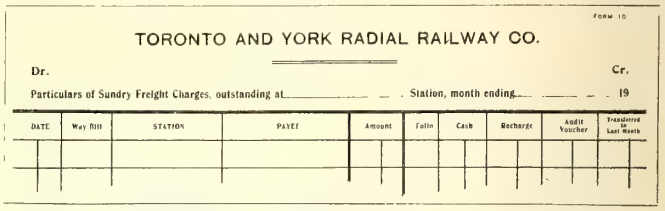
WAGON DELIVERY SERVICE

The Toronto & York Radial Railway maintains a wagon call and delivery service, because it has no trackage through the city of Toronto, and thus far has not been permitted to operate freight cars therein. The terminal of the Metropolitan division is at the Canadian Pacific Railway crossing and Yonge Street, about 2 miles from the business center of Toronto. To make the collections and deliveries the company now requires three two-horse wagons, two one-horse wagons, besides one three-ton and one five-ton gasoline motor truck. It may be said in passing that the company had to conduct a private educational campaign to make the chauffeurs of these motor trucks understand that their duties are precisely the same as those of the teamsters as regards freight handling. This point should be borne in mind by other railways which are considering the use of motor trucks in cities where automobiles and taxicabs may outnumber the chauffeurs.

The charge for the regular wagon service was formerly 1½ cents per 100 lbs., with a minimum of 15 cents. This charge has now been increased to 2 cents per 100 lb., with a minimum of 20 cents. As a matter of fact this company practically has been giving an express service at freight rates, and has come to the conclusion that those who want the quickest possible service ought to pay more than 2 cents per 100 lb. To this end an express wagon will be added to the service to handle all such business at express rates.

The principal wholesale houses in Toronto are supplied with rate cards and shipping cards, showing all agent and non-agent stations on this railway's line. In addition, the company's representative has a system of calling on both receivers and shippers to learn what goods are moving, when they expect to ship or receive goods, what complaints they have as to delays, etc.

A dispatcher controls the movements of the teamsters and chauffeurs, as he receives all telephone messages from merchants and wagon men en route. He must record the names of the consignors, the quantity of material to be shipped, when the shipment is to be ready for the wagon and to whom the call was assigned. The wagon men also keep a form, on which they record the time they arrived and left certain places, and how much material was handled. When their assignments are completed, the teamsters must call up the dispatcher for further orders. These forms, therefore, act as a check on the time of the truckmen, and also show whether shippers are holding up the wagons unnecessarily.



FORM 10

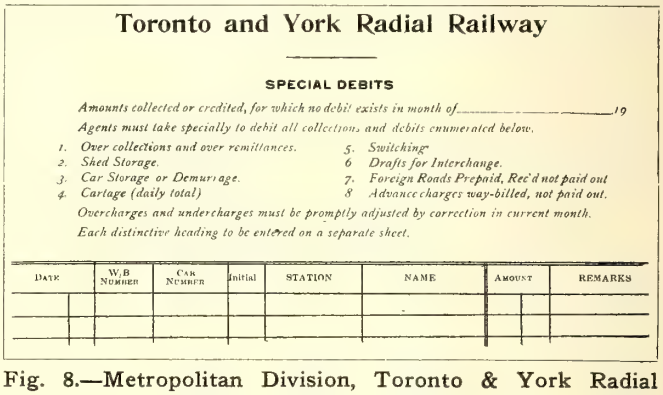
TORONTO AND YORK RADIAL RAILWAY CO.

Dr. Cr.

Particulars of Sundry Freight Charges, outstanding at _____, Station, month ending _____ 19

DATE	Way Bill	STATION	PAYEE	Amount	Folio	Cash	Recharge	Audit Voucher	Transferred to Last Month

Fig. 7.—Metropolitan Division, Toronto & York Radial Railway—Particulars of Outstanding Freight Charges



Toronto and York Radial Railway

SPECIAL DEBITS

Amounts collected or credited, for which no debit exists in month of _____ 19

Agents must take specially to debit all collections and debits enumerated below.

1. *Over collections and over remittances.*
2. *Shed Storage.*
3. *Car Storage or Demurrage.*
4. *Cartage (daily total)*
5. *Switching*
6. *Drafts for Interchange.*
7. *Foreign Roads Prepaid, Rec'd not paid out*
8. *Advance charges way-billed, not paid out.*

Overcharges and undercharges must be promptly adjusted by correction in current month.

Each distinctive heading to be entered on a separate sheet.

DATE	W.B NUMBER	CAR NUMBER	Initial	STATION	NAME	AMOUNT	REMARKS

Fig. 8.—Metropolitan Division, Toronto & York Radial Railway—Special Debits

TORONTO AND YORK RADIAL RAILWAY

Mr. ..... Agent at ..... Station, in account with Toronto & York Radial Ry.
for month ending ..... 190....

	TOTAL	FOR AUDIT USE
Outstanding from last Month		
Inward to Collect		
Outward Prepaid		
Other Roads Prepaid		
Special Debits		
Cash from Treasurer		
Drafts for Interchange		
TOTAL		

	TOTAL	FOR AUDIT USE
Remittances		
Advance Charges		
Other Roads Prepaid, Received		
Overcharge Vouchers		
Audit Vouchers		
Balances: Sundry Outstandings		
Balances: Ledger		
Balances: Cash on hand		
TOTAL		

I hereby certify the above statement to be correct.

Agent.

SUMMARY OF CASH REMITTANCES	
DATE	AMOUNT
TOTAL	

Fig. 6.—Metropolitan Division, Toronto & York Radial Railway—Balance Sheet from Station Agent

FREIGHT ACCOUNTING

Knowing how easy it is to make freight accounting complex, the company has endeavored to get along with the least number of forms consistent with accurate accounting. In the first place, ledger accounts with shippers are not kept at the stations, but only with a few large customers in Toronto, others receiving the standard form of expense

bills. These expense bills are made out in duplicate, one serving as a receipt for payment. The few special forms, not reproduced, relate mainly to those required by the custom regulations between the United States and Canada and to live stock shipments which are in the form of non-liability contracts. A special milk record form is used for the shipments to the City Dairy Company, the principal milk dealer in Toronto. This form simply gives a list naming all dairymen and the number of cans forwarded by them to the dairy company. This list is checked by the dairy agent at North Toronto and is the basis for the ledger account between the railway and dairy. Other milk shippers use the regular shipping form. The rate for transporting an 8-gal. can 20 or 30 miles is 15 cents per can, which includes the return of the empty.

Conductors are furnished with pick-up waybills, which are used for shipments received at way points and are made out in triplicate, for the shipper, office and next station agent. The latter transfers the data from the pick-up waybill on to a regularly numbered waybill, which he makes out in triplicate, one copy to go with the shipment, a second to the head office and the third to his file. If goods for shipment are delivered directly to the station agent the latter gives the shipper a regular bill of lading which specifies the number and kind of packages, marks, estimated weight or quantity and charges, whether prepaid or not.

An explanation of the debit and credit items shown on the reproduced balance sheet, Fig. 6, will give a fairly accurate idea of the accounting activity of the ordinary freight agent, and will show how all money handled by him is checked up at headquarters. "Outstanding from last month" refers to particulars of sundry freight debit charges outstanding or not cleared at the reporting station at the end of the previous month; these particulars are listed on the form shown in Fig. 7. "Inward to collect," "Outward prepaid" and "Other roads prepaid" all relate to the ordinary debits owed by the station agents for charges on shipments to or from other local points. "Special debits" cover amounts collected or credited for which no debit exists in the reporting month; these special debits are shown in Fig. 8, together with the waybill and shipping data. "Cash from treasurer" is self-explanatory. "Drafts for interchange" are based on drafts issued by the agents at the junctions; a statement of this interchange traffic is sent to the auditor four times a month. It should be understood that agents bill only as far as the junction point; that is, there is no through billing, although through rates are in effect. "Remittances," the first credit item, covers all money turned over during the month and detailed at the right of the balance sheet. "Advance charges" and "Other roads prepaid, received" are for advances paid out for business with other lines. "Overcharge vouchers" are for overcharge remittances made by the agent; in such cases the agent secures a duplicate receipt from the customer and sends one receipt to the auditor with the proper identification data as to the expense bill involved. The "audit vouchers" item is accompanied by the agent's credit voucher.

AGENT'S CREDIT VOUCHER

To Auditor:—

Please allow this station credit for the following amounts.

Credit will be taken on . 19 — Balance Sheet.

WAY BILL		STATION	NAME	AMOUNT	STATE FULLY WHY CREDIT IS REQUIRED
DATE	NUMBER				

Fig. 9—Metropolitan Division, Toronto & York Radial Railway—Agent's Credit Voucher

Fig. 9 explains why credit is required on the waybills listed. This credit voucher, Fig. 9, must have attached thereto for checking a copy of agent's correction. "Sundry outstandings" is explained by Fig. 7, already described, which lists both debits and credits in suspension. "Ledger" covers the interchange balance that is due the station agent for the last week of the month, and "Cash on hand" is reported only if the agent has been supplied with money by the treasurer. The station agents are supplied with a cash record and the usual books for listing details of outgoing and incoming freight, monthly abstracts of which are forwarded to the auditor.

Fig. 10 shows the form used for the correction of errors in waybilling. This is made out in triplicate by the sending agent, who retains one copy and forwards two copies to the agent who received the original waybill. The latter certifies the correction and forwards one of his copies to the auditor. Errors in shipments to other roads are taken up by correspondence between the agents concerned.

TORONTO AND YORK RADIAL RAILWAY COMPANY

CORRECTION NO. .....

ISSUED AT ..... STATION 190

TO AGENT AT ..... STATION, CORRECTING WAY-BILL NO. .....

FROM ..... TO ..... DATE ..... 19 CAR NO. .....

PRO. NO.	CONSIGNOR	CONSIGNEE	NO. OF PIECES	DESCRIPTION OF ARTICLE	WEIGHT	RATE	NET FREIGHT	ADVANCED CHARGES	PREPAID	TO COLLECT
		Original Way-Bill Totals								
CORRECTED TO READ:										

Fig. 10—Metropolitan Division, Toronto & York Radial Railway—Form for Correcting Errors in Waybilling

MANAGEMENT

The Toronto & York Radial Railway Company was formed in 1904, with William Mackenzie as president. Mr.

Mackenzie is the well-known Canadian financier, who is associated with D. D. Mann under the popular title of the Mackenzie-Mann Syndicate. These two gentlemen probably have done more for the construction of steam and electric railroads in Canada than any other two men. The general manager of the Toronto & York Radial Railway Company is W. H. Moore, and the assistant manager Charles L. Wilson. Owing to the attention given to the development of the traffic department, the office of traffic manager was created a few years ago and has been held ever since by F. S. Livingston. Mr. Livingston gives particular attention to the development of the freight and express business. The operating and maintenance departments are each subdivided under separate officials who have had considerable experience in electric railway work. The rolling stock of the Metropolitan division was built in the car shops of the Toronto Railway Company, which is also controlled by the Mackenzie-Mann interests.

ELECTRIC RAILWAY CONDITIONS IN AUSTRIA

BY AN AUSTRIAN ENGINEER

Great interest is being taken in Austria in the electrical equipment of steam railroads. This is especially the case in the Alpine province of Tyrol, which, like Switzerland, is rapidly becoming a land of electric railways. The first single-phase railway in the world, the Stubaitalbahn, was built in the Tyrol, and the absence of coal and the large amount of water-power have given added impetus to the construction of electric roads. Recent statistics indicate that there are about 5,500,000 hp available in the water-powers of Austria, or 187 hp for each 1000 inhabitants. This amount is surpassed only in Switzerland, where there are 454 hp for each 1000 inhabitants. The figures showing the percentage of utilized to available power are in Switzerland, 25 per cent; Germany, 20 per cent; France, 18 per cent; Italy, 14 per cent, and Austria, only 9 per cent. A commission appointed by the Government is now systematically studying the subject of utilizing all of the available water-power for electric traction. As the majority of the railroads are owned by the State, there is a tendency to keep the water-power reserved for governmental use until after the report of the commission shall determine how much will be required by the government railways. While the general electrical industry is being seriously handicapped in the meantime, this plan will insure efficient utilization of the water-powers and a uniform voltage.

The first step in the conversion of steam railways to electric traction will probably take place in the Tyrol, where several large water-power stations are to be built with capacities for furnishing 2000 hp to 12,000 hp. The longest existing electric line in the Tyrol is that between Trient and Malè, 38 miles in length. This line will be opened on July 1, and is operated by direct current at 800 volts.

A more interesting line for the railway engineer is the Maria Zell road, now nearing completion in lower Austria. This is the longest single-phase railway on the Continent (57 miles). It is a single-phase line, with 6000 volts on the trolley wire. Water-power is used. The overhead line is equipped with a catenary similar to that of the Hamburg-Blankenese Railway, with strain adjustments every mile or mile and a half. For the present service 14 locomotives, each equipped with two single-phase, 250-hp motors will be used. Owing to the narrow gage, the motors are located above the trucks, and are connected to the wheels with connecting rods.

IMPROVEMENTS IN CONDUIT RAILWAY CONSTRUCTION IN LONDON

As is well known, the greater part of the tramways in the County of London are owned and operated by the London County Council. The Council commenced the work of electrifying the tramways under its control in the year 1902. Since that date several undertakings in the county have been acquired by the Council and only about 10 miles of tramways belonging to other interests are now in operation in the London County Council area. The following table indicates the progress which has been made with the work of electrification. In some years it will be observed that while the amount of electrified line has increased the length of horse line has also increased. This apparent anomaly is accounted for by the acquisition in those years of horse lines by the Council:

ELECTRIFICATION OF COUNCIL'S TRAMWAYS.

Date.	Electric traction in operation. Street miles.	Horse traction, including lines being equipped. Street miles.	Total. Street miles.
March 31, 1904	19¼	69⅜	88⅝
1905	26⅝	68¾	95¾
1906	30⅜	73⅝	104
1907	58⅞	57⅞	116¾
1908	68⅝	51¾	120⅜
1909	84⅜	45⅛	129½

Generally speaking, the electrification of the horse tramways mentioned above has been and is being carried out under the general powers conferred on the London County Tramways by the Electrical Power Act of 1900, but in some instances special authority to reconstruct the lines has been obtained. All new tramways, however, are authorized by act of Parliament.

For operating its electric lines the Council has 1150 cars. This number will be considerably increased within the next few months.

With the exception of about 10 route miles which are equipped with overhead wires, all of the electric lines are worked on the conduit system. This is the only tramway in Great Britain where this system of traction is used, except in Bournemouth, where a short section of conduit system has been installed in the center of the town. Some of the improvements introduced in London since the original construction were described on page 172 of the Street Railway Journal for Feb. 1, 1908, and it is proposed in the accompanying article to describe a few other features of particular interest.

CONDUIT CLEANING

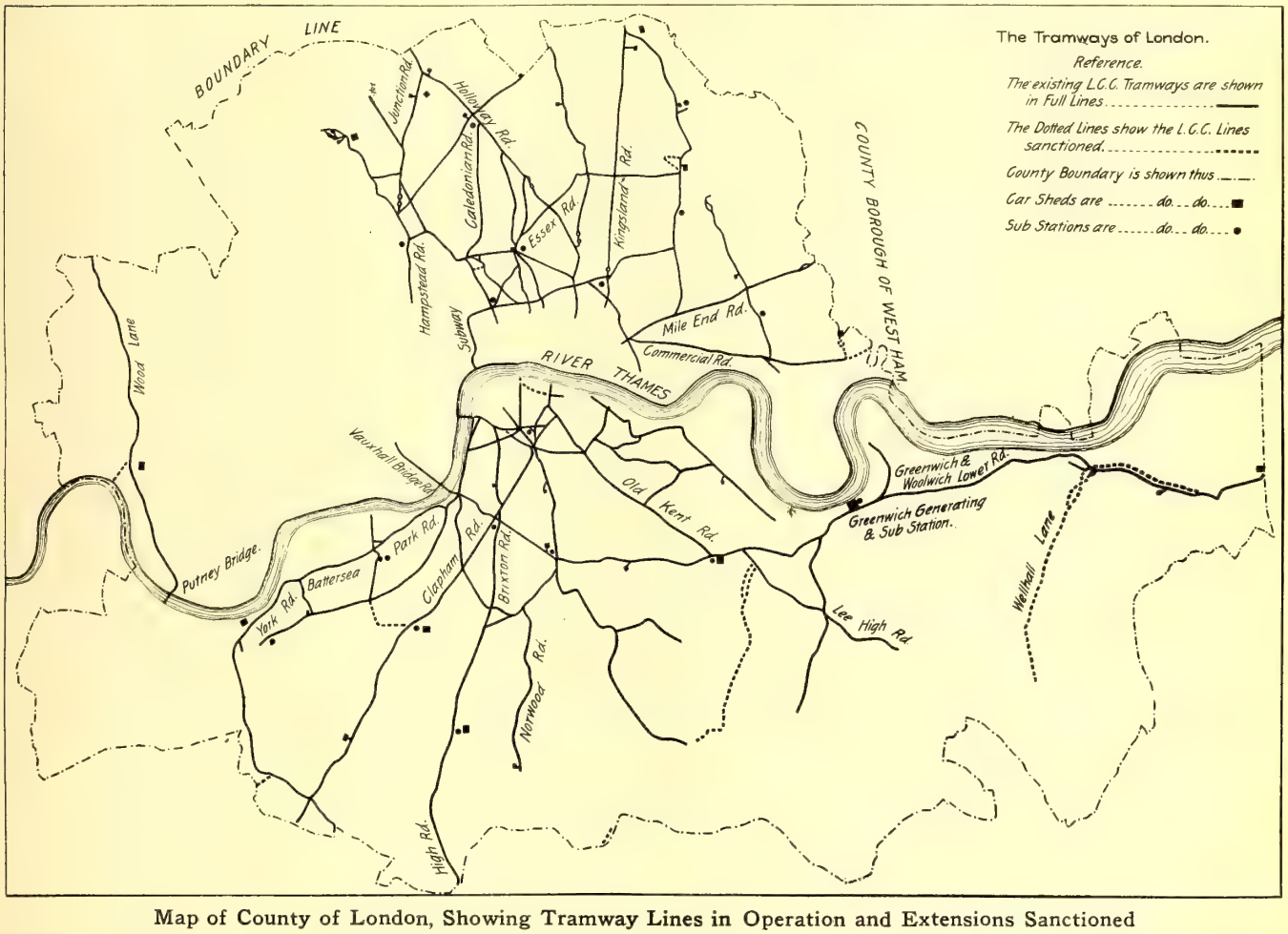
Two methods of cleaning the conduits are at present in use. One is the dry method, the other is the wet method. The former has not proved entirely satisfactory, as it is impossible to remove all the mud by this means. Hand scrapers are used of a shape approximating as nearly as possible the cross-section of the conduit and the mud and dirt is pushed forward by hand until it reaches the catch pits which are placed about every 40 yd. along the track. The catch pits are in communication with the sewers and the difficulty experienced with dry cleaning is more in getting the dirt into the sewer than removing it from the conduit, as the pipes continually choke up with dry refuse which cannot very well be got out except by the use of water. In wet cleaning a hose fed from the public mains is used for washing out the conduit into the catch pits and so into the sewers. With this method the hand scrapers can get over the work much more easily.

Experiments are now being carried out with a mechanical conduit cleaner. This apparatus consists of a small steel

carriage running in the slot on two wheels with a center flange. Supported by this carriage is a frame carrying two scraper blades capable of being turned through an angle of 90 deg. by means of a handle and crank arms, the blades being moved first into line so that the frame and blades can be dropped through the slot. When in position the blades are turned round at right angles to the conduit. The machine is attached to the rear of a car by a towing rod, swivelled to the rear end of the truck. It has been found that this device will clean the conduit efficiently at a speed of about 10 m.p.h. to 12 m.p.h.

The catch pits are provided with sumps and these are emptied at frequent intervals into cars which carry away the deposit.

One of the greatest troubles with the conduit system is



Map of County of London, Showing Tramway Lines in Operation and Extensions Sanctioned

experienced after a long spell of dry weather if a heavy rainstorm follows. Trouble also occasionally happens in low-lying districts due to flooding.

DETECTING AND LOCALIZING FAULTS

The first indication of a fault on the conductor bars is shown in the substation by the opening of the circuit-breaker. Before the breaker is closed the positive conductor in the section in question is connected to a testing resistance of about 5 ohms. If the fault is caused by a dead short-circuit between the bars or a dead earth on the positive conductor a current of 100 amp would pass through the resistance. It should be stated that the negative is connected to earth in the substation. The testing switch is then reversed so as to bring the positive side on to the negative. Then if the fault is merely a positive earth the switch can be closed in the reverse position. If there is still a short-circuit, then the fault is between the positive and negative conductor bars. Men are then sent out with special tools for feeling behind and below the conductor bars so as to find the foreign substances which must have got into the conduit, assuming, of course, that the fault is not in the plough of any car. Usually the fault can be quickly found, but sometimes when pieces of wire, etc., get into the conduit it takes a considerable time to locate them. The insulator box covers are also lifted to help in the inspection.

DISTRIBUTION OF ELECTRICAL ENERGY

There are no very special features in the distribution of electrical energy except that motor-generators are used entirely in the substations with the full line pressure of 6600 volts directly on the stators instead of using rotaries and transformers.

Separate positive and negative low-pressure conductors are used for every half mile of track and are separately controlled by switch panels in the substation. The panels contain the reversing switches and testing appliances.

Special feeder pillars are fixed on the footpaths where the low-pressure feeders connect to the track. These connections are so arranged that either the up or down tracks or both may be fed. Switches are provided for cutting out either section at will. The pillars also contain telephones which are in direct communication with the substations feeding that section.

GENERATING MACHINERY

The main features of the generating plant at the Greenwich power station may be summarized as follows:

(a) Vertical-horizontal engines of 14,000 kw are used in the first portion and turbines of 20,000 kw will be used in the second portion.

(b) Each generator has its own independent exciter either coupled direct or driven by ropes.

(c) Centrifugal pumps for the condensing water are installed in a separate pump house. They are electrically driven and the water is passed through special strainers which are self-cleaning.

(d) The coal is unloaded at a pier on the bank of the Thames by apparatus which is a part of the power-station equipment and gravity bucket conveyors carry it into the bunkers over the boilers. The same conveyors bring the ashes from the basement under the boilers to a large hopper under the pier, from which it is delivered to barges to be taken away.

(e) Each pair of boilers has its own fuel economizer on the floor above and the electrically driven feed pumps are in the basement below the boilers.

(f) Chain grate stokers are fixed to each boiler and the whole of the auxiliary gear is electrically driven throughout the station.

TRACK-WORK MATERIALS

The track rails are of the British standard section No. 4, weighing 105 lb. per yard. The rails at curves sharper than 66 ft. radius are 111 lb. per yard. The length of track rails adopted is 45 ft. for about 90 per cent of the whole. The remaining 10 per cent are of shorter lengths in multiples of 7 ft. 6 in., which is the distance apart of the tie bars which are fixed at every alternate yoke.

A heavy and constant source of maintenance and renewal expense is caused by the rapid wearing away of the guard rails on curves from 45 ft. to 400 ft. radius, especially where the car interval is from one-half minute to three minutes. In many instances it has been found necessary for this reason to renew rails within one to two years after being laid. To reduce this expenditure renewable guards, bolted to the rail after the original flange has been cut off, have been used. These guards are of manganese steel and may if required be reversed when one end is worn. This doubles their life and permits the full life of the rail being obtained.

RAIL JOINTS

All rail joints are supported by a sole or base plate formed by a piece of track rail 2 ft. long with its bottom flange bolted to the bottom flange of the rails.

The tread surfaces of the rails at the joints are hand-filed perfectly smooth until the running surfaces at the adjacent rail ends are in the same plane. This method of ensuring equal wear on the joint has proved of great service in minimizing the number of defective joints. It has also been found that if the whole length of a track is ground on the rail tread before the line is opened for traffic the appearance of corrugations is very considerably delayed, and even if they do appear they are not of so serious a character as on rail surfaces not so treated.

The method of attaching the track rails and the slot rails to the yokes was described in the Street Railway Journal for Feb. 1, 1908.

SLOT WIDTH

Originally, the slot was ¾ in. in width, but it was found by experience that this allowed too little margin for any irregularity in the movement of the slot tongues or other slight diminution of the slot width. A slot 1 in. wide has been adopted on routes more recently constructed, and it has not been found detrimental or dangerous to any kind of street traffic.

Part of the tracks are paved with wood, and the expansion of this paving has frequently diminished the slot width by ⅜ in. to ½ in. It is found that creosoted deal wood paving has the least effect upon the slot. The tracks are generally, however, paved with Aberdeen granite, with a toothing course of harder Guernsey granite to take the excessive wear alongside the running rails. Opposite places of worship, hospitals, etc., where a less noisy paving is necessary, the tracks are paved with creosoted wood.

ROAD BOXES

Access to the insulators is provided at every 15 lin. ft., and to the drainage pits every 120 ft. At special work there is ample access through road boxes to all switch mechanism, connecting cables and conductors.

The road box or hand hole covers are a source of considerable trouble and expense, owing to the rapid wear of the paving in the covers and the rocking action of the covers set up by wear on the bearing edges. These openings are also responsible to a certain extent for the accumulation of mud and dirt in the conduits. To obviate these drawbacks, cast-iron cover plates with the paving carried over them have been substituted for the covers over the insulator chambers, so far with very excellent results. It has not, however, been found advisable to use these cover plates at special work, cross-overs, etc., where constant and rapid access to the conduit and its equipment is frequently necessary.

SPECIAL WORK

The layout and design for all parts of junctions, cross-overs, etc., have as far as possible been standardized, with a view to reducing the delay and expense of renewals. The standard junctions have switches curved on one side to 100 ft. radius. This radius is continued about 10 ft. past the heel of the tongues, and then merged into a 70-ft. radius for the remainder of the curve. The companion track switches have each a movable tongue, thus insuring security and positive action. The mechanism operating the slot tongue is connected with the same shaft as that which operates the tongue of the track switches.

DRAIN RAILS

All running rails and grooves are drained at water holding depressions by drilling a slot in the bottom of the rail groove and connecting this slot by earthenware pipes to the conduit.

CLEANING AND RENEWALS OF SWITCHES

As the slot and track switches are operated simultaneously, it is necessary to make sure of the perfect action of the movable parts and that the mechanism should be certain and rigid in its action. Automatic switches have been tried, but have not been found so satisfactory as manual manipulation in obtaining certainty of movement exactly at the time required and maintaining the changes in the required position until the cars pass. At busy junctions the connecting rod of the switch mechanism is carried in a pipe conduit to the footway, so that the switchman may operate the switches without fear of personal danger.

Generally speaking, repairs and renewals to rails and special work are undertaken during the night and repairs to paving, road boxes, etc., during the daytime.

All-night car service is run on several important routes and during the week the only total cessation of car traffic is from about 2 a. m. to 7 a. m. on Sunday morning.

There are seven depots distributed over the tramway area for the storage and handling of material for the track. Two of these depots are situated alongside the River Thames and two on the Regent's Canal, thus giving convenient and easy handling of materials conveyed by water.

All cars of the Liverpool (Eng.) Tramways are disinfected twice daily during the summer with a solution of chloride of mercury sprayed on the seats and floor. This dries out quickly and leaves no odor.

ACTION NECESSARY TO ASSURE A REASONABLE RETURN ON THE INVESTMENT

BY G. KEMMANN, REGIERUNGSRAT A. D.*

I have read with great interest the series of articles by Charles V. Weston on the subject of the proper return on the investment in city railway enterprises.** The topic treated by Mr. Weston is a very important one and I take pleasure in complying with the suggestion of the editors of the ELECTRIC RAILWAY JOURNAL to discuss the subject from a German standpoint in its columns.

Up to the beginning of the present century the only rapid transit service in Berlin was that supplied by the steam lines which form a part of the large railroad system of the State. Although the design and management of the system are excellent, an unfortunate policy was adopted by the Government in the matter of fares. When the well-known "Stadtbahn" was put in operation in 1882 the idea was prevalent in Governmental circles that a Greater Berlin could be developed by inaugurating a plan of low fares similar to that in London and that thereby the construction of homes in the suburbs of the city would be encouraged. Hence the introduction of a system of extremely cheap commutation tickets, workmen's tickets, school tickets, etc., as well as cheap single tickets.

Low as are the single fares charged in the Stadtbahn the commutation fares are simply ruinous. A private company which should undertake to operate under them would soon become bankrupt and the Government has to earn the interest on the capital which it has invested in the Berlin Stadtbahn from the profits on long-distance riders elsewhere. This situation is clearly described in a statement made by the Minister of Public Works recently to a committee of Chamber of Deputies when he said: "Many of the holders of commutation tickets pay only 2½ to 3 pf. for a 10-pf. (2½ cents) ride. This is below cost price and leads to the abnormal condition that outside tax-payers have to make good the deficiency from this cheap transportation to the extent of 5 pf. (1¼ cents) per ride."

While gratitude can be expected from persons individually a mass of people has no such sentiment whatever toward the benefits bestowed upon them. The granting of such abnormally low fares instead of being thankfully acknowledged has always been accompanied by complaints and criticisms on the part of the public in regard to every detail of the operation of the lines. Nor has the object for which the plan was established been attained, viz.: Low rents in the suburbs. Emigration to them has been stimulated, it is true, but the rents have increased everywhere. Nor have the conditions in London been duplicated, because the leaseholding system of property prevailing in that city is quite different from the freehold property in Berlin with its accompanying exaggerated speculation in land values. The tenant is always expected to pay in the form of rent all profits which may come to the speculator from an otherwise sterile soil. In recognition of these facts the Government has changed its policy so far as further rapid transit is concerned and has declined to develop any additional rapid transit lines in Berlin except to build necessary extensions to its existing system.

Under these conditions private capital was invited to enter the transportation field about the time that the electrical equipment of light suburban railways became feasible, or even before that time, when the light railway law (Kleinbahngesetz) was enacted by the Prussian House in 1892. This bill had been passed to encourage the investment of private capital in the construction of light railways which would develop a suburban and interurban business and act as feeders to the main lines. All light railways in Prussia, therefore, are incorporated under the law which applies as well to rapid transit lines in cities. One of the features of this law is the provision contained in the famous paragraph No. 7, which gives a right of appeal to the national authorities in case any city declines to grant a franchise or right of way to a light railway company or refuses to do so except under very unfavorable conditions. All who have had experience in building under the light railway act know its weak points, but realize that these defects are largely counterbalanced by the right of appeal just described.

The franchise requirements in Prussia are by no means light. The street railway companies are obliged to pave and maintain the pavement for a certain width of the streets over which their tracks run; sometimes the entire width of the street. At other times they are required to illuminate the streets. They are compelled to turn over to the municipalities 8 per cent of their gross receipts as well as one-half of the net receipts exceeding 8 per cent, or even 6 per cent in many cases. Hence it would seem that an average of 8 per cent was considered by many municipalities as the return compatible with public interest to be allowed to the street railway company. Such, for instance, is the case in Berlin where the local street railway company has paid a dividend of 8 per cent for years and has been obliged to pay into the city treasury one-half of the surplus earnings over 8 per cent. The opinion of the Government on this subject can also be assumed from statements made by some of its leading officials to the effect that 8 per cent is a fair return on street railway investments from the public point of view.

In spite of these conditions it is a notable fact that the managers of railway companies in constructing new lines have very rarely taken advantage of the right of appeal contained in the seventh clause of the Light Railway Act. The reason for this is obvious upon a little consideration. The companies prefer to undergo what they consider unjust taxation rather than to get on adverse terms with a community which never lacks the power of showing its displeasure.

The Light Railway Act, as already stated, applies to rapid transit railways in cities, although in both construction and operation they could properly be grouped under the general railway law of 1838. They have, therefore, the privilege of condemning a right of way in the streets; but while this right has been described as being more theoretical than practical with the street railways, this is still more the case with underground and elevated lines. The act applies only to the surface of the streets and does not specify what shall be done if there has to be any interference with the subsoil with its complicated system of sewer, gas and water mains and other subterranean pipes. When the law was passed no consideration seems to have been given to this point, although many rapid transit railways—even one using electricity—were then in operation in London and plans for such lines had been made public in Berlin. Besides condemning the surface, then, it seems to be necessary under the law to condemn the subsoil, for

* Mr. Kemmann is a government councillor, now retired, and has made a study of rapid transit conditions at home and abroad. He has been actively identified with the development of the underground and elevated railroads of Berlin and is now connected with these enterprises, both financially and in an engineering capacity. He has visited this country on several occasions.—[EDITORS.]

** See ELECTRIC RAILWAY JOURNAL for Dec. 26, 1908, and Jan. 2, 1909.

which recourse to the general law of condemnation (Enteignungagesetz) is necessary. But in this law still less consideration is given to the needs of rapid transit lines, and it is doubtful whether the courts would hold that this law authorizes a company to change the location of the city sewers, as any such change might have far-reaching effects. From this it will be seen that many legal questions must be settled before the right of way for an underground railway can be condemned. The trouble is still further aggravated by the fact that the question of the use of the surface of the street comes under the jurisdiction of the municipalities, whereas the control of the subsoil is eventually lodged in the courts.

I have dwelt at some length upon these details in order to show that a rapid transit company cannot accomplish very much if it has not an amicable understanding with the municipalities. Friendship on the part of the National Government is largely platonic, even in this country where the Government is often believed to run everything. In fact, the situation may be made worse if the National Government attempts to make suggestions regarding the course of events. This has been shown recently on several occasions where the cities, which are jealous of their power of self-government, have opposed what they considered an attempt of the National Government to interfere with municipal affairs. Another factor detrimental to a better rapid transit policy is the fact that irresponsible promoters often request franchises for new lines regardless of the economical results which would follow their construction and operation. Last, but not least, among the obstacles to rapid transit improvements is the ever-present disposition of the public to find fault and obstruct every attempt made to secure cheap and quick transit facilities.

With so many adverse parties, namely, cities, public, outside promoters and the law, none of which pays much consideration to the economical side of the question, how can a rapid transit enterprise turn out successfully? Every step forward means that almost insurmountable obstacles must be overcome. There is yet another, to which reference has not been made. Berlin is not a homogeneous body politically as, for instance, is New York. The so-called Greater Berlin is an aggregate of some twenty entirely distinct municipalities, each of which promulgates its own policy. When one considers the different opinions which exist among these organizations and their lack of intelligence in questions relating to rapid transit, it is somewhat surprising that there are still some people who will engage in a rapid transit project.

II

Many engineers are inclined to believe engineering difficulties are the worst obstacles to be faced in rapid transit construction. Few pay full attention to the economic side of the question, although it goes without saying that this is the fundamental consideration. It is a well-known fact that very few rapid transit railways in the large cities of the entire world are in a prosperous condition. The majority are struggling very hard to get a "reasonble return on the investment," as Mr. Weston puts it. Those who expect to find gold mines in the field of rapid transit may be invited to study the reports of the English Royal Commission and Sir Herbert Jekyll's new report to the Board of Trade on London traffic. They would do well also to read carefully Mr. Weston's articles and look through the reports on New York rapid transit which have been submitted by Mr. Arnold, by the New York Chamber of Commerce, etc.

Mr. Weston propounded the question: "What is to be considered a fair return on the capital expended by a company in rapid transit railroads?" The chance of a 4 per cent return will certainly not incite many people to invest money in rapid transit schemes, though few of the existing lines earn much more than a 4 per cent dividend. The Berlin Elevated & Underground Railway is among the favorites. It pays 5 per cent on its common stock. This railway extends over the lines of heaviest travel in the entire city, and therefore will probably be able to maintain this percentage. The Paris subway system is also doing well, for reasons easily understood by those who know the conditions. The Parisians have declined absolutely to extend their lines into the suburbs and the system consequently enjoys a very profitable traffic. Another reason is the unfortunate condition of the surface railway lines in Paris, due to the early expiration of franchises. In consequence the subway supplies, as it were, the place of both rapid transit and surface transportation. With the exception of these two examples there is but one electric rapid transit line which pays more than 4 per cent on its capital, i.e., that in New York City. It is a peculiar fact that in Berlin a 5 per cent dividend is considered very satisfactory for a rapid transit line, even by those who are willing to allow a street railway company to earn 8 or more per cent. It is difficult to understand, however, why a larger return should be permitted on the investment in a cheaply constructed surface line than on a heavily capitalized underground railway, which is 10 to 20 times as expensive per mile, and, moreover, carries with it a greater chance of financial risk.

The principal factors affecting the return yielded by a rapid transit railway are the gross earnings on the one side and the expenses of every nature on the other. With a given class of service the expenses are not liable to considerable variations within prescribed limits except that there is a tendency in all countries toward an increase in wages and cost of materials. To this condition there must be added in Germany a large outlay for benevolent purposes, such as pensions, contributions to funds for sick and disabled employees, etc. The other factor of the return, i.e., income account, varies according to the traffic and rates of fares. The shareholder who at a general meeting of the Berlin Elevated & Underground Railway advocated lower fares in order to get a better return, proved very short-sighted. Traffic necessarily increases as fares are lowered and vice versa, but experience has shown that there is a certain system of fares in every city coincident with the needs of the traveling community that will give a maximum of receipts.

To secure this maximum the tariff must first of all be fair. It is only a matter of justice that a passenger who is carried 10 miles should pay more than one who is carried only 5 miles. I do not consider therefore that a uniform fare such as exists in the United States is in accord with the postulate of equal treatment of the public. I recognize its simplicity to be a great advantage, but simplicity can be attained in other ways. The uniform fare on the Central London Underground Railway was abandoned some years ago. The Bakerloo tube gave it up very soon and now all the London tubes and railways have a scale of fares increasing with the distance. A uniform fare for each of the two classes has been introduced by the Paris Metropolitan, but the reason for this is easily explained by the circumstances already mentioned, that none of the Paris lines oversteps the so-called "Ceinture." In other words, rapid transit stops at the very doors to the outskirts, avoiding

touch with the suburbs which are served by tramways and suburban steam lines. I agree entirely with what Mr. Weston states with regard to the uniform fare, and I do not hesitate to recommend its entire abolition. The American fare of 5 cents is below what it should be for distances beyond a certain limit, and could be less for short distances.

It may not be out of place here to refer to the system of zone fares introduced by the Berlin Elevated & Underground Railway Company. The management of this company followed the State railways in introducing two classes of fares, second and third, in city rapid transit, each class having separate compartments for smokers and non-smokers. This, seemingly, is too many classes for city transit, but it was difficult to see how to do without this two-class system, to which Berlin had grown familiar through decades. From 15 to 20 per cent of the passengers ride in the second class in spite of the 1¼ cents higher fare. The third-class fare on the Elevated & Underground Railway is 2½ cents for four stations, 2¾ cents up to seven stations, 5 cents up to 10 stations and so on. For every three stations an additional 1¼ cents is charged, the average distance between stations being about half a mile. This works out to an average per passenger of 3.3 cents with a line 10½ miles in length and with 23 stations. The average ride is 2½ miles, so that the average fare per passenger is 1.36 cents per mile, a figure which is fair and well adapted to Berlin conditions.

Single tickets only are sold. There are no season, commutation or through tickets, nor passenger tickets of any other kind, except so-called early-hour tickets and a certain rebate granted to children. Single tickets used before 8 o'clock in the morning—"early tickets"—cost 1¼ cents less than the ordinary ones, the minimum, however, being 2½ cents. Children less than six years of age, under charge, are carried free. If there be added to this the statement that dogs are carried for 2½ cents up to the tenth station and 3¾ cents beyond, the entire tariff in force on the Elevated & Underground Railway has been stated. The absolute absence of "transfers" entitling a passenger to change from one means of transportation to another without paying an additional or higher fare is noticeable, as, indeed, it is on the German surface lines. The system of "interchange tickets" that has been adopted on surface lines in many cities (Dusseldorf, Frankfort, and others) is quite different from the American transfer. The principle underlying the interchange ticket is nothing more than a tariff varying according to distance, but spread over two, or even more, sections in a broken journey. Tickets of this class are "through tickets." Whether the passenger has to change or not after paying his fare depends solely on the direction he wishes to travel and on the service provided. According to the principle of least resistance, the companies try to reduce the number of transferring passengers by providing through routes in the channels of densest traffic. In Berlin the only surface line issuing such through tickets or transfers on its own system is the Charlottenburg Tramways Company, which is controlled by the Grosse Berliner Strassenbahn. The Grosse Berliner Company itself has been compelled by the city of Berlin to adopt a uniform fare of 2½ cents, regardless of the distance, which I consider absolutely wrong and unjust even for a tramway. A passenger may ride on a surface car in Berlin 10 miles for 2½ cents. The evil is mitigated to a certain degree only by the fact that on the surface lines shorter rides generally prevail. But the company has declined at all times to issue transfers, and passengers have to pay another 2½ cents fare whenever they change to another car.

Berlin traffic conditions are such that on the Elevated, too, a considerable short-haul traffic prevails, for which the low or short-distance fares are partly responsible. Nevertheless, the surface lines are not greatly affected by the short-haul traffic of the elevated, because the tramways consist of a network of outspreading arteries, whereas the elevated and underground only form a few trunk lines. The effect is still further lessened by the fact that the elevated has a station, say, only every ½ mile, whereas one can board a surface car wherever he likes.

The average distance traveled on the Berlin rapid transit lines does not grow in the same ratio as the railways into the outskirts of the city. This is accounted for by the falling off of traffic in the outer zones, whereas the inner zones become more congested—just the reverse of the state of things in New York, where the long-haul traffic increases as the lines are extended further into the suburban area. Habits of life, land policy, fares and other circumstances account for this variation.

Whatever differences, however, may exist in rapid transit here and abroad, the economical value of suburban lines, considered as self-supporting concerns, is not such as to yield a reasonable return on the capital invested. The uniform fare in the United States, the decreasing density of traffic on the confines of Berlin and London—the Paris system can be ignored in this connection—result in conditions under which the return on the capital invested in long-distance lines is entirely inadequate. Hence the policy of the Berlin Elevated & Underground Railway, inaugurated years ago, either to leave the construction of the suburban sections of the rapid transit system to the city authorities or to large real estate owners wishing to develop their properties, or else to build such lines only on the condition that they be supported by subsidies large enough to cover every deficit of operation, including charges to depreciation, reserve, sinking funds, etc., and say, 4 per cent interest on the capital.

The first step in this direction was the conception of the Neu-Westend line, a spur to connect with one of the main arteries of the present rapid transit system and extending west to an entirely new field recently opened up for building purposes. About 2 miles of this line, which when finished will be 3 miles in length, was opened for traffic on March 29, 1908. The subsidy to defray the deficit train operation was provided jointly by the Neu-Westend Land Company, the city of Charlottenburg and the Government—the latter owning the large area of the Grunewald, which abuts upon the Neu-Westend property. This solution of the problem has proved successful, and the effect of one year's operation of the line has confirmed the preliminary estimates of the receipts. It is expected that the new line will be self-supporting in about 20 years.

Other spurs are now under consideration in a southwesterly direction, but the method of financing them is somewhat different. Large land companies have combined with the local outlying municipalities to build these extensions, but the Elevated Company will operate them. The cities and landowners, among whom is the Government, with a large area suitable for dwellings, will own the lines and will meet all the expenses, including cost of operation. So far as the public is concerned, the operation will be no different than if the line was owned directly by the Ele-

vated Company. This policy was inaugurated first by the city of Wilmersdorf, which worked in harmony with the Royal Commission in charge of the Government estate mentioned, called Dahlen Colony, but the negotiations have not been brought to a final conclusion, on account of opposition on the part of the city of Charlottenburg, which lies next to Wilmersdorf.

Unfortunately, a short section of the Wilmersdorf line has to be built across Charlottenburg territory. This fact was adopted as a pretext by Charlottenburg to defeat the scheme in favor of one of its own. The line desired by Charlottenburg, if built, would largely parallel the Neu-Westend line, the Stadtbahn and the existing rapid transit system, and would serve little new territory. I mention this simply to show that Germans are no better than Americans as regards destructive competition. The Government is seeking means to settle this conflict in a disinterested and fair way, but through lack of power may fail in its efforts to reconcile the interests of the cities.

The authorities of other suburban municipalities, as well as those of Berlin itself, are now engaged in projecting railways of their own, entirely regardless of any harmonious project of rapid transit development or of the facilities offered by the existing rapid transit system. One example is the line of the city of Schoenberg, about 2 miles in length, now in course of construction. Berlin, also, is planning to build two lines across the city, one of them to be constructed jointly with the city of Rixdorf. Progress in this direction, however, is extremely slow, as the local authorities of the several cities concerned have adopted different lines of policy and are extremely jealous of their interests and privileges, while the existing company and the Government are hampered and opposed in any effort they may make toward progressive action.

Unfortunately, there are many of these municipal bodies and the policy of each is dictated so largely by local interests that they seem unable to adopt a broad co-operative and constructive policy. Instead, each indicates a desire to act alone and to leave questions of economy to the future. There is a general cry for subways. Even in the most remote suburbs of Berlin subways are demanded by the local authorities, and in these demands they have the backing of a population that does not care whether the taxpayer of subsequent years will have to pay the cost of non-paying underground railways. Up to the present, German cities have enjoyed good credit, but if they should embark on visionary and expensive schemes of rapid transit such as have recently been advocated, the policy undoubtedly will prove disastrous in many cases. The only local municipal body which professes it will be content with an open suburban line-cut and embankment is that of Dahlem. The Berlin public, as represented by the city authorities, daily papers and city engineers, wants nothing but the most expensive subway construction. They are opposed to elevated railways, and still more to suspended railways, notwithstanding the fact that the finest example of elevated railway construction in existence is in operation in the western part of Berlin. Of this road the city of Berlin may be justly proud, as it certainly disproves the necessity of constructing subways where elevated lines can be built.

III

I should like to recommend the following:

(1) Where the law prescribing the conditions under which railways are to be built does not provide adequately for the construction of rapid transit lines in cities, it ought to be amended, in view of the importance of this subject.

(2) There should be a central competent commission, with power to prevent undue and reckless competition, as well as the requirement of extravagant construction, and to insist that the railways be laid out according to sound and economic principles in accord with public demand, rather than to satisfy local interests. This authority should have power to settle all questions in a broad way and for the welfare of the community as a whole.

(3) All the interests concerned should join in furthering and supporting a sound transit policy; metropolitan rapid transit railways should be exempt from unnecessary financial charges and burdens regarding cost, fare, taxes, etc. To keep the cost of construction as low as possible, less expensive forms of structures, such as elevated or suspended lines, lines in cuts or on embankments, should be considered and allowed when feasible. Private enterprise should be encouraged.

(4) The economical aspects of a rapid transit railway ought to be examined and careful estimates of the probable cost, traffic receipts, expenses and other salient features of the undertaking should be made by competent persons before any financial steps are taken. The method which consists of beginning at the tail end by fixing a certain percentage of interest on capital and then working backward and deriving the items of traffic and cost, is objectionable. Sufficient allowance should be made for depreciation and reserve, and the estimates should be extended over a long enough term so that the increasing effect of depreciation shall be shown correctly.

(5) The fare ought to be reasonable and in accordance with the service rendered; that is, it ought to vary with the distance traveled, but should also be fixed with a view to simplicity. The Berlin zone tariff, with only 22 different kinds of passenger tickets, would seem a practicable solution in many cases. Low rate commutation tickets ought to be avoided entirely, and round-trip and through tickets as far as possible.

(6) A safe return of interest at the rate of, say, at least 5 per cent on the capital expended should be allowed, even with city lines.

ROLLING STOCK MAINTENANCE OF THE PHILADELPHIA RAPID TRANSIT COMPANY

The mechanical department of the Philadelphia Rapid Transit Company has prepared a summary of the work done by it in the past six months. Since Jan. 1, 1909, 986 closed cars and 946 open cars have been repaired. These, with 146 cars classified as miscellaneous, make a total of 2078 cars put through the company's shops in the first half of the year. In the same period 59 closed cars and 849 open cars were repainted, as well as 52 cars of miscellaneous types. There have been changed to the pay-within type 303 cars. These cars have now been in service eight months, and carefully kept accident records show that their introduction has practically eliminated boarding and alighting accidents, which form by far the larger proportion of all injuries on street cars.

In the shops 1,086 men have been employed. On the rolls of the Sixth Street shop alone are 420. The cost of carbody maintenance was $314,492, and motor and electrical equipment maintenance $147,945, making a total of $462,437 for six months. Twenty new steel cars have been ordered for the elevated road at a cost of $12,500 each, or a total of $250,000. Delivery of these cars is expected to begin in August.

DENVER AS A CONVENTION CITY

BY JOHN A. BEELER, VICE-PRESIDENT AND GENERAL MANAGER, DENVER CITY TRAMWAY COMPANY

I have been asked to summarize briefly what those who are planning to attend the Denver convention of the American Street & Interurban Railway Association and its affiliated organizations may expect to see in that city and its surroundings. Denver is the social, political and mercantile center of a State unequaled in scenery, climate and natural resources of every kind. It is young as cities count their age, having emerged from the sage brush barely 50 years ago, while Colorado was still a part of the Territory of Kansas. From a frontier settlement it has grown in half a century to a prosperous, beautiful city of 225,000 inhabitants. Situated on a high, flat tableland at the base of the foothills of the Rocky Mountains, it has developed in every direction, until it well deserves the name of a city of "magnificent distances." It covers an area of 54 square miles, has 1222 miles of streets laid out on the map, of which 38 miles are paved with hard paving and 75 miles macadamized, 282 miles of sanitary sewers, 82 miles of storm sewers and 229 miles of stone and cement sidewalks. These are rather dry figures, but they prove that Denver is by no means a village of the "Wild and Woolly West.'

I shall not make more than passing mention of our street car system, which serves the large and comfortably housed population. The system includes 200 miles of track within the city limits and 75 miles of high-speed interurban lines. We believe the service given is as good as will be found in any city of the same size in the country. There are no subways or elevated lines as yet, as the congestion in the business district, which covers an area 1¼ miles long by ¾ mile wide, is not severe enough to warrant these expensive luxuries.

Denver is pre-eminently a city of homes, beautiful trees, fine lawns and spacious parks. In the days of the early settlers the only trees were a thin fringe of cottonwoods along the banks of the River Platte. The lawns and trees which add so much to the appearance of the streets have been brought up by hand; they represent a labor of love, and it is little wonder that they are appreciated by all of our citizens. Brick and stone buildings are the universal rule in Denver, as no frame buildings are allowed to be erected inside of the city limits. The skyscraper, however, has not come into vogue, as we have plenty of room in which to spread horizontally. Many of the best stores occupy one-story buildings downtown. Among the show buildings are the State Capitol, the new fireproof Auditorium, where the exhibits of the convention are to be displayed, and the buildings and grounds of Denver University.

Perhaps the greatest attractions of Denver are the climate and the scenery of the surrounding country. Contrary to the prevalent idea in many sections of the East, Denver is not in the mountains, but is 12 miles east of the lower range, on a plain approximately one mile above sea level. The mountains west of the city protect it from the severe storms and blizzards which come out of the west and northwest. This, combined with the high altitude, gives Denver a delightful and healthy climate, free from sudden changes and severe extremes of heat and cold. Nothing is more surely to be depended upon than the weather in Denver during the first half of October. It is neither too warm nor too cold then, and no rain is to be expected. It is, in fact, an ideal time of the year.

The scenery surrounding Denver is the most magnificent to be found anywhere in the world. In a day's ride on the Western Pacific Railroad one can reach an altitude of 11,000 ft. and throw snowballs in August. To the south is the beautiful Manitou country and the Garden of the Gods. Majestic Pike's Peak and many other imposing mountains can be seen from the streets of Denver. Few people who visit Colorado from the East stay long enough to fully appreciate all of its attractions. Those who come to the convention for the first time we know will want to come again, and we promise to do all that we can to make them enjoy their visit with us.

All of the electric railway interests in the far West are enthsiastic about Denver as a meeting place. We have been assured that practically all of the Pacific Coast companies will be represented. Few Eastern people realize how much nearer Denver is to the coast than are the cities of the Atlantic seaboard. Denver is the geographical center of the vast region extending from Galveston, Tex., on the south, to Portland, Ore., and Spokane, Wash., on the north, and from St. Louis and Chicago on the east to San Francisco on the west. This territory, embracing many large cities, will send a full quota of members and prospective members.

In closing I wish to say a few words to manufacturers regarding exhibits. The Denver meeting will open to many manufacturers of railway equipment and supplies quite a new field, which is rapidly developing; therefore the question of sending a comprehensive exhibit to the convention is worthy of very serious consideration, and we believe it will be well worth the trouble and cost to be fully represented at the convention, both in exhibits and salesmen. No doubt there will be opportunities for making sales of some of the apparatus exhibited. I dare not be too explicit for fear of disappointing, and I do not wish to make any definite promises. But on behalf of the Western railway men I can assure manufacturers that we will certainly do all in our power to save the exhibitors the expense of return freight on apparatus which is sent out to the convention largely for our instruction and benefit.

TRUSS-SUPPORTED TROLLEY BASES AT MOBILE

S. M. Coffin, master mechanic, Mobile Light & Railroad Company, has equipped the single-truck cars of that company with special bridges to support the trolley bases. Thus the roof of a car is not only protected from undue strains, but the noise within the car is minimized. The "trolley board" or truss on which the trolley base is mounted comprises two pieces of wood 2 in. x 6 in. in section at the center and sized to 1¼ in. x 6 in. at the ends. These pieces are trussed from end to end with two ⅝-in. rods. The wooden pieces are held about 4 in. apart by spacing blocks and are connected to the truss rods by two queen posts placed about 18 in. from the center. This combination of wood and steel trolley plank is in turn supported only at its ends, and therefore the load of the trolley base is entirely removed from the center of the car roof.

An iron saddle extending over the width of the monitor carries two rubber cushions supporting the trolley board. Two through bolts at each end securely fasten the trolley board to the roof, and the tightening of the nuts on these bolts compresses the rubber cushions so that the trolley board holds the trolley base securely in place. The cost of these trolley boards is small and the resulting saving in repairs to the roof is said to be quite marked.

GROSS RECEIPTS FOR 1908

The publication of "American Street Railway Investments," the Red Book for 1909, makes available the operating reports for 1908 of the principal electric railway companies in the country. These figures are given in the accompanying table. No attempt has been made in these statistics to indicate the trackage from which these earnings are secured, and in some cases a considerable difference exists between that in 1907 and 1908, owing to extensions and consolidations. The fiscal years of the companies also vary. That for the New York and Pennsylvania companies, as reported in the table, in most cases ends June 30, that of the Massachusetts companies on Sept. 30, and that of the Ohio companies on April 30. In the case of other companies the fiscal year is in general that ended Dec. 31.

The companies are graded according to gross receipts, but it should be understood that the list below does not give all of the companies in the country within the limits mentioned, simply those whose operating reports are made public. In some cases the company's report shows the gross receipts of all the subsidiary organizations; others give simply the receipts derived from securities owned. The latter companies are distinguished in the accompanying table by an (*) asterisk. Where holding companies have reports in both ways, both figures are given and the date. The meaning of the other emblems is explained at the foot of the second column on page 23.

COMPANIES HAVING GROSS RECEIPTS FOR 1908 OF OVER $1,000,000.

NAME OF COMPANY.	1907.	1908.
Interborough Rapid Transit Co., New York City	$23,179,635	$25,279,470
Brooklyn Rapid Transit Co., Brooklyn, N. Y.	19,936,753	20,548,390
Philadelphia Rapid Transit Co., Philaphia, Pa.	18,338,618	18,557,503
Stone & Webster Organization, Boston, Mass.	14,996,712	17,328,336
New York City Ry. Co., New York City	18,549,109	16,923,189
Philadelphia Co., Pittsburg, Pa.	19,332,306	16,829,156
Boston Elevated Ry Co., Boston, Mass	13,952,966	14,074,196
Chicago Railways Co., Chicago, Ill.	10,569,572	11,037,071
Public Service Railway Co., Newark, N. J.	10,582,857	10,989,970
United Railways Co. of St. Louis, St. Louis, Mo.	10,828,737	10,593,166
Pittsburg Railways Co., Pittsburg, Pa.		9,846,984
Long Island Railroad Co., L. I. City, N. Y.	10,130,407	9,818,544
Chicago City Ry. Co., Chicago, Ill.	[1]7,817,978	[2]9,195,783
Massachusetts Electric Cos., Boston, Mass.	7,758,511	7,809,010
California Gas & Electric Corp., San Francisco, Cal.	6,923,664	7,746,750
Detroit United Ry., Detroit, Mich.	7,133,751	7,179,717
Brooklyn Heights R. R. Co., Brooklyn, N. Y.	11,705,860	[3]7,101,313
Connecticut Co., New Haven, Conn.	7,994,903	6,961,436
United Railroads of San Francisco, Cal.	4,745,116	6,866,303
Brooklyn Union El. R. R. Co., Brooklyn, N. Y.		6,853,057
United Rys. & Electric Co., Baltimore, Md.	7,024,587	6,838,042
Twin City Rapid Transit Co., Minneapolis, Minn.	6,055,743	6,399,509
Kansas City Ry. & Lt. Co., Kansas City, Mo.	5,715,339	6,175,796
New Orleans Ry. & Lt. Co., New Orleans, La.	5,999,731	5,968,498
American Cities Ry. & Lt. Co.	5,437,796	5,434,495
International Ry. Co., Buffalo, N. Y.	5,445,070	5,226,983
Boston & Northern St. Ry. Co., Boston, Mass.	4,618,992	4,662,562
Seattle Electric Co., Seattle, Wash.	3,949,434	4,520,488
Cincinnati Traction Co., Cincinnati, O.	4,459,229	4,428,278
Portland Ry., Light & Pwr. Co., Portland, Ore.	4,050,145	4,351,676
Rhode Island Co. (The), Providence, R. I.	3,859,715	4,217,022
Illinois Traction Syst., Champaign, Ill.	$3,779,187	$4,098,621
Milwaukee Elec. Ry. & Lt. Co. (The), Milwaukee, Wis.	3,926,666	3,991,105
Montreal St. Ry. Co., Montreal, Que., Can.	3,558,745	3,749,443
Washington Ry. & Elec. Co., Washington, D. C.	3,385,749	3,720,573
Toronto Ry. Co., Toronto, Ont. Can.	3,511,198	3,610,273
Nassau Electric Railroad Co., Brooklyn, N. Y.	3,300,126	3,434,132
Georgia Railway & Electric Co., Atlanta, Ga.	3,309,341	3,339,021
Denver City Tramway Co., Denver, Col	[4]2,913,650	[4]3,152,567
Old Colony St. Ry. Co. Boston, Mass.	2,906,663	2,035,599
Oakland Traction Co., Oakland, Cal.	2,789,684	2,801,787
Louisville Ry. Co., Louisville, Ky.	2,668,146	2,758,555
Metropolitan West Side El. R. R. Co., Chicago	2,878,588	2,746,840
*American Light & Trac. Co., New York City	2,463,158	2,723,064
Indianapolis Traction & Terminal Co., Indianapolis, Ind.	2,683,826	2,673,436
Toledo Railways & Light Co., Toledo, O.	2,565,200	2,542,111
Washington Water Power Co., Spokane, Wash.	2,094,282	2,464,118
Northwestern Elev. R. R. Co., Chicago, Ill.	2,100,316	2,463,188
Ohio Electric Ry. Co. (The), Cincinnati, O.		2,463,164
Rochester Ry. Co., Rochester, N. Y.	2,395,273	2,453,632
Omaha & Council Bluffs Street Ry. Co., Omaha, Neb.	1,713,673	2,304,162
Columbus Ry. & Light Co., Columbus, O.	2,228,531	2,289,296
South Side Elevated R. R. Co., Chicago, Ill.	2,105,193	2,241,690
Third Ave. R. R. Co. (The), New York City		[5]2,231,303
Birmingham Ry., Light & Power Co., Birmingham, Ala.	2,220,999	2,167,546
United Traction Co., Albany, N. Y.	2,048,424	2,145,220
East St. Louis & Suburban Co., E. St. Louis, Ill.	2,157,443	2,009,514
Havana Elec. Ry. Co., Havana, Cuba.	1,889,685	2,002,108
British Columbia Elec. Ry. Co. (Ltd.), Vancouver, B. C.	914,157	1,979,319
Utah Light & Ry. Co., Salt Lake City, Utah		1,925,935
Indiana Union Traction Co., Anderson, Ind.	2,089,232	1,902,330
Northern Ohio Trac. & Light Co., Akron, O.	1,909,061	1,890,473
Capitol Traction Co., Washington, D. C.	1,786,508	1,855,974
Tri-City Ry. & Light Co. (The), Davenport, Ia.	1,782,356	1,819,077
Brooklyn, Queens County & Sub. R. R. Co., Brooklyn, N. Y.	1,618,905	1,789,980
Mahoning & Shenango Ry. & Light Co., Youngstown, O.	1,900,662	1,747,927
*North American Co. (The), New York City	1,610,965	1,723,186
Puget Sound Elec. Ry. Co., Tacoma, Wash.	1,664,281	1,694,973
Memphis Street Ry. Co., Memphis, Tenn.	1,604,385	1,627,648
Worcester Consolidated Street Ry. Co., Worcester, Mass.	1,641,265	1,626,143
Dominion Power & Transmission Co., Hamilton, Ont., Can.	1,461,757	1,600,312
Nashville Ry. & Light Co., Nashville, Tenn.	1,578,207	1,597,030
Union Railway Co., New York City.	1,583,656	1,590,156
Coney Island & Brooklyn R. R. Co., Brooklyn, N. Y.	1,621,615	1,562,061
*United Railways Investment Co., San Francisco, Cal.	1,560,864	1,558,789
West Penn. Railways Co., Pittsburg, Pa.	1,242,379	1,551,138
Milwaukee Light, Heat & Traction Co., Milwaukee, Wis.	1,172,278	1,471,477
Aurora, Elgin & Chicago R. R. Co., Chicago, Ill.	1,340,244	1,408,892
Fort Wayne & Wabash Valley Traction Co., Fort Wayne, Ind.	1,283,782	1,322,720
Springfield St. Ry. Co., Springfield, Mass.	1,306,729	1,317,871
Syracuse Rapid Transit Ry. Co., Syracuse, N. Y.	1,176,767	1,312,291
Chicago Consolidated Trac. Co., Chicago, Ill.		[6]1,235,307
Scranton Ry. Co., Scranton, Pa.	1,090,149	1,183,687

NAME OF COMPANY	1907	1908
Forty-second St., Manhattanville & St. Nicholas Ave. Ry. Co., New York City	$1,083,871	$1,171,463
Dallas Electric Corporation, Dallas, Tex.	1,125,673	1,160,967
Utica & Mohawk Valley Ry. Co., Utica, N. Y.	1,045,278	1,151,031
Spokane & Inland Emp. R. R. Co., Spokane, Wash	1,172,626	1,146,177
Manila Elec. R. R. & Ltg. Corp., Manila, P. I.	967,345	1,110,941
Galveston-Houston Elec. Co., Galveston, Tex		1,088,447
Lehigh Valley Transit Co., Allentown, Pa.	1,031,279	1,087,277
Northern Texas Trac. Co., Ft. Worth, Tex.	1,060,953	1,080,577
Wilkes-Barre & Wyoming Valley Traction Co., Wilkes-Barre, Pa	939,051	1,000,273

COMPANIES HAVING GROSS RECEIPTS FOR 1908 BETWEEN $1,000,000 AND $500,000.

NAME OF COMPANY.	1907.	1908.
New York & Queens County Ry. Co., Long Island City, N. Y.	$913,212	$944,856
Grand Rapids Ry. Co., Grand Rapids, Mich.	944,916	940,645
St. Joseph Ry., Light, Heat & Power Co., St. Joseph, Mo	870,286	909,965
Des Moines City Ry. Co., Des Moines, Ia.	779,058	906,747
Winnipeg Elec. Ry. Co., Winnipeg, Man., Can	863,990	903,184
San Francisco, Oakland & San Jose Consolidated Ry., Oakland, Cal	812,868	901,110
Springfield Ry. & Light Co., Springfield, Ill	863,728	893,342
Lake Shore Electric Ry. Co., Cleveland, O	938,161	892,269
Duluth Street Ry. Co., Duluth, Minn	846,084	890,295
Schenectady Ry. Co., Schenectady, N. Y.	1,068,741	887,021
Chicago & Oak Park El. R. R. Co., Chicago, Ill	892,569	869,892
United Traction Co., Reading, Pa	841,573	853,678
Fonda, Johnstown & Gloversville R. R. Co., Gloversville, N. Y	794,933	809,925
Portland R. R. Co., Portland, Me	759,891	782,519
Cleveland, Southwestern & Columbus Ry. Co., Cleveland, O	756,898	775,737
Conestoga Traction Co., Lancaster, Pa.	742,161	762,926
Charleston Consolidated Ry., Gas & Electric Co., Charleston, S. C	727,661	756,327
Houston Electric Co., Houston, Tex	681,724	732,171
Central Pennsylvania Traction Co., Harrisburg, Pa	737,220	715,264
*United Power & Transpt. Co., Philadelphia, Pa	840,119	688,285
Wheeling Traction Co., Wheeling, W. Va.		679,799
Little Rock Ry. & Elec. Co., Little Rock, Ark	642,011	670,897
Hudson Valley Ry. Co., Glens Falls, N. Y	618,614	639,300
Ottawa Elec. Ry. Co. (The), Ottawa, Ont., Can	574,278	616,229
Chicago, S. Bend & Northern Indiana Ry. Co., South Bend, Ind	604,163	612,538
Lexington & Interurban Rys. Co., Lexington, Ky	561,580	611,812
Pueblo & Suburban Traction & Ltg. Co., Pueblo, Col	601,795	608,642
Dry Dock, East Broadway & Battery R. R., New York City	627,979	599,174
Buffalo & Lake Erie Trac. Co., Buffalo, N. Y		583,718
City Ry. Co. (The), Dayton, O	562,840	575,789
Rockford & Interurban Ry. Co., Rockford, Ill	591,396	575,249
Michigan United Rys. Co., Jackson, Mich.	449,058	573,439
Knoxville Ry. & Lt. Co., Knoxville, Tenn.	605,777	572,271
New Jersey & Hudson River Ry. & Ferry Co. (The), Hackensack, N. J	508,179	564,338
Mobile Light & R. R. Co., Mobile, Ala	614,743	563,728
Eastern Pennsylvania Railways Co., Pottsville, Pa	506,335	562,386
Boston & Worcester St. Ry. Co., Boston, Mass	531,560	553,613
Tampa Electric Co., Tampa, Fla	521,181	552,574
Susquehanna Ry., Lt. & Pwr. Co., Lancaster, Pa		$551,479
*American Cities Ry. & Light Co., New York City	$527,123	547,897
El Paso Electric Co., El Paso, Tex	506,693	534,222
Trenton Street Ry. Co., Trenton, N. J.	528,325	528,463
Chattanooga Rys. Co. (The), Chattanooga, Tenn	536,861	525,741
Lackawanna & Wyoming Valley R. R. Co., Scranton, Pa	483,540	524,509
Savannah Electric Co., Savannah, Ga	602,399	505,819
Altoona & Logan Valley Elec. Ry. Co., Altoona, Pa	532,392	500,743

COMPANIES HAVING GROSS RECEIPTS FOR 1908 BETWEEN $500,000 AND $100,000.

NAME OF COMPANY.	1907.	1908.
*American Rys. Co. (The), Philadelphia, Pa	$527,063	$498,758
Ohio Valley Electric Ry. Co., Huntington, W. Va	410,741	493,748
Holyoke Street Ry. Co., Holyoke, Mass.	450,650	478,153
Richmond Traction Co., Richmond, Va.	454,713	475,512
Southwest Missouri R. R. Co. (The), Webb City, Mo	561,535	474,473
Union Street Ry. Co., New Bedford, Mass.	467,853	470,661
Johnstown Passenger Ry. Co., Johnstown, Pa	461,385	466,718
Manchester Traction, Light & Power Co., Manchester, N. H	455,337	464,211
Bangor Ry. & Electric Co., Bangor, Me.	412,434	451,913
Butte Electric Ry. Co., Butte, Mont	475,138	446,571
Western Ohio Ry. Co. (The), Lima, O.	444,846	441,791
Chicago & Joliet Electric Ry. Co., Joliet, Ill.	412,326	435,238
Jacksonville Electric Co., Jacksonville, Fla.	392,394	430,838
Columbia Electric Street Ry., Light & Power Co., Columbia, S. C	410,254	428,818
Halifax Elec. Tramway Co., Halifax, N. S., Can	405,452	424,618
Lincoln Traction Co., Lincoln, Neb	408,216	423,515
Fairmont & Clarksburg Traction Co., Fairmont, W. Va	389,972	416,882
Berkshire Street Ry. Co., Pittsfield, Mass.	409,286	406,150
Indianapolis & Northwestern Traction Co., Indianapolis, Ind		399,368
Richmond Light & R. R. Co., New Brighton, S. I., New York	335,008	395,145
Honolulu Rapid Transit & Land Co., Honolulu, Hawaii	374,610	389,927
Lewiston, Augusta & Waterville Street Ry. (The), Lewiston, Me	366,234	387,185
Auburn & Syracuse Elec. R. R. Co., Auburn, N. Y	354,346	377,372
Evansville & Southern Indiana Traction Co., Evansville, Ind	363,491	373,144
Newton Street Ry. Co., Newton, Mass	357,588	371,991
Springfield Ry. & Light Co., Springfield, Mo	378,046	367,639
East Liverpool Traction & Light Co. (The), East Liverpool, O	202,028	363,551
Whatcom County Ry. & Light Co., Bellingham, Wash	354,469	362,251
Columbus Electric Co., Columbus, Ga	340,574	358,497
Schuylkill Valley Traction Co., Norristown, Pa	360,822	357,555
Easton Consolidated Elec. Co., Easton, Pa.	376,341	356,615
Galveston Electric Co., Galveston, Tex.	369,168	356,275
Scioto Valley Traction Co., Columbus, O.	329,213	355,000
Atlantic Shore Line Ry., Sanford, Me	295,152	348,207
Indianapolis, Columbus & Southern Traction Co., Indianapolis, Ind	265,883	344,694
Washington, Alexandria & Mt. Vernon Ry. Co., Washington, D. C	325,969	344,370
Atlantic Coast Elec. Ry. Co., Asbury Park, N. J	305,465	343,055
Topeka Ry. Co. (The), Topeka, Kan	310,344	342,067
South Brooklyn Ry. Co., Brooklyn, N. Y.		341,156
Manchester Street Ry., Manchester, N. H	339,541	340,469
Ft. Smith Light & Traction Co., Ft. Smith, Ark	309,842	335,518
Toledo, Urban & Interurban Ry. Co., Toledo, O	331,076	331,312

NAME OF COMPANY	1907	1908
Kansas City-Western Ry., Kansas City, Kan.	$280,514	$330,651
Union Electric Co., Dubuque, Ia.	294,922	323,320
Columbus, Delaware & Marion Ry. Co., Columbus, O.	310,995	321,578
Rochester, Syracuse & Eeastern R. R. Co., Rochester, N. Y.		310,958
Binghamton Ry. Co., Binghamton, N. Y.	287,024	310,828
Cleveland, Painesville & Eastern R. R. Co., Cleveland, O.	296,318	295,811
Atlantic Shore Line Ry., Sanford, Me.	290,033	295,152
Western, N. Y. & Pennsylvania Traction Co., Olean, N. Y.	140,779	291,780
Oneida Ry. Co., Oneida, N. Y.	26,409	[7]290,253
New York & Long Island Traction Co. (The), Long Island City, N. Y.	242,526	280,756
Newport & Fall River St. Ry. Co., Newport, R. I.	257,067	280,687
Rochester & Eastern Rapid Ry. Co., Rochester, N. Y.	258,984	280,024
Phila. & West Chester Traction Co., Philadelphia, Pa.	259,248	280,017
Beaver Valley Traction Co. (The), Beaver Falls, Pa.	270,612	279,820
Montreal Park & Island Ry. Co., Montreal, Que., Can.	262,814	277,634
Fitchburg & Leominster Street Ry. Co., Fitchburg, Mass.	289,170	276,899
Chester Traction Co., Chester, Pa.	377,179	274,808
Wisconsin Traction, Light, Heat & Power Co., Appleton, Wis.	254,599	273,666
Helena Light & Railway Co., Helena, Mont.	268,774	270,674
Worcester & Southbridge Street Ry. Co., Worcester, Mass.	229,019	270,561
Niagara, St. Catharines & Toronto Ry. Co., St. Catharines, Ont., Can.	270,463	268,209
Albany & Hudson R. R. Co., Hudson, N. Y.	273,997	267,777
Louisville & Southern Indiana Traction Co., New Albany, Ind.	257,972	266,080
Houghton County Traction Co., Houghton, Mich.	249,919	265,575
Sea Beach Ry. Co., Brooklyn, N. Y.		265,313
Asheville Electric Co., Asheville, N. C.	269,185	264,362
Consolidated Rys., Lt. & Pwr. Co., Wilmington, N. C.	236,092	263,902
Chicago, Ottawa & Peoria Ry. Co., Ottawa, Ill		263,416
Eastern Ohio Traction Co., Cleveland, O.	244,360	259,172
Roanoke Ry. & Electric Co., Roanoke, Va.	192,603	258,528
Interurban Ry. & Terminal Co. (The), Cincinnati, O.	259,148	254,581
Elmira Water, Light & R. R. Co., Elmira, N. Y.	224,817	248,022
Cape Breton Elec. Co., Ltd., Sydney, N. S., Can.	250,065	247,545
Citizens Ry. & Light Co., Ft. Worth, Tex.		246,664
New York & Stamford Ry. Co., Port Chester, N. Y.	136,748	246,514
Rutland Ry., Light & Power Co., Rutland, Vt.	254,835	246,336
Quebec Ry., Lt. & Power Co., Quebec, Can.		[8]238,461
Toledo & Western R. R. Co. (The), Toledo, O.	239,233	236,538
London Street Ry. Co., London, Ont., Can.	232,377	235,032
Mansfield Ry., Light & Power Co., Mansfield, O.	189,906	234,456
Staten Island Midland Ry. Co., New Brighton, S. I., N. Y.	223,033	233,949
Joplin & Pittsburg Ry. Co., Joplin, Mo.	[9]179,227	[9]228,707
Paducah Traction & Light Co., Paducah, Ky.	237,513	226,614
Dayton & Troy Electric Ry. Co., Dayton, O.	213,139	225,057
Ottumwa Ry. & Light Co., Ottumwa, Ia.	208,177	222,534
Hudson & Manhattan R. R. Co., New York City		[10]222,415
Eastern Wisconsin Ry. & Light Co., Fond du Lac, Wis.	189,996	218,611
West India Electric Co., Ltd. (The), Kingston, Jamaica	198,845	217,410
Waterloo, Cedar Falls & Northern Ry. Co., Waterloo, Ia.	205,321	217,103
Pittsburg & Butler Street Ry. Co., Butler, Pa.	$ 36,684	$215,272
Stark Elec. R. R. Co., Alliance, O.	205,192	213,617
Dartmouth & Westport St. Ry. Co., New Bedford, Mass.	209,581	213,510
Citizens' Traction Co. (The), Oil City, Pa.	198,200	212,876
Interurban Ry. Co., Des Moines, Ia.	220,099	211,326
Fries Manufacturing & Power Co. (The), Winston-Salem, N. C.	229,201	209,587
Pensacola Electric Co., Pensacola, Fla.	228,150	209,183
Cincinnati & Hamilton Traction Co., Cincinnati, O.	186,460	207,074
Pittsfield Electric St. Ry. Co., Pittsfield, Mass.	203,530	206,941
Schuylkill Ry. Co., Girardville, Pa.	202,252	206,480
Valley Traction Co., Lemoyne, Pa.	206,475	221,936
Grays Harbor Ry. & Lt. Co., Aberdeen, Wash.	193,744	205,978
Long Island Electric Ry. Co., Jamaica, Long Island, N. Y.	200,182	205,010
Meridian Light & Ry. Co., Meridian, Miss.	208,278	202,657
Indianapolis & Cincinnati Traction Co., Indianapolis, Ind.	199,620	200,355
Kokomo, Marion & Western Traction Co., Kokomo, Ind.	188,269	199,209
Benton Harbor-St. Joe Ry. & Light Co. (The), Benton Harbor, Mich.	172,790	192,239
Wilkes-Barre & Hazleton Ry. Co., Hazleton, Pa.	170,998	191,951
Oneonta & Mohawk Valley R. R. Co., Oneonta, N. Y.	165,937	190,043
Lehigh Traction Co., Hazleton, Pa.	174,424	187,787
Steubenville & East Liverpool Ry. & Light Co., Steubenville, O.	184,115	185,495
Cedar Rapids & Marion City Ry. Co., Cedar Rapids, Ia.	170,904	185,028
Hartford & Springfield Street Ry. Co., Warehouse Pt., Conn.	178,092	184,612
Seattle, Renton & Southern Ry. Co., Seattle, Wash.	149,494	182,295
Connecticut Valley Street Ry. Co., Northampton, Mass.	180,018	182,180
Toledo & Indiana Ry. Co., Toledo, O.	161,227	178,261
Toledo, Pt. Clinton & Lakeside Ry. Co., Toledo, O.	109,172	176,267
Jamestown St. Ry. Co. (The), Jamestown, N. Y.	166,445	172,096
Northampton St. Ry. Co., Northampton, Mass.	174,487	171,440
Western Massachusetts Street Ry. Co., Westfield, Mass.	138,760	167,080
Railways Co., General, New York City.	171,019	167,071
Cincinnati, Georgetown & Portsmouth R. R. Co., Cincinnati, O.	153,616	164,493
Allentown & Reading Trac. Co., Allentown, Pa.	165,169	164,462
Pittsburg, McKeesport & Greensburg Ry. Co., Greensburg, Pa.	202,052	163,258
Orange County Traction Co., Newburgh, N. Y.	133,029	162,562
Sandwich, Windsor & Amherstburg Ry. Co., Windsor, Ont., Can.	135,517	159,959
Sheboygan Lt., Pwr. & Ry. Co., Sheboygan, Wis.	151,375	158,770
Interstate Consolidated Street Ry. Co., North Attleboro, Mass.	174,491	158,379
Camden & Trenton Ry., Trenton, N. J.	170,049	156,722
St. John Ry. Co. (The), St. John, N. B., Can.	140,230	156,654
Milford & Uxbridge St. Ry. Co., Milford, Mass.	178,871	156,308
Southern Wisconsin Ry. Co., Madison, Wis.	154,158	156,157
Chippewa Valley Ry., Light & Power Co. (The), Eau Claire, Wis.	138,475	156,069
Jersey Central Traction Co., Keyport, N. J.	125,943	154,080
North Carolina Public Service Co. (The), Greensboro, N. C.	[11]150,000	[11]153,913
Boston & Maine R. R. (Concord & Manchester Electric Branch), Concord, N. H.	154,772	152,863
Peoria Ry. Terminal Co., Peoria, Ill.	150,782	152,457
Lexington & Boston St. Ry. Co., Boston, Mass.	151,135	151,503
Green Bay Trac. Co., Green Bay, Wis.	143,052	148,538
Portsmouth St. R. R. & Lt. Co., Portsmouth, O.	137,257	147,768

NAME OF COMPANY	1907	1908
Muscatine Light & Trac. Co., Muscatine, Ia.	$142,293	$147,638
Austin Electric Ry. Co., Austin, Tex.	118,476	146,670
Allegheny Valley St. Ry. Co., Tarentum, Pa.	105,677	146,342
Fairmount Park Transportation Co., Philadelphia, Pa.	133,823	145,543
Southern Colorado Power & Ry. Co. (The), Trinidad, Col.	131,342	143,882
Lorain Street R. R. Co., Lorain, O.	177,804	143,381
Syracuse, Lake Shore & Northern R. R., Syracuse, N. Y.	136,345	143,291
Kingston Consolidated R. R. Co., Kingston, N. Y.	142,246	142,467
Williamsport Pass. Ry. Co., Williamsport, Pa.	137,358	141,157
Washington & Canonsburg Ry. Co., Pittsburg, Pa.	125,961	140,667
Louisville & Eastern R. R. Co., Louisville, Ky.	156,372	140,653
Cairo Electric & Traction Co., Cairo, Ill.		140,139
Vicksburg Traction Co., Vicksburg, Miss	114,116	139,072
Northern Electric Street Ry. Co. (The), Scranton, Pa.		138,823
Bridgeton & Millville Trac. Co. (The), Bridgeton, N. J.	141,793	138,637
Tarrytown, White Plains & Mamaroneck Ry. Co., White Plains, N. Y.	132,386	137,995
Iowa & Illinois Ry. Co., Clinton, Ia.	124,026	136,719
Carolina Power & Light Co., Raleigh, N. C.		136,357
Rockland, Thomaston & Camden St. Ry. Co., Rockland, Me.	133,432	135,177
Cincinnati, Lawrenceburg & Aurora Electric Street Ry. Co., Cincinnati, O.	150,300	134,845
Texas Traction Co., Dallas, Tex.		134,825
Poughkeepsie City & Wappingers Falls Electric Ry. Co., Poughkeepsie, N. Y.	124,650	131,679
Anniston Electric & Gas Co., Anniston, Ala.	146,399	131,100
Peekskill Lighting & R. R. Co., Peekskill, N. Y.	111,164	128,987
Athens Electric Ry. Co., Athens, Ga.	110,446	128,753
Clinton Street Ry. Co., Clinton, Ia.	122,000	128,000
Southern Ry. & Light Co., Natchez, Miss.		126,786
Evansville, Suburban & Newburg Ry. Co., Evansville, Ind.	118,508	126,036
West Chester St. Ry. Co., West Chester, Pa.	100,422	125,933
Chautauqua Traction Co., Jamestown, N. Y.	95,739	125,306
Ithaca Street Ry. Co., Ithaca, N. Y.	113,644	122,149
Haverhill & Amesbury St. Ry. Co., Haverhill, Mass.	121,823	121,552
Cedar Rapids & Iowa City Ry. & Light Co., Cedar Rapids, Ia.	107,717	121,529
Elec. Ry., Lt. & Ice Co. (The), Junction City, Kan.	93,738	121,177
New Bedford & Onset St. Ry. Co., New Bedford, Mass.	117,888	120,737
Brockton & Plymouth Street Ry. Co., Brockton, Mass.	121,749	119,862
Dayton & Xenia Transit Co., Dayton, O.	127,555	119,784
Washington, Arlington & Falls Church Ry. Co., Washington, D. C.	106,338	119,289
Elgin & Belvidere Electric Co., Chicago, Ill.		118,478
Danbury & Bethel St. Ry. Co., Danbury, Conn.	113,200	117,966
Syracuse & Suburban R. R. Co., Syracuse, N. Y.	107,473	117,752
Holmesburg, Tacony & Frankford Electric Ry. Co. (The) Philadelphia, Pa.	116,339	116,989
Astoria Electric Co., Astoria, Ore.	107,493	116,760
Toledo & Chicago Interurban Ry. Co., Kendallville, Ind.	102,592	116,028
Bristol & Plainville Tramway Co., Bristol, Conn.	110,641	114,614
Northampton Traction Co., Easton, Pa.	106,495	113,223
Ponce Electric Co., Ponce, P. R.	120,087	113,131
Atlanta Northern Ry. Co., Atlanta, Ga.		112,821
Pennsylvania & Ohio Ry. Co. (The), Ashtabula, O.	118,427	112,664
Union Traction Co. of Kansas, Independence, Kan.		112,076
Jefferson Traction Co., Punxsutawney, Pa.	57,022	111,212
Sydney & Glace Bay Ry. Co., Sydney, N. S., Can.	113,614	110,698
Delaware County & Philadelphia Electric Ry. Co., Philadelphia, Pa.	$110,867	$109,668
Galt, Preston & Hespeler St. Ry. Co., Galt, Ont., Can.	107,093	109,104
Pascagoula St. Ry. & Power Co., Scranton, Miss.	116,049	109,045
Power, Transit & Light Co., Bakersfield, Cal.		108,920
Denison & Sherman Ry. Co., Sherman, Texas		108,448
Dayton, Covington & Piqua Traction Co., Dayton, O.	112,740	107,587
Groton & Stonington St. Ry. Co., Groton, Conn.	104,073	107,077
New York City Interborough Ry. Co., New York City	62,466	106,935
Lebanon Valley Street Ry. Co., Lebanon, Pa.	109,510	106,211
Richmond & Petersburg Electric Ry. Co., Richmond, Va.	102,426	105,532
Burlington Traction Co., Burlington, Vt.	98,868	105,507
Cincinnati, Milford & Loveland Traction Co., Cincinnati, O.	91,337	105,145
Cincinnati & Columbus Trac. Co., Cincinnati, O.	95,492	105,070
Citizens' Electric Street Ry. Co., Newburyport, Mass.	108,383	104,313
Ocean Elec. Ry. Co., Rockaway, L. I., N. Y.	92,578	102,733
Steubenville & Wheeling Traction Co., Wheeling, W. Va.	73,114	102,225
Marion, Bluffton & Eastern Traction Co., Bluffton, Ind.		100,913
Rome Railway & Light Co., Rome, Ga.	92,695	100,635
Hudson, Pelham & Salem Street Ry. Co., Hudson, N. H.	98,272	100,109

COMPANIES HAVING GROSS RECEIPTS FOR 1908 BETWEEN $100,000 AND $50,000

NAME OF COMPANY.	1907.	1908.
Salisbury & Spencer Ry. Co., Salisbury, N. C.		$99,546
Warren Street Ry. Co., Warren, Pa.	$97,916	98,695
Philadelphia & Easton Elec. Ry. Co., Doylestown, Pa.	98,001	98,644
Natick & Cochituate St. Ry. Co., Natick, Mass.	100,078	97,862
Montreal Terminal Ry. Co. (The), Montreal, Que., Can.	95,526	97,354
Springfield, Troy & Piqua Ry. Co., Springfield, O.	98,660	97,294
Cortland County Traction Co., Cortland, N. Y.	77,298	97,197
Dover, Somersworth & Rochester St. Ry. Co., Dover, N. H.	95,993	96,454
Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Co., Geneva, N. Y.	97,148	95,979
Hudson River Traction Co., Rutherford, N. J.	92,616	95,487
New Jersey & Pennsylvania Traction Co., Trenton, N. J.	104,259	95,248
Fargo & Moorhead St. Ry. Co., Fargo, N. D.	85,000	95,000
Marshalltown Light, Power & Ry. Co., Marshalltown, Ia.	88,055	94,136
Muskogee Elec. Trac. Co., Muskogee, Okla.	72,365	94,118
Milford, Attleboro & Woonsocket Ry. Co., Milford, Mass.	105,470	93,901
Erie Traction Co., Erie, Pa.	83,538	93,893
Baton Rouge Electric Co., Baton Rouge, La.	80,054	93,257
Toledo, Fostoria & Findlay Electric Ry. Co., Toledo, O.	79,989	92,242
Blue Hill Street Ry Co., Canton, Mass.	85,228	91,085
Providence & Danielson Ry. Co., Providence, R. I.	92,061	91,023
Boise R. R. Co., Ltd., Boise, Idaho		90,000
Southwestern Traction Co., London, Ont., Can.		89,971
Butler Passenger Ry. Co., Butler, Pa.	92,420	89,626
Great Falls & Old Dominion R. R. Co., Great Falls, Va.	72,664	88,861
Middlesex & Boston St. Ry. Co., Natick, Mass.	89,876	88,481
Conneaut & Erie Trac. Co., Erie, Pa.	80,594	88,380
Monmouth County Elec. Co., Red Bank, N. J.	83,500	88,274

NAME OF COMPANY	1907	1908
Shamokin & Mt. Carmel Transit Co., Shamokin, Pa.	$77,294	$88,100
Port Arthur & Ft. William Electric Ry., Port Arthur, Ont., Can.	69,181	87,367
Sea View R. R. Co., Wakefield, R. I.	81,902	87,026
Danville Ry. & Elec. Co., Danville, Va.	77,315	87,007
Worcester & Blackstone Valley Street Ry. Co., Worcester, Mass.	85,348	86,906
Lawrence & Methuen Street Ry. Co., Lawrence, Mass.	79,473	86,236
Warren & Jamestown St. Ry. Co., Jamestown, N. Y.	84,135	86,114
Walla Walla Valley Traction Co., Walla Walla, Wash.		84,556
Lewistown & Reedsville Electric Ry. Co., Lewistown, Pa.	119,919	84,052
Bennington & North Adams St. Ry. Co., Hoosick Falls, N. Y.	48,360	83,962
Niagara Gorge R. R. Co., Niagara Falls, N. Y.	75,175	83,757
Tri-State Traction Co., Steubenville, O.		83,354
Black River Traction Co., Watertown, N. Y.	94,221	82,757
Southeastern Ohio Ry., Lt. & Pwr. Co. (The), Zanesville, O.	66,067	81,881
Philadelphia, Bristol & Trenton St. Ry. Co., Philadelphia, Pa.	76,705	81,502
Freeport Ry., Light & Power Co., Freeport, Ill.	81,833	81,212
Joliet & Southern Trac. Co., Joliet, Ill.	80,109	80,488
Youngstown & Southern Ry. Co., Youngstown, O.	29,543	79,891
Jackson Ry. & Light Co., Jackson, Tenn.	68,827	79,209
Ashland Light, Power & Street Ry. Co., Ashland, Wis.	25,972	78,849
Rochester & Suburban Ry. Co., Rochester, N. Y.	70,860	78,754
Maumee Valley Rys. & Light Co., Toledo, O.		76,212
Rock Island Southern R. R. Co., Monmouth, Ill.	69,931	76,191
Waverly, Sayre & Athens Traction Co., Waverly, N. Y.	77,303	76,127
Great Falls St. Ry., Great Falls, Mont.	62,467	75,911
Cambridge Power, Light & Traction Co. (The), Cambridge, O.	74,032	75,142
Cohoes Ry. Co., Cohoes, N. Y.	70,051	74,810
Columbia & Montour Electric Ry. Co., Bloomsburg, Pa.	80,724	74,565
Bristol Gas & Electric Co., Bristol, Tenn.	70,142	74,358
Hull Electric Co. (The), Aylmer, Que., Can.	101,905	74,311
Northern Illinois Light & Traction Co., Ottawa, Ill.	66,420	74,292
Sedalia Light & Trac. Co., Sedalia, Mo.		[12]74,122
Biddeford & Saco R. R. Co., Biddeford, Me.	67,582	73,496
Norfolk & Bristol St. Ry. Co., Norwood, Mass.	69,029	70,564
Galesburg & Kewanee Electric Ry. Co., Kewanee, Ill.	63,275	69,432
Shamokin & Edgewood Electric Ry. Co., Shamokin, Pa.	60,064	68,269
Manistee Light & Traction Co., Manistee, Mich.		67,570
Norwich & Westerly Ry. (The), Norwich, Conn.	[13]52,183	67,307
Portsmouth Electric Ry., Concord, N. H.	68,043	67,245
Fort Scott Gas & Elec. Co., Fort Scott, Kan.	67,612	66,700
Sterling, Dixon & Eastern Electric Ry. Co., Sterling, Ill.	57,628	66,498
Farmington St. Ry. Co., Hartford, Conn.	62,342	66,435
Coney Island & Gravesend Ry. Co., Brooklyn, N. Y.	54,387	65,994
Suburban R. R. Co., Chicago, Ill.	65,650	65,917
Newport & Providence Ry. Co., Newport, R. I.	64,179	65,339
Elmira & Seneca Lake Traction Co., Elmira, N. Y.	52,568	65,199
Springfield & Xenia Ry. Co. (The), Xenia, O.	63,979	64,446
Southern Boulevard R. R. Co., New York City	57,648	64,262
Hattiesburg Traction Co., Hattiesburg, Miss.		63,943
Buffalo Southern Ry. Co., Buffalo, N. Y.	58,940	63,786
Toledo, Ottawa Beach & Northern Ry. Co. (The), Toledo, O.		63,596
Wilkes-Barre, Dallas & Harvey's Lake Ry. Co., Wilkes-Barre, Pa.	$65,103	$63,506
Toronto & York Radial Ry. Co. (The), Toronto, Ont., Can.	58,964	63,412
Sandusky, Norwalk & Mansfield Elec. Ry. Co. (The), Norwalk, O.	47,473	62,877
Gardner, Westminster & Fitchburg St. Ry. Co., Gardner, Mass.	64,900	62,780
Tiffin, Fostoria & Eastern Electric Ry. Co., Tiffin, O.	52,812	[14]62,752
Northern Cambria Street Ry. Co., Patton, Pa.	55,602	62,649
Chillicothe Electric R. R., Light & Power Co., Chillicothe, O.	56,229	62,355
People's Street Ry. Co., Nanticoke, Pa.	58,569	62,240
Norton & Taunton St. Ry. Co., Norton, Mass.	57,104	62,031
Slate Belt Electric Street Ry. Co., Bangor, Pa.	59,431	61,906
Providence & Fall River Street Ry. Co., Swansea Centre, Mass.	62,057	61,667
Vincennes Traction & Light Co., Vincennes, Ind.	55,023	61,164
Walkill Transit Co. (The), Middletown, N. Y.	59,866	60,819
Youngstown & Ohio River R. R. Co., Youngstown, O.		60,796
Newton & Boston St. Ry., Newton, Mass.	74,005	60,652
Trenton & New Brunswick R. R. Co., Trenton, N. J.	56,689	59,637
Columbus, New Albany & Johnstown Trac. Co., Columbus, O.	52,582	59,499
Mason City & Clear Lake Ry. Co., Mason City, Ia.	50,387	59,441
Oshawa Ry. Co. (The), Oshawa, Ont., Can.	63,031	59,169
Mattoon City Ry. Co., Mattoon, Ill.	55,374	58,760
Ashtabula Rapid Transit Co., Ashtabula, O.	72,189	58,737
Oswego Traction Co., Oswego, N. Y.	56,466	57,810
Van Brunt St. & Erie Basin R. R. Co., Brooklyn, N. Y.	61,447	57,519
Concord, Maynard & Hudson Street Ry. Co., Maynard, Mass.	59,982	57,500
Ohio River Elec. Ry. & Power Co., Pomeroy, O.	58,121	57,210
Anderson Traction Co., Anderson, S. C.		57,023
Webster, Monessen, Belle Vernon & Fayette City St. Ry. Co., Monessen, Pa.	48,486	56,920
Burlington County Ry. Co., Mt. Holly, N. J.	55,045	56,307
Southwestern St. Ry. Co., Phila., Pa.	64,841	56,045
Levis County Ry., Levis, Que., Can.	56,987	55,700
Kittanning & Leechburg Rys. Co., Kittanning, Pa.	57,029	55,486
Phillipsburg Horse Car R. R. Co., Phillipsburg, N. J.	54,246	55,376
Chatham, Wallaceburg & Lake Erie Ry. Co., Chatham, Ont., Can.		55,002
West Chester, Kennett & Wilmington Ry. Co., Chester, Pa.	56,309	54,995
Warren, Brookfield & Spencer Street Ry. Co., Brookfield, Mass.	61,322	54,778
Charlottesville & Albemarle Ry. Co., Charlottsville, Va.	52,162	54,745
Corning & Painted Post Street Ry. Co., Corning, N. Y.	53,247	54,310
Lake Erie, Bowling Green & Napoleon Ry. Co., Bowling Green, O.	22,392	53,453
Oley Valley Ry. Co., Boyerstown, Pa.		53,089
Exeter, Hampton & Amesbury Street Ry. Co., Exeter, N. H.	52,214	52,963
Sarnia Street Ry. Co., Sarnia, Ont., Can.	37,609	52,436
Uxbridge & Blackstone Street Ry. Co., Co., Uxbridge, Mass.	29,692	52,305
Taunton & Pawtucket St. Ry. Co., Taunton, Mass.	52,925	51,452
Trenton, New Hope & Lambertsville St. Ry. Co., Yardly, Pa.	54,047	50,958
Haverhill & Southern New Hampshire Street Ry. Co., Haverhill, Mass.	46,925	50,614
Waterville & Fairfield Ry. & Light Co., Waterville, Me.	75,680	50,017

COMPANIES HAVING GROSS RECEIPTS FOR 1908 BETWEEN $50,000 AND $25,000.

NAME OF COMPANY.	1907.	1908.
Centre & Clearfield Street Ry. Co. (The), Phillipsburg, Pa.	$48,909	$49,731
Fishkill Electric Ry. Co., Fishkill-on-the-Hudson, N. Y.	51,182	49,710

NAME OF COMPANY	1907	1908
Paul Smith Electric Light, Power & R. R. Co., Paul Smith's, N. Y.	$47,329	$49,368
Titusville Electric Traction Co., Titusville, Pa.	44,431	49,031
Ft. Wayne & Springfield Ry. Co., Decatur, Ind.		48,498
Easton & Washington Traction Co., Washington, N. J.	52,546	48,476
Nahant & Lynn St. Ry. Co., Lynn, Mass.	47,325	48,247
Egerton Tramway Co., Ltd., Stellerton, N. S., Can.	46,466	47,229
Coal Belt Electric Ry. Co., Marion, Ill.	53,420	46,565
Pottstown & Reading Street Ry. Co., Pottstown, Pa.	47,583	46,518
Berlin Street Ry. Co. (The), Berlin, N. H.	44,512	45,806
Pittsburg & Allegheny Valley Ry. Co., Leechburg, Pa.	51,531	45,757
Athol & Orange Street Ry. Co., Athol, Mass	45,674	45,197
New London & East Lyme St. Ry. Co., New London, Conn.	43,756	45,170
Escanaba Electric Street Ry. Co., Escanaba, Mich.	47,043	44,398
St. Francois County Ry. Co., Farmington, Mo.		44,337
Lancaster Trac. & Pwr. Co. (The), Lancaster, O.	44,826	44,149
Owosso & Corunna Elec. Co., Owossa, Mich	42,000	44,000
Lowell & Fitchburg St. Ry. Co., Lowell, Mass	38,725	43,745
Hannibal Ry. & Electric Co., Hannibal, Mo.		43,458
Westmoreland County Ry. Co., Pittsburg, Pa.	46,997	42,870
Templeton St. Ry. Co., Templeton, Mass.	44,265	42,669
Hutchinson Interurban R. R. Co., Hutchinson, Kan.		42,358
Meadville & Cambridge Springs Street Ry. Co., Meadville, Pa.	40,924	41,911
Worcester & Holden St. Ry. Co., Holden, Mass.	43,722	41,854
People's Traction Co., Galesburg, Ill.	38,717	41,440
Chambersburg & Gettysburg Electric Ry. Co., Chambersburg, Pa.	41,636	40,961
East Taunton Street Ry. Co., Taunton, Mass	40,319	40,760
Manchester & Nashua Street Ry. Co., Manchester, N. H.		40,123
International Transit Co. (The), Sault Ste. Marie, Ont., Can.	43,744	40,019
Dubois Electric & Traction Co., DuBois, Pa.	39,773	39,407
Montgomery Traction Co., Norristown, Pa.	39,526	39,216
Toronto Suburban Street Ry. Co., Toronto Junction, Ont., Can.	36,257	39,010
Kankakee Electric Railway Co, Kankakee, Ill.	22,456	38,796
Port Jervis Electric Light, Power, Gas & R. R. Co., Port Jervis, N. Y.		38,478
Trans-St. Mary's Traction Co., Sault. Ste. Marie, Mich.		38,141
Buffalo & Williamsville Electric Ry. Co., Williamsville, N. Y.	36,603	37,977
Haverhill, Plaistow & Newton St. Ry. Co., Plaistow, N. H.	36,964	37,681
Portland & Brunswick Street Ry. Co., Brunswick, Me.	45,447	37,672
Sunbury & Northumberland Electric Ry. Co., Sunbury, Pa.	29,575	37,523
Vallamont Traction Co., Williamsport, Pa.	34,705	36,972
Grand Valley Ry. Co., Brantford, Ont.	41,064	36,947
Marlborough & Westborough St. Ry. Co., Westborough, Mass.	31,253	36,600
Berlin & Waterloo St. Ry. Co., Ltd., Berlin, Ont., Can.	36,571	36,215
Carbon Transit Co., Mauch Chunk, Pa.	32,520	35,783
Windsor, Essex & Lake Shore Rapid Ry. Co. (The), Kingsville, Ont., Can.		35,585
Millville Traction Co., Millville, N. J.	37,186	34,565
Sherbrooke St. Ry. Co., Sherbrooke, Ont., Can.	32,899	34,132
Chambersburg, Greencastle & Waynesboro Street Ry. Co., Waynesboro, Pa	53,428	33,924
Laconia Street Ry. Co., Laconia, N. H.	32,851	33,722
Troy & New England Ry. Co., Troy N. Y.	33,463	33,355
Brantford St. Ry. Co., Brantford, Ont, Can.	$31,294	$32,909
Ogdensburg Street Ry Co., Ogdensburg, N. Y.	33,509	32,880
Peterborough Radial Ry. Co., Peterborough, Ont., Can.	33,597	31,042
Citizens' Electric Co., Eureka Springs, Ark.	50,225	30,084
Claremont Ry. & Ltg. Co., Claremont, N. H.	51,998	[17]30,652
Paris Traction Co., Paris, Ill.		30,489
Waterville & Oakland St. Ry. Co., Waterville, Me.	32,338	30,364
Penn Yann, Keuka Park & Branchport Ry., Penn Yann, N. Y.	30,028	30,241
Homestead & Mifflin St. Ry. Co., Homestead, Pa.	30,300	30,151
Susquehanna Traction Co., Lock Haven, Pa.	30,416	30,010
Kingston, Portsmouth & Cataraqui Elec. Ry. Co., Kingston, Ont., Can.	30,693	29,712
Richmond & Chesapeake Bay Ry. Co., Richmond, Va.		29,706
DeKalb, Sycamore & Interurban Traction Co., DeKalb, Ill.	[15]44,195	[16]29,691
Bush Terminal R. R. Co., Brooklyn, N. Y.	33,798	29,545
Central Passenger Ry. Co., Atlantic City, N. J.	32,094	29,488
Eastern New York R. R. Co., Ballston Spa, N. Y.	45,109	29,479
Hornellsville & Canisteo Ry. Co. (The), Hornell, N .Y.	26,152	29,355
Chicago, Harvard & Geneva Lake Ry. Co., Walworth, Wis.	29,506	29,161
Sharon & Newcastle St. Ry. Co., Sharon, Pa.	30,838	29,030
Bangor & Portland Traction Co., Bangor Pa.	27,929	29,000
Blue Ridge Light, Power & Rys. Co., Staunton, Va.	28,578	28,547
Lewisburg, Milton & Watsontown Passenger Ry. Co., Milton, Pa.	28,151	28,546
Guelph Radial Ry. Co., Ltd., Guelph, Ont., Can.	28,304	28,304
Calais Street Ry. Co., Calais, Me.	28,466	28,293
Philadelphia & Chester Ry. Co., Chester, Pa.	30,445	28,267
Henderson Traction Co., Henderson, Ky.		28,103
Tama & Toledo Electric Ry. & Light Co., Toledo, Ia.		28,094
Ware & Brookfield Street Ry. Co., Ware, Mass.	25,673	27,502
Omaha, Lincoln & Beatrice Ry. Co., Lincoln, Neb.	26,612	26,956
Keene Electric Ry. Co., Keene, N. H.	28,077	26,694
Marcellus & Ostica Lake Ry. Co., Marcellus, N. Y.	23,597	26,557
Granite City Ry. Co., St. Cloud, Minn.	27,098	26,492
Dedham & Franklin Street Ry. Co., Dedham, Mass.	23,248	26,212
Cornwall Elec. Ry., Lt. & Pwr Co. (The), Cornwall, Ont., Can.	25,814	26,244
Jersey Shore Electric Street Ry. Co., Jersey Shore, Pa.	24,965	26,233
Hummellstown & Campbellstown Street Ry. Co., Hershey, Pa.	24,126	26,101
Latrobe Street Ry. Co., Latrobe, Pa.	27,415	26,074
Pawtucket Valley St. Ry. Co., Westerly, R. I.	35,927	25,979
Amesbury & Hampton Street Ry. Co., Amesbury, Mass.	26,187	25,964
Plattsburg Traction Co., Plattsburg, N. Y.	25,522	25,796
Danville & Bloomsburg Street Ry. Co., Grovania, Pa.	28,864	25,093

*Income derived from securities owned; [1]covers 11 months' operation; [2]covers 13 months' operation; [3]for Brooklyn Heights R. R. only; [4]consolidated report of the Denver & Northwestern Ry's properties; [5]Receiver's statement, June 12 to Sept. 30, 1908; [6]Receiver's statement, June 25 to Dec. 31, 1908; [7]1908 figure includes West Shore R. R.'s electrified division; [8]net earnings; [9]covers partly completed road only; [10]operation from Feb. 26 to June 30, 1908; [11]figures are for Greensboro Electric Co.; [12]covers only 7 months' operation; [13] operation from Nov. 12, 1906, to June 30, 1907; [14]covers 14 months' operation; [15]includes gas, light and heat returns; [16]does not include gas, light and heat returns; [17]1908 figures do not include lighting plant returns.

LATEST DEVELOPMENTS IN ELECTRIC RAILWAY APPARATUS*

BY C. D. EVELETH, GENERAL ELECTRIC COMPANY

Among the latest developments in interurban railroading the performance of the 1200-volt system stands out prominently. In many ways it has proved to be a remarkable advance in economy, both in first cost and cost of maintenance, while the perfection of the system as shown by operation is the most phenomenal of any radical change in methods as yet applied to electric railways.

Without exception the results with 1200 volts have been successful and the apparatus has given the manufacturing company no more trouble than do the standard 600-volt equipments after they leave the factory. This is remarkable when one considers the long experience and the successful operation of the present interurban 600-volt system. There are several fundamental reasons for the success with 1200 volts. It is different in few details from the standard 600-volt system and as there are no radical changes, experience on the 600-volt roads has been directly applicable. With the exception of the duty on circuit-breakers and control switches, the problem is purely one of insulation, a simple condition to meet.

The 1200-volt interurban railway system has been installed on the four roads named below. The statements regarding performance are based on experience, and some tests made to determine the performance of substation apparatus under abnormal conditions.

Indianapolis & Louisville.—Consists of a 41-mile section operated at 1200 volts and some foreign operation over 600-volt tracks in Louisville. Country ranges from slightly rolling at the northern end to a rather hilly section at the south. This road operates under representative interurban conditions.

Indianapolis, Columbus & Southern.—Principal operation, 600 volts direct current, but runs cars to Louisville over the tracks of the Indianapolis & Louisville Railway.

Pittsburgh, Harmony, Butler & Newcastle Railway.—There are 73 miles of single-track operated at 1200 volts and about 30 minutes of 600-volt city running in the city of Pittsburgh. The natural difficulties have forced the railway to adopt sharp curves and frequent grades of 3 to 6 per cent. Conditions of service unusually severe, as cars are either running with brakes on down-hill or accelerating up-hill most of the time. In Butler there is a 7.9 per cent grade at the end of a 13-mile stub-end trolley feed. Equipments which operate well on this line should give satisfaction anywhere.

Central California Traction Company.—Six hundred-volt operation in the city of Stockton. The rest of the system is operated at 1200 volts from a third-rail. Country, level; schedules, moderately severe.

OPERATION OF 1200-VOLT LINES

Maximum economy is obtained when the entire road can be operated from single direct-current station located at the center of distribution, doing away with all high-tension wires and substations; such is the case on the Indianapolis & Louisville line, where the stub-end feed is 21 miles one way and 20 miles the other way from the power house. As will be noted from the schedule speed performed and the level running speed of the car, the voltage must be reasonably good, better than on the average 600-volt interurban road. In this station each generating unit consists of two 300-kw, 600-volt machines connected in series. There has been absolutely no trouble with this generating outfit from an electrical standpoint and it is a matter of record that the power house in over a year has delivered power to the line continuously, except when ordered off by the train dispatcher or during momentary interruptions when feeder circuit-breaker has blown from overload. The switchboard is extremely simple, consisting of panels for the generators and two feeders. There has been no trouble of any description with the switchboard apparatus.

On the Central California Traction Company's line power is purchased at 60 cycles and changed to 1200-volt direct current through a motor-generator set, the direct-current generator being wound directly for 1200 volts. At first some trouble was experienced with the arc holding over in case of a bad short-circuit, but this has been entirely overcome by better protection of brush-holders.

On the Pittsburgh, Harmony, Butler & Newcastle line power is generated three-phase, 13,200 volts, 60 cycles, and transmitted directly to motor-generator substations without step-up or step-down transformers. Experience in this power house has been the same as for any 60-cycle power installation and requires no comment.

There are no special features in connection with transmission between power house and substations for 1200-volt work, but attention might be called to the fact that either 60-cycle or 25-cycle power may be used.

The existing substations are operated either with 1200-volt motor-generator sets, the direct-current machine being wound directly for 1200 volts, or motor-generator sets with two 600-volt machines connected in series. The preference and tendency at the present time is for two 600-volt commutators in series since the same set is frequently called upon to supply not only 1200 volts for the interurban running, but 600 volts for use in city service, the substation being located between the city and interurban sections. While there are not as yet any 1200-volt roads operating with rotary converters, this will probably be the most common form of substation on account of the higher efficiency. Tests under all conditions corresponding to operation, including short-circuits with various combinations of conditions, have shown that there is no reason to anticipate any more trouble with two 600-volt converters operating in series as a unit than there is with converters operating in parallel. It may be of interest to know that six sets, each consisting of two 750-kw rotary converters in series, have been sold to the Southern Pacific Railway Company for its Oakland-Alameda division; that 15 300-kw converters for series operation will be used on the Washington, Baltimore & Annapolis road, and that similar arrangements are contemplated for several other roads under construction.

	J. & L., 600,1200 Volts.	I., C. & S., 600,1200 Volts.	P., H., B. & N., 600,1200 Volts.	C. C. T., 1200 Volts.
Months in operation	21	12	12	14
Miles of track	41	41	73	16
Total number of passenger cars	10	3	12	4
Number required for time-table	5	2	8	3
Average daily car-miles operated	1,650	860	3,025	900
Miles per car per day	165	286	252	225
Miles per car in service	330	430	378	300
Stops per mile local service	.4	...	.5	.8
Schedule speed m.p.h.—locals*	27.8	...	22	21
Stops per mile limited	.12	.12	.1	...
Schedule speed m.p.h.—limited*	38.4	38	31	...
Speed level track with avge. voltage	42	42	45	43
Diameter car wheels, inches	33	33	36	33
Acceleration m.p.h.p.s.	1.76	1.76	1.6	...
Motors horse-power rating	75	75	75	75
Armature speed free running	940	940	932	970
Motors open or closed	Closed	Closed	Closed	Closed
Condition	Excellent	Excellent	Excellent	Excellent
Motor voltage	600	600	600	1,200

*Speeds given are for interurban section.

Motor-generator substations on the Pittsburgh line have been found no more difficult to operate than standard 600-volt converter stations, and the same class of substation operators have been employed at the wages customary for 600-volt substations.

OVERHEAD CONSTRUCTION

At Pittsburgh, Mr. Bryan and his associates have developed an especially interesting overhead construction which has proved admirable for the service on his road. On the other roads using overhead trolley standard 600-volt material has been used, generally by the addition of strain insulators in series with standard hangers to give double insulation. Such constructions have given no trouble and may be relied upon. On none of the roads has a case been known where service has been interrupted due to a trolley grounding, showing that the 1200-volt overhead system is as reliable as the 600 volts. It has been found in case of the failure of an insulator or a trolley becoming grounded to a bracket arm that the insulation of the pole itself is sufficient to prevent leakage which would interfere with service.

The Central California Traction Company uses an under-

*Abstract of a paper read before the Street Railway Association of the State of New York, Bluff Point, N. Y., June 29-30, 1909.

running third-rail very similar to that used in the New York Central terminal electrification. The rail is standard section, 40 lb. per yard and is supported on ties 12 ft. apart. The operation has been successful from the start, and the maintenance has been practically nothing up to the present time.

No difficulty has developed in working on either 1200-volt trolley or third-rail, and it has been found unnecessary to take off power when making repairs.

A typical weight distribution for a 1200-volt interurban car equipment is as follows:

Car body	30,000 lb.
Trucks	17,000 lb.
Electrical equipment	20,000 lb.
Heaters, brakes, etc.	3,000 lb.
Total tons	35

Seating capacity, 50 passengers, plus baggage compartment, or 60 passengers, without baggage compartment.

The control is series-parallel Type M, additional rupturing capacity of contactors being obtained by using more breaks in series.

Six hundred-volt power for operation of control and lighting circuits is obtained by a small direct-current compensator or dynamotor which operates automatically from the 1200-volt trolley. This machine has liberal bearings, transmits no power through its shaft, the armature running free like a rotary-converter armature, and is not giving the slightest trouble.

By the adoption of 1200 volts and winding the motors for 600 volts on each commutator, the problem of operating on both 1200-volt and 600-volt trolleys has been much simplified. Cars by using 1200-volt connections may be run on the 600-volt sections at half speed with good economy for city service, or at full speed with all motors in parallel where there are 600-volt interurban sections.

The control is giving entire satisfaction and the troubles from the start have been of a trivial nature, such as snow causing rheostats to ground, a few cases of grounded 1200 leads punctured by lightning, etc.

The trolley-wheel life is somewhat longer than with similar 600-volt service, averaging 5000 or 6000 miles.

MAINTENANCE OF ELECTRICAL EQUIPMENT

Up to the present time there has not been a failure of insulation requiring replacement of a single armature coil or field coil in any motor. One of the principal roads carries no motor repair parts of any description except armature and axle bearings.

With 600 volts on each motor, with two in series, it is evident that when a motor slips the car wheels it will be subjected to abnormal voltage and speed. In meeting this mechanical condition in the design it has been found that the low armature speed has practically eliminated armature-bearing trouble and in meeting the commutating requirement the performance of the motors in operation has shown them to be the most perfect commutating railway motors which have ever been built.

Brush life in a railway motor is the criterion of its performance, since commutation, commutator wear and exposure of windings to dirt, etc., are all dependent upon this item. The actual life of brushes on 600/1200 motors has not yet been determined as on no road have any brushes as yet worn out, though a few have been replaced on account of breakage.

Some sample brushes taken from a motor on the Pittsburgh, Harmony, Butler & Newcastle line, which operates under the most severe interurban conditions, have run approximately 70,000 miles and show 1/8 in. wear. Seven-eighths inches may be worn off before the brush need be thrown away. It is, therefore, safe to assume that the life in some cases may be over 200,000 miles.

No commutators have been reslotted and none has been reduced in diameter over 1/32 in. by wear.

SUMMARY

1. First Cost.

Generally decidedly lower than for 600 volts, as less copper is required and fewer substations.

2. Reliability.

In operation the equipments have in all cases proved as reliable as the best 600-volt equipments.

3. Maintenance.

Has proved as low, or lower, than for 600 volts, due to fewer substations, greater distribution efficiency and low motor armature speeds.

4. Safety.

There have been no fatalities from employees or the public coming in contact with trolley, third-rail or station apparatus.

5. Flexibility.

There are many places where the 1200-volt trolley can be applied to existing 600-volt systems; an extension of 10 to 15 miles on present lines can be made by the simple addition of a 600-volt converter insulated for 1200-volt operation and connected in series with the machines in existing 600-volt stations which will then feed the trolleys from both 600-volt and 1200-volt busbars. This makes a simple and economical arrangement without additional substation attendants.

The 600/1200-volt motors can be made in small or large sizes to suit all classes of service.

The success of the 1200-volt system is assured. It will probably be as common as 600 volts for interurban roads in a very few years. There are now either in operation or under contract eleven (11) 1200-volt railway systems equipped with 50-hp, 75-hp and 150-hp motors.

LATEST IMPROVEMENTS IN ELECTRIC RAILWAY APPARATUS*

BY J. L. DAVIS, WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

Two years ago in papers by Messrs. Renshaw and Hill before this association the advantages of the interpole construction for railway motors were set forth. Subsequent experience with several hundred thousand horse-power of these motors in service has more than substantiated the claims made for them. A brief resumé of these claims may be of interest.

The greater percentage of electrical troubles in a motor arise from the faulty collection of the current at the commutator, and they commence with the sparking, which burns away the copper and the brush, causing high mica, irregularity and roughness of surface, flashing, break-down of insulation from carbon and copper dust, and deterioration of brushes, brush-holders and commutators. In a non-interpole motor, sparking is due primarily to stray magnetic fields, produced by the magnetizing power of the armature winding. These fields are not useful in producing actual power at the axle, and are sources of trouble, as the coil connected to adjacent bars of the commutator, on which the brushes lie, cuts these stray fields and produces a voltage and a strong extra current under the brush which short-circuits the coil. As the brush leaves the commutator bar, the voltage and the extra current induced produce a spark. This spark is of a very destructive nature to both brush and commutator, and especially so if heavy overloads are put on the motor.

The interpoles are small poles placed between the main poles, and excited by coils placed permanently in series with the armature, and so connected as to oppose the effect of the armature winding. The field produced by the armature is thus neutralized and consequently all sparking is stopped. As the same current goes through both interpole and armature coils, the sparking is annulled at all loads within the operating range of the motor.

The ability of an interpole motor to commutate the current is remarkable. On a 65-hp motor, rated at 500 volts, and 100 amp a load of 300 amp at 750 volts can be momentarily carried without showing the least sparking. At any ordinary speed this voltage may be thrown on and off without producing a flash or serious spitting at the brushes. The interpole motor will establish its right to survive if for no other reason than its ability to withstand the abuse of the motorman.

Electric braking, owing to severe abuse of the motors in the past, has had a limited field of application, but with the advent of the interpole motor and the modern designs of traction brakes, this method of braking will become more popular.

* Abstract of a paper read before the Street Railway Association of the State of New York, Bluff Point, N. Y., June 29-30, 1909.

The interpole construction also offers the possibility of speed control, through weakening the field strength, and thus largely reducing the rheostatic losses in starting up. The gain of this economy in power consumption in city service is sufficient to justify the extra complication, and led once in the early days to the introduction of shunted-field motors. This type rapidly passed out of favor, due conjointly to the inability of the older types of motors to properly commutate the loads under these conditions and also to the introduction of the series-parallel control, which gave greater efficiency in acceleration.

In heavy elevated and subway service with frequent trains and stops, and where the motor power required is large, the use of the interpole motor offers a possibility of a material saving in power consumption, effecting very high economy not only in acceleration by shunted-field control, but also in braking by a system of regenerative control returning power into the line.

MAINTENANCE OF INTERPOLE MOTORS

After an experience covering a year and a half of operation, we find all claims for the interpole motor fully realized. On a large elevated system using 200-hp motor equipments, the commutators have maintained a very high degree of polish from the start, the wear on the commutators can hardly be detected, and the average life of brushes is found to be from 100,000 to 150,000 miles.

On another large system where motor flashes averaged at times 300 per month, and proved a most serious source of trouble and interruption to the service, the use of interpole motors entirely stopped the flashing from all causes. Records show inappreciable wear on the commutators, with a resulting brush life of over 100,000 miles. Motors are free from copper and carbon dust. Under these conditions electrical troubles have been practically eliminated.

The same good reports come from small motors in city service and indicate that the saving in the wear on commutators, brush-holders and brushes, together with increased reliability of service, will many times over pay for the extra cost of the interpole construction. Operating records show a brush life of 60,000 to 70,000 miles with the softer grades of carbon brushes.

The general troubles from commutation on the non-interpole motors have been enormously reduced by the expedient of slotting out the mica in the commutator below the surface and by the adoption of a softer brush with a larger graphite content and somewhat lower brush tension. Many operating companies which have been led to adopt this method are most enthusiastic over the results obtained. Operating records show that where 10,000 miles was a good mileage without slotting, the brush life runs from 20,000 to 30,000 miles with slotting, and the commutators do not have to be turned down more than one-third as often. Great improvements have been made in the quality and strength of carbon brushes. Operating engineers are finding out that there is economy in the use of a high-grade carbon brush.

SOLID FRAME MOTORS

The increasing use of larger cars with heavy motor equipments and the rapidly extending practice of retiring equipments for general overhauling at regular periods, are bringing the solid-frame motor more and more into general favor. Pit work in making repairs is being abandoned on these double-truck cars, and with an operating life of motor equipments of later design greatly overlapping the periods between overhauling, the less accessibility of the solid-frame motor for repairs has become much less of a factor than the sturdy mechanical advantages gained by the box-frame design. In the past year the three largest individual orders for purely city service motors have been for the box-frame type.

Of great importance in increasing the length of time between general overhaulings is the use of higher grade and longer life material in the pinions and gears. For a small additional cost the steel of the pinion can be put through special processes and treatments which will add to its life 33 to 50 per cent. The solid cast-steel gear is coming more and more into favor, and with the general introduction of the annealed and specially treated cast-steel gears, the principal objection to the use of solid gears should be overcome. The annealing of the casting toughens the fiber, makes it finer of grain, and at the same time eliminates shrink strains and other weaknesses.

On heavy equipments, where the design is limited, the material must be carefully selected for strength, wear and toughness. In such gears wrought-tire steel rims specially treated are shrunk on annealed cast-steel centers.

The improper meshing of gears and pinions from wear on them, and in the armature and axle bearings, is recognized as being the cause of rapid deterioration of the motor armatures under the excessive vibration, and means are taken to increase the life of the gearing and armatures by the use of higher-grade materials, the protection of bearings by proper dust shields and allowing less wear on the teeth.

An attempt to make the armature windings more compact and resistant to vibration as substantially as in the larger strap-wound armatures, has led to the introduction of the two-turn strap winding for the smaller armatures. This winding packs very solidly in the slot and on the ends. The straps are molded side by side around the whole coil, and there are no crossings of a single strap on another to offer edges, as in a wire-wound coil, to cut through the insulation in winding or to abrade through under vibration. This type of winding marks as distinct an improvement over wire windings as has been given by the substitution of flat strap windings in the field coils of smaller motors for wire windings. Interpole motors of recent design from 50 to 100 hp capacity are provided with windings of this two-turn, strap-wound type.

IMPROVEMENTS IN CONTROL APPARATUS

It is desirable to remove the possibility of arcing in the platform controller. The controller can be so arranged as to break the arc on a separate auxiliary contactor under the car. In a recent design this contactor is an electro-pneumatic switch, operated from a storage air tank and controlled by a valve magnet, energized through a high resistance from the trolley circuit. The storage air tank has a capacity sufficient to provide enough air pressure after standing several days to operate the switch. This system can only be applied on cars with air brakes.

The complications of the entirely automatic multiple-unit control become of less consequence the better the conditions of inspection and maintenance. For smaller city and interurban roads with less favorable conditions of supervision, the control can be greatly simplified by eliminating all automatic features and arranging it for direct operation at the will of the motorman.

ELECTRIC LOCOMOTIVES

While the connecting rod has been a long-established and favorite method of transmission with the steam-railway engineer, the electrical engineer has exploited to the greatest degree the advantages of a uniform torque produced by the motor and gearing. There is a general tendency toward two-motor equipments rather than four-motor equipments, on account of the lower first cost, higher efficiency, less weight and maintenance of the two-motor equipment. At the same time it is desirable to utilize the full tractive effort of all the wheels for acceleration and braking. A large city system, after experimenting with the side-rod method of drive, has recently placed in service a large number of equipments of this type.

While this device has been often proposed in the past for heavy high-speed locomotives, the development of the electric locomotive has been along the lines of the electric car with the motor on the axle. The dangers of having a heavy motor or armature pounding at the rails from a low position over the track were not fully realized until recently. The use of connecting rods enables the motor to be mounted up in the cab where it is easily accessible and provides a high center of gravity with as light and unrestricted running gear and wheels as possible—two essential requisites for heavy high-speed operation.

The Pennsylvania Railroad Company has adopted a design of this type for its powerful direct-current electric locomotives to be used in hauling trains through the tunnel into Manhattan. The motor equipment consists of two large motors, each individually connected to two 68-in. coupled drivers through an intermediate countershaft placed forward of the wheels.

SINGLE-PHASE SYSTEMS

No discussion of the improvements in railway apparatus during the last two years would be complete without some mention of the single-phase system. Although the system was well developed prior to this period and no essential changes have been made other than in details of construction, such as are continually being made in every class of apparatus, new roads have been installed and additional operating experience gained. Several of the earlier installations have been in operation for over four years and have thus reached a point where they may be reviewed from the standpoint of the accountant and the financier and the results relied upon.

The economies in first cost and the saving in power and substation attendance which can be effected in the case of interurban and other heavy electric railway lines by the use of the single-phase system can very readily be demonstrated conclusively by means of calculations or on a test track, but many conservative operators, educated to regard with suspicion any new system or device, have hesitated to consider the single-phase system until actual operating costs from existing lines could be obtained. Accurate figures of this kind for several different roads are now available and bear out to a remarkable degree the predictions made in advance by the promoters.

One of the single-phase lines referred to lies partly in New York State, and the figures given form a part of the records of the Public Service Commission. This line is the Warren & Jamestown Street Railway Company, which operates 22 miles of road between Warren, Pa., and Jamestown, N. Y. The road owns a total of six cars, each equipped with four 50-hp single-phase motors, with hand-operated controllers, and weighing complete, but without load, approximately 29 tons. The line was started during the summer of 1905, and during the year ending June 30, 1907, a total of 284,886 car-miles were run, which was increased during the year ending June 30, 1908, to 296,804. The accounts are kept upon the standard association basis and showed a total operating expense for 1907 of 14.8 cents and for 1908 of 13.9 cents per car-mile. These costs are remarkably low for a small interurban railway and would have been considerably greater had the direct-current system been used. From an engineering standpoint also the mileage record of the cars is a good one, the average per car per year being approximately 47,500 for the first year and 49,500 for the second. These figures give a good indication of the reliability of the apparatus, since with the speeds and service in force on this line such a mileage per car would be impossible if much time was spent in the shop.

The second single-phase line for which operating costs are available is that of the Indianapolis & Cincinnati Traction Company, which operates 24 cars over 108 miles of line between Indianapolis and Connersville and Indianapolis and Greensburg, Ind.

This line was the first single-phase railway in the world to be started on a large commercial scale, and now is operated under conditions of speed and mileage per car which eclipse all other records. The cars weigh approximately 50 tons complete, without load, and are equipped with four 100-hp motors with multiple-unit control.

Certain limited cars on the line make the run of 58.3 miles between Indianapolis and Connersville in 1½ hours, or at an average speed of approximately 39 miles per hour between terminals. About 30 minutes of this time is required, moreover, for covering about 6 miles in Indianapolis, Rushville and Connersville, so that a little over 52 miles is covered in the remaining hour.

During the year 1908 the entire number of cars of this road averaged nearly 65,000 miles each and eight of the cars averaged nearly 99,000 miles each.

COST OF SINGLE-PHASE OPERATION

The entire cost of operation for this road on the standard Street Railway Association basis was approximately 15.5 cents per car-mile for the year 1908, and that of maintaining the electric equipment of the cars approximately 0.72 cent.

The economies which have been effected in the operation of this road by the single-phase system are clearly indicated by comparing its cost of operation with that of several direct-current interurban lines also operating out of Indianapolis.

The following table gives comparative figures of total operating expenses (i. e., accounts Nos. 1 to 38, inclusive, of the American Street Railway Association classification) for the year ending Dec. 31, 1908, on a car-mile basis and also on a basis of the cost per mile of road:

	Miles of road.	Car-miles.	Op. exp. per mile of road.	Operating expenses per car-mile.
Terre Haute, Indianapolis & Eastern Traction Company:				
Danville Division	19.83	245,600	$2,525.18	20.5c
Martinsville Division	30.18	441,275	3,037.05	20.8c
Northwestern Division	91.99	1,280,260	2,383.86	17.1c
Indianapolis, Columbus & Southern Traction Company	62.22	1,054,766.16	3,282.65	19.36c
Indianapolis, Crawfordsville & Western Traction Company (year ending June 30, 1908, the car-mileage for 1908 not being at hand)	45.10	557,194.67	2,260.88	18.3c
Indianapolis & Cincinnati Traction Company	107.38	1,550,060	2,175.92	15.46c

It will be seen from these figures that in spite of the fact that the Indianapolis & Cincinnati Traction Company operates larger and heavier cars, equipped with more powerful motors and gives a considerably higher speed service, its costs of operation, both on a basis of car-miles and road-miles, were considerably less than those of its neighbors, which are typical high-grade roads under exceptionally capable management. Figures of this sort, which are now becoming available, have established the single-phase system on a basis where even the most conservative cannot hesitate to adopt it for roads where investigation shows that the conditions are suitable.

SCHOOLING OF TRAINMEN*

BY N. W. BOLEN, GENERAL SUPERINTENDENT, PUBLIC SERVICE RAILWAY COMPANY

All persons employed by railways in the transportation department as trainmen require sufficient training to be able to satisfactorily and safely perform their duties. After the employment superintendent has made his selections from the applicants presenting themselves, and after he has culled his selection again upon receiving the applicants' histories and letters from their indorsers, the so-called new men are ready for their training. The system followed generally by the street railways all over the country in their preliminary training of employees is fairly uniform, The embryo motorman is put on with an experienced man, who shows him the right way to handle the controller and brake, and after 10 days or two weeks the instructor reports that he has taught his student all the things which are necessary for him to know concerning the operation of a street car. Usually the student is then quizzed by a traffic officer, and upon his satisfactorily answering the various questions asked, his name is put upon the extra list and he is ready to go forth and either successfully pilot his car over the road or smash the first wagon which gets in the way.

The training of a conductor is similar to that accorded the student motorman, in that he is taught the duties by an experienced conductor in regular service. Usually there is little to be added to the instruction of a conductor beyond that which he obtains from actual practice in collecting and registering fares. The young conductor, unfortunately, usually learns many things from his brother conductors, and others, which are neither to his interest nor to that of his employer. The schooling of the motorman requires greater time and more careful supervision than is usually given him by the average superintendent of transportation.

PRELIMINARY TRAINING

A systematic education of trainmen should start with the date of their employment, and should continue until they withdraw from the service. The applicant for a position as motorman should receive his preliminary training in the use of brake and controller in a school room, and from a school teacher who should not only be an experienced

*Abstract of a paper read before the Street Railway Association of the State of New York, Bluff Point, N. Y., June 29-30, 1909.

trainman, but capable of imparting his knowledge, practical and theoretical, to the rawest recruit turned over to him for instruction. The student should then be placed on a car, preferably one equipped with hand brakes and operated on a side line, where, under the direction of an experienced motorman, he should be given practice in the actual operation of a car. After the student has become familiar with the operation of the hand brake and controller, he should be turned over to the motorman of a car operating on a heavy trunk line, where the service requirements are more severe, and air brakes are used. Upon the completion of his service under two or more motormen, and upon his having learned the routes and time points of lines in his division, and having received a certificate stating that fact, the student should be returned to the school room for examination. Upon passing this final examination he may be assigned to work as the transportation superintendent may direct.

Bearing in mind that in two weeks the student has grasped only the rudiments of his work, and that his various faults will rapidly develop when he is sent out alone on a car, then the real work of the instruction department begins. Certain employees, whether they be division superintendents, inspectors or instructors, should now begin their systematic work of following up the green motorman to ascertain his weak points and eradicate, if possible, his faults. This polishing process requires constant work and means daily hammering, with encouraging remarks interposed where they will do the most good. It is usually found that motormen who have been in the service for 15 years are as careless in some details as the rawest recruit. Old motormen have a proneness to overlook the notches on the controller, to misuse the air brake, to start the car before releasing the hand brakes, to take chances when passing wagons, and by at least a thousand and one things new men know nothing of, cause damage or expense. It is by following up and correcting these points that the school for trainmen can show its value. Lectures on the use and abuse of controllers, demonstrated with actual apparatus, together with a clear, practical statement about the equipment of power plants, "the reason why" for various operating rules, and also lectures on accidents resulting from careless operation, form the basis for continuous instruction work. As it is usually found that old trainmen, having once been forced to attend the school, come again voluntarily for further information, greater interest in their work is renewed, and frequently it is possible to note improvements in their methods. The effect, however, is not lasting unless the work is followed up by a constant day-by-day inspection, instruction and supervision. Below is given the method followed by the Public Service Railway Company, of New Jersey, in training motormen in the school of instruction, and also the instructions which are given to them by the chief instructor.

INSTRUCTION OF MOTORMEN

The student motormen, as previously stated, are employed by the superintendent of employment and assigned to the different car houses, where they are placed in charge of instructing motormen, who are the picked men in the service and who are allowed an extra compensation when instructing a student. A student is kept busy on the road from seven to 12 days, breaking in, on both hand and air-brake cars, and after all lines have been covered and the instructing motormen consider him competent, they sign his "breaking in card," which he receives at the time of his appointment. He is then sent to the school of instruction for examination, presenting his card to the chief instructor for identification. Three schools of instruction are maintained, one located at Camden, covering the men of the Southern Division; one in Newark, covering the Essex, Passaic and Central Divisions, and one at Jersey City, covering the Hudson Division. These schools of instruction are in charge of a chief instructor, who has two assistants, both practical men, who were formerly employed as motormen, promoted to road officers or inspectors, and then to assistant instructors, after receiving a thorough training by the chief instructor.

The schools of instruction are equipped with an exact duplicate of car platforms, on which are attached fender, arc headlight, controller, brake staff, fender trip and motorman's brake valve. In the center of the room is a trolley pole on a wire, with cables leading to an overhead circuit-breaker, fuse box and controller. On the floor is practically the equipment of a four-motor car, consisting of four dummy motors, upon each of which is a group of five lights—four white lights, representing the fields, and a center light, which is purple—representing the armature. Between motors Nos. 2 and 3 are three boxes of grid resistance on a frame represented by six red lights, all being wired to a K-6 controller as on a car. On the first position of the controller all lights on resistance and motors are lighted, and as the controller is notched lights on the resistance go out one at a time and lights on the motors become brighter, until the sixth position of the controller is reached, when all lights on resistance go out, which shows the running point of series when the current is going direct to the motors. When the controller is thrown to the seventh or first parallel position part of resistance (about two-thirds) is again picked up, when four red lights are shown on resistance, and as the controller is notched these lights go out one at a time for each position of the controller until the running point of parallel is reached, when the lights on the motors show very bright. For further illustration, diagrams showing how motors take current in series and parallel positions are exhibited on the walls. To fully complete the school for proper instruction, a full air-brake equipment and a truck with motor, pinion, gear and axle attached, have been installed. The terminals of the armature are uncovered to show where damage is done by failing to notch or recognize points on controller; also from starting and stopping car with a jerk, and to show how the current enters and leaves the armature with the reverse handle in different positions. A large horseshoe magnet with iron filings is used to give the student an idea of what causes an armature to revolve.

The student is started with what is called a "Students' Primer," which shows him, first, what is meant by a complete circuit, starting from the dynamo in the power house, how the current passes through the car, why it is necessary to have a complete circuit to operate anything electrical, what is meant by open circuit, short-circuit and ground; the proper names of the different equipment of a car so he can report intelligently any defects, avoiding any delay; standing position on platform and how to handle brake and controller; what to do before starting out of barn with car, etc. While going through the "Primer" with the student every move is illustrated by the machine, and students are requested to ask any questions on points which they do not thoroughly understand before taking up the oral examination, which consists of 100 questions, given below:

QUESTIONS FOR MOTORMEN

Q. Have you read your book of rules?
Q. Is ignorance of rules any excuse for violation of same?
Q. Name principal parts of car necessary for operation of same:
1. On top of car?
2. On platform?
3. Under car?
Q. Where are motors located?
Q. How many motors under car?
Q. What work does controller perform in operating car?
Q. When controller is turned on what causes car to start?
Q. In starting out with car, what is it necessary to do?
Q. What are series positions of controllers?
1. Four-motor car, K-6 controller?
2. Four-motor car, K-28 controller?
3. Four-motor car, K-14 controller?
4. Two-motor car, K-11 controller?
Q. Are all motors getting all current on running point in series? If 500 volts in overhead wire, how divided?
Q. What are multiple positions on controller?
1. Four-motor car, K-6 controller?
2. Four-motor car, K-28 controller?
3. Four-motor car, K-14 controller?
4. Two-motor car, K-11 controller?
Q. Are all motors getting all current in running position multiple?
Q. Course of current from trolley wheel to running rail?
Q. What are the positions of reverse handle?
Q. What are the running points on a K-6 controller?
What are the running points on a K-28 controller?
What are the running points on a K-14 controller?
What are the running points on a K-11 two-motor controller?
Q. Before attempting to fuse a car, cut out motors or touch any part of electrical equipment, what is it necessary to do?
Q. Where is the resistance located?
Q. What is the meaning of the word resistance?
Q. How many leads to your resistance?
Q. Why is it dangerous to run car on resistance points?
Q. Why is all resistance on first position of controller?
Q. How notch controller?
Q. Why is it necessary to recognize every point on controller?
Q. What happens when controller is operated too quickly?
Q. If it becomes necessary to decrease the speed of car, would you attempt to notch your controller backward, and how proceed?
Q. Would you leave car on street at any time without locking controller, taking reverse handle and setting hand brake?
Q. Would you attempt to use power with brake on, and what does it mean?

Q. Case controller is jammed, finger caught so it cannot be thrown to off position, how proceed?
Q. From which end of car do motors start to number?
1. On single-end car?
2. On double-end car?
Q. Where do you find motor switches?
Q. How are motors coupled on switches in controller?
1. Four-motor car?
2. Two-motor car?
Q. Would you attempt to reverse car except to avoid accident?
Q. Do motors generate on reverse four-motor cars without notching controller?
Q. Do they on two-motor cars, and what is it necessary to do?
Q. Where is overhead switch or circuit-breaker located on car, and how throw and reset?
Q. What is overhead switch or circuit-breaker placed on car for?
Q. Where is fuse box located.
Q. What would you do in case cable leading to overhead switch or fuse were burned out or disconnected?
Q. In case you had finger so badly burned that it could not be adjusted to make contact, which finger could be taken off and used to best advantage?
Q. What is fuse placed on car for?
Q. In fusing car would you use any but standard size wire furnished by company, and what does using a heavier wire mean?
Q. Is there any excuse for holding in or tying overhead switch, and what does it mean?
Q. What will cause overhead switch or fuse to blow?
Q. If you had a car which blew overhead or fused several successive times, what would you think was the cause, and how proceed?
Q. Why throw controller to off position going over circuit-breaker?
Q. Would you, in case power was off, attempt to notch controller to find out when power was turned on, and how proceed?
Q. Car failing to move, how locate trouble, starting from trolley pole? How were you instructed?
Q. How would you proceed to complete circuit on running rail in case of dirt on rail or off track?
Q. If cable was disconnected at base of trolley, how proceed?
Q. If car failed to start on first position controller, but started on second or third, where locate trouble, how proceed?
Q. In case fire in any part of electrical equipment, what would you use to put out same?
Q. How many points can you feed controller with one motor cut out on a two-motor car? With two motors cut out on a four-motor car?
Q. Should trolley leave wire, what would you do?
Q. What is result of dragging controller handle around when shutting off power?
Q. Where does trolley cable tap on to controller?
Q. How proceed down grade in case pole came off and brakes give out?
Q. How proceed up grade in case pole comes off and brakes give out?
Q. Would you allow car to coast or drift whenever possible? Give reason?
Q. As soon as you discover any defect in motor which you cannot remedy, what is it necessary to do?
Q. Electrical troubles as they develop, do they ever improve?
Q. When disabled car is being pushed or pulled by another car, in what position would you set reverse handle and overhead switch?
Q. What would you do in case you picked up loose wire in street and it caught in resistance or motor? How proceed?
Q. What would you do in case you found broken trolley wire? How proceed?
Q. Storage air—how charge?
Q. Where is pump switch located?
Q. Where is pump fuse located?
Q. If pump failed to start, where locate trouble?
Q. If you found air pressure going too high, what would you do?
Q. Follow course of air from reservoir to brake cylinder?
Q. How apply air to make ordinary service stop?
Q. How release?
Q. How apply air on down grade?
Q. How apply air on bad rail?
Q. Do you get better results with small application on bad rail?
Q. What is it necessary to do when you find car sliding?
Q. One bell means what?
Two bells mean what?
Three bells, car running?
Three bells, car standing?
Four bells, car running?
Four bells, car standing?
Q. Case of obstruction on overhead wire, how signal conductor to pull pole?
Q. Who may operate car while on line?
Q. Which side of street stop for passengers?
Q. Have you read bulletin relative to stopping on crosswalks, and what does it say?
Q. Who is to throw derailing switches, and would you look back before starting car?
Q. Car coming in opposite direction against facing point switch, would you attempt to move car until trucks of other car were clear of the point?
Q. Who is allowed to ride on the front platform?
Q. Would you attempt to make up excess amount lost time, and what does it mean?
Q. How proceed in case of lightning?
Q. Where is lightning arrester located on car, and what duty does it perform?
Q. How proceed in case water on track?
Q. Would you attempt, in case blockade, to move car right on top of leader, and what will happen if you attempt same?
Q. How many feet give leader in case of above?
Q. Under special work and around curves, what rate of speed run?
Q. Is it advisable to stop car in a curve except to avoid accident? Give reason.
Q. Is it necessary to make a full stop at all trolley and railroad intersections?
Q. What is rule for operating car in foggy weather?
Q. Why is it necessary to sign book at your respective car barns as to condition of car?
Q. Pulling car into car barn, what is it necessary to do before leaving same?
Q. What does red light being displayed mean?
Q. How proceed approaching all street intersections?
Q. How proceed passing standing car?
Q. How proceed following wagon going same direction as car on track? How close get to wagon?
Q. How proceed following car on independent line? How close approach?
Q. In case you hear fire engines approaching, how proceed?
Don't attempt to get ahead of your leader.
Don't see how close you can get to wagon without striking same.
Don't see how near you can stand car on end when making stops.
Don't see how many people you can throw down when starting car.

PUBLIC SERVICE RAILWAY COMPANY.

After the oral examination the student is requested to leave the room while different parts of the machine are crippled or cut out. For instance, the reverse handle is placed at rest and the overhead switch or circuit-breaker thrown off, fuse is taken out, cable disconnected, base trolley, lamp or resistance unscrewed, causing open circuit, field lead light unscrewed, causing open circuit in that motor, etc. The student is then called in to locate these defects. He is also allowed to handle the machine, is shown how to throw out the overhead circuit-breaker and reset same, how to cut out motors, how to fuse car, how to splice cable, the movements he would make in case he was coming down hill and brake and power were gone, the course air pursues from the compressor to the atmosphere, how to make an application of the brakes, how to release, how to make an application on bad rail, what to do when wheels slide, etc.

The subject of prevention of accidents is also taken up thoroughly. The company has certain rules for insuring safe operation of cars, which may be summarized as follows: Shut off controllers at all street intersections 30 ft. before reaching the corner. In passing a standing car ring the gong and have the car under such complete control that it can be stopped in 2 ft. Remain at least 200 ft. behind the next car ahead. Remain at least 20 ft. behind a wagon on the track going in the same direction.

Occasionally the instructing motormen are called to the school in the evening and suggestions are made by the chief instructor for their government in handling students. Printed slips are distributed to them from time to time, with suggestions like the following:

Take more interest in the student, showing and telling him all you know about a car; remember he is watching every move you make and is going to operate a car as he sees you do. If you take chances he will do the same, and his judgment of distance may not be as good perhaps as yours, and he may get in trouble, but encourage him if he lacks confidence.

1. Show him where all switches and fuses are located.
2. Tell him proper names of the equipment of a car, so he can report intelligently condition of a car.
3. Show him the necessity of notching a controller, notch for notch, giving time on first and second positions, so as not to throw any passengers. A car which is started smoothly makes the best time.
4. Show him how to take off controller cover and throw back deflector. Warn him against trying to adjust fingers.
5. Show him how to knock off overhead switch or circuit breaker and to reset same.
6. Show him how to drop and reset fender.
7. Show him how to adjust arc headlight.
8. Tell him of the necessity for making a thorough examination of his car before leaving car house, trying brakes and controller.

(*a*) In following a wagon going in same direction as car on or near the track, if you remain at least twenty (20) feet behind wagon he will do the same.

(*b*) If you throw off your power for street intersections, anticipating a wagon coming out across the street, he will do the same.

(*c*) If you have car under control passing standing car, *being able to stop in two feet*, he will do the same.

(*d*) If you remain three hundred (300) feet behind your leader when running faster than series point speed, he will do the same.

(*e*) The neat and tidy condition of the instructing motorman, also keeping car in clean condition, is very essential as an example for the new man.

9. Show him the necessity of recognizing every point on controller at all times, even after shutting off for section insulator or circuit breaker.
10. Show him the necessity of allowing his car to coast or drift at all times whenever possible, saving machines and power and danger to motors if power is used when going down hill.
11. Show him points on lines where rail is bad and crosswalks are not to be blocked by car.
12. Tell him why he must cut out motors the minute any defect shows.
13. Tell him the necessity for reporting any defect on the car, so the car may be kept in good condition.
14. Have him properly instructed in making out accident reports, and in rendering every assistance possible in securing witnesses to all accidents.

INSTRUCT HIM, ABOVE ALL, TO TAKE THE SAFE SIDE AT ALL TIMES. C. H. COE.

APPROVED
N. W. BOLEN, Supt. of Transportation.
APPROVED
R. E. DANFORTH, General Manager.

This school work occupies the last day of the student's breaking in, and if in the estimation of the chief instructor he is not then competent he is given an opportunity to break in for a few days longer, after which he again comes to the school for another examination, which is considered a final one. As a last test he is taken out with an assistant instructor on a car and given a trial run, and if found incompetent he is dropped as failing to qualify.

The student after leaving school is followed up for two or three days by the chief instructor or one of his assistants, and his movements carefully watched. If found

wanting in any way he is ordered to the school for further instruction.

Reports are received daily from inspectors of motormen who abuse the equipment or fail to follow out instructions. For first offense they are ordered to school when off duty, but on second offense are sent to the school with loss of time.

Student motormen who operate pay-as-you-enter cars are given an examination sheet regarding rules governing the operation of this type of car, which they are obliged to fill out, as follows:

QUESTIONS FOR MOTORMEN

The following questions apply to the operation of "pay-as-you-enter" cars.

1. Would you open front exit door before car had come to a full stop?
2. What exit door should be closed before starting car?
3. Is it necessary to keep front exit door closed at all times?
4. Would you allow any person to enter car through exit door?
5. On what signal would you stop car?
6. On what signal would you start car?
7. Under what conditions would it be necessary for you to call out "Front way out"?
8. Between what points are you allowed to use stools?
9. In case it becomes necessary for conductor to leave the car, how proceed?
10. Do you understand the operation of destination signs, and that it is necessary to examine same and see that they are set square?
11. When you receive four (4) bells from conductor, what does it mean?

(Signed).....

Approved

..... Name.

Instructor.

Approved

.....

Supervisor.

A conductor when employed by the superintendent of employment and assigned to a car house is given a "breaking-in card" and placed on a car with an instructing conductor, who permits him to do the actual work of collecting and registering fares under his direct supervision. After seven days if he finds the student able to do the work, he so certifies on the blank provided for that purpose. After the student works the various other lines of the division he is examined as to the rules, time points, etc., by a supervisory official, and his name is placed upon the working list. If the conductor is to work on a pay-as-you-enter line, his final examination is given by the chief instructor, who has the student try a written examination on the operation of pay-as-you-enter cars.

All further instructions received by the young conductor on the average railroad come to him in the form of admonition or reproof from an inspector and others whose duties require them to follow the operation of the car; and, beyond a few perfunctory warnings from the division superintendent, he is usually not given any attention so long as he properly collects and registers his fares.

TRAINING OF CONDUCTORS

An analysis of the accident statements of the average railway emphasizes the necessity for a more thorough schooling of the conductor. While collecting fares is an important duty of the conductor, it is by no means the only one, for in his keeping is the safey and comfort of the passengers. He must be conscious of the movements of all his passengers, and look after their safety when they do not do so themselves. He must be polite and courteous at all times, and it must be impressed upon his mind that he is the company's personal representative in dealing with the public, that upon him falls the burden of caring for the passengers and creating public opinion. The careless and heedless conductor in a day may undo the work of months, to say nothing of dissipating the profits of the corporation for a great length of time. The schooling, therefore, of the conductor should in a general way follow that above described for motormen. His work should be carefully scrutinized, he should be kept thoroughly alive to the rules and regulations, both in printed order and bulletins; he should receive regular and systematic instruction and advice concerning the improper operation of a car liable to result in an accident, and should be the subject of a daily, hourly and a continuous supervision.

Loyalty is the one trait necessary in the employee, and in these days is especially difficult to create and retain in the trainmen. Good discipline is the key to successful operation, and good discipline depends upon the willingness to do, on the part of the trainmen, as well as upon the methods followed in directing his work. Fair treatment, with a firm, kindly personal hand administering instruction and corrective reproof—equal or uniform treatment for all—the instant correction of evils and unfair acts from whatever source are prime necessities where loyalty is desired. Loyal employees obey the rules cheerfully, take an interest in their work and are amenable to kindly discipline.

ELECTRIC RAILWAY ACCOUNTING*

BY A. L. LINN, JR.

In presenting to the convention this paper, which is based upon six months' experience with all three schedules of the new classification, my first wish is to express my hearty appreciation of the co-operation and assistance of my associates in its preparation.

On Dec. 22, 1908, the commission issued an order to the effect that on and after Jan. 1, 1909, every electric railroad corporation and every street railroad corporation shall keep, "so far as the said accounts are pertinent to the facts and circumstances of the corporation," the accounts prescribed in Schedule A of the uniform system of accounts for street railroads thereto annexed, and that on July 1, 1909, Schedules B and C shall be adopted; corporations having gross earnings in excess of $500,000 annually to use the full detail of the classification, which contains, in Schedule A, 94 capital accounts; in Schedule B, 160 income accounts, with 17 subdivisions, 22 of these accounts for operating revenues, 6 for non-operating revenues; 110 with 6 subdivisions for operating expenses, 1 for taxes, with subdivisions for different classes, 1 with 7 subdivisions for non-operating revenue deductions, 10 with 4 subdivisions for income deductions and 10 for appropriations; in Schedule C, 9 accounts covering mileage and 1 account for car-hour statistics.

Corporations having gross earnings less than $500,000 and more than $100,000 per annum may use a condensed scheme, which contains, in Schedule A, 94 capital accounts; in Schedule B, 117 income accounts, 22 of which are for operating revenues, 6 for non-operating revenues, 67 with 6 subdivisions for operating expenses, 1 for taxes with subdivisions for different classes, 1 with 7 subdivisions for non-operating revenue deductions, 10 with 4 subdivisions for income deductions, and 10 for appropriations; in Schedule C, 9 accounts covering mileage and 1 account for car-hour statistics.

Corporations having gross earnings of less than $100,000 per annum may use a second condensed scheme, which contains, in Schedule A, 94 capital accounts; in Schedule B, 100 income accounts, of which 22 are for operating revenues, 6 for non-operating revenues, 50 with 6 subdivisions for operating expenses, 1 for taxes with subdivisions for different classes, 1 with 7 subdivisions for non-operating revenue deductions, 10 with 4 subdivisions for income deductions, and 10 for appropriations; in Schedule C, 9 accounts covering car-mileage and 1 account for car-hour statistics.

Where the accounts of both large and small companies are kept in the same office it has proved advisable that the accounts of all the companies be kept on the basis of the detailed scheme. The average electric railroad company required to keep its accounts in detail will find applicable approximately 111 of the accounts in Schedule B. It should be remembered that if the experience of accounting corporations with this classification shows opportunities for improvements, such improvements will receive the careful consideration of the commission and its representatives.

The classification adopted by the American Street & Interurban Railway Association and formerly used by the governing commission in this State provided 40 capital accounts and 63 income accounts, 12 of the latter for operating revenues, 4 for non-operating revenues, 38 for operating expenses, 8 for income deductions and 1 appropriation account, the corporations subdividing them for the purpose of furnishing the heads of various departments with detailed information as desired, the number of subdivisions varying to suit conditions and requirements. If it be desired to subdivide any of the accounts in the new

*Abstract of a paper read at the meeting of the Street Railway Association of the State of New York, Bluff Point, June 29 and 30, 1909.

CLASSIFICATION FOR CORPORATIONS HAVING GROSS REVENUES OVER $500,000

Public Service Comm'n Acc't No.	Account No.	
		Maintenance of Way and Structures
701	1	Superintendence of Way and Structures.
704	2	Ballast.
705	3	Ties.
706	4	Rails.
707	5	Rail Fastenings and Joints.
708	6	Special Work.
709	7	Underground Construction.
710	8	Roadway and Track Labor.
711	9	Paving.
712	10	Miscellaneous Roadway and Track Expenses.
713	11	Cleaning and Sanding Track.
714	12	Removal of Snow, Ice and Sand.
716	13	Repairs of Tunnels.
717	14	Repairs of Elevated Structures and Foundations.
718	15	Repairs of Bridges, Trestles and Culverts.
719	16	Repairs of Crossings, Fences and Signs.
720	17	Repairs of Signals and Interlocking Systems.
721	18	Telephone and Telegraph Repairs.
722	19	Other Miscellaneous Way Expenses.
S-522	20	Pole and Fixture Repairs.
S-523	21	Underground Conduit Repairs.
S-524	22	Transmission System Repairs.
S-527	23	Distribution System Repairs.
724	24	Miscellaneous Electric Line Expenses.
725	25	Repairs of Buildings and Structures.
726	26	Other Operations—Dr.
727	27	Joint Way and Structures—Dr.
728	28	Other Operations—Cr.
729	29	Joint Way and Structures—Cr.
730	30	Depreciation of Way and Structures.
		Maintenance of Equipment
741	31	Superintendence of Equipment.
S-508	32	Repairs of Furnaces, Boilers and Accessories.
S-509	33	Repairs of Steam Engines.
S-510	34	Repairs of Hydraulic Power Plant.
S-511	35	Repairs of Gas Power Equipment.
S-512	36	Repairs of Power Plant Electric Equipment.
S-513	37	Repairs of Miscellaneous Power Plant Equipment.
742G	38	Repairs of Cable Power Equipment.
S-528	39	Repairs of Sub station Equipment.
744	40	Repairs of Passenger and Combination Cars.
745	41	Repairs of Freight, Express and Mail Cars.
746	42	Repairs of Locomotives.
747	43	Repairs of Service Cars.
749	44	Repairs of Electric Equipment of Cars.
750	45	Repairs of Electric Equipment of Locomotives.
752	46	Repairs of Shop Machinery and Tools.
753	47	Shop Expenses
754	48	Repairs of Vehicles.
755	49	Other Miscellaneous Equipment Expenses.
756	50	Other Operations—Dr.
757	51	Maintaining Joint Equipment—Dr.
758	52	Other Operations—Cr.
759	53	Maintaining Joint Equipment—Cr.
760	54	Depreciation of Equipment.
		Traffic
771	55	Superintendence and Solicitation.
772	56	Advertising.
773	57	Parks and Other Attractions.
774	58	Miscellaneous Traffic Expenses.
		Conducting Transportation
781	59	Superintendence of Transportation.
		Power
S-501	60	Power Plant Labor. a–Power Plant. b–Boiler Room Labor. c–Producer Labor. d–Engine Labor. e–Electric Labor. f–Cable Power Plant Labor.
S-525	61	Sub-Station Labor.
S-502	62	Fuel for Power.
S-503	63	Water for Power.
S-504	64	Lubricants for Power.
S-505	65	Miscellaneous Power Plant Supplies and Expenses.
S-526	66	Sub-Station Supplies and Expenses.
785	67	Horse Power—Revenue Car Service.
786	68	Power Purchased.
787	69	Jointly Produced Power—Dr.
738	70	Power Exchanged—Balance.
789	71	Other Operations—Dr.
790	72	Other Operations—Cr.
791	73	Jointly Produced Power—Cr.
		Operation of Cars
802A	74	Passenger Motormen.
802B	75	Passenger Conductors.
802C	76	Horse Car Drivers.
802D	77	Other Passenger Trainmen.
803	78	Freight and Express Motormen and Trainmen.
805	79	Miscellaneous Car Service Employees.
806	80	Miscellaneous Car Service Expenses.
807	81	Station Employees.
808	82	Station Expenses.
809	83	Car House Employees.
810	84	Car House Expenses.
811	85	Operation of Signal and Interlocking Systems.
812	86	Operation of Telephone and Telegraph Systems.
813	87	Express and Freight Collections and Delivery.
814	88	Loss and Damage.
815	89	Other Transportation Expenses.
816	90	Joint Operation of Cars—Dr.
817	91	Joint Operation of Cars—Cr.
		General and Miscellaneous
S-831	92	Salaries and Expenses of General Officers.
S-832	93	Salaries and Expenses of General Office Clerks.
S-833	94	General Office Supplies and Expenses.
S-834	95	General Law Expenses.
S-835	96	Insurance.
S-836A	97	Relief Department Expenses.
S-836B	98	Pensions.
S-838	99	Miscellaneous General Expenses.
S-839	100	General Amortization.
S-840	101	Other Operations—Dr.
S-841	102	Joint General Expenses—Dr.
S-842	103	Other Operations—Cr.
S-843	104	Joint General Expense—Cr.
S-844A	105	Accidents and Damages.
S-844B	106	Law Expenses connected with Damages.
S-845	107	General Stationery and Printing.
S-847	108	Store Expenses.
S-848	109	Stable Expenses.
S-849	110	Undistributed Adjustments—Balance.

CLASSIFICATION FOR CORPORATIONS HAVING GROSS REVENUES LESS THAN $500,000 AND MORE THAN $100,000

Public Service Comm'n Acc't No.	Account No.		
			Maintenance of Way and Structures
701	1	1	Superintendence of Way and Structures.
703	2	2–10	Roadway and Track Repairs.
713	3	11	Cleaning and Sanding Track.
714	4	12	Removal of Snow, Ice and Sand.
715	5	13	Other Repairs of Way.
723	6	14–24	Repairs of Electric Power Line.
725	7	25	Repairs of Buildings and Structures.
726	8	26	Other Operations—Dr.
727	9	27	Joint Way and Structures—Dr.
728	10	28	Other Operations—Cr.
729	11	29	Joint Way and Structures—Cr.
730	12	30	Depreciation of Way and Structures.
			Maintenance of Equipment
741	13	31	Superintendence of Equipment.
743	14	32–38	Repairs of Power Plant Equipment.
S-528	15	39	Repairs of Sub-Station Equipment.
744	16	40–43	Repairs of Cars and Locomotives.
749	17	44–45	Repairs of Car and Locomotive Electric Equipment.
752	18	46–49	Miscellaneous Equipment Expenses.
757	19	50	Other Operations—Dr.
758	20	51	Maintaining Joint Equipment—Dr.
759	21	52	Other Operations—Cr.
760	22	53	Maintaining Joint Equipment—Cr.
761	23	54	Depreciation of Equipment.
			Traffic
770	24	55–58	Traffic Expenses.
			Conducting Transportation
781	25	59	Superintendence of Transportation.
			Power
S-501	26	60	Power Plant Labor. a–Power Plant. b–Boiler Room Labor. c–Producer Labor. d–Engine Labor. e–Electric Labor. f–Cable Power Plant Labor.
S-525	27	61	Sub-Station Labor.
S-502	28	62	Fuel for Power.
S-503	29	63	Water for Power.
S-504	30	64	Lubricants for Power.
S-505	31	65	Misc. Power Plant Supplies and Expenses.
S-526	32	66	Sub-Station Supplies and Expenses.
785C	33	67	Horse-power—Revenue Car Service.
786	34	68	Power Purchased.
787	35	69	Jointly Produced Power—Dr.
788	36	70	Power Exchanged—Balance.
789	37	71	Other Operations—Dr.
790	38	72	Other Operations—Cr.
791	39	73	Jointly Produced Power—Cr.
			Operation of Cars
802	40	74–77	Passenger Motormen, Conductors and Trainmen.
803	41	78–79	Freight and Express Motormen and Trainmen.
805	42	80	Misc. Car Service Employees and Expenses.
808	43	81–82	Station Employees and Expenses.
811	44	83–84	Car House Employees and Expenses.
814	45	85–86	Operation of Signal and Telephone Systems.
817	46	87	Express and Freight Collections and Delivery.
818	47	88	Loss and Damage.
819	48	89	Other Transportation Expenses.
820	49	90	Joint Operation of Cars—Dr.
821	50	91	Joint Operation of Cars—Cr.
			General and Miscellaneous
S-832	51	92–93	General Officers and General Office Clerks.
S-835	52	94	General Office Supplies and Expenses.
S-836	53	95	General Law Expenses.
S-837	54	96	Insurance.
S-838	..	97–98	Relief Department and Pensions.
S-839	55		
	56	99	Miscellaneous General Expenses.
S-842	57	100	General Amortization.
S-843	58	101	Other Operations—Dr.
S-844	59	102	Joint General Expenses—Dr.
S-845	60	103	Other Operations—Cr.
S-846	61	104	Joint General Expenses—Cr.
S-847A	62	105	Accidents and Damages.
S-847B	63	106	Law Expenses connected with Damages.
S-848	64	107	General Stationery and Printing.
S-850	65	108	Store Expenses.
S-851	66	109	Stable Expenses.
S-852	67	110	Undistributed Adjustments—Balance.

CLASSIFICATION FOR CORPORATIONS HAVING GROSS REVENUES LESS THAN $100,000

Public Service Comm'n Acc't No.	Account No.		
			Maintenance of Way and Structures
701	1	1	Superintendence of Way and Structures.
703	2	2–10	Roadway and Track Repairs.
C-713	3	11–12	Cleaning and Sanding Track and Removing Snow.
715	4		Other Repairs of Way.
723	5	13–24	Repairs of Electric Power Line.
725	6	25	Repairs of Buildings and Structures.
726	7	26	Other Operations—Dr.
727	8	27	Joint Way and Structures—Dr.
728	9	28	Other Operations—Cr.
729	10	29	Joint Way and Structures—Cr.
730	11	30	Depreciation of Way and Structures.
			Maintenance of Equipment
741	12	31	Superintendence of Equipment.
743	13	32–38	Repairs of Power Plant Equipment.
S-528	14	39	Repairs of Sub-Station Equipment.
744	15	40–43	Repairs of Cars and Locomotives.
749	16	44–45	Repairs of Car and Locomotive Equipment.
752	17	46–49	Miscellaneous Equipment Expenses.
757	18	50	Other Operations—Dr.
758	19	51	Maintaining Joint Equipment—Dr.
759	20	52	Other Operations—Cr.
760	21	53	Maintaining Joint Equipment—Cr.
761	22	54	Depreciation of Equipment.
			Traffic
770	23	55–58	Traffic Expenses.
			Conducting Transportation
781	24	59	Superintendence of Transportation.
			Power
S-501	25	60	Power Plant Labor. a–Power Plant. b–Boiler Room Labor. c–Producer Labor. d–Engine Labor. e–Electric Labor. f–Cable Power Plant Labor.
S-525	26	61	Sub-Station Labor.
S-502	27	62	Fuel for Power.
	28	63–67	Other Power Supplies and Expenses.
786	29	68	Power Purchased.
787	30	69	Jointly Produced Power—Dr.
788	31	70	Power Exchanged—Balance.
789	32	71	Other Operations—Dr.
790	33	72	Other Operations—Cr.
791	34	73	Jointly Produced Power—Cr.
			Operation of Cars
801	35	74–78	Conductors, Motormen and Other Trainmen.
805	36	79–89	Miscellaneous Transportation Expenses.
820	37	90	Joint Operation of Cars—Dr.
821	38	91	Joint Operation of Cars—Cr.
			General and Miscellaneous
831	39	92–95	General Administration.
S-838	40	96	Insurance.
S-839	41	97–98	Relief Department and Pensions, included in General Administration.
S-842	42	100	General Amortization.
S-843	43	101	Other Operations—Dr.
S-844	44	102	Joint General Expense—Dr.
S-845	45	103	Other Operations—Cr.
S-846	46	104	Joint General Expense—Cr.
S-847	47	105–106	Injuries to Persons and Property.
S-848	48	107	General Stationery and Printing.
S-850	49	108–109	Store and Stable Expenses.
S-852	50	110	Undistributed Adjustments—Balance.

classification, the same method may be pursued by first filing with the commission a statement showing the subdivisions proposed. It is not necessary, however, that these subdivisions appear in reports to the commission. For purposes of comparison, last year's income revenue and operating expense accounts may be reclassified on the basis of the new classification. A suggestion for a method of remembering operating expense accounts is shown in the accompanying table. Railway corporations operating electric lighting or gas departments will have to use in addition the accounts prescribed therefor.

The preparation of a uniform system of accounts necessitated that all known contingencies be provided for, and it will simplify matters greatly if each corporation will eliminate from consideration such accounts as are not pertinent to the facts and circumstances. A careful study and analysis of the classification will correct any impression that it will be expensive and burdensome, detailed accounts being necessary for the information and guidance of the corporations. The first cost of printing new blanks is not an important matter for small companies, as they may be typewritten.

The books and records of a corporation simply reflect its actions and transactions. For example, a contract between an accounting corporation, designated as company A, and another corporation, designated as company B, provides that B operate its cars over A's tracks. This means that A shall credit to rent of tracks and terminals such amount as may be received therefor, B charging the cost thereof to track and terminal privileges under the general heading of other rent deductions. If the contract provided that A operate the cars of B over A's tracks and receive the revenue therefrom, then A should charge the amount paid to B to rental of cars and credit the earnings therefrom to the proper account under revenue from transportation. The service rendered and the result obtained are absolutely the same in both instances, the method of treating the accounts being determined by the wording of the contract.

CAPITAL ACCOUNTS

The capital accounts are well defined in the new classification, and it should be borne in mind that it is not the intention of the commission to be technical. For example, the paragraph headed "First entries must enable identification," states that "throughout all capital accounts the first entry in respect of any particular thing shall describe it with such particularity as to enable its identification, and shall give it a distinguishing name, number, or other designation by which it shall thereafter be designated in every entry in any capital account which in any way concerns it." If cars of a certain type are purchased, the bill being explanatory and the record through the voucher, voucher record, journal and ledger clear, this will be ample means of identification to determine at any future time the actual and not the estimated cost of that portion of the property.

Discount upon securities—The ruling that discounts upon securities shall not be charged to capital accounts is one upon which there seems to be considerable difference of opinion. The Railroad Commission of Wisconsin, for example, permits the capitalization of discount on bonds and the expense incurred in connection with their issue, while this classification provides that such discounts be charged to unamortized debt discount and expense, that account to be credited and surplus debited with the amount at the option of the corporation, in whole or in part, either at the time of the sale of the securities or monthly or yearly pro rata, according to a rule uniformly applied during the term for which the securities were issued. When a premium is realized upon the sale of any particular class of stock, such premium shall be credited to the proper subaccount under premium on stock, and remain in such account as long as the stock is outstanding. This should not prevent the corporation from using the funds for any legal corporate purpose.

Withdrawals or retirements—When anything is withdrawn or retired from service, the actual cost, if known (estimated if not), shall be credited to the capital account in which it stood charged at the time of withdrawal. For example, the construction of a $20,000 bridge to take the place of a smaller bridge, the actual cost of which cannot now be determined, the original cost being estimated at $10,000, would necessitate the following entries: Debit account bridges, trestles and culverts, $20,000; the estimated cost of the structure replaced, namely, $10,000, to be credited to fixed capital, Dec. 31, 1908, and charged to the proper account under corporate surplus or deficit. This will leave the fixed capital account increased by $10,000, the difference between the estimated original cost of the old structure and the actual cost of the new. Assuming that the old structure had been in use 10 years, during one year of which the company had charged a proper proportionate amount to depreciation, crediting the same to accrued amortization of capital, the proportion of depreciation applicable to the year, namely, $1,000, would necessitate the following entry:

Accrued amortization of capital, debit	$1,000
Other deductions from surplus	9,000
Fixed capital, Dec. 31, 1909, credit	$10,000

MATERIAL AND SUPPLIES

Small companies may feel it burdensome to keep a material and supplies account in the prescribed form. If these companies will take an inventory each year, placing the amount of the same on the general books under the head of material and supplies, and each month thereafter charge to this account on their vouchers an amount approximately equivalent to one month's supply of material purchased, instead of charging the various construction or operating accounts direct, as heretofore, then by journal entry each month credit material and supplies and debit each construction or operating account with the entire amount assignable to it (assuming that approximately all has been consumed), adjusting any differences at the end of the fiscal year, they will have complied with the intent of the classification.

EXPRESS AND FREIGHT REVENUES AND EXPENSES

The accounts covering express and freight revenues and expenses may be gathered together and subdivided on a special form for the purpose of furnishing the management with a fairly accurate idea of the revenues and expenses of this portion of the company's business. Careful estimates should be made of the department's pro rata share of all accounts not directly affected, such as those for use of tracks, power consumed, etc.

DIVIDEND REVENUES

The monthly report of a corporation owning any considerable amount of securities will be distorted by crediting dividend revenues at the time of payment with amounts received on account of dividends. In the case of securities upon which there is a reasonable expectation of dividends, however, there is nothing to prevent an estimated accrual, carefully made, not upon the books of the company, but upon the operating reports, showing what the result would be if the pro rata share of the dividends on such securities were received monthly.

EXPENSE ACCOUNTS

The classification provides for certain expense accounts, which may be assembled as desired by the accounting corporation. When reporting to the commission, however, it will be necessary to assemble the accounts as in the form of report provided.

ACCIDENTS AND DAMAGES

The determination of the accounting corporation's probable liability on account of casualties has met with some opposition, the objections being to the labor involved and the difficulty of estimating such liability with exactness. The experience of actual application may in time produce fairly accurate results. The adoption of the method of estimating yearly in advance the probable amount necessary to be charged to operating expenses will not affect those expenses, whether the claims are settled promptly or not, except through the saving which may be effected by prompt settlements. When beginning the use of this method, careful estimates should be made of the liability for unsettled accident claims then outstanding, charging the same to surplus and crediting casualties and insurance reserve. A further estimate, based on past experience, should be made of the probable expenditure for the ensuing 12 months, a pro rata share of this amount to be charged

each month to operating expenses, preferably on some arbitrary basis, such as car-miles operated, car-hours operated, or per cent of gross earnings.

DEPRECIATION

Depreciation accounting is a method of conserving capital and maintaining assets intact by providing for renewal and replacement of wasting properties at the expense of revenue, a practice which has obtained to a considerable extent in the past under other designations. Assuming that electric railway corporations have not charged the proper amount of depreciation in the past, an examination of the sums expended in dividends would indicate not that they have suffered from a too generous distribution of profits, but that rates of fare have been too low. It may be contended that, through the issue from time to time of additional securities to provide funds for the renewal and replacement of wornout property which should have been provided out of earnings, interest charges have become burdensome to an extent which will not permit proper dividends to be paid. As a matter of fact, such increase in capitalization has been brought about not by depreciation, but by obsolescence occasioned by the phenomenal development of electrical science and changes made in methods of transportation to meet demands of the public which could not have been foreseen or otherwise provided for; and if it is the purpose of depreciation accounts to provide that the capitalization of a public service corporation shall represent its true value, the appreciation in the value of its assets should be considered in connection therewith. The public, however, is more interested in the efficiency of the service when rendered for a reasonable consideration than in the amount invested in the properties or the rate of return that the security holders may receive.

The difficulty of determining the point at which maintenance ceases and depreciation begins necessitates that each company ascertain as nearly as possible the amount required to take care of maintenance and depreciation not due to obsolescence of the various portions of its property. This amount may then be arbitrarily apportioned on the basis of a unit; for example, car-mileage. For the purpose of illustrating, assume that the estimated amount necessary to be provided to cover the maintenance and depreciation of equipment (as provided in the classification of operating expense accounts) is approximately 5 cents per car-mile per annum. Such being the case, in some particular month an amount equal to 3 cents per car-mile having been expended on account of maintenance, 2 cents per car-mile should then be charged to depreciation of equipment. The method or the amount, or both, may have to be changed from time to time, the amount of depreciation depending on local conditions, the type of property originally constructed, and the degree of maintenance, past and present. The amount of depreciation on different properties or different portions of the same property will vary, making it impracticable to lay down a rigid rule. The commission has left it to the corporations to determine to the best of their ability the amount to be charged to depreciation on their particular properties, and provided only that there shall be filed with them prior to its use the rule adopted. This can be changed at any time by filing the amended rule with the commission prior to its use.

The development of electric railways in the future more and more depends upon public confidence in street railway investments and public confidence more and more depends upon complete and accurate information as to the conditions upon which it is invited. It is possible for individuals to build and operate small electric railways, but such development must of necessity be on a comparatively small scale. It is only when the use of corporate methods and the creation of corporate securities is resorted to that larger enterprises can be developed and the demands of the public met. A corporation is merely a body of persons legally associated and empowered by the State to transact business as an individual might do. Under these circumstances it owes to the general public from which it has received its charter, and more particularly to that portion of the public which constitutes its security holders, such information concerning internal conditions and affairs as may be necessary effectually to safeguard the public interest. As the agency for the collection and dissemination of such information, the activities of public-service commissions should go far to replace the drastic examinations by special commissions and the resulting hasty legislation which in the past have had such an unsettling effect upon the financial world. A suspicion on the part of the public, possibly occasioned in part by the past attitude of public-service corporations toward regulation by government commissions, that facts essential to the safeguarding of public interest were being withheld is being gradually overcome largely through publicity. The purpose of the public in creating such commissions is not to work hardship upon corporations by assuming the functions of management to such an extent as to destroy the incentive to ambition resulting from the prospect or possibility of wealth or attainment to be achieved by energy and close application. Now that public-service corporations may feel that they are to receive fair and impartial treatment will they not be benefited by promptly and graciously furnishing government commissions with all the information desired? In this connection it is sufficiently suggestive to call attention to the salutary effect upon the market for securities resulting from scientific accounting conducted under such restrictions and conditions as constitute a virtual guarantee by law of the figures upon which the value of such securities is based.

WORK OF THE STATE TAX COMMISSION*

BY RALPH R. RUMERY, ENGINEER, NEW YORK STATE TAX COMMISSION

During the past two years I have had a very good opportunity to become familiar with the grievances of most of your companies, and when Mr. Fassett was kind enough to invite me to speak about the reports of traction companies to the State Tax Commission I was very glad to avail myself of the opportunity to tell you of a few of the troubles that the Tax Commission has in making the special franchise assessments. There is no feeling of hostility on the part of the Tax Commission as far as the public service companies are concerned. The commission wishes to avoid as much as possible the misunderstandings which seem bound to occur each year and which react sometimes to the disadvantage of the companies and at other times to the locality where the tax is collected. From year to year we have asked for more information, and have gone more into detail, but experience has shown us that this detailed information is necessary in order to deal justly with the companies concerned.

I want particularly to urge upon you the necessity of filing these reports as early as possible. We can appreciate the fact that with some of the larger companies it is a matter of some weeks to close the books for the year ending Dec. 31, but there is no reason why the supplemental sheets for description of the property and the various schedules should not be filled out by Dec. 31, so that the report may be in shape to forward to us as soon as the books are closed and the financial statement and classification of operating receipts and expenditures are made up. Between April 1 and the middle of May the board certifies tentatively over 8000 special franchise assessments, and you can easily understand how the work is hindered by companies not reporting.

There were several companies represented at the spring hearing this year who wished to protest against the assessment and file their annual report at the same time. These are the tactics which have forced the board to ask for the dismissal of writ of certiorari in certain cases where companies have not reported within the time allowed, which prevents the companies from obtaining the equalized reduction to which they would otherwise be entitled. There is a penalty for not reporting within the time allowed of $100 for the offense, $10 a day for each day that the report is refused, and the company is not entitled to review the assessments by certiorari proceedings.

In justice to you, gentlemen, I will say, however, that we have less trouble with the traction companies than with any other class of public service corporations. If you have any other than the formal objection to file at the

*Paper read before the Street Railway Association of the State of New York, Bluff Point, June 29, 1909.

hearing, it is very essential that the attorney representing the company should be familiar with the physical condition of the property or that some person who is familiar with the property should be at the hearing to answer questions concerning local conditions, as in many cases we are obliged to carry a higher tentative assessment than would be the case if the facts were set out clearly. It is not necessary to wait until the day set for the hearing, as you will always find one of the engineers of the board at the office, and we shall be glad to take up at any time any proposition which may seem to affect the value of the franchise and which might not be shown in your report. This coming year we are putting two new blank pages in the report for any statements which you may care to make about the property, and we want you to give us all the facts that may seem in your minds to affect the value of the franchise in any way.

I would suggest that the companies that operate amusement places or parks, for the sake of the increased traffic on the lines leading to the park, should state the amount of their investment or interest in the park, and should also give us the estimate of what per cent of their receipts they consider to be due to the travel to or from the park or amusement place. The profit or loss from the places themselves, where they are operated by the railroad company, can be shown in the schedules which provide for the classification of operating receipts and expenses.

There will also be a new page for a general description of property outside of streets and public places, as well as an estimate of its value. This information is necessary in order that we may know the total amount of property upon which the company is entitled to a return. The most common failing of the traction companies is the failure to furnish the information called for in Schedule H of our report, where you are asked to give the estimate of receipts from operation according to tax districts, and to subdivide these amounts into receipts "on private right of way" and receipts "on streets, highways and public places." We understand perfectly that it is a very difficult thing for you to do, but it has to be done in order that the total assessment may be properly proportioned among the tax districts, and it is infinitely easier for you to make the approximation with your thorough knowledge of local conditions than for us to try to estimate it in the office.

We often have reports where the source of amounts charged against reconstruction and new construction is not shown. If you sell securities to obtain money for betterments it should be shown as stock issued in the current year. If taken from reserve for improvements and extension or borrowed, it should show in the statement of liabilities, and if paid for out of earnings it should show under appropriations for extensions and improvements. At the bottom of the page for the financial report is a note, "distribution of expenditures for reconstruction and new construction." Several companies, when part of the expense of reconstruction has been charged to capital account, have shown that amount as against new construction. By "new construction" we mean additional mileage, or property, and in a case where we find an amount charged against new construction and no additional mileage or property is shown on the supplemental sheets, it necessitates a higher tentative assessment until the matter is explained.

I am speaking of reports to the Tax Commission only, for I think that where you replace with heavier construction or improved pavement, the difference in cost is a proper charge against capital account. By reconstruction we mean the replacement of wornout or useless material by new or fit material other than the small repairs which must be constantly made. You may have paid for your reconstruction partly from your appropriation for maintenance and partly from your reserve for betterments. We ask for this information, as it is one of the elements which aids us in determining to what extent the property is being kept up. Formerly the only details of operating expenses required were salaries, conducting transportation, maintenance of way and equipment, legal expenses, but the amounts charged against "other operating expenses" were so large that we were obliged to have the additional classification now required.

One of the greatest embarrassments that the commission has to contend with is the failure of the reporting companies to give the detailed information called for in the supplemental sheets. The length of tracks, the weight and type of rail, the ballast used, the kind of paving, the type of overhead construction and the length and size of cables and conductors. All these details are necessary in order that we may properly estimate the cost of reproduction. This year we have asked for the same classification of operating receipts and expenditures as required of all companies reporting to the Public Service Commission. There was some delay on that account last year, as I believe that the Public Service Commission did not decide upon its classification until after our reports were due.

In the supplemental sheets we ask for the value of property as new for the current year; also the depreciated value. By the "value, new 1909," as the new supplementals will read, we mean the cost of reproduction at the present time, and not the original cost of the property. There seems to be a wide difference of opinion regarding depreciation, some companies allowing no depreciation, and others depreciating down to what the property would bring if scrapped. We invariably allow for depreciation in estimating the value of the property, but try to keep between the two extremes.

One thing I must ask you to bear in mind, an assessing officer must assess, but if you will give us the information called for in the schedules and supplemental sheets, I hope the time may come when your only reason for filing complaints against the special franchise assessment will be to get the equalized reduction.

CONVENTION OF THE NEW YORK STATE STREET RAILWAY ASSOCIATION

The twenty-seventh annual convention of the Street Railway Association of the State of New York was held at the Hotel Champlain, Bluff Point, New York, June 29-30, 1909. It was originally planned to hold the convention at the Fort William Henry Hotel, Lake George, but as announced in last week's issue of this paper the Fort William Henry Hotel was destroyed by fire on the morning of June 24. Upon receipt of the news at Albany, President Fassett, of the association, notified such members of the executive committee of the association as could be reached by long-distance telephone, made arrangements to change the hotel reservations to the Hotel Champlain and informed the technical and associated daily press of the arrangements—all so promptly that the press was advised of the revised plan by 10 a. m. Within 12 hours after the discovery of the fire at Lake George printed notices of the change of location had been mailed to all railway companies and electric railway supply houses in New York State and to many in adjoining States. At a meeting of the executive committee, held at the Transportation Club, New York, at 5 p. m., on June 24, Mr. Fassett reported what he had done and received the thanks, in behalf of the association, of all those present, as well as compliments for his quick action and satisfactory decisions.

A number of delegates to the convention went to Bluff Point, by way of Lake George, to take the boat ride on that lake Monday, June 28, and saw the ruins of the Fort William Henry Hotel. Nothing is left but the foundation walls.

The change in location seemed to make no difference in the attendance, which was up to the standard of previous years.

SESSION OF JUNE 29

The morning session of June 29 was called to order at the Hotel Champlain by President Fassett at 10:30 a. m. After the usual roll call the secretary introduced W. L. Pattison, general counsel of the Plattsburg Traction Company, who referred briefly but in a very interesting way to

some of the historical incidents connected with points in the vicinity of the hotel. He concluded by welcoming the delegates to Plattsburg in the name of the company and of President Sanderson, and stated that transportation on the lines of the company during the convention would be afforded those who wore the badge of the association. The secretary then said that he had received letters of regret from Governor Hughes, Horace E. Andrews, August Belmont and some others to whom invitations to be present at the convention and banquet had been extended.

The secretary then read a letter from President Shaw, of the American Street & Interurban Railway Association, calling attention to the meeting of that association at Denver and urging all present to attend. Mr. Shaw also said that committees had been appointed to organize two special trains from New York to carry delegates and others who desired to go to the Denver convention. One of these trains would go to Denver by way of New Jersey and Pennsylvania, the other over the New York Central lines. The committee in charge of the latter train was C. Loomis Allen, chairman, James H. McGraw and John H. Pardee. This committee would make all necessary arrangements for the train, and those desiring to travel by it should notify some member of the committee.

The secretary then read a cordial invitation to the association from E. J. Cook, general manager Rochester Railway, to meet in Rochester in 1910. Mr. Cook's letter was accompanied by invitations from the Mayor of the city and the president of the Chamber of Commerce, urging the association to select Rochester next year and stating that a fine auditorium, recently erected, would be at the disposal of the association during the convention. Upon motion of Mr. Peck the letters were referred to the committee on next convention which should consider the invitation with the committee on nominations.

The president then read his annual address. It follows:

ADDRESS OF PRESIDENT

Owing to the disastrous fire which completely destroyed the Fort William Henry Hotel at Lake George last Thursday morning, it was necessary to decide quickly on another place to hold the twenty-seventh annual convention of this association. Your executive committee immediately took steps in the matter and concluded that, inasmuch as our twenty-fifth annual convention was held here so satisfactorily two years ago, the Hotel Champlain offered the only appropriate solution to the problem, and we hope that our action has met with your approval.

The financial depression of 1908 was the source of never-ceasing strife on the part of railroads generally throughout the country for their very existence. The receipts of trolley companies, however, suffered far less than those of the steam roads, for which we can thank the doing of principally a passenger business. With the dawning of the current year the business interests of the country, and particularly of our own State, have commenced to show a rapid recovery from the panic conditions, and I think it is safe to say that we are once more beginning another era of prosperity, and that with the perceptible reactionary sentiment in favor of progressive business advancement, we may all hope for a future that will permit the proper and logical development of public service industries, which the public is beginning to see is linked so closely with the very life of general prosperity.

The association during the recent legislative session rendered especial service to the member companies. Arrangements were made for complete information relative to all legislation, and an attorney employed, who was particularly familiar with legislative procedure, to make careful inspection of all legislation and to report on such as affected our interests, making such memoranda in connection with it as would bring out the points involved. Copies of his reports were sent out from the president's office almost daily to the various companies. It has been with much satisfaction that we have heard it freely remarked that the service rendered was of the utmost value to numerous companies, together with the assurance that this service, alone, has amply repaid the amount of the assessed dues. If this is a fact, it is particularly gratifying, as we were able to furnish it at a less expense to the association than has previously been done, which, no doubt, was owing to the fact that your president, being located in Albany, had readier facilities at his command. It is also to be understood that in addition to the detailed reports sent out, there was very careful attention given in Albany to the sundry adverse bills introduced, which we can assure you materially assisted in preventing the passage of a number of them. The one measure introduced during the session which vitally affected the street railways was the proposed amendment to the Public Utilities Act. As you are all familiar with this amendment through the reports sent out by the association, it is unnecessary for me to review it here; it suffices to say the bill did not reach the Governor's hands, a committee having been appointed, not only to investigate the need of the proposed amendment, but also to investigate the results obtained under the present act and to report to the next legislature.

During the preceding year the association held two very successful and well-attended quarterly meetings: one in Utica, Nov. 10, 1908, and one in Schenectady, March 24, 1909. The Utica meeting was called especially to discuss the subject of "Track Construction," and two very able papers were presented on questions pertaining to the matter, one by Chas. R. Clark, chief engineer, New York & North Shore Traction Company, entitled "Steel and Concrete Ties," and one by R. A. Dyer, Jr., general manager, Auburn & Syracuse Electric Railroad Company, entitled "Tee Rail in City Streets." At the Schenectady meeting the general subjects for discussion were "Transfers" and "Claims." The topics were capably introduced by C. Loomis Allen, vice-president and general manager, Syracuse Rapid Transit Railway Company, and Hubbell Robinson, attorney, Schenectady Railway Company, with their respective papers, "Transfers—Use and Abuse" and "Claims—Co-operation of Operating and Legal Departments." In addition to these subjects, the meeting received the reports of committees on the various subjects recommended by C. R. Barnes, electric railroad inspector, Public Service Commission, at our last annual convention, namely: "Use of Curtains in Car Vestibules," "Signaling Interurban Cars at Way Stations," and "Carrying Musical Instruments on Passenger Cars." As these reports were merely read and accepted at the Schenectady meeting, they have been placed, at the request of the Public Service Commission, on the program of this convention for final discussion and definite action by the association.

It is with sincere gratefulness that I wish to express my thanks to the various officers of the association, the executive committee, and the members of the several committees appointed during the past year, for their unceasing efforts in behalf of the association, as it was only through their assistance that it has been possible to render the benefits that have been given to the members.

In closing, I wish to earnestly request each attending delegate to make it his especial business to enter enthusiastically into the spirit of this convention. It is of the utmost importance that we all appear promptly at the hour set for the various sessions, remain during the entire time, and enter the discussions with vim and energy. The gentlemen who have prepared papers which will be presented for your consideration have devoted much careful labor in their preparation, and in justice to them and in order that we may derive the benefits for which we are assembled, I personally appeal to each of you to feel that the success of this convention depends absolutely on your individual contribution in the way of attendance and in entering into the various discussions.

REPORT OF EXECUTIVE COMMITTEE

The report of the executive committee was then read by the secretary. It stated that the number of active members of the association had been reduced by one, owing to the consolidation of the Rochester Railway and the Rochester & Eastern Rapid Railway Company into the New York State Railways Company. The number of associate members, which include street railway companies outside of New York State, had decreased by one. Of the allied members, which consist of the supply houses, five had resigned and ten had joined the association, so that the allied members now number nearly 100.

REPORT OF THE TREASURER

An abstract of the report of the treasurer follows:

Balance on hand	$3,978
Receipts	6,485
Total	$10,463
Disbursements	4,361
Balance on hand	$6,101

The report of the treasurer was received with applause.

Arthur L. Linn, Jr., general auditor, New York State Railways, then read a paper on "Electric Railway Accounting." An abstract of this paper is published on page 30 of this issue.

DISCUSSION ON MR. LINN'S PAPER

W. H. Davies, comptroller, Delaware & Hudson Company, said in opening the discussion that the first point to which he wished to refer was the subject of improvement in the system of accounts. Mr. Linn had stated that "it should be remembered that if the experience of accounting corporations with this classification shows opportunity for improvements, such improvements will receive the careful consideration of the commission and its representatives."

Of course, faults could easily be found in any new system that might be promulgated; and, no doubt, this system would not prove an exception, and therefore there was a field for the earnest endeavor and co-operation of this association in order that the best results might be obtained; this could be done by committees already in existence or by new committees specially created for the purpose.

The greatest latitude should be allowed by the authorities in which to work out these improvements; by this Mr. Davies meant that the electric railways should not be compelled to make their improvements along the lines of the present classification, which was patterned so much after the classification adopted for steam railroads.

No fault could be found with a uniform system of accounts where the character of the business was precisely the same; but in a great many particulars the street railway classification must of necessity differ from one designed for steam railways, and Mr. Davies felt that the commissions had gone too far in their efforts to make the two systems comparable.

In discussing the subject of reclassification, Mr. Davies said Mr. Linn had stated that, for the purpose of comparison, last year's income revenue and operating expense accounts may be reclassified on the basis of the new classification. Mr. Davies said that some corporations may find it advantageous, and certainly less burdensome, to reclassify the coming year's accounts on the basis of the old classification. This could be done without the slightest difficulty, for in the majority of cases it could be accomplished by simply grouping together some of the new accounts.

Referring to the identification of charges to capital account, Mr. Davies said it must be borne in mind that the first cost may not always be the cost to credit to capital when a replacement is made. For instance, a structure may originally cost, say, $3,000, and soon after may be improved by an addition which would bring the new value up to $3,100. The $100 must be taken into account in determining the credit to capital by a replacement. This went to show that not only must the original entries be clear and concise as to identification, but also all other entries subsequently made that would affect its cost, and it was necessary to have the last entry refer properly to the former entries which it supplemented. In the case of rolling stock it might be well to have an historical record concerning each item of equipment, which would set forth all these facts and refer to the original entries on the books.

The commission had ruled that discounts on securities issued shall not be capitalized under any circumstances. Those who favored this practice claimed that by issuing securities at a discount corporations were enabled to secure a lower interest rate, and therefore the discount should be periodically charged against income during the life of the security, which in effect increased the interest charge against income, but this premise was not strictly correct. Very few new corporations which had a credit to establish could float bonds at par, no matter what the rate of interest was, for the reason that as soon as a bond bearing a high rate of interest was put out, unfavorable attention was immediately attracted to the security back of the bond, and the result would be to defeat the object sought to be obtained. Mr. Davies, personally, was inclined to favor the claim that, in a majority of cases, discount on securities sold was a price paid to obtain money to construct the railway, just as much as the cost of the different materials used in construction; and, therefore, in such cases, at least, it should be considered a capital expenditure. At any rate, uniformity which was sought by this system of accounts would not obtain, for the reason that many new concerns would issue their securities to a construction company at par, instead of otherwise disposing of the securities and paying for the construction in cash.

Mr. Davies endorsed what Mr. Linn had said in respect to handling the material and supply account, and added that some little trouble may be occasioned by such a method, but it could be easily overcome. For instance: An interurban road might buy its ties all in one month and therefore would not want to charge them all out at one time. But in such cases there would be no objection to distributing such charges over a longer period, provided, however, the account was properly adjusted at the end of the year.

The system of accounts provided two methods for taking care of the wasting of capital:

First when anything was withdrawn or retired from service, the amount at which such thing stood charged in the capital account shall be credited to capital account at the time of withdrawal. Such a practice would provide for wear, tear and obsolescence which had not been taken care of through maintenance.

Second, depreciation accounts were also set up, to which estimated losses shall be charged. This account was very objectionable, Mr. Davies said, particularly from the fact that, if over-estimates were made, the profits were unduly diminished and, vice-versa, under-estimates resulted in an over-statement of the profits. It could readily be seen what an opportunity for juggling the accounts was encouraged thereby.

A suggestion was made by Mr. Davies that a question box for problems connected with the system of accounts be included in the programs for the quarterly meetings of the association.

W. C. Austin, auditor, Oneonta & Mohawk Valley Railway, asked the titles of the accounts to which depreciation had been charged.

A. J. Gies, auditor, United Traction Company of Albany, inquired the object of the total of seat car-miles, which is required by the schedule of traffic statistics.

Mr. Fassett called attention to the Committee on Classification of Accounts, consisting of Messrs. Linn, Davies and Beardsley, and said this committee had co-operated with the commission and would continue to do so.

R. M. Searle, general manager, Rochester Railway & Light Company, said that nine years ago the lighting interests found it necessary, in order to protect their securities, to set up depreciation accounts. It was determined at a meeting in New York City that it would be good practice to set aside 10 per cent of gross revenue. The United States Supreme Court had admitted the necessity for changes by

public service corporations of rates large enough to provide for unforeseen casualties. Real estate frequently was lessened in value. Applying the possibility of similar change to the railway it could be imagined that the installation of a new car would make necessary the removal of a bridge and no fund would exist to meet the expenditure required unless provision had been made for it in advance. With scientific acounting there was no reason why a buyer of securities in a public service corporation should not go to the commission and learn whether the property was well-managed and its accounts kept correctly. The commission had been saturated steadily with truths by the system of accounts. Three years ago the Rochester Railway & Light Company was glad to sell its bonds at 92; they were now 101¼ bid, none offered, on the Rochester Exchange.

As a security holder Mr. Searle appreciated the wiping out of the day of exploitation. That day was gone and officials of public utility corporations might as well recognize it and lift themselves where they belonged and draw the better salaries to which their work entitled them. By the decision in the case of the Longacre Company, which tried to set up in business in New York City as a competitive plant, and by that of the Buffalo, Rochester & Eastern Railroad, which sought to parallel the New York Central & Hudson River Railroad, the commissions had indicated their attitude. These decisions were due to the enormous amount of truthful data submitted by the companies to the commissions; when the commissions analyzed the figures they were able to do so intelligently. When the commission asked for information it should be given more than it asked.

Referring to Mr. Linn's conclusion that street railway fares had been too low, Mr. Searle said that the same assertion had been made for the lighting interests. If it had been argued all along that the companies had charged enough to meet the results of depreciation, they would now have funds, the properties would be more valuable and the officials would be drawing better salaries.

Capt. J. W. Hinkley, Jr., Poughkeepsie City & Wappingers Falls Electric Railway, asked about the treatment of the inquiries and damages reserve.

C. Loomis Allen, vice-president, Utica & Mohawk Valley Railway, asked what effect the estimates would have on the monthly and annual reports. Would the reports reflect facts or estimates? If the reports reflected only estimates did they not give the unscrupulous railway man and the unscrupulous banker a chance to do the very thing that the commission was trying to prevent?

Mr. Linn, replying to the foregoing questions, said that depreciation would be charged to maintenance of equipment and maintenance of way and structures. The object of seat car-miles was to show the commission the results, if it desired the information, on lines where cars of varying seating capacity had been used. All of the companies with which Mr. Linn was connected had charged for a number of years a certain amount to operating expenses each month to cover the estimated expense of injuries and damages The reports rendered under the new system were both facts and estimates. It was not possible to get at the facts without estimates. There was nothing in the law to prevent companies from making up reports for their own purposes from which allowances for depreciation were omitted. The heads of departments would need to know for their own information what the operating expenses had been independent of any allowance for depreciation.

Mr. Allen said that assuming that there were men who had had experience in electric railways since their inception, and had been guided by it, that experience could not guide them in the next 10 years. Development of the properties had been along lines that had never been known before.

Mr. Searle said that during the last 10 days he had endeavored to float securities on a property. He had been asked in every instance by the people with whom he talked, including one lady, about the allowance for depreciation. He had been taught as a child to save for a rainy day. It was possible to start a fund modestly and let it grow, and when a crash came, as it did come to everyone, the fund would help.

Mr. Allen said the question was as to the best method of providing for maintenance of the property. If a fund was set aside to take care of renewals or extraordinary maintenance the problem would be solved in that way rather than by provision for a theoretical depreciation.

Mr. Fassett said the action of the association had caused a modification of the original plan of the commission touching depreciation. He thought that the classification committee had a wide field for action and would recommend its continuance in order that it might keep in touch with the commission for another year.

The committee was thereupon continued, by vote of the association.

TRAINING OF EMPLOYEES

The first paper presented at the afternoon session was that of N. W. Bolen, superintendent of transportation, Public Service Railway, New Jersey. This paper will be found in abstract on page 27 of this issue.

At the conclusion of the reading of this paper George L. Radcliffe, general superintendent, Schenectady Railway Company, complimented the author upon the completeness with which he had covered the subject. He thought it very important that the education should be continuous. Knowledge acquired only by cramming at the start cannot be retained. The instructors also should be kept fresh. On a large system especially, they tend to get into a rut unless care is taken that this should not happen. Mr. Radcliffe called attention to the final paragraph of Mr. Bolen's paper in regard to fair treatment of the men. This is very important and should be begun in the employment department. The employment superintendent should be a capable man and familiar with human nature, particularly the nature of men who make good motormen and conductors. He should be able to impress them at the start with the fact that the company intends to treat them fairly and squarely, that this will continue to be the case as long as a man remains with the company and that the company will do all it can to make him a good motorman or a good conductor if he has the right material in him.

W. R. W. Griffin, general superintendent of transportation, Rochester Railway, said he understood that the paper referred entirely to the operation of city lines and he thought that in such service it was unnecessary to give a man much instruction in mechanical matters. With cars running on a 2 minute schedule it would be impossible for a motorman to do anything effectual in the repair of a car on the road. What the superintendent of transportation wanted was for the car to get out of the way. The most important things to teach the city employee were the questions of operation and of safety. He asked whether the inspectors on the Public Service Railway report good work on the part of the men as well as bad work. He thought the positive records as valuable as those of a negative character.

Mr. Bolen said both kinds of reports were turned in by the inspectors.

W. C. Callaghan, superintendent of city lines, Rochester Railway, was opposed to giving the motormen being taught too much instruction about mechanical matters. He also criticised the term "hammer," used in the paper. He also thought that a man should be given more than two times to qualify. The best men, he said, often take the longest to make good. In Rochester reports of good as well as bad actions are turned in. It is also the practice there, after a new man has been out two weeks, to bring him in and have the inspector or instructor talk over with him the troubles he has had.

R. E. Danforth, general manager, Public Service Railway, explained that the word hammer, used in the paper, did not mean to "knock" but was intended to convey the idea of constant effort. One can hammer up as well as hammer down. If good results are to be secured all must be encouraged to do their best. Unlimited praise is not effective. There must be constant instruction and suggestion. The men above the trainmen need this more, as a rule, than the trainmen, to avoid getting in a rut. He thought that the criticisms upon the amount of mechanical instruction given the men were based upon a misapprehension. This instruction was all covered by what could be taught in one or two hours, and that given had proved very useful. He had known of men on other roads who could not take out a brush, or open a circuit breaker, and who knew nothing of what was behind the controller. They had simply been taught to turn a handle and that was all. He thought the plan of bringing the men in at the end of two weeks an excellent idea, which if possible should be followed out. Frequent meetings of all departments are desirable to keep up the constant efficiency which he advocated. The general manager can key up the department heads by reminding them of the things they may have forgotten. The superintendent of transportation can meet frequently with and talk to the inspectors and so on down the line. The work of the instruction of trainmen begins with the instruction of the inspectors. Too many inspectors cannot see anything unless it hits them. His suggestion of corps efficiency, based upon checking up the work of each department by the heads of those departments and of the department heads by the general manger did not mean one man responsibility. Each individual on the road had his duty to perform, but in the last analysis the conduct of a large transportation system depends largely upon one man. If he is lax, all become careless.

W. J. Harvie, chief engineer, Utica & Mohawk Valley Railway, referred to the importance of instruction of the men in mechanical matters. He said that in Syracuse an instruction car had recently been fitted up and the older men on the system manifested a great interest in it and were anxious to take the course which it afforded. Another matter to be taught was the cost to the company of injury to its property. Too many trainmen have the most hazy ideas of the expense caused by an accident to their car or its equipment. Another point was to have the instruction given in the instruction room duplicate as nearly as possible actual operating conditions. He believed that the mechanical side of instruction to be subordinate in importance to the operating side, but both are necessary. In fact, it is practically impossible to teach intelligent men what to do in cases of emergency without telling them something about the "why and wherefore" of what they are being taught. He then asked Mr. Bolen if his rules required the men to test the controller, air and sand box before taking a car out.

Mr. Bolen replied that that was the case with the controller and air, but not with the sand box, as the Public Service Railway Company was now using sand cars instead of sand boxes.

John Cain, superintendent, Buffalo, Lockport & Rochester Railway, said it was very important to teach a motorman to know when the wheels slide, a condition which an experienced motorman immediately realizes. He did not believe a new man should be considered as competent until finally approved by the chief inspector. On his road all motormen were instructed to test the controller and the air when the car started out, and also after cars had been coupled together.

E. E. Peck, general manager, Schenectady Railway, thought written examinations desirable, and asked Mr. Bolen if on the Public Service Railway they were given in any cases besides those described for the P. A. Y. E. cars. Mr. Bolen said they were not.

E. S. Fassett, general manager, United Railway, Albany, called attention to the question of instruction in the operation of cars at night. Often a new man is put on a run which extends into the evening as a relief and finds the service very different from the daylight run which he had been accustomed with his instructor. The practice in Albany is to give instruction in night as well as day operation. Another point is to prevent a new man from forgetting what he has learned during his period of instruction. When the Albany road has a large extra list, the practice is to have each new man make at least one run a day after breaking in. By the end of that time he would probably get an assignment which would require at least two or three runs a week.

D. M. Beach, attorney, Rochester Railway, advocated recognition of good conduct of the men, saying that it encouraged loyalty in service. He thought some sort of premium should be given for good records.

C. Loomis Allen, vice-president, Utica & Mohawk Valley Railway, believed that thorough education of the men was money well invested. On the original Oneida Railway, the trainmen were first employed at work in the shop assembling equipment. Then they were put on the road for 30 days running the cars up and down. Then they ran the full schedule for seven days without passengers. This training cost the road about $360 per man, but it was money well spent. The Oneida Railway was a high-speed line and the conditions there were somewhat exceptional, so that this plan might not often be necessary.

H. M. Beardsley, secretary and treasurer, Elmira Water, Light & Railroad Company, said his company had the merit system in use. The motorman and conductor at the head of the list for each stated period received a vacation, with pay.

R. E. Danforth, in answer to a question, said that the only premium system in use on the Public Service Railway was one which had been in force at Camden. There a motorman and conductor, after five years' service, were given by the company a new suit or overcoat. Since the present sliding scale of wages had gone into effect this practice had been discontinued.

W. C. Callaghan, Rochester, said that when the merit and demerit system was first introduced at Rochester the men paid but little attention to the acquisition of merits. Now they realize the importance of helping their records by obtaining these good marks by meritorious acts. One man on the system has 186 merits, although 10 is the high-

est number that can be earned at one time. The plan undoubtedly is a good thing.

L. F. Hoffman, general consulting counsel, Public Service Railway, thought the merit and demerit system would be inadvisable in some cases, particularly on large roads. One great difficulty experienced by the legal department was the large number of "no report" cases. These are very dangerous. He thought that when the men were penalized for accidents for which they were responsible the temptation was very great to make no report of such an accident.

W. R. W. Griffin said that in Rochester there had been no trouble from this cause. There is a standing rule there that if a man fails to make a report of an accident in which he has been involved he is discharged. No conductor would want to take this chance to save the motorman from demerits, and vice versa.

TAXATION OF CORPORATIONS

President Fassett then introduced Ralph R. Rumery, expert appraiser, State Board of Tax Commissioners, who read the paper published on page 35 of this issue. There was no discussion of Mr. Rumery's paper.

COMMITTEE REPORTS

President Fassett then said that he would call for the reports on the "Use of Curtains in Car Vestibules," "Signaling Interurban Cars at Way Stations" and "Carrying Musical Instruments on Passenger Cars." Mr. Fassett explained that at the quarterly meeting of the association held at Schenectady, March 24, 1909, reports had been submitted on these three subjects, but no definite action had been taken by the association. This was due largely to two reasons. One was that the association could not compel its members to adopt its recommendations. The other was that the by-laws of the association did not recognize the quarterly meetings, and such action could be taken only at the annual meetings. He thought, also, that if the association should adopt recommendations of this character the Public Service Commission might conclude that all members should abide by them.

C. Loomis Allen then briefly sketched the history of these reports. The committees to investigate them were appointed last autumn at the request of Charles R. Barnes, expert of the commission, and the commission was anxious to get the conclusions of the association on these subjects. He made a very strong plea for the adoption of definite recommendations.

C. Gordon Reel, Kingston Consolidated Railway, agreed with Mr. Allen.

President Fassett thought that in these matters local conditions were controlling factors. If the association should adopt certain recommendations which were best for one road, they might not be the best for another, yet if the association gave them its stamp of approval the Public Service Commission could accept them as the best recognized practice of the association. The legal departments would recognize the force of that situation.

USE OF CURTAINS IN CAR VESTIBULES

A majority and a minority report were presented by the committee on the use of curtains in car vestibules. The majority report was presented by W. R. W. Griffin, general superintendent, New York State Railways, chairman of the committee, and John E. Duffy, superintendent, Syracuse Rapid Transit Railway. The minority report was presented by R. H. Smith, general manager, Albany & Hudson Railroad. The reports were read by Secretary Pardee, and state:

MAJORITY REPORT

Your committee respectively presents majority and minority recommendations. The majority of the committee favors the convenience and unrestricted privilege of the passengers, and in view of the data submitted there does not seem to be any evidence that there is any more danger from accidents in having the curtains open than from having them closed, and in their opinion, this association should express the opinion that the curtains should be left open during the day time so that the passengers could have an unobstructed view of the road-bed and the surrounding country.

There is no doubt in the minds of the majority of the committee but that the public would be better pleased in enjoying this view ahead than by having the curtains closed.

W. R. W. Griffin, Chairman.
John E. Duffy.

MINORITY REPORT

In presenting a minority report on the use of car curtains in the daytime, the undersigned wishes it understood that where conditions are right, he is highly in favor of leaving the curtains open so as to permit passengers to see the track ahead, but he does not approve of doing this at the expense of safety, which in railroad operation is of first consideration. Conditions as to road characteristics, type of car, etc., vary so greatly among railroads and have such a direct bearing on the use of car curtains, that it seems hardly wise to decide either for or against the use of curtains in the daytime without at least indicating the type of equipment under consideration at the time the decision is made.

There is no question about the practice at the present time, as the majority of roads operate with curtains open during the daytime. That it is a pleasure to look out the front end of a moving car cannot be denied, but the question before this committee has been whether, taking all phases of the subject into consideration, the desire of the passengers in this respect, together with the advantages pointed out by the advocates of this method, are sufficient in importance to offset the objections advanced from a standpoint of safety. Those who believe in keeping the curtains drawn in the daytime are not prompted by any desire to detract from the pleasure of the ride, but in all cases the object is to promote safety of operation. Those not in favor of using curtains in the daytime have argued that, in addition to the general desirability of allowing passengers to see the country ahead, the motorman being in full view of the passengers (when operating on full-width platform) must feel the beneficial effect of this supervision and will operate his car with greater care; furthermore, if the motorman has an attack of sickness, his condition will be readily noticed.

Those advocating the use of curtains in the daytime are greatly in the minority, but have adopted their practice as a result of their general railroad experience applied to the conditions on their respective lines. Their arguments are that with the curtains open, the motorman is subject to the annoyance of passengers banging on the door in search of information, and that the lighting of matches, moving of newspapers, etc., inside of the car further tends to attract his attention from his work on account of the reflection caused on the window ahead. It may be that such distraction will last but a moment, but good fortune cannot always guide the coming of these interruptions. Rules cautioning passengers not to attract the attention of the motorman can be generally enforced, but in most cases only after the act of interruption has occurred. It is human nature for the motorman at such times to turn around (if curtains are open) when the doors rattle behind him, for the purpose of "squelching" his annoyer, if not to answer his query. Timid passengers when riding on a single-track road, especially one with a generous supply of curves and grades, are inclined, in case the curtains are open, to peer out the forward end of car and be the first to discover signs of danger either real or imaginary. Such people have been known in several instances to give an unnecessary alarm, thereby throwing the passengers into a state of panic, and a rapid movement on the part of the motorman, whether as an emergency measure or an act of routine operation, brings a nervous person again into the center of the aisle.

Controller and circuit-breaker troubles when severe are quite conducive to panic among passengers, and the undersigned believes that the elimination of such occurrences from the sight of the passengers in itself goes a long way toward vindicating the use of the curtains from a standpoint of safety. This has been the experience of the minority, and if similar experiences have not been met on other roads, it is very safe to say that this situation is the result of a difference in conditions, whatever they may be.

The conclusions to be reached from the answers received by this committee are obvious as far as the general practice at the present time is concerned, but it is somewhat difficult to see how, in view of the character of these answers, it is possible to consistently approve of a general recommendation to operate with the curtains open without pointing out the conditions

under which such practice would be undesirable. No good railroad man would knowingly bring about any conditions which would be inimical to the safety of passengers.

In response to the questions as to whether it would add to the safety of operation to isolate the motorman from all possible chance of interference, 14 of the 17 companies have replied in the affirmative. Thus, it would seem that a large majority of the member companies are in favor of completely isolating the motorman, either by the use of a motorman's cab, the drawing of the curtains, or by such rules as will prevent the passengers from interfering with the motorman, those in favor of the cab being in the majority. Nine of the 17 companies replying do not believe that proper isolation of the motorman can be accomplished, if the conditions surrounding him are such that he can turn around, look through the glass door, and see the actions of any person or persons inside of the car; in other words, over half of those answering do not believe, according to these responses, that it is a matter of safe operation to have the curtains open.

In case of an impending collision of cars, the ability of passengers to see the track ahead is considered to be an advantage by only three of the companies answering, seven being of the opinion that such a condition would result in increased personal injuries, and seven of the companies expressing themselves as being in doubt on this point. Bringing the matter of safety into the consideration of this subject, it will be seen that on the strength of the answers alone, there is a grave question as to the propriety of leaving these curtains open during the daytime, and if it is true, as the majority have decided, that the safety of the public is best conserved by completely isolating the motorman, then it seems that the only consistent recommendation that can be made is as follows:

1. That when cabs are used, the portion of the front bulkhead not occupied by such cab should be unobstructed by curtain.

2. That when no cabs are used, and the motorman occupies the full width of the vestibule, curtains should be drawn during the daytime.

R. H. Smith.

E. F. Peck, general manager, Schenectady Railway, moved the adoption of the majority report.

Mr. Allen said he did not believe the recommendation of the association would act as an order of the commission. It would be considered by the commission as evidence of the character that would be presented at a formal hearing. The point, however, was that the commission had submitted three questions and asked the association for answers. If it was a fact that the members of the association were agreed on the recommendation of the majority report he did not see why the association should not make a recommendation as requested by the commission. He believed that the commission, before issuing an order on this subject, would investigate local conditions governing each case.

The report of the majority of the committee was then adopted.

SIGNALING INTERURBAN CARS AT WAY STATIONS

A supplementary report was presented by the committee on this subject. The committee was composed of J. G. Phillips, assistant general manager, Hudson Valley Railway; S. J. Dill, general manager, Elmira Water, Light & Railroad Company, and George L. Radcliffe, general superintendent, Schenectady Railway. The report states:

A description of a signal, presented with the supplementary report, is as follows:

The committee on signaling interurban cars at way stations begs leave to submit to this association the following recommendation, viz:

Of the signals now in use for the purpose of signaling interurban cars at way stations, the one best adapted to that purpose consists of an enclosed signal located at the station and operated by the passenger, and which, when so operated, shows a light toward the approaching car.

This signal was described in our report made in Schenectady on March 24, 1909. [See Electric Railway Journal of April 3, Page 619.—Eds.]

We do not recommend the use of a semaphore arm with this signal, as we believe it impossible to enforce the use of any signal by the public except as necessity requires.

Another signal to be used for this purpose consists of a box enclosing five incandescent lamps with a glass disk or lens in one or both sides of the box. This box is attached to a pole at the stations so that the light, when the connection is made, shines through the disks in such a way that it is visible to the motorman approaching the station. The signal is lighted by means of a rope extending down the pole to within easy reach of the platform, this rope being pulled by the passenger when he desires to stop the car. The connection by which these lights are turned on is weighted so that it shuts off automatically.

The supplementary report of the committee was adopted.

CARRYING MUSICAL INSTRUMENTS ON PASSENGER CARS

Albert Eastman, general express and passenger agent, Utica & Mohawk Railway, chairman of the committee which considered this subject, read the report. The report was signed by Mr. Eastman and C. H. Smith, general superintendent, United Traction Company of Albany, and is as follows:

Owing to the fact that the replies received from the various electric railways in the State of New York indicated a great diversity of opinion as to rules and regulations governing the carrying of musical instruments on passenger cars, your committee did not feel justified in making any recommendation at the Schenectady meeting.

It now seems desirable that a definite recommendation be made, and in considering the matter further we beg to make the following report: We believe that to prohibit the carrying of musical instruments on passenger cars would cause a great inconvenience, especially when no other facilities are offered for transportation of such instruments, and in order to regulate this traffic the committee begs to make the following recommendations, namely:

That large musical instruments be carried on passenger cars only on permit, such permits to be issued in books of 10 or 20 coupons, or a permit to cover one particular movement signed by proper officer. These permits to be issued after a release has been signed and subject to the rules and regulations of the individual companies as to what hours such instruments will be carried and on what part of the car. In making this recommendation we believe the same rule should apply to any large or bulky article that passenger desires to carry on a passenger car and that cannot be carried on the lap of the passenger.

Mr. Fassett described the practice of the United Traction Company, which requires a release in each case before a book of permits is issued. The permits provide that the holder shall not attempt to board cars with bulky instruments during rush hours or at other times of heavy load.

The report of the committee was then adopted.

President Fassett appointed the following nominating committee, and adjournment was then taken until Wednesday morning: C. Loomis Allen, B. B. Nostrand, R. E. Danforth, Joseph K. Choate and C. H. Smith.

WEDNESDAY SESSION

The Wednesday session was called to order by President Fassett. The first order of business was the presentation of a paper by J. L. Davis on "Latest Improvements in Electric Railway Apparatus." This paper will be found on page 25 of this issue. After the reading of his paper, Mr. Davis said in answer to a question that tests on regenerative control with interpole motors had proved very satisfactory. He thought there was a future for this system, but it had not been commercially perfected. Mr. Davis also briefly described the Pennsylvania Railroad side-rod locomotive, which he said was designed to make 90 miles an hour. Several locomotives were in course of construction and would be tested this summer.

C. D. Eveleth then read his paper on "Latest Developments in Electric Railway Apparatus," which will be found on page 24 of this issue. At the conclusion of this paper he read a short addition on automobile block signals. He said that the General Electric Company had developed such a signal with track circuit control and that it afforded the same high-class protection as the ordinary d.c. steam railroad system. The new method is known as the "two-frequency" system, and does not require any insulated joints or impedance bonds.

W. H. Davies spoke of the lack of unity between the Interstate Commerce Commission's classification of accounts and that of the New York Public Service Commissions. He said that there were differences of opinion concerning the course to be followed regarding matters connected with the accounts. President Fassett said that this subject would be taken up by the committee on classification of accounts. In view of the great interest in the subject he suggested further that the accounting system be considered at the next quarterly meeting of the association.

During the session, Matthew C. Brush, general manager of the Boston Suburban Electric Companies, entered the room and was invited by the president to take a chair at his table.

On motion of C. Gordon Reel, a rising vote of thanks was extended to President Fassett for his efficient conduct of the affairs of the association and the promptness with which he acted in changing the location of the convention after the Fort William Henry Hotel had been destroyed by fire. Mr. Fassett acknowledged his thanks to the executive and entertainment committees which had assisted him in this work.

C. Loomis Allen, general manager of the Oneida Railway Company, Syracuse, then presented the report of the nominating committee as follows: President, E. F. Peck, general manager of the Schenectady Railway Company, Schenectady; first vice-president, C. Gordon Reel, general manager of the Kingston Consolidated Railroad Company, Kingston; second vice-president, E. J. Cook, general manager of the Rochester Railway Company, Rochester. Executive committee: E. S. Fassett, general manager of the United Traction Company, Albany; J. W. Hinkley, general manager, Poughkeepsie City & Wappingers Falls Electric Railway Company, Poughkeepsie; W. H. Collins, general superintendent, Fonda, Johnstown & Gloversville Railroad Company, Gloversville; J. K. Choate, president, Oneonta & Mohawk Valley Railroad Company, Cooperstown; secretary, J. H. Pardee, operating manager, J. G. White & Company, New York; treasurer, H. M. Beardsley, secretary and treasurer, Elmira Water, Light & Railroad Company, Elmira. All the foregoing were unanimously elected.

President Peck was then escorted to the chair by Messrs. Reel and Choate. He expressed the hope that he would have the co-operation of all the delegates in making the work of the association a success during the coming year.

The next annual convention will be held at Rochester.

The Engineers' Society of Pennsylvania has offered a series of prizes for the best design for ornamental poles to be used as combination supports for trolley wires and electric lights. Designs will be considered based on using any desired material for these poles, such as iron, wood or concrete, but, as the competition is based on practical lines, economy in design will be taken into consideration.

The poles should be constructed so that wires carried in conduits can be brought in at the base and passed through to necessary outlets for feed wire connections. This will necessitate one or more passages. Provision should be made for good foundations and anchorage, so that all lateral strain will be taken care of without it being necessary to furnish outside supports. Each design must be accompanied by specifications, estimate of weight, and cost based on 100 poles being required.

The competition is open to the general public and all specifications and estimates must be in the hands of the committee by noon of July 15. The prizes offered are: First prize, $25; second prize, $15; third prize, $5.

THE SOCIAL SIDE OF THE CONVENTION

The fine weather and the picturesque surroundings of the Hotel Champlain assisted the entertainment committee in providing a very attractive and popular program during the two days' stay at Bluff Point. A number of ladies were present and took part in the golf tournament which occurred Tuesday morning. The first prize was won by Mrs. H. N. Ransom, of Albany, and the second prize by Mrs. Fuller, of Springfield, Mass. Mr. Garland, of the Ohio Brass Company, had charge of the tournament At its conclusion the Fifth Regiment Band, from Plattsburgh, gave a concert on the hotel piazza. On Tuesday afternoon an automobile ride was given the ladies by courtesy of the Lozier Company.

The great social event of the day, outside the banquet, was the ball game at 5 p. m. between the railway men and the supply men. The former were captained by E. J. Cook, of Rochester, whose side, including substitutes, were Captain Hinckley, E. F. Peck, C. Gordon Reel, E. S. Fassett, C. Loomis Allen, W. H. Collins, R. E. Danforth, Henry Page, George Radcliffe, W. R. W. Griffin, A. E. Reynolds and N. W. Bolen. The supply men were under the doughty leadership of H. N. Ransom, and consisted of J. B. Smiley, C. R. Ellicott, Jr., R. M. Campbell, E. H. Chapin, B. Standish, B. Bradfield, C. S. Hawley, W. G. Corey, T. Thompson, N. Garland, W. M. Wampler, N. W. Grier. The field umpire was A. L. Linn, Jr., and the home umpire Major H. C. Evans. After a vigorously contested game, in which several home runs were made, the score stood 18 to 11 in favor of the supply men.

The annual banquet of the association was held in the main dining room of the Hotel Champlain on Tuesday night, June 29. The attendance was large, and the speeches were listened to with appreciation and enthusiasm. The following menu was served:

Little Neck Clams
Cream of Chicken a La Reine
Olives Salted Almonds Radishes
Boiled Salmon, Mouseline
Cucumbers Pommes Hollandaise
Sweetbread Croquettes with Peas
Sirloin of Beef with Green Peppers
Punch Cardinal
Broiled Squab on Toast
Lettuce and Tomato Salad
Neapolitaine Ice Cream
Fancy Cakes
Coffee

President Fassett introduced J. H. Stedman, of Rochester, who presided as toastmaster. The speakers were C. S Sims, general manager of the Delaware & Hudson Railroad, whose subject was "Railroad Capitalization"; Hon. Martin H. Decker, member of the Public Service Commission of New York, Second District, who spoke on "Corporation Advantages Under Comprehensive Regulation"; Howard MacSherry, general counsel, Public Service Railway, Newark, N. J., whose text was "Our Critics," and Rev. H. D. L. Grabin, rector of Trinity Episcopal Church, Plattsburg, who spoke in place of Warnick L. Kernan, of Utica, who was unable to be present.

On Wednesday the ladies joined in a bridge whist tournament in the hotel, and in the afternoon all went to Plattsburg to inspect a dress parade of the Fifth Regiment of regular infantry stationed there. The party occupied the grand stand erected in anticipation of the Champlain ceremonies next week, and greatly enjoyed the military display, as well as the music of the regimental band. Altogether, the social festivities, as well as the technical features of the convention, were very successful.

DISTANCE BETWEEN CENTERS OF TRACKS IN CHICAGO.

The distance between centers of tracks and width of cars has been the subject of a heated controversy in Chicago during the past three months. On June 23 the committee on local transportation of the City Council held a public hearing at which the advocates of both wide and narrow spacing were heard. George Weston, member of the Board of Supervising Engineers, presented a written discussion on the subject in which he reviewed the action of the board in this matter during the first year of its existence and at other meetings of later date. He also expressed himself in favor of the narrow spacing now being used in reconstructing the surface tracks.

The distance between track centers was one of the first questions taken up for decision by the Board of Supervising Engineers after its organization and prior to the passage of the rehabilitation ordinances. The decision was to adopt 9 ft. 8½ in. where wide cars were to be used and this was incorporated in the ordinances as follows:

The distance between track centers may remain as at present, but in order to accommodate large modern cars and provide for their safe passage, this distance may be at least 9 ft. 8½ in. between center lines of tracks.

The centers of existing tracks with few exceptions were 9 ft., 9 ft. 6 in. and 10 ft. Cars 9 ft. wide were being operated on the 9-ft. 6-in. tracks and cars 8 ft. 6 in. wide on tracks with 9-ft. centers. The maximum distance between cars was 18 in. and the minimum distance 6 in. Mr. Weston called attention to these facts as showing that the use of narrow spacing was not of recent origin. In July, 1907, the board adopted standard specifications for tracks which fixed the distance between centers at 9 ft. 8½ in. and the work of rehabilitation was actively begun. Shortly afterwards a fatal accident occurred to a person caught between cars and the newspapers began a campaign against the narrow spacing. B. J. Arnold, chairman of the board, directed that an investigation be made at once into the practice in other cities. The result of this investigation is shown in the accompanying table. In addition to the data given in this table Mr. Weston cited the practice in New York City where the standard spacing of tracks is 10 ft. ½ in. and the width of the widest cars is 8 ft. 3½ in., which leaves 21 in. between cars.

TRACK SPACING AND CAR WIDTHS IN CITIES.

City and company.	Distance C. to C. of tracks.	Width of double truck cars.	Street between curbs.	Space between cars.
Boston El. Ry. Co.	9′ 8½″	8′ 6″	70′	15½″
	9′ 3½″	.....	30′	8½″
Prospect Park & Coney Island Ry. Co.	12′ 0″	8′ 2½″	60′	45½″
Nassau Elec. Ry. Co.	8′ 10¾″	8′ 1½″	24′	10¼″
Phila. Rapid Transit Company	11′ 7″	8′ 6″	88′	37″
	9′ 2¼″	8′ 6″	34′	8½″
Rochester Ry. Co.	9′ 11″	8′ 2″	59′ 3½″	21″
	8′ 7″	7′ 8″	38′	11″
Twin City Rapid Transit Company	10′ 0″	9′ 2½″	40′	9½″
Milwaukee Elec. Ry. & Light Co.	11′ 0″	8′ 6″	50′	30″
	9′ 6″	8′ 6″	36′	12″
International Railway Company	9′ 8½″	8′ 9¼″	58′	11″
	9′ 0½″	8′ 9¼″	28′	3¼″
Denver City Tramway Company	12′ 0″	8′ 2″	60′	46″
	10′ 0″	8′ 2″	34′	22″
*United Railways Company of St. Louis	10′ 2″	9′ 0″	36′	14″
Cincinnati Traction Company	9′ 8½″	8′ 4″	42′	16½″
	9′ 2½″	8′ 4″	30′	10½″

*Cars of this company that are operated single-ended—that is, turn on loops, are offset on the trucks from the center lines 2″, making an added clearance between cars of 4″, and making a total space between offset cars of 18″.

At a meeting of the board on Aug. 27, 1907, Mr. Arnold recommended that a track center spacing of 10 ft. 2 in. be adopted and that the overall width of cars be limited to 8 ft. 6 in. At a subsequent meeting this recommendation was put to vote. Charles V. Weston, then a member of the board representing the city of Chicago, and Harvey B. Fleming, representing the Chicago City Railway, voted in favor of retaining the dimension of 9 ft. 8½ in. B. J. Arnold, chairman, and J. Z. Murphy, representing the Chicago Railways Company, voted for a change in the spacing. As a result of the tie vote the distance was not changed and all new construction carried on to date has been in accordance with the original specifications.

The present agitation has been caused by a bill introduced in the State Legislature fixing the minimum distance between cars at 3 ft. and a similar ordinance introduced in the Chicago City Council. It was this ordinance on which the public hearing was held. Mr. Weston continued his discussion by expressing his personal views as follows:

A condition should be maintained that will result in the least number of accidents. In order to make the space between tracks safe for a cool-headed, self-possessed man the space should be 30 in. to 36 in., and it would be better if it could be made 48 in. I am not convinced that the safety would be greater with a 20-in. space between cars than with an 8½-in. space. A medium or undersized person, at least, would not be crushed to death between cars in a 20-in. space, but it is believed by many people who have studied the subject and who are engaged in the business of operating cars on public streets that a space between cars approaching 20 in. would result in a condition that would invite people to seek refuge in that space, who might be knocked down or fall and be dragged under the trucks, and thereby greatly increase the number of crossing accidents.

This question is not strictly a technical or engineering question, and it is impossible to theorize on which condition will result in the least number of fatal accidents. The crossing policeman, who is stationed at the busy street intersections to regulate traffic and to safeguard the pedestrians, and who is in daily contact with the problem, is competent to pass judgment upon this subject. I have recently interviewed a number of the crossing policemen at intersections where street cars are being operated, and in every instance these men say that if the space cannot be made wide enough to be absolutely safe then it should remain as it is. There should be no condition existing that would invite people to take refuge in an unsafe space.

With tracks 10 ft. 2 in. center to center and cars 8 ft. 6 in. wide overall, the distance between the overhang of the car and the curb will be practically the same as with a track center of 9 ft. 8½ in. and cars 9 ft. wide overall, namely, 9 ft. 7¾ in. in one case, and 9 ft. 8 in. in the other. This distance between car and curb is the minimum that should be considered, particularly upon a business street with a 38-ft. roadway, because with the ordinary delivery wagon backed up to the curb for loading or unloading the space is just sufficient to allow a car to pass; and with a large coal wagon or truck moving parallel with the track there is just space sufficient for the car to pass and allow some variation in the exact position of the wagon in the space. The Chicago Railways Company now have under contract 350 cars 8 ft. 6 in. wide overall and this new equipment and widened centers on some streets will give an opportunity to study by comparison the net result in accidents to pedestrians.

At a meeting of the Board of Supervising Engineers, held on June 29, a resolution was adopted fixing the minimum distance between track centers at 10 ft. 2 in. and the maximum width of cars to be built hereafter at 8 ft. 6 in. This is in accord with Mr. Arnold's original recommendation.

COST OF SPRINKLING STREETS IN DETROIT

Some data on cost of sprinkling tracks in Detroit was published in the Electric Railway Journal of May 22, 1909, page 949, in connection with the report of F. H. MacPherson & Co., accountants, made to the Committee of Fifty, which is investigating the street railway situation in that city. A correction should be made in the heading of the table showing the cost of sprinkling which appeared on the bottom of page 949. The title of this table should read, "Sprinkling Tracks—Showing Number of Tanks of Water Used, Mileage and Direct Labor Cost, 1904-1908, inclusive." The columns of costs cover the direct labor charges only and not the entire cost of sprinkling.

PEORIA ELECTROLYSIS CASE

Another stage of the long-drawn-out litigation usually referred to as the "Peoria electrolysis case," but by no means the final one, was reached on June 22, when Frank L. Wean, of Chicago, as special master in chancery, filed a second report to the United States Circuit Court for the Northern District of Illinois. The complainant in this case is the Peoria Waterworks Company and the defendant is the Peoria Railway Company. The suit, which has been pending in one form or another for perhaps 15 years, arose out of the damage to the plaintiff's buried water mains alleged to be due to escaping current from the defendant's return electric circuit. The master's finding is as follows:

The evidence offered on this re-reference fails to disclose any method which will completely or substantially prevent the injury complained of and all the evidence fails to disclose the discovery, since the hearing under the previous order of reference, of any new principle or fundamental law, regarding the nature and effect of electric current, or of any new method of preventing the escape of such current different in principle from those known at the time of the former hearing. In other words, the evidence on this reference, taken as a whole, tends to confirm the findings stated in this special master's former report.

The former conclusions, which the master fails to change, were published in the STREET RAILWAY JOURNAL for June 22, 1901. In effect they were that the injury complained of exists; that it is permanent and continuing; that it is being caused by the defendant; that the complainant can do nothing to prevent the injury; that the defendant can prevent it by the use of the double trolley system, which, though more expensive to install, is as safe, economical and satisfactory in its operation as the single trolley system.

Objections to the master's report have been filed by the defendant's counsel, John P. Wilson, of Chicago, and I. C. Pinkney, of Peoria, who contend that many of the findings of the master are contrary to the evidence, particularly the statement that it is more difficult to prevent the escape of current since the former hearing, owing to the increase of traffic and the passage of large interurban cars. Categorically, findings as to injury to pipes, pitting and the alleged injury to the complainant's distributing system are objected to as being contrary to the greater weight of evidence.

The next step in this litigation no doubt will be a motion by the complainant's attorneys to have the master's report confirmed by the court. Undoubtedly the judge hearing that motion will take the case under advisement, and it will probably be some time before the court's decision is announced. From this decision there is, of course, opportunity for appeal by either side.

Since the announcement by the Metropolitan Street Railway Company that it would accept eight college graduates into its employ as apprentices it has received more than 500 applications. The announcement mentioned was published in the ELECTRIC RAILWAY JOURNAL for May 29, 1909. Some of the institutions whose graduates are represented among those from whom applications have been received and the number of applicants are as follows: Cornell University, 14; Pratt Institute, 17; Stevens Institute of Technology, 11; College of the City of New York, 7; Hebrew Institute of Technology, 5; Cooper Union, 9; International Correspondence School, 7; West Point, 2; Fordham, 3; Yale, 4; Harvard, 3; Purdue, 1; Leland Stanford, 2; Brooklyn Polytechnic, 6; Syracuse University, 9; Holy Cross, 2; Massachusetts Institute of Technology, 7, and Missouri University, 1.

DENVER CONVENTION CIRCULAR OF THE MANUFACTURERS' ASSOCIATION

George Keegan, secretary of the Manufacturers' Association, has sent out this week a circular containing advance information about the convention arrangements in Denver. The text of the circular follows:

As previously announced, the date for holding the twenty-eighth annual convention of the American Street and Interurban Railway Association at Denver, Col., has been changed from Oct. 18 to 22, inclusive, to Oct. 4 to 8, inclusive.

The Manufacturers' Association, which holds an exhibition in connection with the street railway convention, has secured for exhibit purposes the use of the Auditorium Building, located at Fourteenth, Champa and Curtis Streets. This building, together with temporary buildings that will be erected immediately adjoining the Auditorium, will provide approximately 45,000 sq. ft. of exhibit space exclusive of aisles.

The executive committee at its last meeting fixed the rate for this space at 30 cents per square foot for space in the Auditorium proper and 20 cents per square foot for exhibit space in the annex building. These figures include light, electric power, and practically all other concessions that went with the space at Atlantic City convention last October. Excellent facilities will be provided for track exhibits, which can be displayed on tracks in the street adjoining the Auditorium.

The Western Passenger Association, covering the lines between Chicago and Denver, and the Eastern Passenger Association, covering the lines between New York and Chicago, will soon announce their decision on passenger rates. The change in date made it necessary to reopen negotiations with these associations.

The matter of reduced freight rates is under consideration with excellent chances of securing exposition rates on all freight, which is full rate from initial point to Denver with free return, amounting practically to half rates.

A circular containing information regarding hotel rates is now being prepared by Secretary Swenson of the American Association and will be issued within a few days.

The exhibit committee has had plans drawn showing the layout of the exhibit space and will forward to all members within a few days all detailed information concerning exhibits, together with application blank for exhibit space. [The circular, containing a plan of the exhibit space, rates and other information, which was distributed prematurely to some members last week, contained several errors, which are corrected in part above. An accurate plan will be mailed as soon as prepared.—EDS.]

From the amount of enthusiasm displayed by the members of the American Association the twenty-eighth annual convention promises to be one of the best attended meetings ever held and it is hoped that the members of the Manufacturers' Association will do their share to add to the success of the convention.

THE McGRAW-HILL BOOK COMPANY

The book departments of the McGraw Publishing Company and the Hill Publishing Company have consolidated under the corporate name of the McGraw-Hill Book Company, with offices after July 1 at 239 West Thirty-ninth Street, New York. This consolidation brings together two of the most active publishers of technical books in the country. The new company takes over the book departments of both houses with a list of about 250 titles, both industrial and college text books, covering all lines of engineering. It will continue as well the retail, importing and jobbing business of the two houses.

The officers of the new company are: President, John A. Hill; vice-president, James H. McGraw; treasurer, Edward Caldwell; secretary, Martin M. Foss.

Mr. Hill is head of the Hill Publishing Company, which controls the *American Machinist, The Engineering and Mining Journal*, and *Power and the Engineer*. Mr. McGraw is head of the McGraw Publishing Company, which issues the *Electrical World*, ELECTRIC RAILWAY JOURNAL and *The Engineering Record*. Mr. Caldwell has been manager of the McGraw Book Department for several years and Mr. Foss manager of the Hill Book Department.

MEETING OF THE COMMITTEE ON EDUCATION

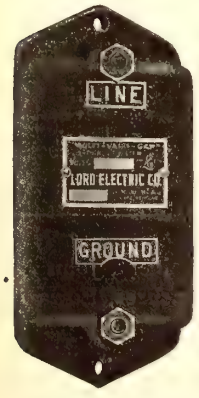
A meeting of the committee on education of the American Street & Interurban Railway Association was held at the offices of the association at 29 West Thirty-ninth Street, New York, on June 24. Those present were: Prof. H. H. Norris, of Cornell, chairman; Prof. D. C. Jackson, of the Massachusetts Institute of Technology; Prof. A. S. Richey, Worcester Polytechnic Institute, and R. E. Danforth. On April 10 the committee sent out a circular letter in regard to the work for the coming year, a copy of which was published in the Electric Railway Journal for May 1, 1909. This letter described the two educational plans which the committee had in mind, one for the benefit of technical graduates who desire to learn the railway business, and the other for present employees of the companies who wish to increase their knowledge of the technical side of electric railways. The replies which have been received to this letter indicate that the railway companies as a whole are very enthusiastic over both plans. The two plans decided upon at the meeting held on June 24 which were recommended to the association for adoption are similar to those outlined in the previous circular, but will embody certain changes suggested by the letters already received.

Some of the smaller companies in their replies indicated that they are uncertain whether the plan of the apprenticeship course for technical graduates could be inaugurated on their systems. The committee wishes it to be thoroughly understood, however, that no company is too small to take advantage of this plan, if it desires to do so, and will make this point clear in the next circular to be issued within a short time.

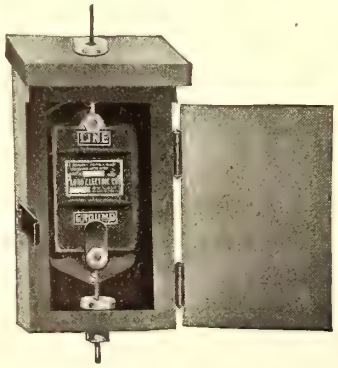
The comments made on the second plan of a correspondence course for the benefit of present employees of the companies were also enthusiastic and seemed to indicate that all of the member companies replying will take advantage of this plan. If all of the member companies of the association are equally enthusiastic there will be enough men to start a new university.

THE MULTI-VAPO-GAP LIGHTNING ARRESTER

The Garton "Multi-Vapo-Gap" lightning arrester, made by the Lord Electric Company, New York, is of the type in which natural cloud conditions are simulated by arranging for a large number of vapor gaps which will not permit the passage of dynamic electricity. The body of the arrester is a highly hygroscopic mass, which holds moisture in suspense in a fixed and definite volume and maintains it in a static conductor form only. The hygroscopic mass is hermetically sealed in a porcelain housing.



Car and Station Arrester



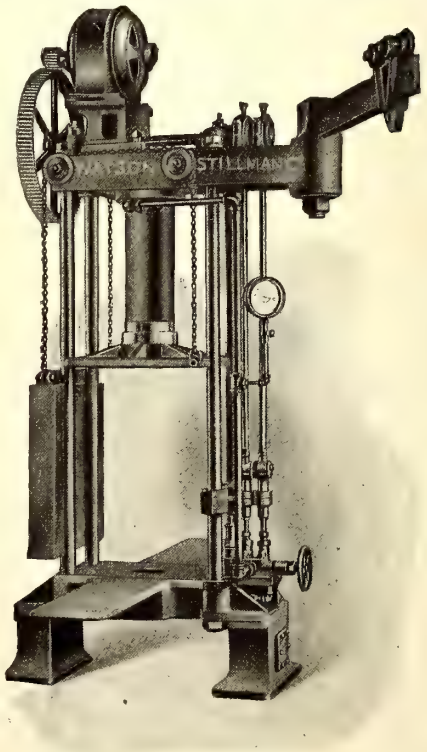
Line Arrester

It is stated by the manufacturer that the impedance of this arrester is virtually nil, because the myriads of moisture globules, though mechanically separated, are infinitely close together, due to the chemical and hygroscopic composition. The multiplicity of vapor gaps eliminates the need for an air-gap, which feature, together with the low impedance, makes it impossible for static electricity to build up on the line. The arrester is provided with a telltale, which indicates and records the passage of the discharge. This telltale can also be used to open the circuit, which is a valuable feature when testing. The maintenance of the arrester involves no trouble, as it has no moving parts, is electrically indestructible, and contains no metal aside from the terminals. The arrester is also free from all forms of carbon.

The block type of this arrester is enclosed in weatherproof wooden boxes when made for line or car use. It is recommended that for line use the arresters should be distributed five to the mile and connected with the same maker's "Hydro-Ground" grounding device, described in the Electric Railway Journal of June 19. In the case of car protection it is suggested that the arrester be connected directly to the trolley base by a separate conductor and the truck or motor body by another conductor. This will make the lightning arrester circuit on the car independent of other circuits, and establish a direct path from the trolley base to the running rails.

A REVERSED CYLINDER PRESS

The Watson-Stillman Company, New York, has just introduced a reversed cylinder forcing press, which should prove a handy tool for pressing bearings and for miscellaneous work. As will be seen from the illustration, a crane bracket and beam extending from one end enables the operator to swing a heavy piece of work on to bracket shelves extending out from each side of the bottom platen. These shelves, 30 in. x 12 in., are detachable, can be lifted



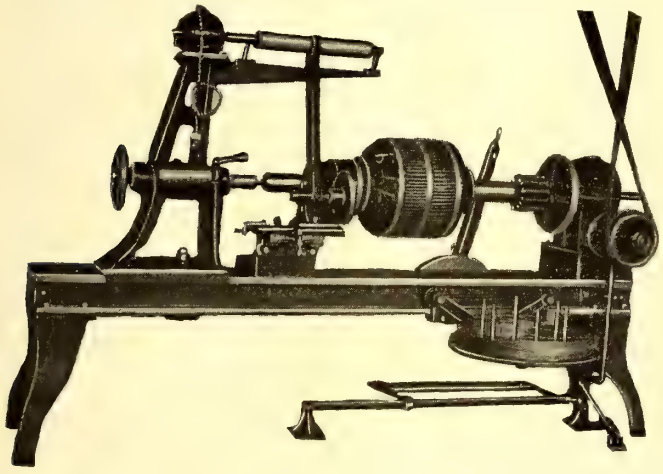
Reversed Cylinder Press

off on jobs where they would be in the way, and are sufficiently strong to support any work that will go into the machine. They will be appreciated by those who have had to push castings or parts into place on the ordinary small platen. The motor, mounted upon pedestals on top of the press, drives the pump shaft through single reduction gearing. If desired, a hand or belted drive is furnished, instead of the motor. On the other end of the pump shaft are two eccentrics, each driving one of the pistons of a ¾-in. x 2-in. twin pump, for which the pedestal legs act as reservoirs. The operating valve is of the single-screw stem type, and connected to release the pressure from the work when opened and start the ram down when closed. It will not retain the pressure unless the motor is stopped or the liquid driven through the safety valve. Other types of valves may be substituted to meet special conditions. A gage is furnished to read in tons or pounds per square inch, as desired.

COMBINATION TOOL FOR COIL AND COMMUTATOR WORK AND GRINDING

The American General Engineering Company, New York, has just perfected a unique combination tool which should find a place in many electric railway shops. In this device one foundation framing and bed is used for all kinds of coil winding, banding and heading, commutator truing and slotting, and miscellaneous grinding. A view of the machine is shown in the accompanying illustration.

A spindle at the rear of the main spindle takes care of the armature coil winding, and a spindle on the end of the live spindle takes care of the field winding. The lever



Combination Tool for Coil, Commutator and Grinding Work

attachment used in banding work for putting tension on the wire is fitted with a fiber shoe to minimize friction while there is strain on the arm. The use of this fiber shoe allows the operator to move the arm more freely.

The work on commutators from 4 in. to 20 in. in diameter is done at the other end of the machine. The feature of having the motor on top of the center gives the opportunity of tightening or loosening the belt. By means of a screw the upper arm shown can be placed in a vertical position or at an angle, so that while a commutator is being taken out or put in the lathe it will not interfere in any way with the crane above the machine.

The emery wheel spindle is on the slide at the left. By substituting for this wheel a plate with a high-speed tool attachment, any desired cut can be made on the commutator. The grinding wheel may then be used to take off all tool marks and give a fine finish to the work. The machine has also received a commutator slotting device which will work on the same slide and drum as that used for grinding and commutator truing.

The commutator slotter and grinder are motor driven, and the winding end is belt driven through a new style friction clutch, which gives a powerful positive drive.

CONSUMPTION OF TIES

During 1908 the steam and electric railroads of the United States purchased more than 112,000,000 cross-ties, costing at the point of purchase over $56,000,000, an average of 50 cents a tie, according to statistics just made public by the Bureau of Census in co-operation with the United States Forest Service. This was some 40,000,000 ties less than the quantity purchased in 1907, when the total was approximately 153,700,000, the highest ever recorded. The decreased purchases in 1908 were, of course, chiefly due to the business depression which affected every line of industry. This forced most of the roads to purchase only the ties which were absolutely essential for renewals, and heavily cut down the purchase for new track. In 1908 only 7,431,000 cross-ties were reported as purchased for new track as against 23,557,000 in 1907. Of the total number of ties purchased for all purposes the steam roads took approximately 94 per cent, leaving about 6 per cent for the electric roads.

It is interesting to note the wide range of woods used for cross-ties. The preliminary report by the Census Bureau lists separately 15 classes or species. Of these the oaks are now and have always been by far the most important. The oak ties amounted to more than 48,000,000, or 43 per cent of the total quantity purchased. Next to these ranked the southern yellow pines, with 21,500,000, or 19 per cent of the total. It will be seen that the oaks and southern pines combined furnished nearly three-fourths of all the ties bought by the railroad companies last year.

While the oaks, and particularly the white oaks, have always been the preferred woods for cross-ties and still form a large proportion of the total, the increasing prices demanded for satisfactory oak ties are forcing the companies to look more and more for substitutes. Many of these, when treated, give a longer service than can be secured from untreated oak ties. Among the woods which have been most largely treated so far are the yellow pines, particularly loblolly pine, Douglas fir, western pine and lodge-pole pine.

This year's statistics add to the list two kinds of cross-ties which previously had not been reported in sufficient quantity to justify listing them separately. These are gum and beech. The purchases of gum ties in 1908 exceeded 260,000, while but slightly more than 15,000 of them were reported in the previous year. Of beech ties, the purchases in 1908 amounted to nearly 193,000, against but little more than 51,000 in 1907. These are woods which are distinctly not suitable for cross-ties unless they are given preservative treatment. Their increased use, therefore, is one of the many results of the progress of wood preservation in the United States. For many years beech has been one of the principal cross-tie woods in Europe, where its value when given chemical treatment was long ago recognized. It is not uncommon for European roads to secure from 20 to 30 years' service from beech cross-ties. Untreated, they would not last long enough to warrant their use at all.

LONDON LETTER

(From Our Regular Correspondent.)

The fourteenth annual convention of the Incorporated Municipal Electrical Association was opened in Manchester by a reception and conversazione at the Town Hall by the Lord Mayor on the evening of June 21. On June 22 the presidential address was delivered by S. L. Pearce. This was followed by a paper on "Cheap Units" by A. Sinclair, Swansea, and after the discussion the members and friends were entertained at luncheon at the Town Hall by the electricity committee. In the afternoon the delegates were conducted to the generating stations. On June 23 the delegates were taken by special train to Liverpool, where the association was welcomed at St. George's Hall by Sir Charles Petrie. The following papers were read at Liverpool: "The Influence of Metallic Filament Lamps on the Electrical Industry and on Street Lighting," by E. E. Hoadley, Maidstone, and "Modern Cable Systems," by E. M. Hollingsworth, St. Helens. After luncheon the various generating stations in Liverpool were visited and the royal mail steamship *Mauretania* was inspected. The meeting on June 24 was held at the Municipal School of Technology in Manchester, and the following papers were read: "Steam Turbines from the User's Point of View," by A. S. Blackman, Sunderland, and "Notes on Condensing and Water Cooling Plants," by E. Lunn, Huddersfield. On the afternoon of June 24 the works of the British Westinghouse Company at Trafford Park were visited. June 25 was given over largely to a business session, at which a president was elected and new members admitted. On the afternoon of June 25, however, delegates and visitors were afforded an opportunity to visit the station of the Lancashire Electric Power Company, Radcliffe, and the various electrical manufacturing plants in the vicinity, and many persons availed themselves of the courtesy thus extended, to their personal profit.

The managers' section of the Municipal Tramways Association held a successful conference in Newcastle in June. Sir Joseph Ellis, chairman of the tramways committee, accorded the managers a hearty welcome. Ernest Hatton described the Newcastle Tramways in a paper, and Mr. McElroy, Manchester, read a paper on the charges for energy for traction purposes. A paper on the medical examination of motormen and conductors was read by Mr. Hamilton, Leeds. Other subjects, such as time meters, maintenance of track and the use of transfer tickets were considered in papers delivered by Mr. Mozley, Burnley; Mr. Rogerson, Halifax, and Mr. Ellis, Cardiff.

The through service of tram cars between Leeds and Bradford has now been established. It will be remembered that the two corporations have been experimenting for some time with the object of through service in view. The gage of the Leeds system is 4 ft. 8½ in., but the gage of the Bradford system is only 4 ft. More than a year ago Mr. Spencer, of the Bradford system, invented a sliding sleeve, which, when fitted to the axles, enabled cars to pass from one system to the other over a stretch of track of tapering gage, and two cars so equipped have been in operation for a year.

After various improvements a number of cars were equipped with the sliding sleeve and put into permanent operation, the Lord Mayor of Leeds driving the first decorated car over the boundary into Bradford and the Lord Mayor of Bradford driving a decorated car in the opposite direction. The fare for the entire journey is to be 6d, and, judging by the traffic for the first week, the service is going to prove successful.

At a recent meeting of the City Council of York the report of the tramways committee recommending the acceptance of the tender of Dick, Kerr & Company to construct and equip the tramway system at a cost of £78,000 was definitely adopted. The time specified in the contract for the construction is 12 months. but arrangements have been made with the contractors by which that time is to be reduced to six months. Certain amendments were moved, but finally the report was adopted as a whole, and the work will be immediately commenced. With the exception of Oxford and one or two other places, there would appear to be very little more new work of this kind to be done in England.

Mr. Mallins, the general manager of the Liverpool Tramways, is having every car on the Liverpool system disinfected twice a day. Hitherto each car has been disinfected at night, but during the hot weather Mr. Mallins proposes to have each car thoroughly disinfected in the middle of the day as well.

Mr. Mallins has each car swept carefully and the floor sprayed with a small quantity of chloride of mercury. The operation only occupies a moment or two, and as there is no obnoxious odor, it should result in a distinct benefit to the hygiene of the city at large.

The City Council of Leeds has recently adopted the report of the sub-committee which visited the Continent to consider the trackless trolley. This report recommends that one of the systems inspected should be given a trial, and the route to Farnley has been selected for the experiment. It is, therefore, extremely probable that Leeds will show the way in England for an experiment of this nature. As the subject has received considerable attention in Great Britain during the last year the experiment will be watched with interest.

Northampton was the most recent city to send a deputation to the Continent, and it is understood that this deputation has also returned well impressed with the practicability of a trackless trolley tramway in outlying Northampton. The Edinburgh tramway committee, on the other hand, after considering a report of a deputation which it sent to the Continent to study the trackless trolley, has come to the conclusion that there are not sufficient data to warrant an expression on the subject, as the installation of the system would involve considerable increase in the cost of maintenance of roads and might prove a source of danger to the public using the highways.

The preamble of the bill of the Central London Railway, which has been applying to Parliament for an extension of its "twopenny tube" at its eastern end from the Bank to Liverpool Street, has been amended, as a much more logical terminus has been proved by the Parliamentary Committee, and it is likely that this work will be proceeded with at once. It is interesting to note also that at the inquiry the engineer of the Central London Railway gave some information about the proposed short subway to connect the Central London station at the British Museum with the Holborn station of the Great Northern, Piccadilly and Brompton tube. It is intended to have a traveling staircase to bridge the two hundred or three hundred yards between the platforms.

As stated recently, the North East London Railway has revived its scheme for constructing a tube from the Monument in the city to Waltham Abbey in the northeastern suburbs. The company was incorporated in 1905, but permission has never been granted by Parliament for financial reasons. The scheme, however, is being kept alive, and an extension of time for adequately financing the plan has been granted.

The City of Glasgow, which has always been looked up to as the representative city for municipally operated tramways, shows, during the last fiscal year, a decrease of £18,000 in the gross receipts of its tramway lines. It is argued, somewhat naturally, by other cities, that this has been caused to a certain extent by the extensive use of halfpenny fares in Glasgow. It would appear, however, that this had nothing to do with the case, and that the decrease is simply based upon the condition of poor trade in that northern city, where the shipbuilding industry in particular has been extremely slack. The effect of depression in trade on almost every tramway in Great Britain has been very pronounced during the last year, and Glasgow does not seem to have suffered much more seriously than other cities.

Andrew Nance, general manager of the Belfast Tramways, has just presented his annual report. Mr. Nance states that out of about 80 corporations 24 show an expenditure of 7d. per car mile run, the highest rate shown being 9¼d. There is a net profit, after deducting all fixed charges, of more than £37,000, and the receipts actually show an increase of £1,000 over those of the previous year, and work out at 9.12 of a penny per car mile run, which compares very favorably with preceding years.

In his Royal Institute lectures Professor Dalby has pointed out that the conversion of suburban systems to electrical working is equivalent to an increase in the size of the stations, claiming that for a journey of 100 miles, at 50 miles an hour, the steam locomotive is commercially more satisfactory, while electric traction should be used if the scheduled speed were doubled.

The London County Council has passed the estimates submitted by its highways committee for a further expenditure of £1,800,000 for further tramway developments in the current financial year. The total capital expended and authorized is now put at £12,750,000, the expenditure to March, 1909, being £9,484,000, leaving approximately £3,250,000 for future expenditure. These figures are exclusive of the price of the portion of the London United Tramways system which the Council has decided to buy, and also of the expenditure for the construction of the lines for which Parliamentary sanction is being sought. The above is the estimates of the Moderates in the Council. The only criticism offered by the Progressive party was that still more money ought to be spent and that the money ought to be spent more rapidly.

A. C. S.

News of Electric Railways

Cleveland Traction Situation

On June 21 the City Council considered the Tayler ordinance and finally voted it down. All the adherents of the Mayor voted with him to defeat the ordinance. Councilmen Homer and Walz refused to vote, stating that the Tayler ordinance had not received just consideration.

Acting under a suspension of rules, the City Council on the evening of June 24 gave Herman J. Schmidt rights on 13 routes as extensions of the Payne Avenue grant, which has not yet been voted upon by the residents of the city. The extension ordinance received the solid support of the administration Councilmen, including Mr. McLain, a Republican, but was opposed on the floor by Dr. Walz, who introduced the Tayler ordinance, and four Republicans, all of whom cast their votes against the Schmidt grant.

Councilmen Horner and Kramer attacked the ordinance on the ground that it is invalid, in that it provides for extensions of a route on which the franchise has not been approved by the people, and which is, in fact, not an ordinance until such approval is secured, once a petition is properly signed asking for a referendum vote. Councilman Walz asserted that the ordinance failed to embody the safeguards for the people that are contained in the Tayler ordinance and that it is entirely inadequate in its provisions for city supervision over service and operation. Mr. Walz pointed out the omission of many conditions that were insisted upon in any ordinance that might be passed in the interest of the Cleveland Railway, and asked why the administration granted favors in one case that were denied in another. These so-called extension grants include all but three of the main lines now occupied by the Cleveland Railway on the East Side and those on the West Side not included in the grants made to the original 3-cent companies. They include a provision to the effect that transfers shall be given to all other low-fare lines.

At a meeting of citizens of Cleveland in the library of the Chamber of Commerce Building on June 21 a committee of 100 was named to oppose the Schmidt franchises in the referendum election. Homer McDaniel, who was made chairman of the meeting, was selected as chairman of an executive committee of seven to conduct the campaign. The committee proposes to hold meetings all over the city, beginning about July 1. Chairman McDaniel spent the week beginning June 21 considering the personnel of the committee of seven that will have direct charge of the campaign against the Schmidt ordinance.

Speaking in a tent located in the heart of the original 3-cent fare district on the West Side on the evening of June 23, Mayor Johnson declared that he could prove from the figures in the receivers' hands that 3-cent fares had paid, and he challenged any one to debate the question with him. He has written Chairman McDaniel of the citizens' committee, asking that his men take part in public debates in his tent. Mr. McDaniel has replied that he cannot commit himself until his committee of seven is named and has time to consider the matter. At one of his meetings M. J. Gallagher, a member of the committee, stated that if the Mayor's challenge is refused he will resign.

I. P. Lamson, president of the Lamson & Sessions Company, has written a letter to the Chamber of Commerce, in which he asks that all business men so arrange their affairs as to be in the city on the date of the referendum election, Aug. 3, and that their vacation schedules, whether they are in favor of or opposed to the Schmidt grants, be so fixed that their employees may have an opportunity to vote.

On June 26 the city was flooded with circulars in which this question was asked: "What do you think of business houses which insist that you shall pay 5 cents carfare when you are now riding for 3 cents?" Then followed a list of firms on the West Side and on the East Side which are represented on the Chamber of Commerce committee of 100. The fact that these firms are represented on the Chamber of Commerce committee was noted again after the list of firms. The circular was concluded with this advice: "Think it over! This is considered by the merchants as an attempt by the Mayor at boycott, especially since many of the members of the citizens' committee of 100 were called up by telephone beforehand and asked if they were going to remain on the committee, and if they did not think it would hurt their business if they did." The members of the committee named in this circular and others said that the accusation that they favor a 5-cent fare is false; but that they do favor the best service that can be given for a fare that will cover the cost and yield a fair return on the investment.

Transit Affairs in New York

Application was made on June 25 to the Board of Estimate by the Public Service Commission for permission to advertise for bids for new subway routes. These new lines are, with some minor changes, those planned by the Bradley-Gaffney-Steers Company. The commission asked to be allowed to advertise for bids for construction alone, for equipment and operation in case of construction alone, and for construction, equipment and operation and also to advertise for offers for the equipment and operation of the Brooklyn loop lines and the Fourth Avenue line, which are to be constructed by the city. The Bradley-Gaffney-Steers Company has made these routes part of its proposed system and is ready to contract with the city for equipping and operating them.

Under the suggestions made by the commission in its communication to the Board of Estimate it will be possible to let contracts for building sections of the road or for the entire system as mapped out by the company. It would also be possible under this provision for the Interborough Rapid Transit Company to compete for the Lexington Avenue section alone, a route for which it is desirous of getting a franchise in order to extend the present subway up the East Side of the city. The commission declared:

"It is to be noted that in considering the proposition of 'construction alone' this may be undertaken by either municipal funds or by special assessment in whole or in part. Under the present law contracts for equipment and operation will be under the indeterminate plan as outlined above. Contracts for construction, equipment and operation also will be under the indeterminate plan, ownership of the road being vested in the city. Provision will be made for soliciting bids for and letting an entire system or any part thereof to a successful bidder with appropriate provisions in the contracts for operating the various routes in conjunction with each other and for the apportionment of charges and rentals. These are matters which it is impossible to work out at the present time, but must be developed and perfected during the preparation of the contracts. As soon as the commission is advised of your wishes in the premises the drafting of the invitations and the form of contracts can be commenced. If the commission can receive such advices at an early day the work of preparing the contracts will be undertaken."

The matter has been referred to a select committee of the board consisting of Comptroller Metz, President McGowan of the Board of Aldermen and Borough Presidents Ahearn, Coler and Haffen.

Mayor McClellan has approved the franchise of the Hudson & Manhattan Railroad passed by the Board of Estimate recently, this being the final step toward authorizing the extension of the road from Sixth Avenue and Thirty-fourth Street to the Grand Central Station. W. G. McAdoo, president of the company, has stated that work will be begun as soon as possible and that trains will be running to the Grand Central Station by 1911.

In a report submitted to Bridge Commissioner Stevenson, Assistant Engineer Lane of the department, who has charge of the traffic on the Brooklyn Bridge, says that the number of trolley cars and trucks crossing the bridge during May was greater than in any other month since it was built. The daily average of trolley cars from 5 to 6 p. m. was 324, as against 267 for 1907.

Judge Lacombe, of the United States Circuit Court, has granted the application of the receivers of the Metropolitan Street Railway to amend the original order as to their administration of the road. By the judge's ruling, the receivers will supplement their present system of accounting by making such additions or changes as may be agreed upon in writing by all parties interested and approved by the court, and all questions as to the manner and form of keeping their books, on behalf of conflicting interests, are reserved for further determination by the court.

The Public Service Commission will apply to the Board of Estimate for $350,000 to build a new subway station on the Broadway branch near 190th Street. There is at present no station between 181st Street and Dyckman Street, and the population of the district is growing fast.

The Public Service Commission has announced an opinion by Commissioner Maltbie in which the commission disapproves the style of wheelguard in use by the Second Avenue Railroad and the Fifty-ninth Street line of the Central Park, North & East River Railroad. Commissioner Maltbie recommends that the cars be equipped with automatic trip wheelguards such as are now in use on the lines of the Third Avenue Railroad.

Association Meetings

Central Electric Railway Association, Detroit, Mich., Aug. 26.

Central Electric Accounting Conference, Indianapolis, Ind., Sept. 11.

American Street & Interurban Railway Association and affiliated associations, Denver, Col., week commencing Oct. 4.

Colorado Light, Power & Railway Association, Denver, Col., during the week of Oct. 11-16.

Municipal Ownership Defeated in San Francisco.—On page 999 of the issue of the Electric Railway Journal of May 29, 1909, mention was made of the passage in San Francisco of an ordinance to submit to the voters of the city a bond issue of $1,950,000 to cover the cost of reconstructing the Geary Street, Park & Ocean Railroad and extending the line to the Cliff as a municipal enterprise. The question was voted upon on June 24, and the proposal was defeated. The franchise of the Geary Street, Park & Ocean Railroad expired in 1906.

Suspension of Judgment Asked in St. Louis Case.—Motions by attorneys for the United Railways, St. Louis, Mo., to transfer the Barrie case, recently affirmed by the Appellate Court, to the Supreme Court of Missouri, and for a rehearing, have been overruled by the St. Louis Court of Appeals. A motion has been made, however, for suspension of judgment pending the decision of the Missouri Supreme Court in other cases involving similar points. In the case of David Barrie against the United Railways, Judge Reynolds held the United Railways Company liable for judgments and claims against the St. Louis Transit Company, which it absorbed.

Date Set for the Opening of Lower Hudson River Tunnel.—William G. McAdoo, president of the Hudson & Manhattan Railroad, has announced that the company will formally open its tunnel between Jersey City and Cortlandt Street, New York, on July 19. Special trains for invited guests will be run at 10 a. m., and the line will be opened to the public at 3 p. m. Preparations are being made fittingly to celebrate the event in Jersey City, and a program is being arranged to include the participation of Governor Hughes of New York, Governor Fort of New Jersey, Mayor McClellan of New York, Mayor Wittpenn of Jersey City, William G. McAdoo, president, and other officers of the company in the ceremonies.

Indiana Tax Board Reduces Taxable Value of Electric Railroads.—The Indiana Tax Board has notified the electric railways of the State of the assessed value of their properties for taxation. Beginning July 6, 12 days will be allowed for hearing appeals for a change or modification of the assessments. The board has assessed the electric railway property on a valuation of $21,663,001, as against $21,666,768 for 1908. The value of the improvements on electric railways for 1909 is estimated at $994,189, while that for 1908 was placed at $934,565, making a net gain in the value of improvements over 1908 of $59,624. This includes the construction of nearly 10 miles of road by the Evansville Terminal Railway and 12 miles by the Goshen, South Bend & Chicago Railway. The following companies reported increases in mileage: Chicago, Lake Shore & South Bend Railway, 59.43 miles; Chicago, South Bend & Northern Indiana, 26.17 miles; Evansville & Southern Indiana, 4.3 miles; Indiana Union Traction Company, 2.21 miles; St. Joseph Traction Company, 1.08 miles; Terre Haute, Indianapolis & Eastern Traction Company, 1.12 miles; Indianapolis Street Railway, .41 mile.

Use of Boston Common for Subways Questioned.—A brief has been filed with the full bench of the Supreme Judicial Court of Massachusetts by the plaintiffs in the case of E. D. Codman and others against the Boston Transit Commission, relative to the use of Boston Common in connection with the construction of the Boston terminus of the Cambridge subway. It is argued that the use of the Common "impairs" its service to the inhabitants of the city and that the question is one of constitutionality. The case may ultimately go to the Supreme Court of the United States. In reply the Boston Elevated Railway has filed a brief which states that the plaintiffs cannot be heard on the question, since the Common is not their property. The City of Boston owns the Common subject to legislative control, which has often been exercised. The Common cannot be exempt from the exercise of the right of eminent domain. Land devoted to or taken from one public use may be appropriated by the Legislature for another. A brief is also filed by Corporation Counsel Babson for the Boston Transit Commission and one by Contractor McGovern, in favor of the proceedings. A feature of the case is an effort by the plaintiffs to secure the location of the Cambridge subway terminus at Scollay Square instead of at Park Street. The full bench will review the case with the expectation of an early decision.

Electrical Engineering at Cornell University.—At Cornell University this year the degree of mechanical engineer was conferred on more than 225 candidates, including about 75 who have specialized in electrical engineering. Two years ago the electrical course was improved by the addition of a junior laboratory course. The present class is the first to graduate with this complete course, namely, eight hours of required electrical work in the junior year and 20 hours in the senior year. This complete course comprises (1) a junior laboratory course with one experiment per week throughout the year; (2) a senior laboratory course with two experiments and one recitation per week throughout the year; (3) a junior recitation course on the elements of electrical engineering with two recitations per week throughout the year; (4) a senior recitation course on the theory of electric curcuits and machines with two recitations per week throughout the year, and (5) a senior problem course with two computing periods per week throughout the year. Last year these were (1) design of electrical machinery; (2) electric power generation and distribution; (3) telephone engineering; (4) wireless telegraphy, and (5) elementary and advanced electric railways.

Government Suit Against New Haven Railroad Dismissed.—On June 24 the Attorney-General of the United States directed the dismissal of the Government's suit against the New York, New Haven & Hartford Railroad and the Boston & Maine Railroad for violating the anti-trust law. In explanation of his action the Attorney-General issued a statement in which he said: "In view of the fact that the suit of the United States now pending against the New York, New Haven & Hartford Railroad and the Boston & Maine Railroad for a violation of the anti-trust act rests almost entirely upon a claim that these companies had already consolidated by means of stock ownership, and since the community most directly affected is the State of Massachusetts, whose laws now expressly authorize such consolidation, the Attorney-General has determined to dismiss the Government's action. In that action the further complaint was made that the New York, New Haven & Hartford Railroad had acquired a number of electric railways in Massachusetts and adjoining States, and that this was a combination in restraint of inter-State commerce. Since the Government's suit was determined upon, however, the Supreme Judicial Court of Massachusetts, in a case involving the right of the New York, New Haven & Hartford Railroad to acquire electric railways in Massachusetts, has decided that the railroad has no such power, and the New York, New Haven & Hartford Railroad has been parting with such electric railway properties. Upon this question the Attorney-General is convinced that, whatever may have been the merit of the claim when the suit was begun, there is not now in this case any such element of competition in inter-State commerce by reason of such ownership of electric railways as justifies further prosecution."

St. Louis League of Electrical Interests.—Capt. Robert McCulloch, president and general manager of the United Railways, St. Louis, Mo., was elected president of the St. Louis League of Electrical Interests at its permanent organization a few days ago and Walter Robbins, assistant general manager of the Wagner Electric Company, was chosen secretary. The executive committee is composed of S. A. Hobson, H. H. Humphrey, and F. E. Newbury. The meeting was attended by 180 representatives of electrical interests of St. Louis, including consulting engineers, public service corporations, electrical jobbers, electrical contractors and electrical manufacturers. Nine members of the St. Louis Electrical Club, which was organized 17 years ago, were made members of the new organization. They are Capt. Robert McCulloch, George Rosenthal, H. H. Humphrey, F. K. Beardsley, J. F. Gerleman, W. N. Mathews, A. S. Partridge, W. A. Layman and E. H. Abadie. Following his election as president, Capt. McCulloch announced that the hall of the United Railways, at Park and Grand Avenues would be made available as a meeting place for the club. An executive committee of five members will be appointed by President McCulloch. The objects of the new league are to encourage cooperation among electrical interests of St. Louis; to increase interest among those engaged in the commercial, legal, patent, professional and financial sides of electrical work; to establish a means by which public questions affecting the welfare of St. Louis may receive consideration by all the electrical interests of the city; to increase the recognition of the electrical industry commensurate with its importance; to form a body free from the imputation of devotion to special interests and to provide educational and social features for its members. The meeting was addressed by Capt. McCulloch, Secretary Robbins, C. A. Houts, F. N. Jewett and others.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Massachusetts.—The Massachusetts Legislature of 1909 adjourned on June 19 with the passage of about 540 acts and 145 resolves, about a score of which are of interest to electric railways. One of the most important acts passed was an amendment to the law authorizing a street railway to increase its capital stock or issue bonds. This law relaxes slightly the stringent conditions under which companies have heretofore labored in trying to raise money in Massachusetts for the reasonable and proper conduct of their affairs, and improves the possibilities in the way of financing betterments. A specific case of legislation intended to surround an operating company with easier conditions of financing is illustrated by the law passed to give the Connecticut Valley Street Railway Company the right to issue, subject to the approval of the Railroad Commission, bonds or notes payable at periods of not over 12 months for the purpose of refunding the present funded debt and paying other obligations up to the amount of $750,000. In passing this law the Legislature thereby recognized some of the difficulties which attend the raising of funds by lines operated in thinly populated districts, and showed its willingness reasonably to encourage those in charge of the maintenance of the facilities in the region named. A law was passed to change the date when stockholders in railroads and street railways may subscribe for new stock, amending the previous law by permitting the directors to set the date at which each stockholder shall be given written notice of the amount of the increase proposed, the number of shares or fractions to which the stockholder is entitled to subscribe, the price and time limit upon the subscription.

The general law relating to the location of street railways was amended by permitting the company desiring a location to wait a maximum of 60 instead of 30 days before accepting a grant of a location or an alteration in a route already granted. The acceptance of such a location previously depended upon the vote of the president or a majority of the directors of the company. The 1909 amendment allows the acceptance to be "executed in accordance with the by-laws or a vote of the directors," giving a little broader latitude in the legality of acceptances of locations. Another section in the 1909 amendment provides that any requirement in the general laws of action to be taken or instruments to be signed by the president, directors or the majority of the directors of a street railway relative to the grants, extensions, alterations and revocations of location, abolition of grade crossings and rights in State highways shall be sufficiently and legally complied with if such action is taken by a vote, and if such instrument is executed in accordance with, and by the person or persons designated in, a vote of the directors at a meeting duly and properly held at which a quorum is present.

In connection with the determination of the taxable value of corporate franchises as legally provided for, an amendment was passed to the effect that "underground conduits, wires and pipes laid in public streets, and poles, underground conduits and pipes, together with the wires thereon or therein, laid in or erected upon private property, or in a railroad location, by any corporation except street railway companies, the value of whose poles, underground conduits and pipes, together with the wires" * * * "for the purposes of taxation, shall, like their rails and rights of way, be included in and not deducted from the value of their corporate franchises." In the case of a street railway company, whether or not chartered under the laws of Massachusetts, the tax commissioner is required to deduct from the franchise value as determined so much of the value of the company's capital stock as is proportional to the length of that part of its line that lies outside the State, if any does; and also the value of its real estate, machinery and poles, underground conduits, pipes and wires, subject to local taxation within the State. The inclusion of the poles in the items to be deducted is a definite relaxation of the burdens of taxation, so far as this particular portion of the physical plant is concerned in its relation to the company's franchise. A general law was passed authorizing all street railway, electric railroad and elevated railway companies within the State to transport military supplies over their respective lines subject to the regulation of the Railroad Commission. Another general law was passed enlarging the powers of the Railroad Commission so that if the board is of the opinion that stations or waiting rooms should be relocated it shall in writing inform the company of the improvements or changes which it considers necessary to recommend.

A number of special acts and resolves were passed, one of the most important being a resolve that the Boston Transit Commission and the Massachusetts Railroad Commission, sitting jointly, shall investigate and report to the Legislature in January, 1910, whether or not, in their opinion, it is advisable, expedient and in the public interest: (First) To amend the Boston Elevated-West End consolidation law of 1908 by providing for a distribution of any of the assets of the West End Street Railway among its stockholders, or by changing the terms and conditions of the first and second preferred stock to be issued by the Boston Elevated Railway. (Second) To authorize the Boston Elevated Railway to acquire and hold the stock and securities of other street or electric railroads; and (third) to authorize the Boston Elevated Railway to extend its elevated structure from Sullivan Square to Medford. In connection with the proposed consolidation of the Boston Elevated and the West End systems a resolve was also passed to extend the time in which it can take place to Dec. 31, 1910.

Another matter of importance to be reported upon by the joint board at the request of the Legislature is the question of future subways, tunnels and elevated railway lines in Boston. About a dozen petitions and bills were introduced at the last session, asking for the construction of new rapid transit routes of various degrees of merit, ranging from projects which are the logical outcome of previous development to schemes of extraordinary conception and expense. All these measures were brought before the committee on metropolitan affairs and heard at greater or less length, so far as time permitted, with the outcome that the committee recommended and the General Court passed a resolve requiring an investigation and report in January, 1910, by the joint board as to the advisability of the projects. It was felt that more would be gained by studying these transit problems of Boston in a group than singly, and for this reason the Legislature also passed a resolve directing the joint board to investigate and report in January, 1910, upon the advisability of permitting the Boston & Eastern Electric Railroad to build a tunnel under Boston Harbor and certain subway lines in connection with it. A number of measures of minor import were passed, including an act to allow the Old Colony Street Railway Company to use the tracks of the Fore River Shipbuilding Company in Quincy, and an act authorizing the General Electric Company to use a portion of the tracks of the Pittsfield Electric Street Railway. The East Boston Railroad was authorized to use electricity as a motive power, if it so desires, and the term of the Boston Transit Commission was extended until July, 1911.

Among the bills which either did not pass or which were referred to the next General Court, one of the most important was the bill authorizing the New York, New Haven & Hartford Railroad to hold the stock of the Berkshire Street Railway Company. A measure which was given leave to withdraw was a bill to relieve street railways of the burdens of the so-called "excise tax" by providing that every company should be required, in lieu of any present stipulations and conditions, to keep in repair so much of the surface material of streets, highways and bridges as is included in the portion occupied by its tracks, and in unpaved streets a strip 18 in. wide on each side of the track was to have been added. Several bills relating to the Boston Elevated Railway were given leave to withdraw. One was a measure requiring the company to give night transfers on its system at Adams Square or Hanover Street, Boston, and another was a bill to provide for exits from the elevated structure at short distances apart. A third bill which failed to pass was a measure permitting the Old Colony Street Railway to lease its lines in Hyde Park and Dedham to the Boston Elevated Railway. A bill to allow the City Council of Boston to exact an excise tax as a condition upon the granting of franchises to any public or semi-public corporation was killed. The bill of the Boston, Lowell & Lawrence Electric Railroad to secure the right to build elevated and subway structures in Lowell, Lawrence, Somerville and Boston failed to pass, as did the bill to change the Boston terminus of the Cambridge subway from Park Street to Scollay Square. A bill to create a public-service commission to take over the work of the Boston Transit Commission and the temporary Metropolitan Improvements Commission was defeated. Another bill which failed was one imposing a fine or imprisonment upon any seeker for a position with a public-service corporation making false statements upon a written application. The bill of Mayor Hibbard, of Boston, providing that a street railway may be assessed three-quarters instead of half the cost of street widening in cases where the widening has been done within two years of or on account of a track location obtained there failed to pass. A bill to extend the time limit from one to two years for bringing a suit for damages in case of the death of a passenger or non-employee through the negligence of a railroad or street railway was killed. Three other bills which were short-lived required street railway companies to equip their cars with lifting jacks, fenders and hot-sand apparatus. The bill to define further the purposes of issuing stock and bonds by street railways was referred to the next Legislature.

Financial and Corporate

New York Stock and Money Market

June 29, 1909.

The recovery in the stock market, which has been in progress during the week, continued to-day and there was an increase in the volume of trading. Since the beginning of the present upward movement the majority of the list has recovered more than half of the losses sustained during the reaction of a fortnight ago. Even Amalgamated Copper, in spite of the adverse statistical position of the copper metal market, has recovered the greater part of its loss. Traction shares have been unusually active. Both issues of Interborough-Metropolitan have been traded in liberally and the preferred has recorded several points advance. Third Avenue, while it, too, has been quite active, has receded a few points on the announcement of a reorganization plan involving an assessment of $25 per share.

The bond market continues to be strong—large issues whenever offered being quickly over-subscribed—and the money market shows no signs of stiffening. Quotations to-day were: Call, 1¾ to 2 per cent; 90 days, 2¼ to 2¾ per cent.

Other Markets

Philadelphia Rapid Transit continues to be the most active traction issue in the market of that city, but the price has been very well sustained. Union Traction has also been active with quotations unchanged.

In the Chicago market, there has been little trading in tractions. Even Kansas City Railway & Light, which has heretofore been fairly active, has been out of the market. But few lots of City Railway issues have been offered.

Massachusetts Electric shares have been practically the only tractions which have commanded any interest in the Boston market during the past week. Prices have recorded only fractional changes.

In the Baltimore market, in addition to the continued activity in United Railways bonds, there have been some transactions in the stock during the past week. The prices have ranged from 11¾ to 12¼.

Quotations of various traction securities as compared with last week follow:

	June 22.	June 29.
American Railways Company	a45¾	a45¾
Aurora, Elgin & Chicago Railroad (common)	a43	39½
Aurora, Elgin & Chicago Railroad (preferred)	a88	a88
Boston Elevated Railway	128	129
Boston & Suburban Electric Companies	*16	*16
Boston & Suburban Electric Companies (preferred)	*71	*71
Boston & Worcester Electric Companies (common)	10	10
Boston & Worcester Electric Companies (preferred)	a56	a56
Brooklyn Rapid Transit Company	77⅛	79½
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	86¾	87½
Capital Traction Company, Washington	a134½	a135
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*4	*4
Chicago & Oak Park Elevated Railroad (preferred)	*14	*14
Chicago Railways, ptcptg, ctf. 1	a109	a109
Chicago Railways, ptcptg, ctf. 2	a36¾	a38
Chicago Railways, ptcptg, ctf. 3	a28	a28
Chicago Railways, ptcptg, ctf. 4s	a10	a10
Cleveland Electric Railway	*78	*78
Consolidated Traction Company of New Jersey	a78½	a78½
Consolidated Trac. Co. of N. J. 5 per cent bonds	106¼	a106½
Detroit United Railway	a62⅜	a62
General Electric Company	160	161¾
Georgia Railway & Electric Company (common)	a93	a93
Georgia Railway & Electric Company (preferred)	88	87
Interborough-Metropolitan Company (common)	16⅛	16⅝
Interborough-Metropolitan Company (preferred)	45⅜	50⅜
Interborough-Metropolitan Company (4½s)	78¾	79⅞
Kansas City Railway & Light Company (common)	a49	a49
Kansas City Railway & Light Company (preferred)	a84¾	a84¾
Manhattan Railway	143⅞	a147
Massachusetts Electric Companies (common)	a12½	a13½
Massachusetts Electric Companies (preferred)	a68	71
Metropolitan West Side, Chicago (common)	a17	a17
Metropolitan West Side, Chicago (preferred)	a52	a50
Metropolitan Street Railway	a27	a26
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	83¼	82⅝
Northwestern Elevated Railroad (common)	a23	a23
Northwestern Elevated Railroad (preferred)	a69½	a69½
Philadelphia Company, Pittsburg (common)	42½	a42½
Philadelphia Company, Pittsburg (preferred)	a44	a43
Philadelphia Rapid Transit Company	29¼	a28½
Philadelphia Traction Company	91	a91½
Public Service Corporation, 5 per cent col. notes	a100½	a100½
Public Service Corporation, ctfs	a89	a88½
Seattle Electric Company (common)	*109	*112
Seattle Electric Company (preferred)	102	*102
South Side Elevated Railroad, Chicago	a55½	a55½
Toledo Railways & Light Company	a9	a8½
Third Avenue Railroad, New York	26¼	21¾
Twin City Rapid Transit, Minneapolis (common)	104¼	103⅝
Union Traction Company, Philadelphia	53⅛	a52½
United Railways Inv. Co., San Francisco (common)	38¾	a39
United Railways Inv. Co., San Francisco (common)	38¾	a39
United Railways Inv. Co., San Francisco (preferred)	a62	a56½
Washington Railway & Electric Company (common)	a43	a42½
Washington Railway & Electric Company (preferred)	a90⅝	a90⅝
West End Street Railway, Boston (common)	92	92½
West End Street Railway, Boston (preferred)	105¼	104
Westinghouse Electric & Manufacturing Company	83¼	85
Westinghouse Elec. & Mfg. Company (1st pref.)	a124	121¼

aAsked. *Last sale.

Third Avenue Railroad Submits Reorganization Plan

The committee representing the holders of bonds issued under the first consolidated mortgage of the Third Avenue Railroad, New York, dated May 15, 1900, has submitted to the Public Service Corporation of the First District of New York for consideration a plan for the reorganization of the company which provides briefly that the company shall issue immediately $16,516,600 of refunding mortgage bonds, $32,000,000 of adjustment mortgage 5 per cent accumulative bonds and $20,000,000 of stock, the two main purposes being to provide upward of $7,000,000 of new money and to give the old security holders new securities.

The plan of reorganization as filed with the commission shows that the property covered by the consolidated mortgage of the Third Avenue Railroad is to be purchased by the bondholders' committee at a foreclosure sale (unless they should decide to proceed without foreclosure and sale) and a new company is to be organized under the laws of New York, by which the following securities shall be issued when approved by the Public Service Commission: $40,000,000 of first refunding mortgage 50-year 4 per cent gold bonds, to carry interest from July 1, 1909; $32,000,000 accumulative adjustment mortgage gold bonds, to carry interest from July 1, 1909, and $20,000,000 of stock, as previously mentioned.

Of the refunding bonds, which are to be redeemable at 105 per cent and accrued interest on and after July 1, 1914, on three months' notice, $5,000,000 is to be delivered to an underwriting syndicate to be formed by the committee, and of which the members of the committee may become members; $10,516,800 is to be issued to holders of the present consolidated bonds of the Third Avenue Railroad, being 8 per cent for unpaid interest and 20 per cent on account of principal; $11,445,000 is to be reserved to take up the underlying bonds; $1,000,000 is to be issued forthwith to provide for necessary extension, and $12,038,200 is to be reserved for future extensions or improvements, under restrictions to be defined in the mortgage.

The adjustment bonds are to be cumulative and be entitled to elect a majority of directors until the full interest, including accumulations, has been received for five consecutive years, and are to be redeemable in whole, but not in part, at par and accrued interest on any interest date on three months' notice by the company. Of the total amount $30,048,000 is to be issued to holders of the present consolidated bonds of the Third Avenue Railroad, being 80 per cent of the principal thereof; $1,000,000 is to be delivered to the syndicate and $952,000 is to be reserved to take care of certain issues of subsidiary companies, any balance to remain in the treasury of the new company.

The new stock amounting to $20,000,000 is to be delivered to the syndicate and offered to the present stockholders of the company who deposit their stock and consent to this plan and pay $25 per share, in an amount equal in each case to 125 per cent of their present holdings.

The summary and conclusion of the plan of reorganization as submitted to the Public Service Commission says:

"The present Third Avenue Railroad consolidated 4 per cent bonds will receive 8 per cent in refunding bonds of the new company for the unpaid interest and, on account of principal, 20 per cent in refunding bonds of the new company, and 80 per cent in adjustment bonds of the new company. The present stockholders will receive on the payment of $25 per share 125 per cent of their present holdings in stock of the new company. The syndicate will receive $5,000,000 of new bonds, $1,000,000 of adjustment bonds and $20,000,000 of stock, which stock it will offer to the shareholders upon payment by them of $25 per share, and in addition provide the committee with sufficient cash to pay the reorganization expenses and the other cash requirements, making a total of $7,500,000.

"In submitting this plan the committee has sought to make a sound and, so far as may be, permanent organization. Twice within a generation the progress of science has necessitated the entire reconstruction of the Third Avenue Railroad—first by installation of the cable system, and second by electrification, and that process may possibly hereafter be repeated. Property of this class is also specially sensitive to the exercise of taxing powers, and it may at any time be imperilled by State regulation, and, in addition, we have to face the popular delusion that while in all other departments of life the purchasing power of a nickel has during the last generation nearly been cut in two, and the price of everything proportionately raised, the people should still have transportation at prices which prevailed in 1870. These are considerations which expose street railway properties to unusual vicissitudes which demand that the fixed charges shall be as light as possible and explain the drastic character of the foregoing plan."

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—Another bill of foreclosure has been filed by the bondholders of the Wisconsin division of the road, ancillary to the one filed in Milwaukee. The bills will be considered together.

Dallas (Tex.) Interurban Electric Railway.—Attorney-General Davidson, acting on behalf of the State of Texas, has filed suit in the district court at Austin against the Dallas Interurban Electric Railway for the appointment of a receiver and for the forfeiture of the charter of the company on the ground of insolvency.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe of the United States Circuit Court has denied the application of the Guaranty Trust Company, New York, for permission to appeal to the United States Supreme Court from the decree of foreclosure and sale of the Metropolitan Street Railway, made on March 18, 1909.

New Orleans Railway & Light Company, New Orleans, La.—The New Orleans Railway & Light Company has listed on the New York Stock Exchange an additional $3,866,000 of its general mortgage 4½ per cent bonds, due 1935. This is part of an authorized issue of $30,000,000, and a total of $17,509,000 has now been listed on the exchange. Of the additional issue, the proceeds of $1,532,000 have been devoted to reduction of the company's current liabilities and $323,000 to retiring a like amount of four issues of underlying bonds. Proceeds of $2,011,000 of the bonds were devoted to the capital expenditures of the company, which since May 1, 1906, are stated to have amounted to $3,314,671. Some of the principal items of the latter are: Cars and their equipments, $306,971; power stations, $1,721,527; track extensions, $129,596; track improvements, $462,988, and various electric and gas construction. The balance sheet of the company as of Dec. 31, 1908, submitted to the New York Stock Exchange, shows assets of $67,696,899 and liabilities of $67,696,899.

Rockford & Interurban Railway, Rockford, Ill.—The Rockford & Interurban Railway, which has been taken over by the Union Railway, Gas & Electric Company, has organized as follows: H. D. Walbridge, New York, president; Emil G. Schmidt, Springfield, Ill., vice-president; T. M. Ellis, Rockford, Ill., general manager; W. H. Lemon, Springfield, Ill., secretary; W. F. Woodruff, Rockford, Ill., treasurer; H. D. Walbridge, Emil G. Schmidt, E. W. Clark, W. H. Lemon, W. Partridge and T. M. Ellis, directors.

Seattle (Wash.) Electric Company.—The directors of the Seattle Electric Company have declared a semi-annual dividend of 3 per cent on the common stock of the company, payable on July 15, 1909, to stockholders of record on July 6, 1909. This is an increase from a 5½ per cent to a 6 per cent annual dividend basis.

Taunton & Pawtucket Street Railway, Taunton, Mass.—Application has been made in the Massachusetts Superior Court for a receiver for the Taunton & Pawtucket Street Railway on a petition filed by the Federal Trust Company, Boston, trustee for $200,000 bonds, for default of interest in January, 1909.

Aurora, Elgin & Chicago Railroad, Chicago, Ill.—Hayden, Miller & Company, Cleveland, Ohio, offer for subscription at a price to yield more than 5.3 per cent the unsold portion of a block of $1,000,000 of the first and refunding 5 per cent bonds of the Aurora, Elgin & Chicago Railroad, dated July 1, 1906, and due July 1, 1946, but subject to call in whole or in part at 102 and interest on or before, but not after, July 1, 1911. The par value of these bonds is $1,000, and interest is payable January and July at the Citizens' Savings & Trust Company, Cleveland, Ohio, or the First National Bank, New York. The Northern Trust Company, Chicago, is trustee of the mortgage.

Choctaw Railway & Lighting Company, McAlester, Okla.—The Colonial Trust & Savings Bank, Chicago, offers for subscription at 93 to yield about 5½ per cent the unsold portion of $150,000 of 5 per cent gold bonds of the Choctaw Railway & Lighting Company, dated March 2, 1908, and due March 1, 1938, but redeemable after 1913 at 105. Interest is payable in May and September at the Colonial Trust & Savings Bank, Chicago, the National City Bank, New York, and the Mercantile Trust Company, St. Louis. The McAlester Trust Company is trustee of the mortgage securing the bonds. The bonds are of the denomination of $500 and $1,000. A circular gives the total capital stock of the company at $1,000,000, of which $750,000 is common stock and $250,000 preferred stock. There is an authorized issue of $1,500,000 of bonds, of which $750,000 has been issued, this including the $150,000 now offered for subscription. The statement of earnings for the six months ending December, 1908, shows that the gross receipts of the company were $78,613; net earnings, $30,976; bond interest, $18,750, leaving a surplus of $12,226.

Traffic and Transportation

Strike in Pittsburgh

As a result of an order issued to the union employees of the Pittsburgh (Pa.) Railways Company at 11 p. m. on June 26, they refused to take out their cars on June 27, and for two days comparatively few cars were run in Pittsburgh. The men said that an agreement made with them in April, 1909, looking to the readjustment of runs and other matters had not been lived up to by the company and demanded that several employees who had recently been discharged for infraction of the company's rules should be reinstated. The company refused flatly to accede to these demands, and the position of the company in the matter is clearly indicated in the following statement which it addressed to its employees on June 26:

"Gentlemen—Referring to the present contention between you and the company, we are amazed at the stand you have taken, considering the nature of the grievances. We maintain that we have not failed to abide by the working rules of April, 1909.

"Section No. 1, regarding which you complain, reads: 'The hours of service will be made as nearly as possible equal on the basis of a maximum of 11 hours and a minimum of 8 hours, with 10 per cent leeway. In case the superintendent of transportation can arrange the schedule on the basis of a maximum of 10 hours and a minimum of 8 hours, and completing all swing runs within 14 hours, the same shall be done. On this date, April 27, 1909, there are 1165 runs, of which 213 are tripper runs of less than 8 hours. It is believed by the company that fully 50 per cent of these short tripper runs can be lengthened by extending the time for completing such runs to 16 hours and the company will use its best endeavors to so improve these runs within 30 days. All men shall have reasonable time to eat.'

"The company promised to use its best efforts to lengthen these short runs and has made considerable progress in this direction, notwithstanding the fact that additional cars have been put in service to comply with the recommendations of the State Railroad Commission for the rush hours, and to provide for the change in traffic conditions from the winter to summer schedules.

"This question of schedules is a very difficult one, as it is often impossible to lengthen one man's run without shortening the run of some other man, and since April last the superintendent of transportation personally has been most of the time engaged in working out schedules, and has also had his schedule force doubled in order to arrange the runs in such a manner that they would be pleasing to you. Your representatives have been asked for suggestions—a few of which they have given.

"There is at every barn of the company a box in which men are requested to place suggestions for the betterment of the service, and any man who is dissatisfied with his run has the privilege of suggesting a remedy, which will gladly be adopted if it does not prove detrimental to the service or an inconvenience to the public.

"As to Sunday runs, referred to in section No. 10, it is true that they are longer than week-day runs, the idea being that as it takes fewer men to operate the schedule with long runs, it is possible to allow more men to be off on Sunday.

"As to your complaints regarding the treatment of the three men: First, this is a case of 18-months' standing and had never been brought to the attention of the higher officials of the company until about two or three weeks ago. Surely the complaint could not have been so very serious or it would not have lain dormant so long a time.

"Second, this case is one in which a man lost six days as a punishment for a refusal to assist in raising a blockade which was inconveniencing the public. There is considerable evidence on both sides of this controversy, and since the man had already been reinstated it was only a question of the time he had lost. The company desired to sift the evidence to the bottom, but when pressed by the representatives of the men for an immediate decision the officials of the company could not do otherwise upon the evidence before them than uphold the division superintendent who entered the complaint. The fact that the man was from another division, and that he was unknown to the division superintendent other than by the number on his cap, would seem to be sufficient proof that the division superintendent had good reasons for reporting him, since he could not have been prejudiced in the matter.

"Third, this case is one in which a man was discharged for entering, while in company uniform, a public drinking place and drinking intoxicants in the form of beer and whisky in the presence of one of the inspectors of the

company. This discharge is covered by the following rule: 'For the betterment of the service and the safety of the public, it will from this day be the policy of this company to not retain in its employ men who use intoxicating liquors or cigarettes, or are in the habit of gambling. While it is the privilege of each individual to eat, drink and smoke what he pleases, it becomes the duty of this management to have in the service only men of sober and temperate habits, physically and mentally able to perform the duties to which they may be assigned.'

"A copy of this rule was handed or mailed to each individual motorman or conductor at the time of its adoption two years ago, the rule being adopted for the safety of the public as well as for the benefit of the men. For these reasons it is incumbent on the company that the rule be strictly enforced. The plea made as to length of service of the particular party violating the rule only intensifies the gravity of the offense.

"We feel that our action in the above case is just, and that any reasonable board of arbitration would so decide."

James D. Callery, president of the company, subsequently issued a formal statement to the press in which he said that everything had been done by the company that was possible to satisfy and conciliate the committee representing the motormen and conductors. At the conference on June 25, between the committee and the officials of the company, Mr. Callery said that the members of the committee themselves suggested and wrote out a form of arbitration to which the officials of the company willingly assented. The conference between the company and the representatives of the men was then adjourned until 9 a. m. on June 26, when the agreement was to have been signed, but the representatives of the men did not call until 7 p. m., and at that time they positively refused to arbitrate matters in accordance with the plan which they themselves had suggested at the conference on the previous day. In view of this fact, the company announced that beginning on Tuesday, June 29, it would be prepared to operate practically the full complement of cars. William O. Magee, Mayor of Pittsburgh, immediately got into touch with both the men and the company in an effort to adjust the difficulties between them, and it was announced on June 28 that at 10.30 p. m. he had succeeded in effecting a reconciliation between the company and its employees, and at 5 o'clock a. m. on June 29 the men returned to work.

By the terms of the settlement the number of "short runs" are to be reduced 50 per cent; the men withdrew their objections to emergency runs; Sunday runs are not to be longer than the weekday schedules; a motorman discharged on charges of drinking while in uniform is to be reinstated pending arbitration; a conductor suspended on charges of refusal to help remove an obstruction to traffic is to be paid in full for the time of his suspension, and a conductor who lost seniority is to be restored.

Judicial Opinion Expressed in Evansville Injunction Case

In making permanent on June 22 the temporary injunction secured by the Evansville & Southern Indiana Traction Company, Evansville, Ind., restraining its former employees from interfering with the orderly management of the company, as noted in the Electric Railway Journal of June 26, 1909, page 1178, C. A. De Bruler, judge of the Vanderburgh Circuit Court, discussed some very interesting points, among them the question of whether or not a man's business should be considered property, a subject which is also considered in an article by President Taft in the June issue of *McClure's Magazine*. The opinion of the judge is that the purpose of the strikers and their sympathizers is to ruin the business of the plaintiff. He said that while the several acts of the strikers and their sympathizers might singly be lawful, when taken together they are unlawful because of the end in view. The opinion may also be said to be notable because of the position which the judge assumed in saying that "the defendants are not working in the interest of any rival railroad, but are seeking, as they themselves proclaimed from the witness stand, to destroy the business of the plaintiff, which is as much property as houses or land." The opinion is concluded as follows:

"It remains to be considered whether the various acts of the defendants in inducing the public not to ride on the cars, which have been established by the testimony, and in good part admitted, and which have been very effective, are unlawful and ought to be enjoined. On this subject I cannot at all agree with authorities which seem to hold that an act lawful in itself, when considered independently and without any relation to an unlawful purpose, cannot become unlawful because of the unlawful animus which inspires it. I believe it to be true that where the object to be attained by a series of acts is distinctly unlawful, that all such acts are themselves unlawful, although when separately considered as independent acts having no relation to the unlawful purpose they may be entirely innocent.

"Now, in this case, the purpose of the defendants in the performance of all the acts complained of, by which in various forms people are induced not to ride on the cars, is not only not denied, but is boldly, emphatically avowed. It is simply the financial ruin of the plaintiff unless the plaintiff will agree to certain conditions demanded by the defendants. That this purpose is distinctly unlawful, I cannot see how any reasonable man can doubt. This is not at all a case of legitimate competition in trade. Within certain well-defined limits a merchant may lawfully advertise that he will sell his goods at a cheaper rate than his rival in trade, and he may solicit the public by any sort of legitimate argument or persuasion not to trade with his competitor, although he may know that his efforts in this direction will result in the financial ruin of the other person. Even in this case, however, he may easily transgress the law and render himself liable to an action.

"In this case, however, there is no question of competition. The defendants are not working in the interests of any rival railroad line, but are seeking, as they themselves proclaimed from the witness stand, to destroy the business of the plaintiff, which is as much property as houses or land, in order to force the plaintiff to accept their terms of employment. It is claimed by the defendants that this is the right of free speech; in my judgment it is an utter perversion of that right. No rights are absolute, and every right, including that of free speech, must be exercised within the limits that it does injure another. I am thoroughly satisfied from the evidence, and from the avowals of the defendants themselves, that they have conspired to ruin the plaintiff's business by driving it by loss of revenue to financial ruin, without legal excuse or justification, and that every act done in furtherance of that unlawful purpose is itself unlawful because of the purpose which inspired it, although the act itself, considered independently and as unrelated to the conspiracy, might be wholly innocent and lawful.

"It must not be forgotten that the plaintiff is a public service corporation, and that it is bound by its franchise to run its cars on schedule time, and that the public ought to be allowed to travel on the cars without fear of molestation. It must be remembered also that even mere inducement or persuasion not to travel on the cars may, and usually does, convey veiled threats, or an insinuation that it is not safe to do so. For these reasons I think that justice can be accomplished in this case by overruling defendant's motion to dissolve the restraining order and sustaining the motion for a temporary injunction in accordance with the terms of the restraining order, without modification."

New Rule Adopted to Govern Excursion Rates in Indiana

William J. Wood, chairman of the Railroad Commission of Indiana, recently made the following recommendation to the commission regarding excursion rates, which was ratified by the commission on June 16:

"To the Railroad Commission of Indiana: I beg leave to report that the secretary and the tariff clerk having called to my attention certain tariffs and to what appears to be a continual violation of Subdivision C, Section 13 of the Railroad Commission Act, I called a conference of some of the carriers interested, and after being fully advised I beg leave to report that where excursion rates are made, as they are constantly made in this State, publishing rates from one point to another point in the State without protecting the same or lower rates at intermediate points, there seems to be a clear violation of Subdivision C, Section 13 of the Railroad Commission Act, which provides: 'It shall be unjust discrimination for any carrier subject hereto to charge or receive any greater compensation in the aggregate for the transportation of like kinds of property or passengers for a shorter than for a longer distance over the same line in the same direction, the shorter distance being included in the longer.'

"It will be noted that there are several provisos and exceptions, but it is clear that where excursion rates are made generally as stated above, none of them comes within these provisos or exceptions. However, as the provisions of the State giving the commission power, upon application of the carriers, to authorize such carriers to charge less for the longer than for the shorter distance, is silent with respect as to how and when such application shall be made or authority given, and since the statute gives the commission power to prescribe rules for conducting the business and proceedings of the commission, I recommend that our Rule No. 5 be amended by adding thereto the following: 'Provided that this rule (No. 5) shall not apply to

cases where the carriers desire to make excursion rates, less than regular rates, from one point to another point or points, and which are not to apply to intermediate shorter distances, but in such cases the filing of the rate sheet of such rates by the carrier with the commission shall be deemed to be an application by the carrier and authority by the commission to charge a less rate between such points for a longer than for a shorter distance,' unless the commission shall give notice objecting to or prohibiting such rates."

Rule 5 as originally adopted by the commission follows:

"A. Before hearing a petition to be allowed to charge less for the long than for short hauls as provided by the laws of Indiana, the commission will publish a notice of the pendency of the petition in some newspaper in the vicinity where the permit is to operate. Such notice will be published but a single time, not less than 10 days before the hearing. The expense of publication shall be paid by the petitioner. Any party interested in the petition may appear in person or by counsel and resist the same."

Accident Report in Pennsylvania for Quarter

The Railroad Commission of Pennsylvania has issued the following report of accidents to children on street railways in that State for the quarter ended March 31, 1909:

Age...	1 to 5.		5 to 7.		7 to 9.		9 to 12.		12 to 15.		Total.	
	K'd.	Inj.	K'd.	Inj.	K'd.	Inj.	K'd.	Inj.	K'd.	Inj.	K'd.	Inj.
Male..	1	6	1	10	1	5	1	12	1	10	5	43
Female	1	4	0	3	0	2	0	2	0	2	1	13
Total..	2	10	1	13	1	7	1	14	1	12	6	56

The commission has also issued the following comparative statement of accidents for the quarter ended March 31, 1909:

	January, 1908			January, 1909		
	Killed.	Injured.	Total.	Killed.	Injured.	Total.
Employees.....	10	524	534	28	517	545
Passengers.....	2	38	40	1	63	64
Trespassers.....	26	23	49	54	58	112
Others.....	1	19	20	6	40	46

	February, 1908			February, 1909		
	Killed.	Injured.	Total.	Killed.	Injured.	Total.
Employees.....	15	574	589	14	395	409
Passengers.....	2	47	49	1	39	40
Trespassers.....	30	13	43	47	50	97
Others.....	8	23	31	5	13	18

	March, 1908			March, 1909		
	Killed.	Injured.	Total.	Killed.	Injured.	Total.
Employees.....	12	512	524	32	457	489
Passengers.....	2	38	40	3	51	54
Trespassers.....	27	33	60	43	54	97
Others.....	10	9	19	2	26	28
Total	145	1853	1998	236	1763	1999

Recommendations Regarding Service in Kansas City

The Public Utilities Commission of Kansas City, Mo., after carefully considering the subject of service furnished in Kansas City by the Kansas City Railway & Light Company, has issued a report, of which the following is the substance:

"First—The Kansas City Railway & Light Company has substantially complied with the request to run more cars per hour on the lines designated, but seating capacity is diminished. While the increases have not been exactly as requested, the requirement has been substantially lived up to so far as number of cars per hour is concerned, but not as to seating capacity. Carrying capacity has been decreased owing to two facts: Some of the new pay-as-you-enter cars have smaller seating capacity than the cars they replace, and trailers were practically abandoned during the cold weather and had not been resumed on May 5 and 7, the dates of tests.

"Second—The increased number of cars put on has not increased traffic congestion so as to interfere with the service.

"Third—The additional cars have improved the frequency of the service, which is now much beyond the requirements of the peace agreement.

"Fourth—It is recommended that the service be regulated by special ordinance from time to time, as with the growth of the city any ordinance will be speedily outgrown. The company has met the request for new cars and has shown a disposition to increase service when required by putting on certain cars on lines where no request was made. It should be borne in mind that in comparing the results of May, 1909, with those of August, 1908, comparison is made between a date when there was no park traffic and a date when this was at its heaviest.

"Fifth—It is recommended that the company be requested not only to continue the increased cars in use, but to further increase seating capacity, which can best be effected by the use of trailers. It is recommended that trailers be increased on all lines where this can be done without danger to an extent of 50 per cent of cars run between the hours of 5 p. m. and 7 p. m., and 33 1-3 per cent between the hours of 6 a. m. and 8 a. m."

Accident at Wilmington.—In a collision between two cars on the Claymont line of the Wilmington (Del.) City Railway on June 24 more than 30 persons were injured.

Sunday Cars in Edmonton.—The ratepayers of Edmonton, Alberta, Canada, have voted to operate the Edmonton Radial Railway on Sunday. The line connects Edmonton and Strathcona and is a municipal undertaking.

Whistles and Arc Headlights in South Bend.—The City Council of South Bend, Ind., has passed an ordinance prohibiting the sounding of whistles on interurban cars in South Bend, and has also passed an ordinance requiring electric railways operating in South Bend to dim the arc headlights of their cars within the city.

Accidents in Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company reports that out of 120,000,000 passengers carried in Philadelphia in the quarter ended March 31, 1909, only one was killed and 116 hurt. Carrying about half as many passengers as all the traction companies of the State, only 21 per cent of the fatalities of all kinds occurred on the lines of the Philadelphia Rapid Transit Company—eight out of a total of 37. Of the total of 763 injured on all lines, 230 accidents occurred on the lines of the Philadelphia Rapid Transit Company.

Harrisburg Company Answers Request for Fare Reduction.—In answer to the petition of residents of Rockville, Lucknow and Feldheim for a reduction of fare on the Fort Hunter line of the Central Pennsylvania Traction Company from 10 cents to 5 cents, the officials of the company state that the line has never been self-sustaining; that the company has not paid its stockholders dividends for years, and point to the returns annually made to the city by the company on the basis of 3 per cent of the gross receipts, which showed a decrease from $17,568.15 in 1907 to $17,307.59 in 1908.

Warning Against Accident Faker.—B. B. Davis, secretary of the American Street & Interurban Railway Claim Agents' Association, has warned all claim agents to watch for George Ferkel, 35 years old, a tinner by occupation, who claims Salem, W. Va., as his home. Ferkel is said to have collected $20 from the Cincinnati Traction Company on June 5, alleging injury to an old hernia due to sudden starting of a car. On June 21 he made a similar claim against the East St. Louis & Suburban Railway. He was arrested and placed in jail in East St. Louis, charged with attempting to obtain money under false pretenses.

Indiana Commission Recommends Posting of Red Cross Rules.—The Railroad Commission of Indiana has requested that the placards of the American Red Cross Society which contain rules to be observed to avoid accidents be posted in all steam railroad and electric railway waiting rooms in Indiana. The rules of the society follow: "Never cross a railroad at grade crossing before making sure that no trains are approaching. Never stand on the platform of a car which is in motion. Never jump from a car which is in motion. Never cross a track in front of a standing train before making sure that there is no danger from some other train, or cause. Never disregard the cautionary rules for safety posted at stations, crossings, etc. Never forget that carelessness on your part concerning these precautions endangers your own life and the happiness and welfare of those near and dear to you.'

Instructing Chicago Trainmen in the Law of Negligence.—An important step in the education of trainmen has been taken by the Chicago (Ill.) Railways in issuing a primer which gives the gist of a wide variety of court decisions relating to the law of negligence in street railway cases. This book is the work of Twyman O. Abbott, who has succeeded in presenting the subject in 115 paragraphs, most of which contain only from 50 to 75 words. The primer has been distributed to all the conductors and motormen of the company and is also given to students for car positions. Among the subjects treated are the following: Negligence in Law; Contributory Negligence; Gross Negligence; Proximate Cause; Right to Use of Highway; Distinction Between Car and Other Vehicles; Rights of Public on Highway; Effect of Failure to Keep Sharp Lookout; Duty to Sound Warnings Not Affected by Custom; Improper Starting and Stopping of Cars; Overloading and Overcrowding; Newsboys; Transfer; and Rights of Children on the Highway.

Adoption of Standard Classification of Accounts Ordered in Vermont.—As the result of the hearing before the Pub-

lic Service Commission of Vermont at Montpelier on May 28 to permit the electric railways of the State to show cause why a general order should not be issued by the commission to take effect July 1, 1909, requiring the electric railways in Vermont to adopt the uniform system of accounts prescribed by the Interstate Commerce Commission on June 1, 1908, the Public Service Commission of Vermont issued the following order under date of June 16, 1909: "Beginning with July 1, 1909, and thereafter until further order of this commission, each of the corporations operating electric railways within this State is hereby ordered to adopt and use the uniform system of accounts prescribed for electric railways by the Interstate Commerce Commission on June 1, 1908, and which is fully described in the classifications then issued by said commission, which are described in the notice above recited, and a copy of which has been furnished by this commission to each of said corporations."

Hearing on Methuen Fares.—The Massachusetts Railroad Commission gave a hearing on June 25 on the petition of the Selectmen of Methuen asking for a reduction in the fare from 10 cents to 5 cents on the Lawrence-Dracut line of the Boston & Northern Street Railway between the Broadway-Essex Street transfer station in Lawrence and the Methuen-Dracut town line. Selectmen Rushton, Harris and Hardy represented the town and Bentley W. Warren the company. The principal issue was the existence of a fare limit at the entrance of the company's private right-of-way about 7000 ft. east of the Methuen-Dracut line. The petitioners contended that the limit should be extended to the above municipal line. Mr. Warren stated that the company cannot afford to carry passengers any further on the Methuen-Dracut line for 5 cents than at present, as the fare covers a ride of about 4.25 miles, a rate of 1.25 cents per mile. The issue is simply the charging of a fare sufficient to pay all the costs of operation and a reasonable return on the investment. The district between the Dracut-Methuen line and the beginning of the private right-of-way east of it is populated mainly by campers who, as a rule, live in the territory only in the summer. If the fare were reduced the tendency would be to cut the fare between Lowell and Lawrence from 15 cents to 10 cents, cutting down the revenue 50 per cent. The 15-cent fare between Lowell and Lawrence applies to any part of each city in relation to the other. The petitioners desire to cut out a complete fare zone in the through service. Chairman Hall stated that in this case the issue is the reasonableness of the fare with the whole traveling public's interests in mind, taking into account the influence of the disputed zone in the through fare between Lowell and Lawrence. The commission has taken the case under advisement.

"Look Out for the Little Ones."—Under this heading the United Railways & Electric Company, Baltimore, Md., is running accident bulletin No. 11 in the daily newspapers in Baltimore. The bulletin follows: "Modern conditions and the great growth in population of the city make quick communication between the suburbs and the various sections of the city essential and it is the business of a rapid transit company to supply this need. Last year the street cars of Baltimore carried approximately 550,000 people and traveled about 75,000 miles a day through the city and suburbs, and it is evident that it is impossible to avoid some accidents in transporting so many people such a distance through crowded thoroughfares. Accidents are bound to happen, as the price modern civilization pays for rapid transit, but especially in hot weather, when the streets are crowded, there are more apt to occur those very distressing accidents to young, thoughtless children, who run suddenly on the track, and it is the purpose of this bulletin to try to point out some way of avoiding this particular kind of accident. We want to do all we can to lessen the danger of injury to people on the street, and we feel that the best results can only be obtained by hearty cooperation on the part of Baltimore fathers and mothers with our efforts to avoid accidents of a kind so distressing to everybody, and we think that the following suggestions, if followed, will have a very good effect: (1) Teach the children to have a healthy fear of the car tracks and always to avoid them. (2) Whenever possible see that some older member of the family has a watchful eye on them. (3) As a sure preventive, have your children play on streets where there are no car tracks. There are plenty of such streets and they furnish an infinitely safer playground. Our motormen are not heartless machines on the front platforms, but are for the most part married men, with children of their own, and they all exert every effort to avoid injury; what we ask of the Baltimore parents is to cooperate with us in attempting to avoid accidents, and to use all the care possible beforehand in order to prevent something that would be a cause of regret to all concerned."

Personal Mention

Mr. Joseph Pequegnat has been elected secretary of the Guelph (Ont.) Radial Railway to succeed Mr. Robert Simpson.

Mr. John A. Rivers has been appointed superintendent of the Los Angeles & Mt. Washington Incline Railway, Los Angeles, Cal.

Mr. Charles F. Whitlock has been appointed auditor of the Johnson City (Tenn.) Traction Company to succeed Mr. Virgil Slaughter.

Mr. Raymond E. Preble has been elected treasurer of the Salisbury & Spencer Railway, Salisbury, Mich., to succeed Mr. Dwight Smith.

Mr. D. G. Trayers has been elected president of the Norwood, Canton & Sharon Street Railway, Sharon, Mass., to succeed Mr. William O. Faxon.

Mr. A. K. MacCarthy has been appointed general manager and purchasing agent of the Levis County Railway, Levis, Que., to succeed Mr. H. H. Morse.

Mr. Byron Trimble has been elected secretary of the Pittsburgh, McKeesport & Greensburg Railway, Greensburg, Pa., to succeed Mr. C. W. Scheck.

Mr. Harlan Sperry has been appointed chief engineer of the Warren, Cortland & Jefferson Traction Company, Cortland, N. Y., to succeed Mr. George H. Switzer.

Mr. D. J. Collins has been elected secretary of the Roanoke Railway & Electric Company, Roanoke, Va., to succeed Mr. F. H. Shelton, who retains the office of treasurer.

Mr. N. C. Richards has been appointed general manager of the Yakima Valley Transportation Company, North Yakima, Wash., to succeed Mr. George S. Rankin, resigned.

Mr. A. A. Crawford has been appointed chief engineer, electrical engineer and master mechanic of the Youngstown & Ohio River Railroad, Leetonia, Ohio, to succeed Mr. A. McManemy as engineer and Mr. Sidney Selby as master mechanic.

Mr. John Rock, Jr., has been elected secretary of the Grafton (W. Va.) Street Railway to succeed Mr. T. A. Devensy, and Mr. L. C. Louden has been appointed master mechanic of the company to succeed Mr. J. W. King.

Mr. D. F. McGee has been elected secretary of the Astoria (Ore.) Electric Company, and Mr. A. E. Smith has been elected treasurer of the company to succeed Mr. C. N. Huggins, who formerly acted as secretary and treasurer.

Mr. I. L. Oppenheimer, superintendent of the Ohio River Electric Railway & Power Company, Pomeroy, Ohio, has been appointed general superintendent of the Lexington & Interurban Railway, Lexington, Ky., to succeed to the duties performed by Mr. John B. Crawford as general manager of that company.

Mr. A. A. Churchill has been appointed master mechanic of the Jersey Central Traction Company, Keyport, N. J., to succeed Mr. A. S. Flatland, who resigned some time ago. Mr. Churchill was connected with the Salem Light & Traction Company, Salem, Ore., for a number of years and later was connected with the Oregon Water Power & Railway Company, Portland, Ore.

Mr. W. R. Putnam has been appointed superintendent and park manager of the Menominee & Marinette Light & Traction Company, Marinette, Wis. Mr. Putnam was graduated from the University of Minnesota in 1897. After two years of banking experience, he accepted a position as manager of the Red Wing Gas & Electric Company, Red Wing, Minn., and remained with this company and its successors, the Red Wing Gas, Light & Power Company, from May 1, 1899, until recently, when he accepted the appointment of superintendent of the Menominee & Marinette Light & Traction Company, in charge of its gas, electric and street railway departments.

Mr. James B. Noyes has been appointed a member of the Boston Transit Commission by Mayor Hibbard, of Boston, to fill the vacancy caused by the death of Thomas J. Gargan. Mr. Noyes is about 40 years of age. He was born in Canton, Mass., and was educated at the Canton High School, Chauncy Hall School and Harvard. He served four years as secretary to Congressman Elijah A. Morse, and for a short time was connected with the Boston *Herald.* For a number of years he has been a member of the firm of Curtis & Cameron, publishers of the Copley prints. On March 18, 1908, Mr. Noyes was appointed by Mayor Hibbard to succeed Mr. Charles Logue as a Schoolhouse Commissioner.

Mr. John Harrington, whose appointment as superintendent of Division 7 of the Boston (Mass.) Elevated Railway

was noted on page 1180 of the ELECTRIC RAILWAY JOURNAL of June 26, 1909, to succeed John J. Horgan, deceased, has been connected with the Boston Elevated Railway and the West End Street Railway, Boston, since 1886, in which year he entered the employ of the latter company as a conductor. In 1893 Mr. Harrington was appointed starter at the North Cambridge station, and in 1895 he was made chief inspector of the Cambridge division, a position which in rank is next to that of superintendent. Mr. Harrington, although he has been connected with the company nearly 25 years, is only 44 years old.

Mr. F. M. Lott has been appointed inspector of the rolling stock for the Twin City Rapid Transit Company, Minneapolis, Minn. Mr. Lott has for many years been connected with the street car and the electric railway industries. He entered the employ of the electrical department of the J. G. Brill Company in 1892 and remained with that company until 1898, when he was appointed to take charge of the electrical department of the Jackson & Sharp Car Company, Wilmington, Del. When the Jackson & Sharp Car Company and American Car & Foundry Company were consolidated in 1901 Mr. Lott re-entered the employ of J. G. Brill Company as assistant to Mr. T. D. Shipper, electrical engineer of the company. In 1905 Mr. Lott was appointed chief wireman of the southern division of the Public Service Corporation at Camden, N. J., but resigned from this company in 1908 to become master mechanic of the Green Bay (Wis.) Traction Company.

Mr. John B. Crawford, general manager of the Lexington & Interurban Railway, Lexington, Ky., has been appointed general superintendent of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind. Mr. Crawford was general manager of the Lexington & Interurban Railway for a year and a half, and before that was superintendent of transportation of the Fort Wayne & Wabash Valley Traction Company. He is 33 years of age and has been connected with railway work for about 15 years. Mr. Crawford's first street railway work was in Hartford, Conn., in connection with the electrification of the Hartford Street Railway. Subsequently he took the electrical course in the testing department of the General Electric Company and then entered the power field as assistant superintendent of the Conductor Power Company, which was engaged in constructing a transmission line for power and lighting service on the Pacific Coast at the time Mr. Crawford entered its employ. Returning to the East, Mr. Crawford accepted the position of general superintendent of the Groton & Stonington Street Railroad, New London, Conn., from which he resigned to become connected with the Fort Wayne & Wabash Valley Traction Company.

Mr. B. R. Stephens, who recently resigned as general traffic manager of the Illinois Traction System, Champaign, Ill., was tendered a banquet by 45 members of the traffic department of the company at the Leland Hotel, Springfield, Ill., on the evening of June 24, and was presented a loving cup as a memento from his associates. Among those present were the following: Mr. William B. McKinley, Champaign; Mr. A. S. Hagen, Lincoln; Mr. C. M. Otwelland and Mr. F. H. Colver, Carlinville; Mr. F. H. Richmond, Mr. J. S. Wellman, Mr. B. E. Tabler, Mr. K. J. McCorkle and Mr. S. McFarland, East St. Louis; Mr. Fred Swanson, Champaign; Mr. E. Williamson, Auburn; Mr. A. R. Drennan and Mr. F. B. Hawse, Bloomington; Mr. E. E. Hoyt, Clinton; Mr. C. C. Hurin, Decatur, Mr. R. S. Drum, Girard; Mr. H. F. Leverenz, Staunton; Mr. S. K. Holland and Mr. John Cady, Peoria, and Mr. S. J. Kelly, Mr. V. C. Gourley, Mr. H. H. Hanselman, Mr. C. H. Castle, Mr. A. R. Willard, Mr. Edward McKee, Mr. A. F. McCoy, Mr. B. R. Ongley, Mr. G. F. Ostermeier, Mr. Elliott Reddick, Mr. J. H. Ryan, Mr. R. R. Scott, Mr. G. J. Stelte, Mr. J. D. White, Mr. R. E. Wright, Mr. J. Williamson, Mr. R. Williamson, Mr. F. E. Webster, Mr. T. T. Thompson and Mr. M. W. Thompson, Springfield, and Mr. B. R. Stephens, the guest of honor.

Mr. W. E. Barlow was recently appointed master mechanic of the Easton (Pa.) Transit Company to succeed Mr. Charles F. Roberts. Mr. Barlow was born at Galion, Ohio, Oct. 22, 1873, and attended the public school there until January, 1888, when his parents moved to Philadelphia. He then entered the Philadelphia Manual Training School and was graduated from that institution in 1892. In 1894 he was graduated from the Philadelphia College of Pharmacy and in March, 1896, was graduated from the electrical department of the Drexel Institute of Science. He entered the employ of the Philadelphia & West Chester Traction Company on April 1, 1896, as the electrician in charge of cars and lines, and was later promoted to master mechanic and in 1898 was appointed assistant superintendent of the company. In February, 1900, Mr. Barlow accepted the position of general superintendent and master mechanic of the Lewiston & Reedsville Electric Railway, Lewiston, Pa., but resigned from that company on July 1, 1903, on account of ill health. He was employed from 1903 to 1905 in the line and cable department of the Philadelphia Rapid Transit Company under Mr. F. H. Lincoln. For a year Mr. Barlow was associated with his brother, Dr. Lewis E. Barlow, as a druggist, and from 1906 until quite recently he had charge of the electrical construction for the Keller-Pike Company, electrical engineers and contractors, Philadelphia.

OBITUARY

James B. McCance, treasurer of the Southern Michigan Railway, South Bend, Ind., is dead. Mr. McCance became connected with the Southern Michigan Railway at the time of the reorganization of the Northern Indiana Railway in 1899, and served at first as head of the clerical forces of the two companies. A year later he was made auditor and treasurer of the companies and retained these positions until the separation of the two companies in January, 1907, when he was appointed treasurer of the Southern Michigan Railway. Mr. McCance was born in Pittsburgh, Pa., in 1867.

Patrick H. Dolan, superintendent of the Pittsfield (Mass.) Electric Street Railway, and a director of that company and also a director of the Berkshire Loan & Trust Company, Pittsfield, died at the home of his brother, Mr. Peter C. Dolan, president of the Pittsfield Electric Street Railway, on June 25. Mr. Dolan was born in Ireland, but was educated in the public schools of Simsbury, Conn., where his parents removed. When a very young man he took a position in a fuse factory in Simsbury and was employed there until he was 19 years of age. With his brother, Mr. Peter C. Dolan, Patrick H. Dolan then went to New Britain, where the two brothers bought the Bassett House and the livery stable run in connection with that hotel. They rented horses to the New Britain Street Railway and when that company failed they purchased the road and equipped it with electricity. In 1893 they sold the property and disposed of their other interests in New Britain. Subsequently, they purchased the controlling interest in the Pittsfield Street Railway, which at the time was a horse line about 2½ miles long. This road they reorganized and extended, and now there are about 21 miles of track.

Charles C. Reynolds, general manager of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., died at his home in Indianapolis on June 26 from a stroke of paralysis which was followed by pneumonia. Mr. Reynolds was born in Vernon, Ind., on May 1, 1859. He left school at the age of 16 and entered railroad service as a telegraph operator on the St. Louis division of the Chicago, Cincinnati, Cleveland & St. Louis Railroad. Subsequently, he was appointed train dispatcher of this company and later was made trainmaster of the St. Louis division. In January, 1890, Mr. Reynolds resigned from the Chicago, Cincinnati, Cleveland & St. Louis Railroad to become superintendent of the Erie Railroad, a position which he held for 12 years. Mr. Reynolds' first experience in electric railway work was as manager of the Illinois Valley Traction Company. His record of a little more than a year with this company secured for him the appointment of general manager of the Indianapolis & Northwestern Traction Company, Lebanon, Ind., which had just completed a line between Indianapolis and Lafayette. Mr. Reynolds remained with this company as manager until 1906, when it and five other lines were merged as the Terre Haute, Indianapolis & Eastern Traction Company, with Mr. Reynolds as manager. Mr. Reynolds' electric railway and steam railroad connections brought him into close touch with business interests in Indiana and the Central West, and he was held in high esteem by his business associates and by many with whom he came into contact only casually in performing his duties. He is survived by a widow and six children.

The New Hampshire Electric Railways, Haverhill, Mass., which took over the Haverhill & Amesbury Street Railway on June 1, 1909, voluntarily increased the wages of the employees of the Haverhill & Amesbury division of the New Hampshire Electric Railways on July 1, 1909, from 20 cents and 22 cents an hour to the following scale to make the rate conform with that on other divisions of the system: Class No. 1, men who have been in the service of the company less than one year, 20 cents per hour; class No. 2, men who have been in the service of the company one year and less than two years, 21 cents per hour; class No. 3, men who have been in the service of the company two years and less than four years, 22 cents per hour; class No. 4, men who have been in the service of the company four years and less than seven years, 23 cents per hour; class No. 5, men who have been in the service of the company seven years and less than ten years, 24 cents per hour; class No. 6, men who have been in the service of the company ten years and over, 25 cents per hour.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Suburban Railway, Phoenix, Ariz.—Incorporated to build an electric railway in Phoenix. Headquarters, Phoenix. Capital stock, $500,000. Directors: C. B. King, B. A. Fowler, J. W. Dorris, Geo. M. Halm and E. J. Bennitt. [E. R. J., May 8, '09.]

Gainesville Railway & Power Company, Gainesville, Ga.—Application has been made for articles of incorporation for this company, which recently purchased the property of the Gainesville Electric Railway. The street railway in Gainesville consists of about 8 miles of track. Headquarters, Gainesville. Capital stock, $150,000. Incorporators: A. G. Sharp, Atlanta; W. A. Carlisle, W. H. Slack, H. H. Dean, J. W. Smith, Z. T. Castleberry, Gainesville.

***Chicago, Aurora & DeKalb Railroad, Aurora, Ill.**—Incorporated to build an electric railway from Aurora to DeKalb. Headquarters, Aurora. Capital stock, $950,000. Incorporators: J. H. Bliss, Sugar Grove; F. W. Ravlin, Kaneville; E. L. Lyon, F. M. Killian and J. C. Murphy, Aurora.

***DeKalb & Western Railway, DeKalb, Ill.**—Incorporated to build an electric railway from Chicago to Rock Island. Capital stock, $25,000. Incorporators: Newton Taylor, Elgin; J. F. Pearce, L. D. Grier, Frederick Krengel and Osman F. Cole, Chicago.

***Cincinnati, Louisville & Indianapolis Electric Railroad, Aurora, Ind.**—Incorporated to build street and interurban railways in and between Greendale, Lawrenceburg, Aurora, Risen Sun, Patriot, Florence, Markland, Vevay, Lamb, Brooksburg, Kent, Blocher, Madison and Scottsburg. Principal office, Aurora. Capital stock, $100,000. Incorporators: Ames B. Shuts, John C. Hooven, C. E. Hooven, W. B. Mayo and Wilbur Hargitt.

***Kentucky Electric Railway, Providence, Ky.**—Incorporated to build an electric railway from Dawson Springs to Providence, 20 miles. Headquarters, Providence. Capital stock, $10,000. Incorporators: Ben Sisk, Silent Run; B. H. Roney, J. T. Edwards, M. E. Edwards, S. Hicks, W. G. Roney and M. G. Roney.

***Independence, Siletz & Pacific Railway, Salem, Ore.**—Incorporated to build an electric railway from Simpson through Siletz Indian Reservation to the coast. Capital stock, $500,000. Incorporators: O. M. Taylor, D. N. Sears and H. Hirschberg.

***Rochester & Mars Street Railway, Butler, Pa.**—Application has been made for a charter for this company to build a street railway from the Baltimore & Ohio depot at Mars to Rochester, a distance of 23 miles. At Mars connection will be made with the Pittsburgh & Butler Street Railway; at Ogle, 2 miles west of Mars, with the Pittsburgh, Harmony, Butler & New Castle Railway, and at Rochester with the Beaver Valley Traction Company. The final survey has been completed, rights of way and franchises have been obtained and construction contracts will be let soon after the charter is issued in July. Incorporators: J. H. Barrett, president and chief engineer; W. H. Biggs, treasurer, D. R. Torrence, secretary; David Hunter, Jr., and J. G. Downie.

FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has applied to the City Council for a franchise to operate a street railway on Sixth Street between Olive Street and Figueroa Street.

Bloomington, Ill.—The City Council has granted to the Illinois Traction System, Champaign, a 20-year franchise to operate its cars over the lines of the city.

Peoria, Ill.—The City Council has granted to the Peoria Railway Terminal Company a 40-year franchise to build a street railway on Washington Street. The franchise provides that work must be started within 30 days after it is accepted. [E. R. J., May 22, '09.]

Petersburg, Ill.—The Springfield, Beardstown & Quincy Interurban Railway has been granted a 50-year franchise by the City Council. The right of way from Springfield to Petersburg has been secured. [E. R. J., Feb. 13, '09.]

New Orleans, La.—An ordinance has been introduced in the City Council directing the Comptroller to advertise for the sale in block, at public auction at the City Hall, to the highest bidder, a 50-year franchise to construct a double-track street railway on Adams Avenue from Julia Street to Orleans Boulevard, thence along the right of way of the old Spanish Fort Railroad to Spanish Fort. The franchise provides that the bidder shall commence construction within 90 days after the contract for the franchise is signed, and that at least one track shall be completed within one year.

Gardnerville, Nev.—The Board of County Commissioners has granted to H. H. Springmeyer and A. Jensen a franchise to build a street railway from the terminus of the Carson Valley branch of the Virginia & Truckee Railroad to Gardnerville, a distance of 1 mile.

Morristown, N. J.—Application has been made to the Board of Freeholders by the Morris County Traction Company for a two-year extension of its franchise to complete the double tracking of its railway between Millburn and Maplewood. [E. R. J., June 19, '09.]

Ronkonkoma, N. Y.—The Town Board has granted a franchise to the South Shore Traction Company, Patchogue, to construct an electric railway from Ronkonkoma through Setauket, Stony Brook, Lake Grove to Port Jefferson.

Norwood, Ohio.—The Southwestern Ohio Traction Company, Cincinnati, has applied to the City Council for a franchise to operate an elevated and street railway in Norwood. The ordinance was referred to the Streets and Grades and Street and Steam Railways Committee. John E. Bleekman, president. [E. R. J., May 29, '09.]

***Kennewick, Wash.**—Application for a franchise has been made to the City Council by C. A. Lundy, S. C. Emmons and G. F. Richardson, Kennewick, to build an electric railway from Kennewick through Horse Heaven to the Kennewick Highlands.

TRACK AND ROADWAY

***Vilonia, Ark.**—It is reported that J. N. Simpson and G. Bush are planning to build an electric railway from Conway through Vilonia to Beebe, 14 miles.

British Columbia Electric Railway, Vancouver, B. C.—This company has awarded the contract for the grading of the Fourth Avenue west extension of its line from Granville Street to the west city limits, to T. R. Nickson & Company.

Monterey & Del Monte Heights Railway, Monterey, Cal.—F. M. Fairchild, 1707½ Oak Street, San Francisco, general manager, writes that this company, which is to connect Monterey and Seaside with an electric railway 5 miles in length, will start construction about July 15. The supplies are now being purchased. The company will do its own construction, except to build the 1200-ft. bridge across Lake Del Rey. Three cars will be operated and power will be purchased. Capital stock authorized, $100,000; issued, $25,000. Officers: H. R. O'Bryan, Monterey, president; G. W. Phelps, Pacific Building, San Francisco, vice-president; S. W. Mask, Monterey, secretary; A. G. Metz, Monterey, treasurer. [E. R. J., May 29, '09.]

United Railroads, San Francisco, Cal.—This company proposes to build an extension on Cortland Avenue and through the Bernal Heights district from Mission to Folsom Streets, about 1 mile in length.

Lewiston (Idaho) Terminal Company.—It is said that this company has begun laying tracks in Lewiston for an electric railway. The line will be 1 mile in length and will be used as a terminal for other lines entering Lewiston. The track, which is being installed by the Warren Construction Company, will be laid with 90-lb. rails. [E. R. J., May 8, '09]

Belleville, Ill.—It is stated that subscriptions to the amount of $30,000 have been secured by E. L. Thomas and D. C. Thomas, promoters of the proposed electric railway between Belleville and Mascoutah. A company to be known as the Belleville-Mascoutah Traction Company will be incorporated and preliminary arrangements will be made at once, preparatory to beginning construction. [E. R. J., May 29, '09.]

DeKalb-Midland Railway, Chicago, Ill.—John W. McQueen, secretary, advises that this company will commence construction in about 30 days on its proposed electric railway between DeKalb, Elva, Waterman, Somonauk and Sandwick, 28 miles. Franchises from DeKalb, Sandwick, Somonauk and Waterman are for 50 years, with freight-carrying privileges. It has not yet been decided whether the company will generate or purchase power to operate the proposed railway. Capital stock, $150,000; issued, $100,000. Principal office, 134 Monroe Street, Chicago. Officers: John F. Pearce, Chicago, president; W. G. Wilcox, vice-president; John W. McQueen, Elgin, secretary; Herbert J. Burdick, Y. M. C. A. Building, Elgin, treasurer; O. F. Cole, 131 La Salle Street, Chicago, chief engineer. [E. R. J., April 17, '09.]

Bluffton, Geneva & Celina Traction Company, Bluffton, Ind.—L. C. Justus announces that this company will start,

within a few days, construction on its proposed railway between Bluffton, Ind., and Celina, Ohio. Work will be started simultaneously at both ends of the route and it is expected to be completed within a year. [E. R. J., May 22, '09.]

***Fort Wayne, Ind.**—It is stated that the surveys for the proposed electric railway from Fort Wayne to Bryan, Ohio, 41 miles, have been completed and that much of the right of way has been secured. Plans are under way for organizing a company to build the line. Edgar A. Tennis, Fort Wayne, promoter.

Louisville & Northern Railway & Lighting Company, New Albany, Ind.—It is stated that this company will soon build a branch from Scottsburg to Madison, Ind., where it will connect with another railway to Vevay, Aurora, Lawrenceburg, Ind., and Cincinnati, Ohio.

Valparaiso & Northern Railway, Valparaiso, Ind.—This company has increased its capital stock to $250,000. It proposes to construct an interurban railway to connect Valparaiso, Chesterton and Gary. Lewis E. Woodward, secretary. [E. R. J., Oct. 3, '08.]

Des Moines, Winterset & Creston Electric Railway, Des Moines, Ia.—It is reported that the company has let the contract for the building of its proposed electric railway between Creston and Des Moines to Judd & Ross. [E. R. J., May 1, '09.]

Wichita Railroad & Light Company, Wichita, Kan.—This company writes that it expects to build 4 miles of railway in Wichita. W. R. Morrison, general superintendent.

Lexington & Interurban Railway, Lexington, Ky.—This company has awarded the contract for grading its extension from Lexington to Nicholasville, 12 miles, to J. W. Oliver, Knoxville, Tenn. The contract amounts to approximately $150,000, and will require excavation and fill of about 100,000 yds. of earth. The work must be completed by Nov. 15.

Kentucky & Ohio River Interurban Railroad, Paducah, Ky.—This company, which projected an interurban electric railway from Paducah to Cairo, Ill., is now contemplating an extension in Henderson, Ky., and a line to Memphis, Tenn. At a meeting of the directors recently, it was decided to reorganize in July and incorporate for $5,000,000. The company eventually intends to cross the river at Henderson and make connections with railroads at Evansville, Ind. The company has in object freight business more than passenger traffic. The Strang gasoline motor car will be used. [E. R. J., May 22, '09.]

Boston & Northern Street Railway, Boston, Mass.—This company has awarded to Michael McDonald, Boston, the contract for all the work up to the sub-grading preparatory for track laying on its proposed extension from Stoneham to Spot Pond.

United Railways & Electric Company, Baltimore, Md.—This company has closed a contract with the Lorain Steel Company, Ohio, for the electric welding with steel bars of 5000 rail joints. The work has already started and considerable has been accomplished.

Kansas City & Southeastern Traction Company, Kansas City, Mo.—The survey of the electric railway which this company proposes to build from Kansas City to Jefferson City has been completed as far as Lone Jack. About half a mile of rock work, preliminary to track-laying, has been done near Raytown and also near Little Blue station. It is expected that the railway will be built ultimately to Jefferson City. Chas. A. S. Sims, president. [E. R. J., March 6, '09.]

Lehigh Valley Transit Company, Allentown, Pa.—At a meeting of the directors of this company arrangements were made to spend $1,000,000 for improving its railway system in Allentown. R. P. Stevens, president, was authorized to order equipment for the proposed belt line requested by the City Council, on which construction has been started.

Duquesne & Dravosburg Street Railway, Duquesne, Pa.—It is stated that this company will soon begin the construction of its 3-mile railway from Duquesne to Dravosburg. Officers: Fred W. Scott, Duquesne, president; J. C. Cato, Aliquippa, vice-president; T. F. Van Kirk, Coraopolis, secretary, and A. J. Krill, Aliquippa, treasurer. [E. R. J., May 22, '09.]

Philadelphia Suburban Traction Company, Philadelphia, Pa.—W. J. Cooley advises that this company has been formed for the purpose of building a broad-gage electric railway from Hatboro, through Davisville, to Southampton, 3½ miles. It has not yet been decided when construction will be started. Capital stock, authorized, $25,000; issued, $7,000. Headquarters, 1328 Chestnut Street, Philadelphia. Officers: W. E. Watts, Williamstown, N. J., president; John L. Grogan, Philadelphia, vice-president; W. J. Cooley, Philadelphia, secretary; H. C. Case, Newton, treasurer; J. E. Bonnell, Philadelphia, general manager; W. A. Merrick, Newton, chief engineer. [E. R. J., June 19, '09.]

Mountain Railway, Chattanooga, Tenn.—This company is having surveys and plans prepared by the Cushman-Fairleigh Engineering Company, Chattanooga, for building an incline railway from the property of M. H. Ward at Mountain Junction to a point near the Lookout Mountain House. D. J. Duncan, Chattanooga, is the promoter. [E. R. J., March 27, '09.]

Columbia & Walla Walla Traction Company, Dayton, Wash.—Two surveying parties will be put in the field within a few weeks by this company to relocate the route and set grade stakes for its proposed electric railway from Dayton to Wallula. One of the engineering corps will commence work near Dayton and the other near Walla Walla. The old survey made three years ago by the company will be changed materially. It is said that 5000 hp is available at the site of the power plant on the Tukanon River. Announcement is made that before the expiration of the 90 days' option limit offered by the company, the entire interests of the old company will be turned over to new promoters. Two months of the option remain, but the transfer will be made as soon as M. S. Parker, Spokane, who, with E. M. Symonds, is in charge of the preliminary work now being done at the power site of the Tukanon, at Dayton, Waitsburg and Walla Walla, has completed it. [E. R. J., April 10, '09.]

Connell Northern Railway, Tacoma, Wash.—H. C. Nutt writes that this company has been organized for the purpose of building a steam railroad between Connell and Adrian, and will be owned and operated by the Northern Pacific Railway. [E. R. J., June 19, '09.]

Vancouver (Wash.) Traction Company.—Arrangements have been made with this company to extend its electric railway to Orchards, a bonus of $10,000 having been practically raised by the citizens, and work will begin at once. An extension to La Center is also to be built but action on it has not reached definite form as to actual construction.

Washington-Oregon Traction Company, Walla Walla, Wash.—This company proposes to build an electric railway from Walla Walla, Wash., to Pendleton, Ore., a distance of 50 miles. It will run through Vinson, Weston, Athena and Adams. The average grade between Walla Walla and Pendleton is a little less than 2 per cent. The maximum curves will be of 10 deg. There will be a 300-ft. bridge over Umatilla River, a 200-ft. bridge over Walla Walla River and a few shorter spans over smaller streams. The land has been surveyed from Walla Walla to Pendleton and is being surveyed for an extension from Pendleton to Umatilla, a distance of 45 miles. Grading will be begun in September, 1909. A hydro-electric power plant will be constructed. W. S. Matthias, general manager of the company, 607 East Main Street, Walla Walla, Wash., to whom the ELECTRIC RAILWAY JOURNAL is indebted for the above information, also writes that the company is now prepared to receive bids for the following material: 5500 tons 70-lb. steel rails, 940 tons 60-lb. steel rails, spikes, angle bars, locknuts, bolts, switches, frogs and cross-rail bonds, 145,000 cross ties, 75 miles wire fencing, 55 miles overhead trolley wire, 50 miles 4 2/0 feeders, 50 miles transmission line, 50 miles telephone wire, 4000 ft. 24-in. tile, 1200 ft. 36-in. tile, 10 flat cars, 1 work car, 1 steam locomotive (oil burner preferred), poles for 60 miles of road. [E. R. J., June 19, '09.]

Bay Shore Street Railway, Green Bay, Wis.—This company has completed its railway to Bay View. Fred A. Rahr and Frank E. Murphy are said to be interested in this company. [E. R. J., Dec. 19, '08.]

Milwaukee Western Electric Railway, Milwaukee, Wis.—This company has announced that it has completed surveys for its line and that construction work will be begun within the next three months. The general engineering and provisions, such as overhead or third-rail construction, kind and voltage of current to be used are now under consideration. The company will build an electric railway in a general northwesterly direction from Milwaukee to Beaver Dam, Wis., having a total length of main line and branch of approximately 68 miles. It will pass through the villages and towns of Butler, Templeton, Sussex, Merton, North Lake, Alderley, Neosho, Hustisford and Juneau. A branch line extending in a southern direction through Pewaukee to Waukesha, will connect with the main line at Sussex. A general contract for the construction of this railway has been awarded to the Chapman Company, Chicago, Ill. Val Zimmerman, Jr., president. Headquarters, Majestic Building, Milwaukee. C. A. Chapman, Inc., 204 Dearborn Street, Chicago, Ill., engineer.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company has opened its extension

from Milwaukee to Waterford, 29 miles southwest of Milwaukee.

SHOPS AND BUILDINGS

Connecticut Company, Willimantic, Conn.—This company has prepared plans for a new car house which it proposes to build at a point between Willimantic and South Coventry. The structure will be 120 ft. x 35 ft. The basement will be especially fitted up for the accommodation of the employees. [E. R. J., June 26, '09.]

POWER HOUSES AND SUBSTATIONS

City & Suburban Railway, Brunswick, Ga.—The contracts for engines and generators of the power house of this company have been awarded to the Allis-Chalmers Company, Milwaukee, Wis. The Westinghouse Electric Company, Pittsburgh, Pa., will supply all other equipment. The power house has been completed and the boilers are in place.

Columbus (Ga.) Railroad.—This company has ordered the Stone & Webster Engineering Corporation to carry out reconstruction on the city mills plant, to provide a station capacity of 600-kw, 2300-volt, alternating current and 200-kw railway direct current. The work will include the replacing of two wheels and installation of a new 2-phase alternator with auxiliaries.

Savannah Electric Company, Savannah, Ga.—This company has contracted with the Stone & Webster Engineering Corporation for the installation of a new 1000-kw turbine and auxiliaries in the Indian Street station.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—This company is having plans for extensive additions to its power plant drawn by H. M. Byllesby & Company, Chicago, Ill. The boiler room of the station will be completely remodeled and boilers having a capacity of 1400 hp will be installed. These boilers will probably be equipped with automatic stokers and the necessary pumps and other fittings will also be needed. It is probable also that a coal and ash-handling apparatus will be built. A new steel stack, 10 ft. inside diameter, will be built. The plans also provide for the addition of three 2000-kw turbo-generators in the engine room. The present engine-room equipment consists of a 1500-kw Allis-Chalmers turbo-generator, an 800-hp Fulton engine driving a Bullock generator, and a 400-hp Buckeye engine driving a Westinghouse generator. William G. Dows, president and general manager.

Lexington & Interurban Railways, Lexington, Ky.—It is stated that this company expects to soon begin the construction of a power house at Valley View. The plant is expected to cost approximately $250,000.

Interborough Rapid Transit Company, New York, N. Y.—This company has contracted with the Westinghouse Electric & Manufacturing Company for the building of 2 3000-kw, 3-phase rotary converters, and 16 1100-kva single-phase transformers. It is stated that one of these sets is for substation No. 6 and the other for substation No. 7.

Western Ohio Railway, Lima, Ohio.—This company has purchased recently one 1000-kw Westinghouse low-pressure turbine.

Philadelphia Rapid Transit Company, Philadelphia, Pa.—This company will make improvements to its power station at Thirty-third Street and Market Street which will involve an outlay of $225,000. Beside other equipment a 6000-kw Westinghouse exhaust steam turbine will be installed in the station. An extension will be made to the power house on North Delaware Avenue. This improvement will cost, it is estimated, $100,000.

Memphis (Tenn.) Street Railway.—This company is considering the building of an extension to its power house and installation of an engine, generators, etc.

Washington-Oregon Traction Company, Walla Walla, Wash.—W. S. Matthias, general manager of this company, whose address is 607 East Main Street, Walla Walla, Wash., has written the Electric Railway Journal that the Washington-Oregon Traction Company, which proposes to build an electric railway between Walla Walla and Pendleton, Ore., as noted on page 57 of this issue of the Electric Railway Journal, is in the market for the following apparatus: Steel pipe (quantity and dimensions not given), 3 2400 hp impulse water wheels, 3 1200-kw, 3-phase, 00-cycle volt generators with exciters, 9 400-kw raising transformers, switch-board lightning arresters, 20 miles of transmission line, 3 200-kw transformers, 1 300-kw transformer and all other necessary equipment.

Kenosha (Wis.) Electric Railway.—This company advises that it expects to build a powerhouse 50 ft. x 35 ft. It has recently purchased 1 300-kw Allis-Chalmers turbo-generator, 1 200-kw Westinghouse motor generator, 3 125-kva Westinghouse transformers and 180 metallic-flame arc lamps.

Manufactures & Supplies

ROLLING STOCK

Cheyenne (Wyo.) Electric Railway is having one city car built by the Danville Car Company.

Texarkana Gas & Electric Company, Texarkana, Tex., is in the market for three new single-truck cars.

Ralston Electric Railway & Power Company, Ralston, Neb., has purchased one second-hand 20-ft. motor car.

Pittsburgh (Pa.) Railways has ordered two baggage and express cars from the G. C. Kuhlman Car Company.

William B. Michel, 140 Cedar Street, New York, is in the market for 40 4-yd. two-way dump cars, narrow gage.

Argenta (Ark.) Street Railway has purchased one second-hand car from the Little Rock Railway & Electric Company.

Sioux Falls (S. D.) Traction System has purchased one 18-ft. motor car from the Dorner Railway Equipment Company, Chicago.

Cairo & St. Louis Railway, Cairo, Ill., a road under construction has placed an order for three cars with the Danville Car Company.

United Railways & Electric Company, Baltimore, Md., contrary to the previous report in the Electric Railway Journal, will not purchase any new rolling stock.

New York, New Haven & Hartford Railroad, New Haven, Conn., has ordered two electric freight locomotives from the Westinghouse Electric & Manufacturing Company.

Kanauga Traction Company, Gallipolis, Ohio, has purchased three 21-ft. motor cars and two open trailers from the Dorner Railway Equipment Company, Chicago.

Colfax Springs (Iowa) Railway has purchased one 20-ft car mounted on Brill 21-E trucks and equipped with Westinghouse No. 49 motors from the Dorner Railway Equipment Company.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has ordered 10 city cars from the Cincinnati Car Company. This order was reported in the Electric Railway Journal of May 22, 1909.

Cienfuegos, Palmira & Cruces Railroad, Cienfuegos, Cuba, is in the market for two new 30-passenger gasoline motor cars and four second-hand flat cars for construction purposes. This equipment will be purchased by T. N. Motley & Company, 50 Church Street, New York.

Wheeling (W. Va.) Traction Company advises that it has so drawn the specifications for the eight cars mentioned in the Electric Railway Journal of May 29, 1909, that in case it decides to adopt the pay-as-you-enter system the new rolling stock can be readily converted at little expense.

Washington-Oregon Traction Company, Walla Walla, Wash., a proposed road, contemplates purchasing four passenger motor cars, two trailers, two 50-ton electric locomotives and 100 box cars for service when its line is completed. It is also in the market for 10-flat and one work car besides an oil-burning locomotive for construction purposes.

Long Island Railroad, Long Island City, N. Y., has ordered 120 all-steel motor and trail cars for service between Long Island City and the Pennsylvania terminal, New York, under the East River, from the American Car & Foundry Company. Mention of the contemplated purchase of these cars was made in the Electric Railway Journal of April 10, 1909.

Boston & Northern Street Railway, Boston, Mass., has ordered one Barber car of the latest improved type from the Barber Car Company, York, Pa. The company has also ordered type O-50 trucks from the Standard Motor Truck Company, Pittsburgh, Pa., for the 42 cars purchased from the Laconia Car Company, as mentioned in the Electric Railway Journal of June 26, 1909.

Gallatin Valley Electric Railway, Bozeman, Mont., has purchased through Westinghouse, Church, Kerr & Company a double-truck semi-convertible passenger, baggage and smoking car for Sept. 1, 1909, delivery. The car will be 51 ft. 2 in. over vestibules and have a body length of 41 ft. 8 in. Westinghouse air brakes, Brill folding vestibule doors and mutually operating sliding doors were specified. Other details are: Curtain Supply Company curtain fixtures, Dedenda gongs, Peacock brakes, four Westinghouse 307 motors, Nichols-Lintern sanders, Brill seats and Brill No. 27-E-2 trucks.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, has purchased three 56-ft. interurban passenger cars, one 56-ft. parlor car and three 50-ft. express cars, all of

which will be mounted on Baldwin class 84-30 trucks. The cars will be finished in mahogany, full empire ceiling, Hale & Kilburn No. 110-CE and No. 199-EE seats upholstered in plush and leather, inlaid linoleum floors, Edwards sash fixtures and Pantasote curtains. The parlor car will have a lavatory in addition to the toilet room. Westinghouse No. 112 motors and air brakes were also specified. Mention of this contemplated purchase was made in the ELECTRIC RAILWAY JOURNAL of April 17, 1909.

Pittsburgh & Kansas City Railway, Pittsburgh, Kans., has drawn up the following specifications for the 4 closed cars reported in the ELECTRIC RAILWAY JOURNAL of May 15, 1909, as having been ordered from the American Car Company:

Weight .....18,000 lb.	Curtain fix....Curtain S. Co.
Length of body.....28 ft.	Curtain material...Pantasote
Length over vestibule, 40 ft.	Gongs ..... Dedenda
Width over sills..7 ft. 11 in.	Hand brakes ..... Brill
Width at belt.....8 ft. 4 in.	Heaters ..... Consolidated
Body ..... wood	Journal boxes ..... Brill
Underframe ..... wood	Seating material
Air brakes .. Westinghouse	Rattan and mahogany
Couplers.....Van Dorn	Trucks, type, Brill No. 27-GI

Interborough Rapid Transit Company, New York, has ordered 100 additional all-steel cars, making a total of 350 for subway and elevated service. The equipment was divided between the General Electric Company and Westinghouse Electric & Manufacturing Company. It has contracted with the General Electric Company for 380 200-hp motors for the equipment of 190 new steel cars for the subway; also for 190 control equipments for the same cars. In addition, the General Electric Company will supply 40 equipments of control for elevated motor cars, 60 trailer equipments for the subway and 40 trailer equipments for the elevated. The Interborough Company also bought from the Westinghouse Electric & Manufacturing Company 120 125-hp motors for the equipment of 60 elevated cars and 20 equipments of control for these cars.

TRADE NOTES

Simmern Automatic Railway Signal Company, Los Angeles, Cal., has removed its offices from Los Angeles, Cal., and is now located at 1109 Crocker Building, San Francisco.

Standard Underground Cable Company, Pittsburgh, Pa., announces that its San Francisco office address is now in the First National Bank Building.

A. Bement, Chicago, Ill., consulting engineer, has secured the services of R. L. Baker, who was recently connected with the department of experimental engineering of the University of Wisconsin.

McKeen Motor Car Company, Omaha, Neb., has received orders from the following steam railroads for gasoline motor cars: St. Joseph & Grand Island Railroad, Bellingham Bay & British Columbia Railroad and the Erie Railroad.

Frank Ridlon Company, Boston, Mass., furnished the lighting equipment, consisting of one 100-kw d.c. and one 125-hp a.c. motor, together with the wiring, lamps, fixtures and decorative effects, for the production of "Joan of Arc" given in the Harvard Stadium June 22 by Maude Adams.

Stover Motor Car Corporation, Philadelphia, Pa., has been organized with headquarters at 1201 Harrison Building, Philadelphia, with a capital of $200,000 to take over the Stover Motor Car Company, Freeport, Ill. The company will have factories at Wilmington, Del., and Freeport, Ill.

Western Electric Company, New York, has recently appointed J. A. Currie as its representative in the railroad department in the Middle West, with headquarters at the company's factory in Cleveland, 2163 East Thirty-ninth Street. Mr. Currie has been connected with electric railway interests for a number of years, attending to the construction and purchasing end and has a wide acquaintance among railway managers.

Rooke Automatic Register Company, Providence, R. I., has equipped with its registers all the double-deck gasoline busses which the Fifth Avenue Coach Company, New York, is now operating over the Queensboro Bridge between Manhattan and Queens. These vehicles are similar to those in use on Fifth Avenue, New York, on which the Rooke system has been employed for nearly two years with complete satisfaction.

Cutler-Hammer Manufacturing Company, Milwaukee, Wis., announces that it has purchased the plant, business and patents of the J. L. Schureman Company, Chicago, Ill. The manufacture of Schureman controlling apparatus will be continued, and all agreements and contracts made by the J. L. Schureman Company will be carried out by its successor. The services of S. M. McFedries, general manager of the Schureman Company, have been retained by the Cutler-Hammer Manufacturing Company, and he will remain in active charge of the manufacture and sale of Schureman apparatus. J. L. Schureman retires from the business. Until further notice customers of the Schureman Company should direct orders and inquiries to the old address, J. L. Schureman Company, 70 West Jackson Boulevard, Chicago.

ADVERTISING LITERATURE

Buckeye Engine Company, Salem, Ohio, has issued a new booklet on its electric blue-printing machine.

Griffin Car Wheel Company, Chicago, Ill., has printed a folder showing various sections, profiles and sizes of its chilled-iron car wheels.

Carnegie Steel Company, Pittsburgh, Pa., has just prepared a pamphlet on steel wheels giving specifications, profiles and tables of diameters and circumferences.

Hess-Bright Manufacturing Company, Philadelphia, Pa., has sent out a new price list on radial, thrust and adapter bearings. On a number of sizes there have been substantial reductions in price made.

Peter Smith Heating Company, Detroit, Mich., has brought out an illustrated catalog on its hot-water heating system for electric railway cars. Many types are illustrated for both city and interurban service.

British Thomson-Houston Company, Ltd., Rugby, England, has issued a new catalog describing Curtis exhaust and mixed pressure turbo-generators. These turbines are of the horizontal type and are built in all sizes from 200 kw upward.

Warren Webster & Company, Camden, N. J., have issued Part VIII of their general catalog of steam specialties in which are described several systems of steam heating, feedwater heaters, steam separators and numerous smaller specialties.

Dearborn Drug & Chemical Works, Chicago, Ill., have published a small pamphlet entitled, "Lubrication vs. Friction," in which the process of manufacture and testing of the high-grade oils and lubricants made and sold by this company is described.

J. P. Devine Company, Buffalo, N. Y., has printed a pamphlet describing the Passburg vacuum drying and impregnating method for field and armature coils and transformers. It has also printed a catalog on the apparatus required for this work.

General Electric Company, Schenectady, N. Y., has just issued the following bulletins: No. 4664 on direct-connected, engine-driven railway generators, from 5 for 550 volts to 600 volts; No. 4666, type "H" transformers; No. 4668, on the GE-216-A railway motor; No. 4670, gaskets and bell mouths for conduit wiring.

Ohio Brass Company, Mansfield, Ohio, has printed some circulars of information on the Tomlinson automatic radial car coupler, type A, form 5, size No. 1. This coupler has been designed to meet the demand for a smaller and less expensive device than the type A, form 2, No. 2, for city work where the loads are not excessive. The new coupler is recommended for all city work where trailers are hauled and is suitable for the most severe curves and grades. The head of this coupler differs from type A, No. 2, in being smaller and lighter and also in having somewhat shallower serrations and a wide, flat face. The object in having a wide, flat face is to permit intercoupling with other types. The coupler head and draft gear are combined into one unit, the head being cast with a long stem into which the tailpiece is fastened. The coupler is made in one length only, namely, 4 ft. 6 in. from the face of the hook to the center of the tail pin hole.

NEW PUBLICATION

Trolley Wayfinder. Boston, Mass.: The New England Street Railway Club, 1909; the New England News Company, Boston, wholesale agents. Illustrated. Price, 10 cents.

The New England Street Railway Club has issued its official street railway guide for 1909, a most complete directory of trolley tours throughout New England. Some 21 trips from Boston are given, as are also innumerable trips between places of historic and scenic interest throughout New England generally. An alphabetical list of towns directs the user to tables for specific instruction as to route, rate of fare and distance between towns. Twenty-one railways publish maps of their entire lines, and many others publish maps pointing out the chief attractions of their roads. The Trolley Wayfinder is well established, and on account of the care exercised in its preparation has increased from year to year in popularity until it has come to be looked upon by many trolley tourists in New England as indispensable.

TABLE OF MONTHLY EARNINGS

Notice:—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including Taxes. †Deficit. ‡Taxes and Insurance.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions from Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., May '09	188,749	103,833	84,917	43,809	41,107
	1 " " '08	158,410	94,879	63,531	44,154	19,377
ATLANTA, GA. Ga. Ry. & Elec. Co.	1m., May '09	300,995	144,925	156,070	.....	.....
	1 " " '08	267,016	135,860	131,156	.....	.....
BELLINGHAM, WASH., Whatcom Co. Ry. & Lt. Co.	1m., Apr. '09	31,552	18,002	13,550	8,138	5,412
	1 " " '08	29,495	15,427	14,068	7,959	6,109
	12 " " '09	371,906	217,545	154,361	101,733	52,628
	12 " " '08	363,568	202,582	160,986	91,920	69,066
BINGHAMTON, N.Y. Binghamton St. Ry.	1m., Apr. '09	24,972	16,281	8,691	8,966	†275
	1 " " '08	22,730	14,845	7,885	8,359	†474
	4 " " '09	100,880	59,101	41,779	36,468	5,311
	4 " " '08	88,868	56,769	32,099	33,211	†1,112
CHAMPAIGN, ILL. Illinois Tr. System.	1m., Apr. '09	341,933	*198,180	143,753	3,982	139,771
	1 " " '08	318,867	*196,189	122,678	.....	122,678
	4 " " '09	1,362,868	*797,634	565,235	12,646	552,588
	4 " " '08	1,269,654	*757,643	512,011	.....	512,011
CHARLESTON, S. C. Charleston Con. Ry. Gas & Elec. Co.	1m., May '09	63,971	38,740	25,231	13,917	11,314
	1 " " '08	63,695	40,513	23,182	13,817	9,365
	3 " " '09	184,341	114,625	69,715	41,750	27,965
	3 " " '08	186,241	120,776	65,465	41,450	24,015
CLEVELAND, O. Cleveland, Painesville & Eastern R. R. Co.	1m., May '09	28,039	13,136	14,903	8,285	6,618
	1 " " '08	24,705	13,218	11,487	8,001	3,487
	5 " " '09	105,658	57,534	48,125	41,125	7,000
	5 " " '08	101,894	56,888	45,006	39,828	5,178
DALLAS, TEX. Dallas Electric Corporation.	1m., Apr. '09	100,964	61,678	39,286	28,832	10,454
	1 " " '08	91,617	60,746	30,871	30,063	808
	12 " " '09	1,217,574	787,967	429,607	344,517	85,090
	12 " " '08	1,139,478	749,308	390,170	341,600	48,569
DULUTH, MINN. Duluth St. Ry.	1m., Apr. '09	75,422	47,256	28,166	18,417	9,749
	1 " " '08	68,948	42,681	26,267	18,417	7,850
	4 " " '09	287,923	186,183	101,740	73,667	28,073
	4 " " '08	264,133	173,842	90,291	73,667	16,624
EAST ST. LOUIS, ILL. East St. Louis & Suburban Ry.	1m., May '09	171,073	95,539	75,534	.....	.....
	1 " " '08	159,882	91,446	68,436	.....	.....
	5 " " '09	792,329	453,751	338,578	.....	.....
	5 " " '08	811,268	425,369	385,899	.....	.....
EL PASO, TEX. El Paso Elec. Co.	1m., Apr. '09	46,493	29,304	17,189	7,890	9,289
	1 " " '08	41,536	32,431	9,105	7,012	2,093
	12 " " '09	547,361	374,527	172,834	90,087	82,747
	12 " " '08	530,429	377,369	153,060	76,141	76,919
FAIRMONT, W. VA. Fairmont & Clarksburg Tr. Co.	1m., Apr. '09	34,895	12,643	22,252	‡1,893	20,359
	1 " " '08	31,213	10,851	20,362	‡1,069	19,293
	4 " " '09	128,048	50,578	77,470	‡7,588	69,883
	4 " " '08	117,194	46,947	70,247	‡4,306	65,941
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., Apr. '09	106,250	65,974	40,277	.....	.....
	1 " " '08	99,741	59,381	40,359	.....	.....
	4 " " '09	420,971	253,257	167,714	.....	.....
	4 " " '08	397,976	231,815	166,161	.....	.....
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Apr. '09	97,837	56,532	41,305	17,190	24,115
	1 " " '08	79,352	45,466	33,886	15,050	18,835
	12 " " '09	1,142,510	668,124	474,387	200,449	273,937
	12 " " '08	1,064,416	590,838	473,577	165,267	308,310
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Apr. '09	93,721	55,245	38,475	21,259	17,216
	1 " " '08	83,447	48,573	34,874	20,584	14,290
	12 " " '09	1,129,450	655,736	473,715	249,743	223,972
	12 " " '08	1,066,752	627,456	439,296	234,216	205,080
GRAND RAPIDS, MICH. Grand Rapids Railway.	1m., Apr. '09	77,625	37,290	40,335	18,876	21,459
	1 " " '08	68,826	37,245	31,581	18,200	13,381
	1 " " '09	302,801	150,214	152,587	75,682	76,905
	1 " " '08	271,355	153,365	117,990	72,797	45,103
HARRISBURG, PA. Central Penn. Trac. Co.	1m., May '09	66,350	46,719	19,631	.....	.....
	1 " " '08	60,549	45,246	15,303	.....	.....
	5 " " '09	290,850	220,777	70,073	.....	.....
	5 " " '08	270,318	226,844	43,474	.....	.....
HOUGHTON, MICH. Houghton County Tr. Co.	1m., Apr. '09	25,727	14,257	11,470	6,242	5,228
	1 " " '08	20,679	11,864	8,815	4,736	4,079
	12 " " '09	285,724	158,704	127,020	63,124	63,896
	12 " " '08	255,433	144,746	110,687	57,436	53,251
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., Apr. '09	40,307	23,931	16,376	9,345	7,031
	1 " " '08	35,880	21,568	14,312	10,066	4,247
	12 " " '09	449,838	261,617	188,220	111,434	76,787
	12 " " '08	403,624	241,197	162,427	97,643	64,784
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Apr. '09	542,377	300,783	241,593	153,847	87,747
	1 " " '08	492,472	267,657	224,815	151,016	73,798
	11 " " '09	5,939,558	3,355,220	2,584,338	1,698,819	885,519
	11 " " '08	5,620,390	2,926,330	2,694,061	1,683,912	1,010,149
LEXINGTON, KY. Lexington & Interurban Rys.	1m., Apr. '09	45,508	35,256	10,252	.....	.....
	1 " " '08	44,801	32,456	12,345	.....	.....
	4 " " '09	165,233	130,029	35,203	.....	.....
	4 " " '08	165,756	120,431	45,325	.....	.....
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., May '09	346,908	161,683	185,225	105,793	79,431
	1 " " '08	326,376	165,717	160,659	92,901	67,758
	5 " " '09	1,688,095	850,090	838,004	517,601	320,404
	5 " " '08	1,560,230	842,010	718,220	476,387	241,833
Milwaukee Lt., Ht. & Trac. Co.	1m., May '09	115,924	29,542	86,382	63,319	23,063
	1 " " '08	111,768	29,195	82,573	59,849	22,725
	5 " " '09	528,522	146,838	381,684	304,397	77,287
	5 " " '08	505,952	144,952	361,000	286,702	74,298
MONTREAL, CAN. Montreal St. Ry.	1m., May '09	329,339	184,148	145,192	42,891	102,301
	1 " " '08	313,679	169,724	143,955	46,462	97,493
	8 " " '09	2,437,056	1,524,083	912,973	261,757	651,216
	8 " " '08	2,341,552	1,485,624	855,928	270,571	585,357
NORFOLK, VA. Norfolk & Portsmouth Trac. Co.	1m., Apr. '09	138,859	87,817	51,041	.....	.....
	1 " " '08	143,465	83,689	59,776	.....	.....
	4 " " '09	607,417	357,561	249,856	.....	.....
	4 " " '08	558,917	358,650	200,267	.....	.....
OKLAHOMA, OKLA. Oklahoma Ry.	1m., Apr. '09	31,653	20,546	11,107	.....	.....
	1 " " '08	19,614	14,425	5,189	.....	.....
	4 " " '09	109,907	75,102	34,805	.....	.....
	4 " " '08	73,099	54,671	18,428	.....	.....
PADUCAH, KY. Paducah Traction & Light Co.	1m., Apr. '09	18,352	11,137	7,215	7,033	182
	1 " " '08	19,150	11,260	7,890	7,010	880
	12 " " '09	223,638	133,554	90,084	82,624	7,460
	12 " " '08	237,111	145,659	91,452	83,140	8,312
PENSACOLA, FLA. Pensacola Electric Co.	1m., Apr. '09	18,559	11,468	7,091	4,322	2,769
	1 " " '08	9,924	9,775	149	4,132	†3,983
	12 " " '09	222,958	140,371	82,587	51,998	30,589
	12 " " '08	221,339	149,636	71,703	49,109	22,594
PHILADELPHIA, PA. American Rys. Co.	1m., May '09	254,475	.....	.....	.....	.....
	1 " " '08	247,040	.....	.....	.....	.....
	11 " " '09	2,584,962	.....	.....	.....	.....
	11 " " '08	2,642,038	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., Apr. '09	9,096	7,025	2,071	1,758	313
	1 " " '08	8,155	7,160	995	2,350	†1,355
	12 " " '09	124,421	85,978	38,443	25,332	13,111
	12 " " '08	121,377	87,524	33,853	27,471	6,382
PORTLAND, ORE. Portland Ry., Lt. & Pwr. Co.	1m., May '09	399,589	177,920	221,669	125,026	96,643
	1 " " '08	355,774	178,322	174,452	113,437	64,015
	5 " " '09	1,842,035	877,732	964,303	609,160	355,143
	5 " " '08	1,706,532	877,706	828,826	581,549	247,277
ST. JOSEPH, MO. St. Joseph Ry., Lt., Heat & Pwr. Co.	1m., May '09	77,187	42,621	34,566	21,537	13,029
	1 " " '08	72,447	40,232	32,215	20,597	11,618
	5 " " '09	377,824	205,271	172,553	104,869	67,684
	5 " " '08	340,713	186,390	154,323	102,060	52,263
ST. LOUIS, MO. United Railways Co. of St. Louis.	1m., May '09	975,544	*597,240	378,304	232,792	145,512
	1 " " '08	920,765	*591,543	329,222	232,278	96,944
	5 " " '09	4,427,546	*2,830,577	1,596,969	1,172,308	424,661
	5 " " '08	4,248,217	*2,795,239	1,452,978	1,164,715	288,263
SAN FRANCISCO, CAL. United Railroads of San Francisco.	1m., Apr. '09	620,626	345,527	275,099	.....	.....
	1 " " '08	568,656	359,520	209,136	.....	.....
	4 " " '09	2,337,252	1,391,271	945,981	.....	.....
	4 " " '08	2,128,346	1,478,893	649,453	.....	.....
SAVANNAH, GA. Savannah Elec. Co.	1m., Apr. '09	47,488	30,802	16,686	17,442	†756
	1 " " '08	46,091	29,214	16,877	16,235	642
	12 " " '09	601,671	370,767	230,904	208,986	21,919
	12 " " '08	603,222	409,605	193,617	200,837	†7,220
SEATTLE, WASH. Seattle Elec. Co.	1m., Apr. '09	422,129	261,843	160,286	104,140	56,145
	1 " " '08	356,089	212,485	143,604	84,725	58,879
	12 " " '09	4,721,194	2,787,651	1,933,542	1,152,322	781,221
	12 " " '08	4,318,397	2,575,441	1,742,956	992,006	750,950
SPRINGFIELD, ILL. Springfield Ry. & Lt Co.	1m., Apr. '09	76,006	38,508	37,498	16,670	20,828
	1 " " '08	67,665	36,192	31,473	15,603	15,870
	4 " " '09	340,349	164,149	176,200	67,039	109,161
	4 " " '08	310,515	150,006	160,509	62,039	98,470
TACOMA, WASH. Puget Sound Elec. Ry. Co.	1m., May '09	147,943	108,249	39,694	46,001	†6,307
	1 " " '08	132,491	84,064	48,426	42,805	5,622
	12 " " '09	1,744,479	1,174,493	569,986	526,627	43,359
	12 " " '08	1,687,279	1,049,241	638,039	485,112	152,927
TAMPA, FLA. Tampa Elec. Co.	1m., May '09	46,432	28,634	17,797	4,797	13,001
	1 " " '08	44,501	30,959	13,541	2,335	11,206
	12 " " '09	570,137	363,376	206,761	49,539	157,222
	12 " " '08	534,066	380,213	153,854	17,721	136,133
TOLEDO, O. Toledo Rys. & Lt. Co.	1m., May '09	213,155	126,611	86,544	70,871	15,673
	1 " " '08	199,054	109,444	89,610	71,719	17,891
	5 " " '09	1,086,240	621,109	465,131	354,651	110,480
	5 " " '08	1,031,381	574,930	456,451	348,374	108,077

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Take One Fare at a Time

The practice of collecting more than one fare at a time when change has to be made should not be encouraged. Where the pay-as-you-enter system for collection of fares has not been introduced it is found that conductors, in their rounds of open cars, frequently accept fares from several passengers without stopping to make change when denominations larger than 5 cents are tendered. Bank tellers and cashiers in stores deal separately with persons in transactions involving the passage of money. While the act of making change for a street railway fare, because of the invariable unit rates, is simpler than that of cashing a check or taking care of receipts for different amounts, it has the same importance and risk as any other transaction where cash is involved; the chance for dispute is present if any complication arises. Conductors who form the habit of accepting more than one fare at a time when change has to be made have been observed to ask the passengers the denomination tendered, and also to mix the change of two passengers. In the former case the conductor subjects himself or the company to the possibility of loss, and in the latter the passengers may be annoyed or angered. A number of companies recognize the desirability of avoiding any dispute on the subject of fares by requiring the conductor, when obliged to give change, to state the amount of money received from the passenger and the amount returned to him, and also to collect all fares separately, and not in bunches. In fact, this practice has proved so satisfactory that rules to do this have tentatively been embodied by the committee on city rules in the proposed code of standard rules to be considered at Denver next October.

Painters and Paint Making

The art of the master painter, like that of many another skilled workman, has undergone many changes in the past decade. Just as the introduction of automatic machines has revolutionized nearly all manufacturing methods, so has the development of scientific paint making completely altered the character of the painter's trade. In the old days the master painter manufactured largely his own paint from the raw material. His head was full of secret formulas picked up here and there in the course of his long experience. The more secretive he was and the more he changed and manipulated his ingredients to suit imaginary differences in conditions, the more valuable employee he was considered. The preparation of his materials was of more importance than their application. If a certain secret mixture of oils and driers and pigments did not give satisfactory service, there was always some vague but sufficient excuse. Some of these old-time painters were skilful and efficient, considering the means at their disposal for mixing paints, but others worked by rule of thumb and trusted to luck and the ignorance of their superior officers.

Modern paint making methods have relegated the shop paint grinder and the mixing barrel to the background, and have brought about the passing of the old-time master painter. The efficient painter of to-day takes the paints issued to him, ready to apply, and puts them on the wood strictly according to instructions issued by the manufacturer of the paints. He is skilled with his hands, and need have no knowledge of what the paint contains or how it is mixed. The old prejudice against ready mixed paints is rapidly disappearing. Good paints are necessarily sold

largely on reputation, and there is nothing for the paint maker to gain in selling loaded or watered paint. The large manufacturer can buy oils and pigments cheaper and of better quality than can the small consumer. Precise factory methods insure uniformity of color and quality, and a new formula is not tried out on a car as a first experiment. The tendency in the paint business is to supply materials as nearly ready to apply as packing and shipping will permit, leaving to the painter the single responsibility of putting them on the cars.

Enforcing Permanent Instructions

System is the foundation of the successful organization of shop and office forces. The heads of departments have too many other important duties to permit them to follow up, day by day, the routine work of every subordinate. It is necessary to outline the individual duties of each employee, and it is also essential that all employees be guided by general instructions promulgated for permanent use. In every office there are numerous standard methods and practices which are supposed to be followed, but it frequently happens that they are disregarded, through ignorance or neglect. The importance of having every employee follow the general instructions covering these standards, as well as special individual instructions, is apparent. It should be the duty, therefore, of heads of departments to define as clearly the general duties of all of the employees under them as they define their special duties. In the transportation department the bulletin board serves the purpose of calling the attention of the trainmen to standing orders. The men are supposed to consult the bulletin board each day before taking out their cars. Neglect to do this is not considered an excuse for failure to obey these standing orders as long as they are posted on the board. The same plan lends itself to the promulgation of general and permanent instructions in the shops and in the office. Each subordinate who is given any responsibility should receive and receipt for a copy of each sheet of standing instructions issued from time to time, and at regular periods should be required to sign a statement that he has read within a week all of the instructions and rules then in force. In this way the responsibility for violation of any of the rules or regulations can be placed directly. Of perhaps more importance is the incentive created for the men to actually study the instructions at frequent intervals, so that they will be refreshed in their minds.

Open Cars and Pleasure Riding

In many sections of the country the open car has always possessed a popularity for pleasure riding with the public which has not been attained by any other type of equipment. The objections of the open car from a traffic standpoint are serious. It takes longer to load an open car than it does for a closed car or semi-convertible car. The use of the open car demands a double equipment of rolling stock, and the presence of a running board introduces an undeniable source of danger. Nevertheless, there is a fascination, more pronounced in some sections of the country than in others, but still quite general, about riding in an open car, and as long as there is such a demand the car will have a money value.

Undoubtedly, the popularity of the open car is due largely to the fact that it affords the least possible obstruction to the movement of fresh air through the car. This gives a sense of freedom to the passenger because the car is not closed in front or on the sides. The sensation in riding is much more like that experienced in an automobile than in traveling in a car which is closed. From an operating standpoint, also, the open car has certain undeniable advantages, and these, with the demand for the car on the part of the public, have led to its retention, in spite of the competition of the modern semi-convertible car. If the latter, with its desirable features of minimizing accidents and investment in climates where there is changeable weather, is to supplant the open car, the good points of its rival should be studied, and as many of them as possible should be incorporated. Finally, if there are any meritorious features which can be introduced in the semi-convertible and not in the open car they should be adopted.

In considering this matter one should bear in mind that the greater part of the passenger traffic of the open car comes from pleasure travel, a very large factor in which is easy riding. Special attention should therefore be given to the trucks and their under attachments in the semi-convertible car. It is possible, too, that the use of screen doors instead of glass would improve the distribution of fresh air in circulation. It may even in time be necessary to use a grating construction of the side panels, although the principal difficulty in the semi-convertible appears to be due to the tendency of the vestibules to form air pockets. In some semi-convertible cars the doors of which are operated by compressed air a considerable portion of the car length is necessarily solid when the doors are of glass and slide toward the center of the car body in opening. Where possible, it would be well to open this portion of the car, and, presumably, some way might be found, in the season of pleasure travel, to attach temporary curtains to such openings for use in cases of storm. The problem is admittedly difficult, but it seems clear that if the semi-convertible car is to obtain its full share of pleasure riding, it will have to be brought closer to the standards of atmospheric circulation which have always made the open bench car so popular.

Some Reasons for Going to Denver

Discussion of the merits of Denver as a city for the convention of the American Street & Interurban Railway Association occupies so prominent a place in the current affairs of the companies that it may be well to epitomize some of the reasons why it is of measurable advantage for an official to attend a meeting of this character once a year. It will be assumed that the company which has under consideration as a proper business question the subject of the expense of a trip to Denver for its officials is well managed and progressive. Its officials in all departments are assumed to be those of a character that will seek improvement in methods and criticism of existing practice if anything better can be learned from the practice of other roads.

A man of systematic business habits, if attending a convention, will get well acquainted with a few people, meet

a number of others, go to all the sessions of the various associations which the arrangement of their times of meeting will permit, and will inspect the exhibits thoroughly. By so doing he brings a new point of view into his own work. He gets away from the routine of his office or shop, and from that fact alone is able to consider problems in a way which is not always possible during close application to official duties.

The advantage of personal acquaintance between two live men, occupying similar positions in different companies that are not competitive, is so plain that mere reference to it may be sufficient. From his own experience every man who thinks about the problems he has to solve will testify to the value of the ideas which he has received at some time in his life by discussion with others. Now, these ideas may result eventually as much to the benefit of the man himself as to the company that employs him, but the company is likely, in any event, to get its fair share of all that is learned. If the man is made a better railway operator, engineer, accountant, executive, or is equipped to fill the duties pertaining to any other department better, which will be the fact if full advantage is taken of all the opportunities presented at an important convention of this nature, the industry as a whole is benefited. If the officials do not make progress in their methods the system will not progress, and if it does not it will fail to keep up with the increasing traffic needs of every developing community in this country. These facts are incontrovertible, whether the convention is held in a city near or remote.

Denver, it is true, is somewhat farther distant from the cities on the Atlantic seaboard than any other place which has been previously selected for a meeting of the American Street & Interurban Railway Association. It is not, however, very much farther in point of time, as it can be reached from New York in from 48 to 60 hours, depending upon the trains taken and the connections made. This is only about 30 hours longer than if the convention was held in Chicago. In other words, if a person left New York at 3:30 p. m. on Friday he could be in Denver at 3 p. m. on Sunday. The railroad fare will, of course, be somewhat more than if the convention was to be held in the Middle West, but the railroads are making special rates to Denver this year and the fare, in excess of that which would have to be paid to attend a convention in, say, Columbus or St. Louis, will not be a very large percentage of the total convention expenses of a delegate in one of these nearer cities.

On the other hand, all of the advantages which have been cited for attendance at a National railway convention are presented at Denver, and many others in addition. The farther away one goes from his own city the greater the difference in operating conditions are apt to be, and the more one will be able to learn by inspecting them. Especial attention has been given in Denver to certain features of operation, such as the general design of rolling stock and protection against lightning, and a week, or even three or four days, spent in that city should be extremely profitable to the operating superintendent, the engineer or any person connected with any of the various departments of a railway company, independent of the gain derived from attending the convention itself.

The Coney Island & Brooklyn Decision

One of the long-expected decisions in regard to the proper fare to be charged between Brooklyn and Coney Island, that relating to the Coney Island & Brooklyn Railroad Company, has just been handed down by the Public Service Commission, First District. That relating to the Brooklyn Rapid Transit Company has not yet been announced. The position of the Coney Island & Brooklyn Railroad was peculiar, because it formerly had two rates of fare between Coney Island and Brooklyn, charging 10 cents on Saturdays, Sundays and holidays and 5 cents on other days of the week. This fare was in force from 1902 until Aug. 31, 1908, when the company, after 30 days' notice, advanced its fares on all days to 10 cents.

The legal status of the situation can be briefly summed up by saying that some time before this advance in fare two complaints were lodged with the Public Service Commission, claiming that the 10-cent charge on Saturdays, Sundays and holidays was "unjust, unreasonable and unlawful." The commission has been engaged during the past 18 months in hearing testimony on and considering these claims. In the meantime the Legislature passed an act requiring both companies to reduce their fare to 5 cents, but this act was vetoed by Governor Hughes, because the subject was under consideration by the commission.

The decision delivered by Commissioner Bassett is published elsewhere in this issue, and is probably the most important relating to electric railway companies which has thus far been delivered by the commission. We shall not attempt to analyze the argument, because the position of the commission is fully outlined in the decision itself, but it might be well to call attention to a few of the salient points.

In the first place, the commission holds that an electric railway company is responsible for the maintenance of its property in good condition, not only now, but in past years, and declares that if a part of the funds which should have been used for such maintenance of the property has been paid out to the stockholders in dividends they should suffer, and not the public. The second point is that the commission will not order a reduction of fares if the earnings of the company after maintaining the property in good condition will not also provide a proper return to the stockholders. Commissioner Bassett does not state what he considers a proper return, but he does say that the commission will decline to reduce fares when the net earnings, after depreciation charges have been met, are not more than 6 to 6½ per cent of the physical value of the property, not including any allowance for franchises, good will, going concern or development charges. The third point indicated in the decision is that the commission will decide questions of this kind largely upon evidence obtained after the public hearings are closed, without giving the company an opportunity to cross-examine the witnesses.

The question of fares on week days was not involved in the complaint received by the commission, and it declined to pass upon it, although Commissioner Bassett expresses an opinion that such an increase is unreasonable and unjustifiable and of slight profit to the company, but that the company has a legal right to make such a charge. On the question of the 10-cent fare on Saturdays, Sundays and holidays the commission decided in favor of the company.

ROLLING STOCK STANDARDIZATION IN BROOKLYN—TRUCK AND CAR ALTERATIONS

The standardization of the trucks and car bodies operated on the Brooklyn Rapid Transit Company's surface lines has been accompanied by the introduction of various miscellaneous improvements tending to increase the reliability of the service and to decrease the maintenance. The following paragraphs will discuss such alterations as may be of interest to other companies.

TRUCK STANDARDS

When standardization of the surface equipment commenced in July, 1906, there were about 15 truck designs

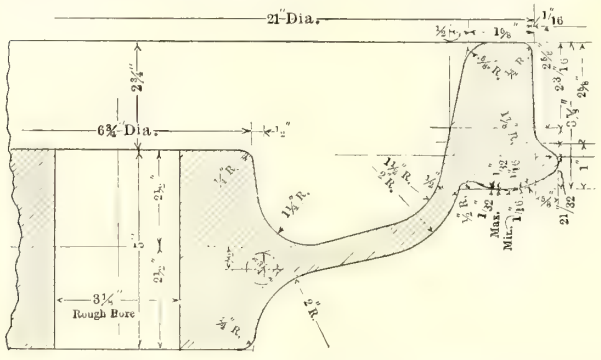
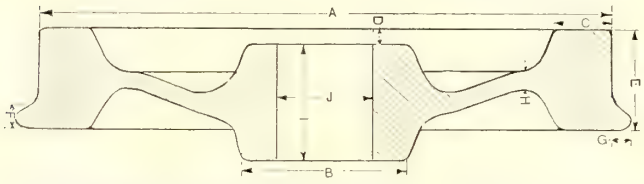


Fig. 1—Truck and Car Alterations—21-in. Rolled Steel Pony Wheel for Maximum Traction Trucks

in use. Since then the Peckham No. 6, Peckham No. 9, Brill No. 21-E and half a dozen other trucks have been eliminated, leaving the present distribution as follows: Peckham No. 25 and Baldwin No. 185 (of like construction) on convertible cars; Peckham No. 14-D-5 on 200 semi-convertible cars; Brill No. 22-E maximum traction on 250 semi-convertible cars, 513 double-truck closed cars, and 750 double-truck open cars; DuPont trucks for 77 single-truck closed cars and 163 single-truck open cars. Detailed descriptions of the latest surface and elevated trucks adopted by the company will be presented in another article, which will contain the specifications under which these trucks were built.

In the actual truck framing very few changes have been



required. Perhaps the only one which need be mentioned is the use of the tie-bars on the Brill maximum traction trucks and a new design of compression pin casting.

WHEELS AND AXLES

The Brooklyn Rapid Transit Company has been using Schoen-Carnegie rolled-steel wheels for its elevated and surface M.C.B. trucks. It has now decided to use the same wheels for the drivers of maximum traction trucks and has even gone so far as to draw up a design for a rolled-steel pony wheel, as shown in the accompanying drawing, Fig. 1. The first rolled-steel wheels were tried as early as 1905. The company's experience has proved the solid wheel to be cheaper on a mileage basis and decidedly safer through the elimination of broken flanges. The costs of rolled-steel and cast-iron driver and pony wheels compare as follows:

	Rolled steel	Rolled steel	Cast iron	Rolled steel	Cast iron
Material.....					
Diam., inches..	34	33	33	21	20
Cost per 10,000 miles	$1.1508	$1.04	$1.1628	$0.62	$0.6914
Mileage	120,000	120,000	35,000	90,000	35,000

The cost of the 21-in. rolled-steel pony wheel and of the 34-in. wheel is based on experience with 33-in. rolled-steel wheels. The 34-in. wheels are used as drivers on maximum traction trucks and the 33-in. wheels for the four-motor cars. Fig. 2 shows the profile record used

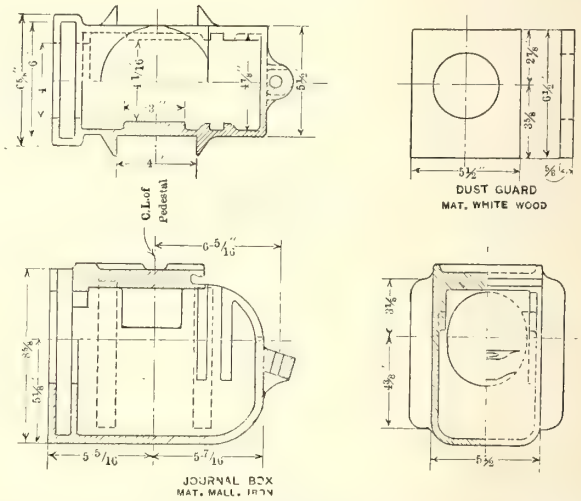


Fig. 4—Truck and Car Alterations—Journal Box for Brill Maximum Traction Truck

when rolled-steel wheels are checked upon delivery. This wheel profile is lettered in accordance with columns on the record blank, Fig. 3, thus serving as a convenient guide for the inspector.

Only two axle diameters are now used on the surface cars. The latest type of semi-convertible car represented by class 2500 and the double-truck four-motor equipments have 4¾-in. axles, but all other cars have 4-in. axles. The axles of most elevated motor cars except 36 cars with Baldwin trucks are 6 in. at the motor bearing, 6 7/16 in. at the wheel seat and 6½ in. at the gear seat. The motor axles of the Baldwin trucks are 5½ in. at the motor axle bearing, 6½ in. at the wheel seat and 7 in. at the gear seat. The axles of the 100 new class 1400 cars at 6½ in. at the motor bearing, 7¾ in. at the wheel seat and 7 13/16 in. at the gear seat. The axles of trail trucks of motor cars are 5 in. in the center, 6 in. at the wheel seat and 6¼ in. inside the wheel hub. The axles on trail cars are 5⅜ in.

INSPECTION OF ROLLED STEEL WHEELS

	ORDER NO.	WHEEL NO.	HEAT NO.	A	B	C	D	E	F	G	H	I	J	BORE OUT OF CENTER	RIM WARPED	WHEEL OUT OF ROUND	REMARKS	DATE INSPECT
1																		
2																		
3																		
49																		
50																		

Figs. 2 and 3—Truck and Car Alterations—Profile and Record Blank for Wheel Inspection

at the wheel seat and taper from 5⅛ in. to 4½ in. at the center.

JOURNAL BOXES

For surface cars the company has decided to use the journal box standards of the American Street & Interurban Railway Engineering Association except on maximum traction trucks where the axles are not suitable. The original Brill boxes furnished with the maximum traction trucks are being replaced by boxes designed by the railway company which are similar to those used on its Peckham 14-D-5 trucks. The Brill box had a large space reserved in the bottom for wick lubrication and was provided with a steel ring dust guard. The wick did not prove an efficient lubricator and has been replaced by the company's standard oily waste. The steel ring dust guard was objectionable as it cut into the axle and has therefore been superseded by a wooden guard. The journal boxes on the four-motor equipments have also been changed from wick to waste lubrication. This box is made dustproof by a 1/16-in. lead gasket between the cover and box. The cover is secured to the box by two tapered bolts and lock nuts.

The journal box standards in elevated service are as follows: Elevated trailers, 3½ x 6¼-in. plain boxes with end-thrust stop wedges; trailer and motor trucks of motor cars with 4¼-in. x 8-in. M.C.B. journal boxes except the motor trucks of Class 1400, which have 5-in. x 9-in. journals.

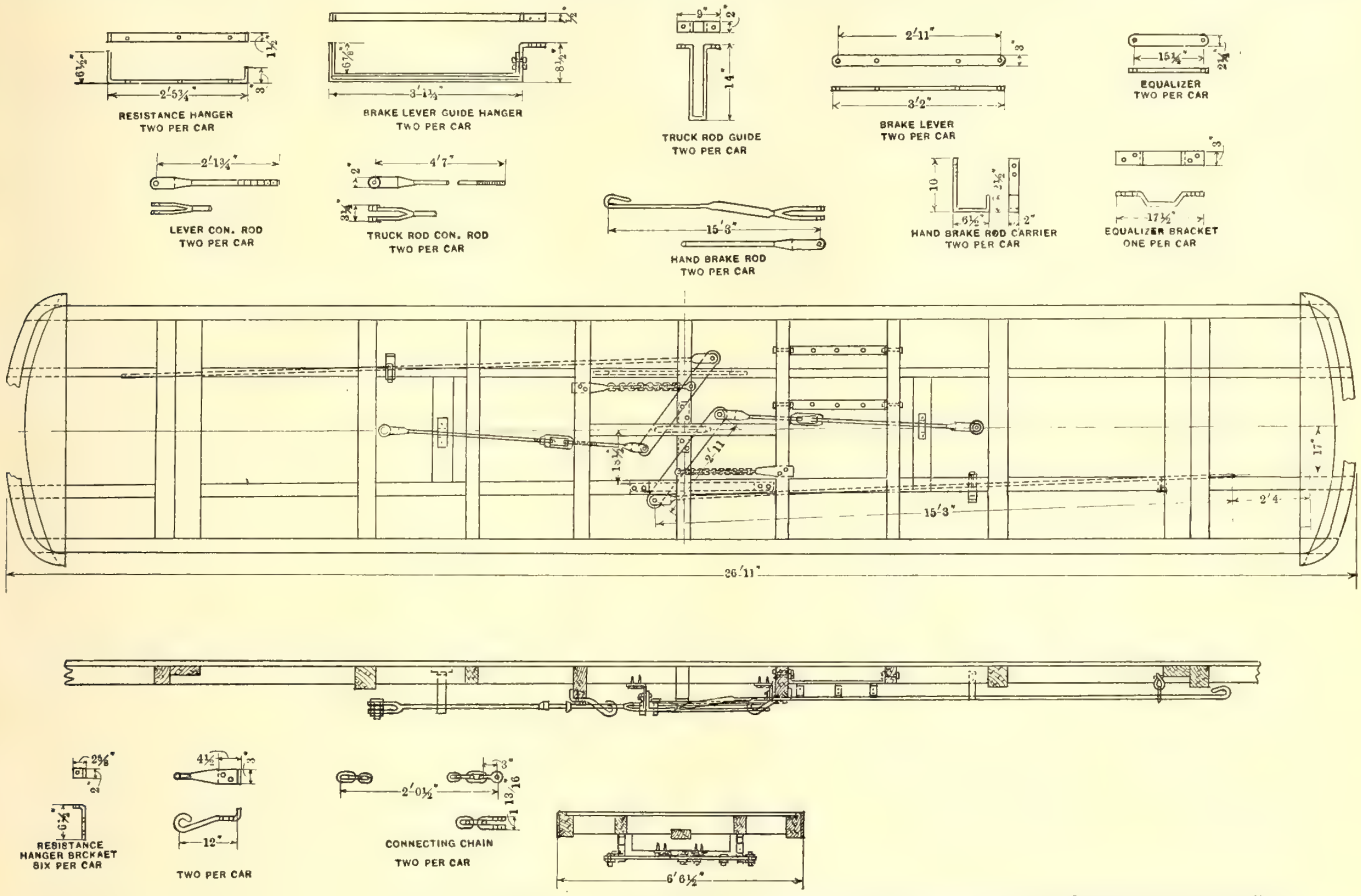


Fig. 5—Truck and Car Alterations—Standard Brake Rigging of Double Truck (Open) Surface Passenger Cars

BRAKING IMPROVEMENTS ON SURFACE CARS

Double car-body brake levers have replaced the old brake rigging which consisted of a single lever and chain. Of course, if the single-truck rod broke, the car was crippled for all braking purposes. Under the present conditions the destruction of one truck rod still permits the braking of the other truck.

Brake leverage diagrams and tables of stresses in rods, levers and pins have been calculated and recorded in blue-

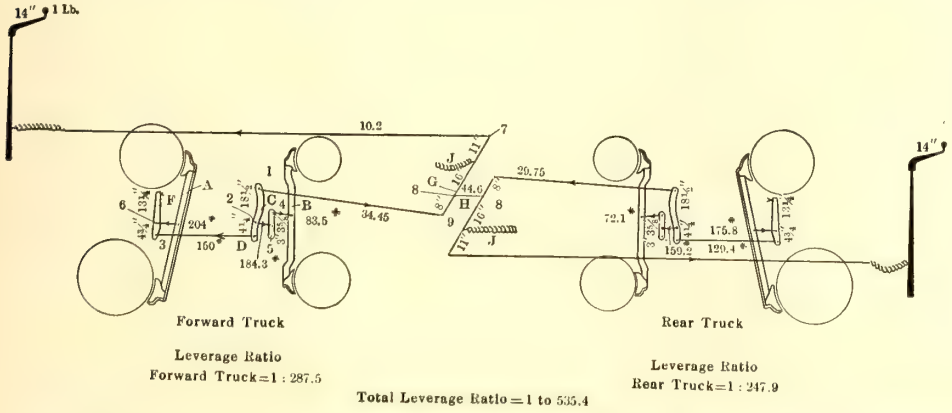


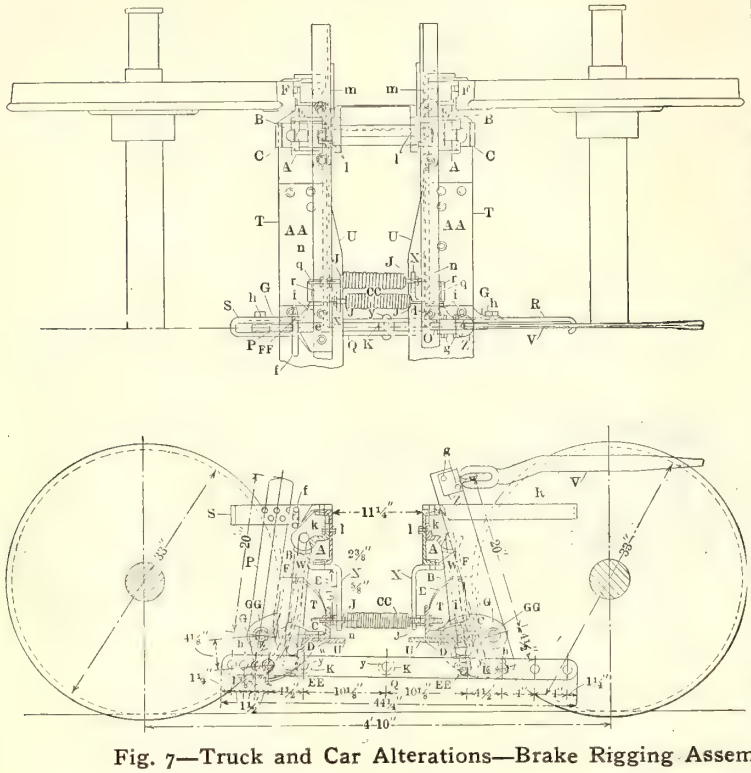
Table of Stresses, at 50.1 #			
Rods & Levers		Pins	
Mark	Tensile Stress Lbs. per Sq. In.	No.	Shearing Stress Lbs. per Sq. In.
A	21790	1	4562
B	17200	2	13740
C	17000	3	11170
D	14510	4	3110
E (Cub.com Beam)	15860	5	3758
F	20035	6	15180
G	13830	7	838
H	4614	8	4190
J (Chain)	6654	9	3352

Car Nos.	Weight Equipped	Lb. required on Brake Handle to give Shoe Pressure of 90% of Total Weight of Car
2500-2599	35200	59.1

Electric Ry. Journal

Fig. 6—Truck and Car Alterations—Brake Leverage Diagram of Type O-45 Maximum Traction Truck for Cars Weighing 35,200 lb.

print form for all classes of cars. Fig. 6 shows one of these records as prepared for the cars numbered 2500-2599, which are mounted on Standard O-45 maximum traction



CHANGES IN PECKHAM NO. 25 TRUCKS

Two of the principal alterations in the brake rigging of the Peckham No. 25 truck shown in Fig. 7 are an increase

Bill of Material

Mark	Description	Material	No. Pcs. per Trk.	Remarks
A	Brake Link Hanger	Mall. Iron	4	
B	" " Sleeve	"	4	
C	" " Bearing	"	4	
D	" " Block	"	4	
E	" Shoe Head	Cast Steel	4	
F	Brake Shoe		4	
G	" Lever Jaw	Mall. Iron	2	
H	Channel Washer	"	8	
J	Y Plug	"	8	
K	Connector Washer	Cast Iron	3	
L				
M				
N				
O	Live Lever — 27¼" x 3⅛" x 1"	O.H. Steel	1	
P	Dead " — 25⅝" x 3 x 1"	"	1	
Q	Live & Dead Lever Conn. — 44⅛" x 2½" x ⅝"	"	2	
R	" Lever Guide — 38" x 2" x ⅝"	Wrot. Iron	1	
S	Dead " Bracket — 26" x 2¼" x ⅝"	"	1	
T	Brake Beam — ½" x 4" x 6'-4 10'L	Steel	2	
U	" " Reinforcement Plate — ⅝" x 3" x 36"	"	2	
V	Live Lever Connector — 20" x 2" x ⅜"	"	1	
W	Brake Shoe Key — ⅝" x ⅜"	Soft Steel	4	
X	Release Spring Bracket — 13" x ⅝" x 2½"	"	4	
Y	Live & Dead Lever Bushing — 1" Long, # 11	C.D.S.T.	8	
Z	" Lever Clevis — 3½" x 1" Dia. & 5⅝" x ½" x 2⅝"	O.H. Steel	1	
a				
b				
d	Live Lever Guide Bolt — ⅝" x 2"	Wrot. Iron	2	
e	Dead " Bracket Bolt — ¾" x 2½"	"	2	
f	" " Eye Pin — ⅝" x 9"	"	1	
g	Live " Clevis Bolt — ½" x 2½"	"	2	
h	" & Dead Lever " — 1" x 3⅝"	"	4	
i	Brake Lever Jaw " — ⅝" x 2"	"	8	
k	" Link T Bolt — 1⅜" x 16⅜" Upset	B.B. Iron	4	
l	" " Hanger Bolt — ¾" x 2" & ½" x 1½"	Wrot. Iron	12-¾" & 8-½"	
m	" Shoe Head Bolt — ¾" x 2½"	"	4	
n	" Rel. Spring " Short — ⅝" x 2½"	"	4	
q	" " " " Long — ⅝" x 13"	"	4	
r	Release Spring Bracket Bolt — ¾" x 2½"	"	4	
t				
u				
w	Brake Link Bearing Rivet — ½" x 2¼" R.H.	Steel	4	
y	Live & Dead Lever Conn. Rivet — ½" x 2⅛" R.H.	"	3	
AA	Brake Beam Rivets — ⅝" x 2⅛" R.H.	"	14	
BB				
CC	Release Spring — Developed Length 11" x 9/32"	Sprg. Steel	4	1⅛" O.D. 8" long
DD				
EE	Cotter — Brake Hanger T Bolt	Sprg. Steel	4	
FF	" — Dead Lever Eye Pin	"	1	
GG	" — Brake Lever Bolts	"	2	

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Fig. 7—Truck and Car Alterations—Brake Rigging Assembly of the Peckham No. 25 Passenger Truck

trucks. The average weight of these cars is 35,200 lb. (empty). It will be noted from the table that with a brake

in the size and a change in the design of the brake hanger T-bolt. These alterations were made because of break-

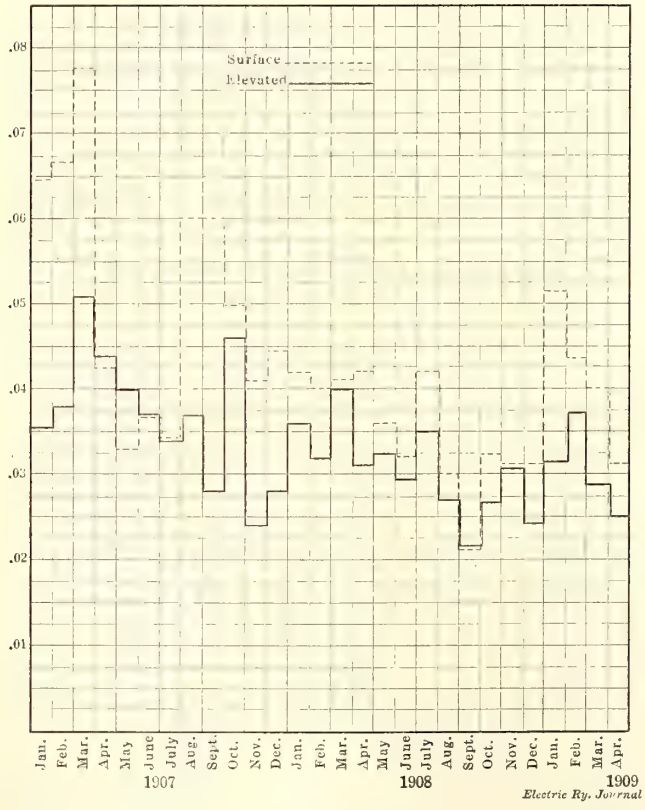


Fig. 9—Truck and Car Alterations—Brake Shoe Costs Per 1000 Ton-Miles

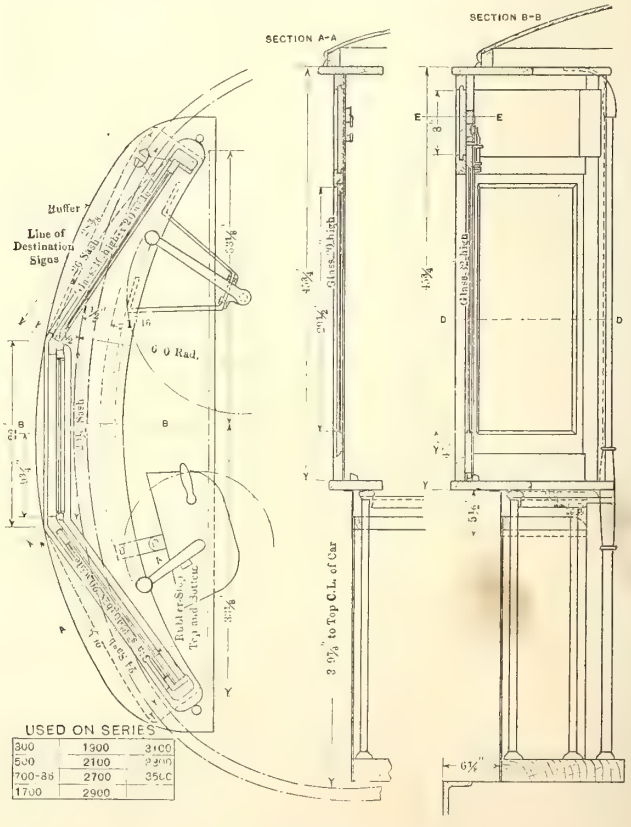


Fig. 10.—Truck and Car Alterations—Vestibule for Double Truck Surface Cars

handle pressure of 59 lb. the pressure on the brake shoes equals 90 per cent of the weight of the car. The highest tensile stress in the brake rigging is 21,790 lb. per sq. in.

ages of the old T-bolts, which caused the brake rigging to drop in the street. The T-bolt was increased from 1 in. to 1⅛ in. It was strengthened by enlarging the bolt at the

point where it was fastened to the head and eliminating the square corners at the intersection of the head and bolt. The head is also made oblong in shape, 1¼ in. x 1⅛ in., instead of 1 in. round as before, thus allowing additional wear. Changes similar to the foregoing are being made on the Taylor hangers, also used on the elevated line.

The brake beams originally furnished with the Peckham No. 25 trucks were too weak and first gave trouble by breaking in the center. This was remedied by the addition of a ⅝-in. x 8-in. steel plate which was riveted to the horizontal leg of the original 4-in. x 6-in. x ½-in. angle. There has since been some trouble from the beams breaking near the ends where the leg of the angle is cut away for the brake shoes. This is now taken care of when installing new brake-shoe heads by substituting a brake beam which is 1 in. wider and gives ample strength at that point. The Taylor brake hangers were so located that they fouled the gear cases when the brake shoes were worn and the wheels low. The location is now being shifted toward the side of the truck. Incidentally, this change admits using an interchangeable brake beam with the Peckham No. 100 freight truck. At the present time all motors on Peckham No. 25 and No. 100 trucks are rigidly suspended to the angle iron of the truck frame, but they will eventually be arranged for spring suspension.

All this truck change-over work is being done on a maintenance basis. When one brake beam breaks the other three are also removed, but are used on other cars instead of being scrapped. In this way the change-over is made without excessive expense.

BRAKE-BEAM STOP OR ANTI-CHATTERING DEVICE

Fig. 8 shows the details of the brake-beam stop or anti-chattering device as made for the pony and driving ends of Brill maximum traction trucks. The old stop casting, which had a smooth back and a long center hole, through which it was bolted to the truck bar, used to give trouble by sliding up and away from the brake beam. This has been overcome in the new casting by cutting oblique grooves in the back to permit height adjustment. A wrought-iron shim at the bottom provides for wear. Fig. 8 is accompanied by a bill of material, from which it will be noted that new bolts and washers were not required in making the change.

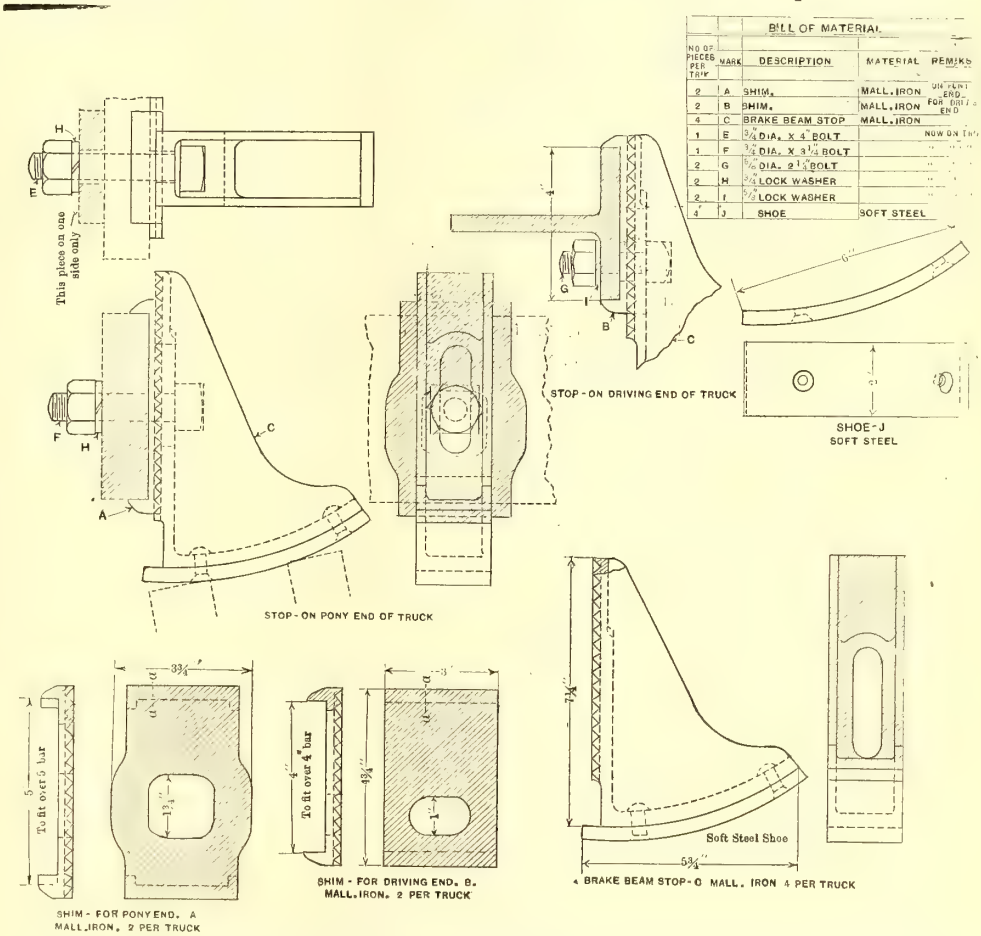


Fig. 8—Truck and Car Alterations—Details of Brake Beam Stop for Maximum Traction Trucks

SAND BOXES

The sand box being an important factor has also been given attention. The surface cars are equipped with some "Ham" sand boxes, but the majority are of the "Reliable" type.

BRAKE SHOES

As the brake-shoe standardization practice of the company was quite fully described in the ELECTRIC RAILWAY JOURNAL of Oct. 24, 1908, a résumé only will be given here for the sake of completeness. The figures on life and cost, however, cover periods later than those given in the earlier article.

Standardization of brake shoes was first considered in 1903 when there were 27 types on the surface and 13 on the elevated lines. By changes in the brake rigging, particularly on utility cars, the surface patterns have been reduced to 22 and the elevated patterns to 4. Eventually there will be but two patterns, one for 33-in. and 34-in. wheels and one for 20-in. ponies These two standards are in accordance with the recommendations of the American Street & Interurban Railway Engineering Association for wheels with narrow treads. They are made by the American Brake Shoe & Foundry Company as patterns M-512 and M-582, respectively. New heads to take these shoes have been designed throughout.

As a considerable number of the old patterns are still in service every endeavor is made to get the maximum wear from the different brake shoes. Each foreman is furnished with a blue print showing the attainable wear of each type of shoe as proved by experience and it is his duty to see that these standards are at least maintained if not bettered. This surface railway was the first to keep brake-shoe costs on a ton-mile basis, believing that this unit offers fairer comparisons than the train-mile. The ton-stop unit would be even better if such a comparison were practicable under the wide variety of running conditions involved in city service. The accompanying curve sheet, Fig. 9, shows the ton-mile brake-shoe cost records for the period from January, 1907, to April, 1909. These costs do not include credits for scrap.

CAR-BODY STANDARDS

It is rather difficult to present any detailed description of the rehabilitation of the surface car bodies because so much of the work was simply a thorough overhauling of neglected rolling stock. Sagging platforms in particular were noticeably frequent. On steel-supported platforms this defect was eliminated by reinforcing the channel iron knees by riveting an additional plate inside the channel. During 1906 the company began to install on all cars

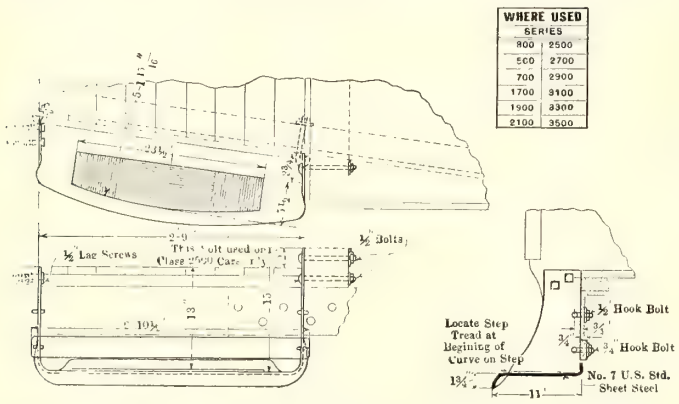


Fig. 11—Truck and Car Alterations—Standard Step for Surface Cars

semi-inclosed Sjoberg vestibules of the three-light design shown in the accompanying illustration, Fig. 10. The vestibule sash is made with both upper and lower tracks. On the later four-motor cars the vestibules are of practically the same type, but they are built in the posts extending from the crown piece to the bonnet, whereas old car vestibules are built up from the dash to the top.

these details for the convertible car of the 2500 series introduced in 1907. This car is 38 ft. 3¾ in. overall, 28 ft. over the body and is 7 ft. wide overall. The body underframing is of wood and the platforms are carried on 6-in. x 3½-in. x ½-in. outside angles, reinforced at the end sill by 5-in. x 3-in. x ⅜-in. angles. Interesting features of the floor framing are the sub-end sills placed 9¼ in. from the end sill; the connection of the cross-sills to the side sills by standard angles instead of ordinary bent angles, and the reinforcement of the side sills by a ⅝-in. x 8-in. steel plate.

The seats in the four-motor convertible cars from the 3700 type upward were originally rattan-covered. The maintenance of these seats is so high, owing to their rapid deterioration and even wanton destruction, that it has been decided to substitute wooden seats. The slats are made of cherry ⅜ in. thick x 1 11/16 in. wide. It is figured that the cost of a wooden seat and back will be less than that for recovering the present seat with rattan. This work is being done coincident with truck changes.

BUFFER REINFORCING CASTING

Cast-steel buffer reinforcing castings have been built for both the open and closed cars to strengthen the buffers in the center. This improvement was made to prevent the bending usually caused by striking other vehicles or by the binding of draw-bars in the buffer angle iron on curves As the buffer height of the open cars is about 12 in. more than that of the closed cars the reinforcing casting of the former is provided with an apron which prevents it from riding over the bumper of a closed car ahead.

HEATER ARRANGEMENT

To prevent scorching from electric heaters it was deter-

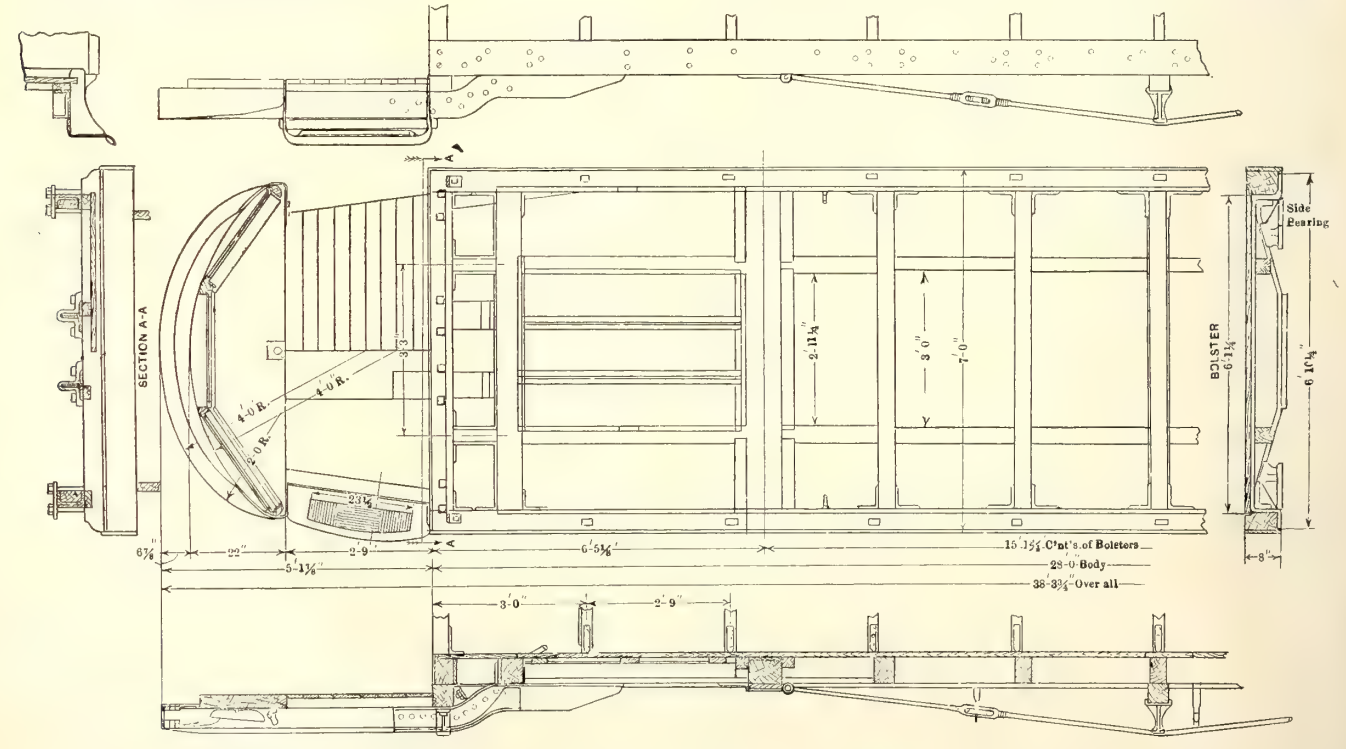


Fig. 12—Truck and Car Alterations—Underframe of Surface Convertible Passenger Cars, 1907 Type

The Universal safety tread is the standard for all surface cars except the four-motor equipments, which have Stanwood steps. The length of the step is 2 ft. 9 in. and the width is 11 in., including the curve on the step. The tread is placed on No. 7 sheet steel and is 23½ in. long and 5½ in. wide overall. The latest surface car underframing and platform practice is shown in Fig. 12, which presents

mined to allow 5 in. between the front of the seat and the seat riser panel to which the heater is attached. This has been done in both elevated and surface cars. The old cars standardized have heat deflectors made of a wooden board lined with transite. The new cars have a galvanized-iron deflector which it is believed will give better satisfaction at a lower cost. This arrangement is illustrated in Fig. 14,

which shows in section a side post and seat of the convertible surface cars first built in 1907.

SASH, CURTAINS AND FIXTURES

Over 550 of the semi-convertible cars have removable sash which are held in place by a metal capping extending its entire length. This capping is held by screws passing through the post with the head on the inside of the post in a cup washer. In the older cars a steel bolt was used with a plain instead of a flanged washer, but it was found that the rusting of the steel gave a bad appearance. In the later cars a bronze screw is used and the washer is flanged to prevent the screwdrivers from slippingg and scratching the wood. This also give a neater appearance as it covers up the joint between the washer and the woodwork. The

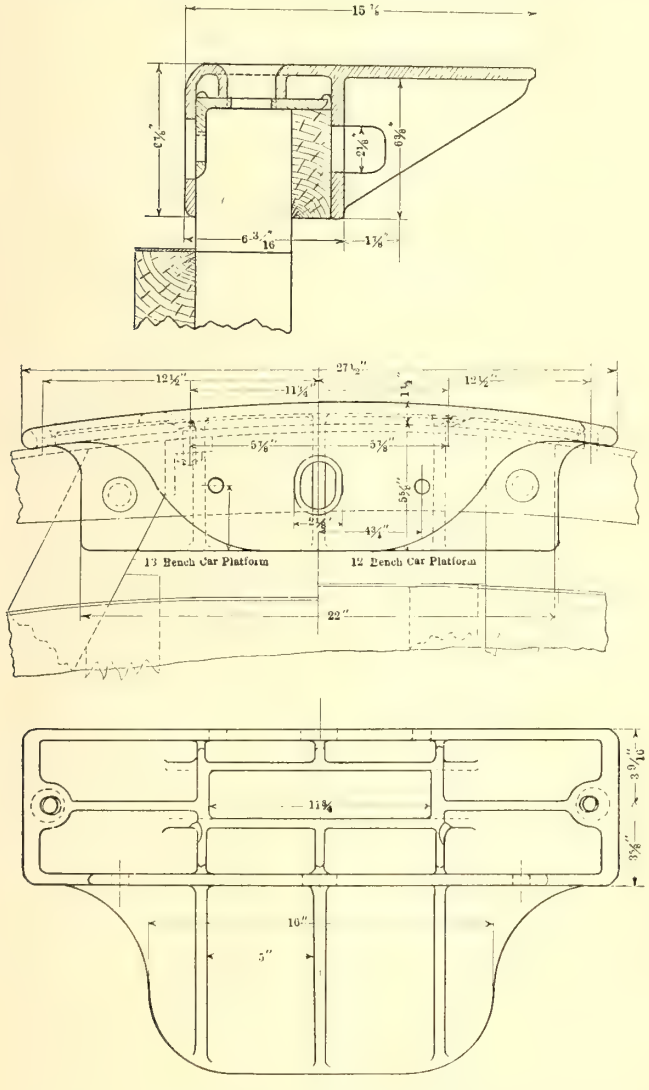


Fig. 13—Truck and Car Alterations—Buffer Reinforcing Casting for Surface Cars

space between the post is 1/32 in. less than the thickness of the sash so when the sash capping is installed it will be tight against it and prevent rattling. The sash numbers are stamped on the post corresponding to numbers on the sash.

The standard curtain material for the closed semi-convertible cars is Pantasote pattern J, color 74, with Hartshorn tin rollers and Acme open-car cable fixtures. The material for closed cars is the same, but the company has adopted the No. 88 ring fixture of the Curtain Supply Company. This is interchangeable with the Forsyth 86 used on most cars and displaces the Burrowes type. The material for single-truck open cars is duck with Acme open-car cable fixture, but for double-truck open cars and the 118 convertible elevated cars there has been adopted a double-coated Pantasote, the inside face color 82 and the outside color 74. This double color was adopted because on the open cars the shade gets discolored on the inside. Pantasote is readily cleaned and recolored.

CAR SIGNS

Fig. 15 shows the standard arrangement of transfer, spitting and similar signs on the bulkhead of open surface

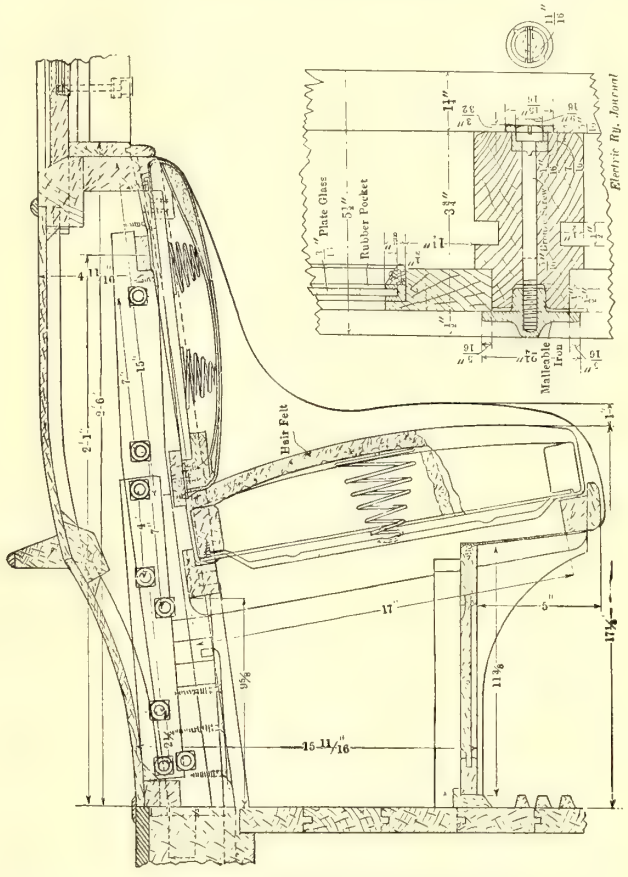


Fig. 14—Truck and Car Alterations—Side Post and Seat of 1907 Type Convertible Surface Car

cars. The locations of the same signs on closed cars are the same except that the "Notice to Passengers" is placed in the side molding. These general arrangements were

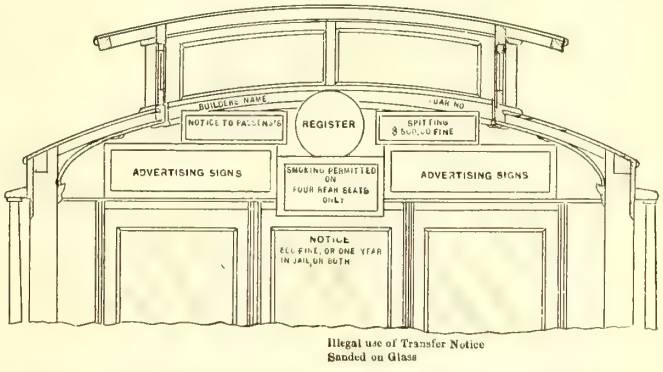


Fig. 15—Truck and Car Alterations—Diagram of Signs on Bulkhead on Open Surface Passenger Cars

fixed after conference between the superintendents of the mechanical and transportation departments and the car advertising contractor.

A sheet steel side destination sign is installed in the diagonal corners of every elevated motor car. The portion underneath this sign has the car number painted in white letters on a black background of sanded glass.

THE WISCONSIN CONVENTION

The Wisconsin Electric & Interurban Railway Association and the Northwestern Electrical Association held a joint meeting at the Grand View Hotel, Chain O' Lakes, near Waupaca, June 28 and 29, 1909. This summer meeting was called by the officers of the two associations to furnish a means of discussing operating topics of interest to electric railway and light companies and incidentally to give members a chance for a brief outing along with the convention. Sixteen electric railway and lighting companies of Wisconsin were represented. The sessions were presided over partly by Clement C. Smith, of Milwaukee, president of the Wisconsin Electric & Interurban Railway Association, and Ernest Gonzenbach, of Sheboygan, president of the Northwestern Electrical Association.

One of the important results of the meeting was the consolidation of the two associations, which has been talked about for some 18 months as being desirable and probably inevitable. The sentiment was unanimous in favor of this consolidation, inasmuch as both associations are now practically limited to the State of Wisconsin. Years ago the Northwestern Electrical Association was formed to cover a number of States, but by the organizing of various State associations in the States surrounding Wisconsin the territory has gradually been limited to the State of Wisconsin. The Wisconsin Electric & Interurban Railway Association, consisting of electric railway and lighting companies in Wisconsin, was organized recently with the double object of having occasional meetings for the discussion of operating topics and for taking up various matters in connection with the Wisconsin commission and Wisconsin legislation. The consolidation of the two associations has been hindered somewhat by the fact that the Northwestern Electrical Association has not technically been limited to the State of Wisconsin. Under the new arrangement individual membership in the association without vote, but with all other privileges of the association, is given to all former individual members. Individual memberships will cost $5 per year. The company or Class A members with voting power pay dues at the rate of one-tenth of 1 per cent of their gross receipts.

The question of consolidation of the associations was first brought up in an executive committee meeting of the Northwestern Electrical Association the afternoon of June 28. After considerable discussion it was decided to recommend to the two associations a consolidation to be carried out as follows: The name of the association is to be the Wisconsin Electrical Association. The membership is to consist of companies and individuals as before outlined. Various company members of the Wisconsin association agreed to subscribe enough to wipe out the debt of the Northwestern association, amounting to about $300, thus allowing the consolidated association to start with a clean slate. Dues are to be paid beginning with Jan. 1, 1910. Owing to the incompleteness of records, no attempt will be made to collect delinquent dues. All present and former members wishing to continue membership shall pay alike, beginning with Jan. 1, 1910.

This plan of the executive committee was presented to the association at the morning session June 29 and was unanimously adopted by both associations. The executive committees of the two associations were then directed to draft a constitution and by-laws and nominate officers to serve until the annual meeting in January, 1910. At a special session held at 2 p. m., June 29, C. C. Smith, speaking for the joint committee, reported in favor of a constitution the same as that of the Wisconsin Electric & Interurban Railway Association, with the additional provisions for membership recommended by the executive committee already outlined. The committee placed in nomination two tickets, one consisting of the former officers of the Wisconsin association and the other of the former officers of the Northwestern association. The election resulted in a mixed ticket from the officers of the two associations, as follows: Ernest Gonzenbach, of Sheboygan, was elected president, being formerly president of the Northwestern association; Clement C. Smith, of Milwaukee, former president of the Wisconsin association, was elected first vice-president; Irving P. Lord, of Waupaca, was made second vice-president, and George B. Wheeler, of Eau Claire, was made third vice-president. The secretary and treasurer is John S. Allen, of Lake Geneva, formerly secretary of the Northwestern association.

This consolidation will result in one good, strong association for Wisconsin, and will relieve the uncertainty as to the future of the Northwestern Electrical Association which has been hanging over it for some eight years past. Every one was agreed as to the importance of keeping up the work of the Wisconsin Electric & Interurban Railway Association as regards legislative matters. Lest there be some misunderstanding as to just what this work consists of, a few words about the association's method of handling legislative matters will be in order. It is well known that whenever a State legislature convenes numerous bills are proposed which are ill advised and likely to do damage to the industries which they affect. It is necessary that the bad points of these bills be pointed out and brought forcibly to the attention of legislative committees or other members of the Legislature if the passage of such legislation is to be avoided. Under the old methods of handling these matters the smaller companies of a State were obliged either to ignore such injurious proposed legislation and trust to luck that it be not passed or go to considerable expense and trouble to present their cases individually. The plan now in use in Wisconsin and rather imperfectly carried out in some other States also is for the association to employ some competent attorney to keep track of proposed legislation affecting electric railway and lighting companies and to present to the committees or to the individual legislators reasons why such legislation should not pass. The expense of maintaining this service by a competent attorney is borne by the various members of the association and the cost is much less than if dependence were placed in the individual efforts of various companies. In many cases the managers of individual companies would take chances on the passage of a bill rather than go to the expense of a trip to Madison. Under the present arrangement no such chances need be taken as to obscure measures, as the association's attorney watches all legislation affecting its members.

REPORT ON LEGISLATION

At the first session, which was held Monday morning, June 28, E. W. Fairchild, of Milwaukee, the attorney who has handled the association's legislative matters for the past year, made a report on recent legislation in Wisconsin affecting public utilities. He said that but little legislation affecting such utilities had been passed the last session. The reason for this is that the public utility law providing for the commission has solved so many of the problems which come up in connection with public utilities. Matters are now left to the commission which formerly would have been the subject of bills before the

Legislature. He called attention to the large amount of work involved in keeping track of proposed legislation. Every bill must be read carefully sentence by sentence, because some overlooked paragraphs or joker in a bill may be of great importance and may be passed by the Legislature without full knowledge of its intent.

Amendments to the Wisconsin public utility law were made last session to cover the following points of interest to electric railway companies. The time before which companies may voluntarily give up their franchises and avail themselves of an indeterminate franchise under the power of the commission was extended from July 1, 1908, to Jan. 1, 1911. On the latter date the question may be reopened as to whether all companies shall be forced to give up their franchises and take indeterminate permits. Mr. Fairchild said that it looked very much as if such action would be taken in 1911. The Wisconsin commission is very much in favor of the indeterminate permit idea on the grounds that a definite period of expiration of the franchise involves uncertainty as to the future of the property and necessitates higher rates than would be necessary if the company could continue to do business indefinitely on its good behavior. Another change in the utility law makes it necessary to have a vote of the people in a city or town before any public utility can be purchased by the municipality. The temperature in cars was before required to be kept at 70 deg. under all conditions. This has been modified to read 60 to 70 deg. whenever reasonably profitable. Waiting rooms are now required on interurban roads in towns of 150 population and over. In case of injury of a person at a railroad crossing the burden of proof of the carelessness of the person injured is upon the company. The law now makes prosecution of those caught stealing electricity easier than before, because it removes the value limitation previously imposed. The matter of industrial insurance will doubtless come up at the next special session of the Legislature.

In the discussion which followed Mr. Fairchild was asked as to whether there seemed to be any likelihood that the present commission law of the State would be repealed, as there had been some agitation on that subject. Mr. Fairchild replied that he thought such a move extremely improbable. The movement against the commission originated in one point which failed to get reduced rates in a certain hearing and had made but little progress. The Legislature and commission are working in very close touch and harmony and the ideas of the commission on any subject are taken almost as law by the Legislature.

PURCHASE OF COAL ON B.T.U. BASIS

R. T. Gunn, general manager of the Eastern Wisconsin Railway & Light Company, Fond du Lac, read a paper on "Purchase of Coal on Straight Contract or B.t.u. Basis."

He stated that in generating power by steam the cost of coal is about 75 per cent of the entire expense. In most properties the one item of fuel is almost as much as the combined labor payrolls of the entire property. Mr. Gunn after a year of investigation feels that it is demonstrated beyond a doubt that the only proper method of making coal purchases is on a heat unit or B.t.u. rating. All the larger coal companies, and especially those who handle the best grades of fuel, are only too anxious to sell on a guarantee of so many heat units per pound of coal and are willing to contract and make settlements on analyses at the end of each month, the purchaser paying the bonus where coal exceeds the guarantee and withholding where the coal does not come up to the guarantee. To go more into detail, he gives an example of how this may be worked out in practice. In this locality Youghiogheny screenings may be bought on a guarantee of 13,000 B.t.u. per pound of coal. To determine what the coal will average and obtain a fair test, a small sample is saved from each day's delivery. These samples are mixed thoroughly and at the end of the month analyzed. Care must be taken to keep samples in airtight jars. The coal may be wet and the analysis should tell the condition of the coal as actually received and not after it has been air dried. Local conditions figure more in buying coal than in any other department of the business. Some may find it economy to buy cheap and low grades of fuel, while others may find economy in the best fuel containing the highest number of heat units per pound, although comparatively much higher in price per ton. Two examples illustrate this. In one power plant which is equipped with B. & W. water-tube boilers one boiler is sufficient to carry the load 18 hours out of the 24, a second being added over the peak load. With low-grade coal containing a large amount of ash this would be impossible, as furnaces would have to be cleaned during the 18-hour period. This plant, therefore, uses the best coal obtainable. When low-grade coals were used three boilers were required to carry the peak load and two boilers at all times. A saving of $10,000 per annum is now being made in this plant by using the higher grade fuel. These results have been obtained by making B.t.u. tests over a period of several months with different kinds of coal. The same company has another plant equipped with Jones underfeed stokers which when operating on high-grade coal shows only a slight saving over the cheaper grades of coal. The human element is one which must have more consideration if the best results are to be obtained. Firemen can lose or save more money for a public utility than any other laborer connected with the organization. This accounts in a great many instances for the fact that the management does not obtain much better results from high-grade than from inferior coals. Purchasing fuel on a B.t.u. basis stops the practice of delivering coal from mines other than that called for in the contract, so that the coal is not uniform. The time will soon arrive when all fuel will be purchased on its real value like any other commodity.

In presenting his paper Mr. Gunn also emphasized the economy to be obtained by forcing boilers to their maximum capacity. Part of the saving in the plants he referred to is due to this forcing and not allowing boilers to run underloaded.

C. N. Duffy, Milwaukee, said that June 1 the Milwaukee Electric Railway & Light Company entered into a contract for the purchase of coal on a B.t.u. basis as a result of investigations. The company is now obtaining coal of a better average heat value than before and at a lower price.

Some questions were raised by members as to the value of continuous CO_2 flue gas recorders or indicators as a guide for firemen. One member thought them too expensive for an ordinary plant. Another thought that recording steam-pressure gages did almost as well, because they required uniform handling of fires. Ernest Gonzenbach, however, exploded the idea that a uniform steam pressure meant proper handling of fires. He told of his experience in the management of a North Carolina plant which presented a beautiful steam chart, but where the coal economy was poor. The firemen were in the habit of loading the furnaces as full of coal as they could be piled and then

sitting down to play the banjo. By a reform in firing methods the monthly coal bill was cut down from $5,000 to $2,200. In regard to methods of estimating output for figuring coal consumption per kw-hour he called attention to the fact that some companies take the total kw-hours generated rather than the total kw-hours sent out of the station. Deducting the current used in the station to assist in the production of energy sometimes made considerable difference. In the Sheboygan plant the consumption averages about 5 lb. of coal per kw-hour actually sent out.

J. R. Cravath, Chicago, in answer to a question as to the use of the Venturi meter for measuring the water fed to boilers, told of the practice of the Rockford (Ill.) Electric Company, which keeps a Venturi meter with a recording chart in the feed line of the boilers. This records continuously the rate of boiler feed and the man in charge of the fireroom is not allowed to start an additional boiler in operation until the meter indicates that the rate of water consumption is considerably in excess of the rated load of the boilers in service. This keeps the boilers well loaded at all times. There is more in heavy loading of boilers than at first appears. When a boiler is being forced a fireman must of necessity handle his fire so as to get a fair degree of economy from the coal in order to keep up steam. There is no leeway for the formation of air holes in the fire.

R. T. Gunn spoke very favorably of the use of a Williams regulator to keep a constant height of water in the boiler. This prevents water being allowed to get low and other conditions not conducive to economy or safety.

W. D. Voth, chief engineer, Sheboygan Light, Power & Railway Company, gave an outline of the premium plan which has been in use for four years in the Sheboygan plant with great success. The company inaugurated this plan at a time when it was found that fuel oil and miscellaneous power-house supplies were costing 1.1 cents per kw-hour. The power-house force is given a premium amounting to 10 per cent of the saving below 1.1 cents per kw-hour. The premium is divided among the men in proportion to their respective salaries. It is really in the nature of a gradual increase of salary, because the larger the output and the better the load factor the larger the amount available for premium. Mr. Gonzenbach said that he thought it better to pay an increase in this way than by raising salaries.

W. E. Haseltine, Ripon, reported having used a similar premium plan in the power house successfully. He has a combined water and light plant. The output of the plant in horse-power-hours is figured both in electricity and in water pumped. This was determined for each month of the year before the premium plan was begun because the relative amounts of electricity and water put out vary from month to month. The plan is to give the fireman 20 per cent of the saving in coal per hp-hour by comparison with the same month of the year before the premium plan went into effect.

PARKS AND PLEASURE RESORTS

R. M. Howard, Green Bay Traction Company, read a paper on "Summer Parks," which applied to parks in and near cities with a population in the neighborhood of 30,000. He said that an amusement park fitted up with good attractions in the neighborhood of such a city would usually attract big crowds for one or two years until the novelty wore off, after which there is likely to be a decline. He took up a case of such a park and figured out the cost of maintenance of the park and the interest and depreciation on the extra rolling stock required to handle its peak traffic. His figures were very discouraging to any company attempting to maintain such a park.

Mr. Gonzenbach, of Sheboygan, spoke along the same lines. He figured that his company is making money by keeping its park closed. The park traffic looked good to the uninitiated, but really there was a deficit. The fixed expenses of maintenance, the extra cars required and the accidents which occur in connection with handling such crowds were against profits. His experience with baseball parks was also discouraging. The traffic was of such a short peak-load nature that it yielded little revenue commensurate with the cost of contributing to the park and the extra rolling stock. In the lighting business peak loads are avoided because of the small returns that they gave on the necessary investment. In the railway business the companies seem to have been exerting themselves to secure this very peak-load business.

Irving P. Lord, of Waupaca, told of his experience with a baseball park. The baseball enthusiasts of Waupaca came to him asking for support for baseball games. His company furnished the land for the park and transported the players as a contribution to the baseball movement. After running in that way a year the baseball people wanted further financial help. The venture had not been profitable to the company. More people wanted to ride home at once at the close of a game than this small road had cars to handle, and this caused dissatisfaction and criticism of the service. Ball games had been held on Sunday. He had found that the weather being equal, Sundays without ball games give street railway receipts about the same as those on which there are ball games. This meant that people were traveling in other directions and, furthermore, the crowd which goes out into the country or elsewhere on Sunday is a much better one to handle, as it is distributed through the day. Electric Park, which his company owns, has been concessioned so that the company has no expense of maintenance. He thinks that much the best way.

George B. Wheeler, of Eau Claire, expressed himself as somewhat concerned with the adverse reports on pleasure-resort traffic profits given by Messrs. Howard, Gonzenbach and Lord. His company had just started a resort under conditions which seemed to him favorable for making it a profitable venture. The ground has been obtained at a nominal rent. It is situated on an existing line of track so that no new track investment is required and is between a town of 20,000 on one end of the line and 10,000 on the other end. About $5,000 has been appropriated to pay the expenses of this traffic for the coming season. He did not favor once-a-week amateur baseball, but rather a professional ball club with frequent week-day games. His company had appropriated $500 per month toward baseball.

Mr. Gonzenbach called attention to the fact that concerts, theaters and baseball games are productive of peak-load traffic because of the large number of people which must be moved at once. He therefore favored a park with continuous attractions of some kind which are not expensive to maintain.

Clement C. Smith stated his experience with the Sterling & Dixon (Ill.) line, where a large amount of money had been spent in a park midway between the towns. The result was a most dismal failure. The leading attraction in that park now is a cage of monkeys.

Mr. Howard said that on his company's interurban park open-air dances were held twice a week and found to be profitable, as the crowd going to these dances could be handled on the regular cars.

REPORT ON EDUCATION

Thursday morning Prof. Cyril M. Jansky gave a paper and talk on the work which the University of Wisconsin is doing to spread scientific information of everyday use among those engaged in various industries. The old idea, he said, was to cultivate culture simply for culture's sake, and that culture was only for gentlemen. The idea of making culture serve any useful end would have been scorned. The professor then brought out the idea that to advance the welfare of a people scientific principles must be applied to all things industrial. Scientific knowledge must be made to permeate down among the masses. He then told of the Wisconsin University extension work which is being conducted to help men in various industries to learn more about the processes which they handle and to become educated in the principles and so become more effective and useful members of society and better employees of the companies for which they work. These courses are carried on by correspondence and by occasional visits of instructors to places where classes may be formed. The general plan is to fit the work to the individual in each case, which, of course, involves much work by the instructors. The work is carried on by means of a State appropriation for the purpose, but a nominal fee is charged for tuition because people in general do not appreciate things which are free. The work differs from ordinary commercial correspondence school work in that it is not a commercial or money-making scheme, being supported by the State.

Professor Jansky's remarks were received with much interest and appreciation by the managers present, and it appeared from the discussion that all prized the opportunities which this university extension work offers to men in the employ of various companies who wish to become better posted along various lines of value to themselves and their companies.

John S. Allen, Lake Geneva, spoke specifically of having a boiler-room man who is looking for just this kind of instruction.

Clement C. Smith suggested that where there is a group of properties or network of interurban lines classes might be formed to meet at some central point. The question was then asked as to the effect on the men of such education and whether it did not soon result in their employment by other companies in better positions. The consensus of opinion and experience seemed to be that men who work diligently at correspondence or other courses are likely to become too valuable to remain in the same position long, but this was not considered an objection to the plan, but rather as a proof of its success. As one member put it, "We want the kind of men that are going ahead. We do not want men that no other company wants."

R. T. Gunn said that the employees of this company had derived much benefit from a kind of educational meeting which is held every two weeks.

Ernest Gonzenbach emphasized the point that there is really no place on an electric railway system for a purely unskilled laborer. Even the least skilled man of the lot who is working along the track needs a certain amount of special knowledge and the scale of wages should be such as to hold these specially good men. Considerable was said during the discussion about better education of men in the boiler-room. Mr. Gonzenbach thought that better educated men were needed in the car shop even more than in the boiler-room.

C. N. Duffy, Milwaukee, expressed much appreciation of the address of Professor Jansky of the university work of which he is the director. He thought the point should be strongly emphasized that the greatest work that the university can do is in the education of the unskilled laborer. The more men there are who leave operating companies because they are too good for the companies the better it will be for all of the companies. All that had been said about need for better knowledge in the boiler-room applied with equal force to the common worker in the accounting department.

In closing Professor Jansky called special attention to the university's six weeks' summer school for artisans, in which those taking correspondence work can come to the university and have the advantages of the regular laboratories and learn laboratory methods. Nearly everything can be learned by correspondence except knowledge of laboratory methods and apparatus, and this can be obtained in the six weeks' summer course.

DESIRABLE AND UNDESIRABLE BUSINESS

Mr. Gonzenbach then gave a talk on the undesirability of certain classes of business in both the electric railway and electric lighting fields. In connection with electric lighting this unprofitable business is, of course, that which is on for a short time during the company's heaviest peak load, which yields a small yearly revenue, but calls for large investment in apparatus and consequently large interest and depreciation charges.

The electric light man, he said, had by this time come to recognize that purely peak-load business is not desirable. In the railway business, however, we have apparently done all we can to pile business into peaks. By means of baseball and amusement parks immense crowds were gotten together, all of which had to be handled within a short time each day or each week and for a few weeks each year, and as if that were not enough fares had been reduced to get a crowd. Apparently the railway man liked excitement and he usually got it. The amusement park doubtless amused the natives, but did not amuse the railway man at the end of the season. As to park attractions, let them be the natural attractions of an attractive piece of land, if possible, without expensive maintenance charges. Interurban lines having natural parks obtained from them a net gain of traffic without any added cost of operation.

Something which had set him to thinking some time ago was the discovery that 10 to 15 per cent of his interurban revenue came from a single small community a short distance out of town. He is now devising means for ultimately securing a continuous settlement of suburbanites along the interurban line, getting people who work in the city to live in the country. In order to work up this suburban-home idea he began to look up available literature on suburban topics. He found that none of it was suited for the possible suburbanite of small means. He therefore had a paper prepared called the "Suburban Outlook," which he also arranged to supply to other neighboring interurban roads.

After the conclusion of Mr. Gonzenbach's address the meeting adjourned.

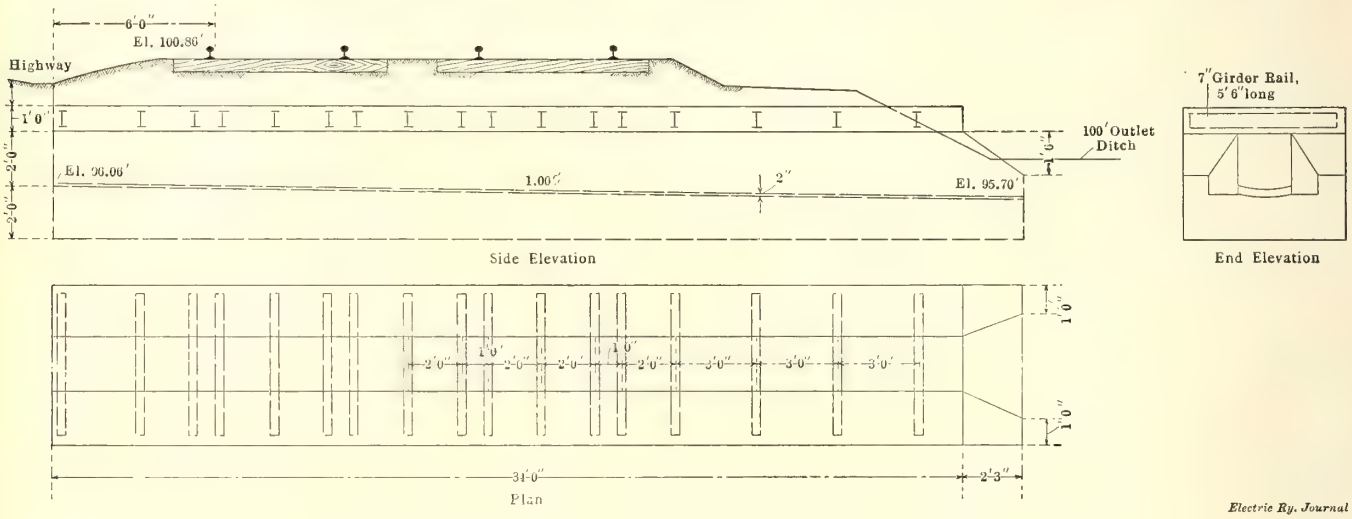
Separate cars for women, which were tried in the Hudson Tunnels, were withdrawn on July 1, as the experiment proved a failure.

REINFORCED CONCRETE CULVERTS OF THE SCHENECTADY RAILWAY

The high-speed double-track interurban line of the Schenectady Railway Company connecting Albany and Schenectady parallels the State highway for about 12 miles. Last year the New York Good Roads Commission rebuilt the highway and laid a macadam road. In the course of this work it was necessary to build seven culverts under the roadway to drain the land on each side. The Schenectady Railway Company was required to build an equal number of connecting culverts under its right of way. The type of construction used by the railway company is shown in the accompanying engraving.

The tracks were first shored up by the section gangs, two 5-in. T-rails, 30 ft. long, being placed under each rail. The excavation, consisting mostly of sand and some back fill, was then started by the construction gang. The foundation concrete was a 1-3-6 mixture with 2-in. stone and was placed without forms. Small rubble stones, spaced about 2 ft. apart, were set in concrete to act as binders for the side walls. When the foundation had set, the side walls and roof were started, using collapsible forms. The roof form was placed in sections and supported in the center on posts so that it fitted inside of the side wall forms and also acted as a spreader. The concrete in the side walls was a 1-3-6 mixture, the same as the foundation, and was placed with a spaded face. The roof concrete was a 1-2-4 mixture with 1-in. stone and was reinforced by short lengths of 7-in. girder rail spaced as shown on the plan. The roof was further reinforced by Clinton wire mesh which was interwoven between the rails. The small clearance between the top of the culvert and the base of the ties made it necessary to put in extra heavy reinforcement in the roof and to use a rich concrete mixture in order to prevent breakage under the shock of 40-ton interurban cars running over the structure at high speed. When the concrete was sufficiently hard, the forms were removed by knocking out the legs from under the roof forms which dropped into the opening and were then hauled out. By removing the roof forms, the spreader for the side wall forms was taken out, making it a simple matter to loosen and remove them. The exposed parts and as much of the opening as could be reached were then finished with neat cement. When the back fill was completed, the shoring was removed and the tracks resurfaced and aligned by the section gangs.

The following quantities were used for each culvert: Excavation, 62 cu. yd., at 40 cents; 1-3-6 concrete, 26.5 cu. yd., at $6.50; 1-2-4 concrete, 7.5 cu. yd., at $8; 7-in. girder rail, 17 pieces, weighing 2275 lb., at $15 scrap value; Clinton wire mesh, 175 sq. ft., at 10 cents. The prices given are average prices and include cost of transporting and installing in place. The average actual cost of each of the culverts was about $290, to which should be added $40 for shoring up and replacing tracks and $15 for engineering and superintendence, making the total cost approximately $345.



Reinforced Concrete Culvert, Schenectady Railway Company

ANNUAL REPORT OF RHODE ISLAND RAILROAD COMMISSIONER

The report of Joseph P. Burlingame, Railroad Commissioner of Rhode Island for the year ended Dec. 31, 1908, states that the receipts of some of the street railway companies showed a decline during the year, while others experienced an increase. The financial statistics in the report relate to the year ended June 30, 1908.

The 10 corporations reporting had 399 miles of single track. The paid-up capital stock was $25,763,485. The results of operations in 1908 compare with those of 1907 as follows: Total receipts, $5,666,203; increase, $224,135. Total expenditures, $4,503,958; increase, $141,820. Net earnings, $1,162,245; increase, $82,315. The gross earnings were derived from the following sources: Passenger department, $4,317,465; increase, $51,412. Freight department, $182,442; increase, $25,090. Rent of roads, express privileges, transportation of mails, etc., $1,166,296; increase, $146,663. The Rhode Island Company, operating 284 miles of road in the State, contributed $4,217,023.

Discussing the subject of accidents, the report says:

How accidents can be prevented is the question that is interesting all Railroad Commissions, as well as all the corporations operating the roads.

I believe it would be better if every accident that happened was reported, as the publicity thus given would, I think, have a tendency to make the public more careful. Many accidents happen that are caused by the negligence of the traveling public—people rushing across tracks without looking, attempting to get on or off moving cars—this carelessness in many cases leads to accidents that many times result seriously, and in some cases fatally. I believe that if the public would co-operate with the railroad corporations and exercise due care, many accidents could be prevented.

The report recommends that more power be given to the Railroad Commissioner.

CONEY ISLAND & BROOKLYN FARE DECISION

Commissioner Bassett, of the Public Service Commission of New York, First District, handed down this week a decision in the cases of J. Monheimer and Scott MacReynolds against the Coney Island & Brooklyn Railroad for charging a 10-cent fare on Saturdays, Sundays and holidays between Coney Island and Brooklyn. An abstract of the decision follows:

This proceeding arose upon two separate complaints, each of which asserts that the 10-cent fare charged by the defendant company on Saturdays, Sundays and holidays on each of its Coney Island lines is unjust, unreasonable and unlawful. The two complaints were without objection consolidated for the purpose of the hearing and progressed as one proceeding. At the time of the filing of the complaints and for some time after the close of the hearings in this proceeding the defendant charged a single fare of 5 cents on each of its Coney Island lines on all week days excepting Saturdays and holidays. This 5-cent fare on ordinary business days, with the extra fare for other days, had prevailed since 1902 and continued in force until Aug. 31, 1908, when the fare was increased to 10 cents on all days of the week.

The commission has not only received and considered in this proceeding all of the facts that the parties cared to present, but it has deemed that this case shall embody the entire question of Coney Island fares so far as that question pertains to this railroad. To this end the investigations of the commission have been carried on for many months, and the conclusions reached in this opinion are based upon all of the data obtained, the larger part of which were not adduced by any of the parties, but were either presented by the commission or have been ascertained and analyzed by it since the public hearings were closed.

FARE CONDITIONS

We shall first consider this case according to the fare conditions that existed at the time of the hearings, and prior to Aug. 31, 1908. The reason why the difference in fare was made on holidays appears to be that on ordinary week days this railroad would carry few Coney Island passengers in competition with the elevated roads of the Brooklyn Rapid Transit system if 10 cents fare were charged. On Saturdays, Sundays and holidays, however, especially in summer, the movement of travel was so great that all lines of travel were well patronized. The result was that the defendant company obtained a large patronage on the crowded days, even at 10 cents fare.

ROUTES AND EARNINGS

The defendant company operates six different routes to Coney Island either by through car or on transfer, as follows:

(1) From Covert Avenue in the Borough of Queens to Coney Island, a distance of 11.53 miles.
(2) From Delancey Street, Manhattan, 12.38 miles.
(3) From Grand Street Ferry, Brooklyn, 11.18 miles.
(4) From Park Row, Manhattan, 11.278 miles.
(5) From Fulton Ferry, Brooklyn, 10.51 miles.
(6) From Hamilton Ferry, Brooklyn, 9.3 miles.

In the fiscal year ending June 30, 1907, the extra fares amounted to $94,724.88, out of a total of $1,612,924.02. The net income of the company in 1907, after payment of operating expenses, rentals, taxes and fixed charges, was $81,044.75. It is apparent that if the extra fares had not been collected and the riding had continued the same, the company would have been unable to meet the fixed charges. No dividends have been paid on the stock of the company since Feb. 1, 1907. The total passenger receipts from June 30, 1906, to April 8, 1907, were $1,229,303.92, while from June 30, 1907, to April 8, 1908, they were $1,156,155.36, a falling off of $73,148.56 as compared with the previous year.

The Coney Island & Brooklyn Railroad Company has during recent years had capital stock of $2,000,000 outstanding (at present writing $2,980,725) and mortgage bonds of $3,500,000 bearing interest at 4 per cent. Its route mileage is 13.75 miles. It leases the Brooklyn City & Newtown Railroad Company and pays therefor $100,000 per annum, being 5 per cent on the mortgage bonds of the Brooklyn City & Newtown Railroad Company of $2,000,000. The route mileage of the Brooklyn City & Newtown Railroad Company is 9.854; that of its proprietary company, the DeKalb Avenue & North Beach Railroad Company, is 0.532, all construction having been done by the proprietor. The combined route mileage is thus 24.136. The entire system is double-tracked. Since the Coney Island & Brooklyn Railroad Company's consolidated mortgage is a lien on the entire system, and its proceeds are applied to any part, the funded debt may best be compared with the combined route mileage. The per mile funded debt of the system is thus $228,000.

DIVIDENDS

Notwithstanding payment of interest on the above funded debt averaging over $225,000 per mile of route, the company for the period between 1902, when the 10-cent fare went into effect, and 1907 paid as dividends an average of 11.43 per cent per annum on its capital stock of $2,000,000. If during this period one-third to one-half of the net income were put aside for proper reserves (as recommended by Mr. Ford, the expert of the company), 5.71 per cent to 7.62 per cent average dividends could have been paid. If 5 cents fare to Coney Island had been charged instead of 10 cents, the company could have still paid 3.3 per cent to 4.4 per cent per annum on its capital stock after providing for rentals, interest and depreciation, assuming that no profitable increase of traffic had taken place as a result of the lower fare.

Since 1899, when it began to pay substantial dividends, it has paid practically its entire surplus earnings to its stockholders. The following is a schedule showing dividends paid and net income.

Year ending June 30.	Dividends—Rate per cent.	Dividends—Amount.	Net income for the year.
1899	9.50	$189,190.00	$213,794.52
1900	10.00	199,800.00	173,067.40
1901	12.00	239,900.00	360,571.78
1902	16.00	320,000.00	334,069.54
1903	16.00	320,000.00	325,972.81
1904	16.00	320,000.00	308,004.65
1905	14.00	280,000.00	160,908.36
1906	8.00	160,000.00	161,494.24
1907	6.00	120,000.00	81,044.75
	107.50	$2,148,890.00	$2,118,928.05

The foregoing facts clearly show that the failure of the company to put aside a reserve for depreciation and its policy of paying the largest possible dividends, regardless of the upkeep of the equipment of the railroad, are responsible for the condition of the company at the time of the hearings. The stockholders having obtained in the form of dividends the earnings that should have gone for maintenance, should not now object because renewals and increased maintenance and interest charges make dividends temporarily impossible, nor should this presumably temporary situation stand in the way of a reduction of fare if other considerations would justify such a reduction.

CLAIMS OF THE COMPANY

Several claims were set up by the company to show that the 10 cents fare to Coney Island is justified, regardless of the conclusions that may be drawn from the large past earnings of the company. We will take these up in order.

1. It is claimed that the cost of labor has increased. Tables compiled from the sworn reports of the defendant show no substantial increase of the cost of labor per unit of service. Table XVIII (Commission's Exhibit 25) shows the average number of cash passengers per employee (regardless of nature of employment) from year to year. Substituting for the year 1907 the number of cash passengers, as corrected by the elimination of second fares, we find that the average number of passengers per employee increased from 27,905 in 1899 to 35,551 in 1907, which shows a saving of labor equal to 22 per cent in proportion to the number of passengers. The highest increase of wages, however, mentioned by the defendant's expert was from 20 to 23 cents per hour, i.e., 15 per cent.

2. It is claimed that the Coney Island business must earn thrice the fixed charges of ordinary business because it is purely a summer business. The bulk of the Coney Island traffic, as indicated by the monthly fluctuations of the returns from second fares for 1907, was done during five summer months, as shown in the accompanying table.

May	$8,962.20
June	14,421.33
July	22,996.45
August	17,460.76
September	11,525.78
All other months	13,174.72
Total, 1907	$88,541.24

During the months of November, December, January and February no second fares were collected on the DeKalb and Franklin Avenue lines; on the Hamilton Avenue line the collections aggregated $79.49, and on the Smith Street line they were likewise very small. It may therefore be assumed that the operations of those four months are not affected by the Coney Island traffic. The winter traffic required the defendant to be ready to furnish 497,901 car-miles in December; the maximum Coney Island traffic in the month of July brought the car-mileage up to 756,031 miles, which is an increase of 52 per cent. How much of this increase is due to the normal increase in summer over winter is not shown by the evidence, but part would be necessitated in any case. Neither does the evidence show how many more cars must be supplied in the rush hours than at other times of day. It would seem likely that the extra cars needed by any city railroad for summer and rush hour uses would go far to cover the special needs of the Coney Island traffic of this railroad.

3. It is claimed that the entire Coney Island business is conducted at a loss. The monthly income account of the company for the year 1907 shows the highest net earnings reported for the five summer months from May to September, both inclusive, during which the net earnings aggregated $220,443.93 out of a total of $264,476.77; i.e., 83.5 per cent of the total net earnings for the year. Operating expenses and taxes during these months averaged $118,-362.12 per month, while during the winter months they averaged $101,408.50 per month. Thus the increase in the cost of operation during the summer was only $16,943.38 per month, while the gross earnings increased from a monthly average of $107,698.91 for the winter season to $162,450.91 for the summer season; i.e., by $54,752. There was a net gain of $37,808.62 per month over the average winter net earnings. The ratio of operating expenses and taxes to gross earnings for the five summer months was 72.8 per cent, whereas the ratio of operating expenses and taxes to gross earnings during the remainder of the year 1907 was 94.1 per cent. These figures clearly show that the summer business is not conducted at a loss, and that the increase of that business means an increased profit. On the contrary, it is clear that the operating cost of the summer traffic is less than that of the winter business. The addition to the monthly operating expenses caused by the summer business is but 30.5 per cent of the addition to the monthly gross earnings. It should be noted, however, that summer business is not synonymous with Coney Island business. There is a large Prospect Park traffic in summer also.

CONDENSED INCOME STATEMENT OF THE CONEY ISLAND & BROOKLYN RAILROAD COMPANY FOR 1907, WITH COMPARATIVE CAR-MILE EARNINGS AND EXPENSES FOR EACH OF THE YEARS 1902 TO 1907.

	Amount in year ended June 30, 1907.	Income and expenses per car-mile— 1907. cents.	1906, cents.	1905, cents.	1904, cents.	1903, cents.	1902, cents.	1902-7, cents.
Revenues:								
"City" fares	$1,518,199.14	22.387	22.940	23.002	24.319	23.918	23.326	23.296
Second (Coney Island) fares	94,724.88	1.397	1.397	1.406	1.709	1.809	1.242	1.492
Revenue from carrying mail, etc	800.00	.012	.012	.012	.013	.014	.004	.011
Total car earnings	$1,613,724.02	23.795	24.350	24.420	26.041	25.740	24.572	24.798
Miscellaneous earnings	7,850.24	.116	.076	.072	.075	.085	.125	.091
Total revenue from operation	$1,621,574.26	23.911	24.426	24.492	26.116	25.825	24.697	24.889
Expenses:								
Maintenance	$246,927.32	3.641	3.429	3.247	2.828	2.783	2.715	3.121
Operation of power plant	314,332.12	4.635	4.313	4.222	3.983	3.882	2.764	3.987
Operation of cars	455,646.08	6.719	6.667	7.148	6.814	6.493	6.451	6.719
General expense	211,942.55	3.125	3.132	3.131	3.300	3.078	2.981	3.126
Total expenses of operation	$1,228,848.07	18.120	17.542	17.748	16.924	16.236	14.911	16.953
Taxes	58,272.63	.859	.866	.790	1.055	1.127	1.071	.960
Total expenses and taxes	$1,287,120.70	18.979	18.408	18.538	17.979	17.363	15.982	17.913
Net income:								
Surplus revenue over expenses and taxes	$334,453.56	4.932	6.018	5.954	8.137	8.462	8.715	6.976
Non-operating income	41.00	.000	.014	.024	.008	.006	.019	.012
Total clear income	$334,494.56	4.932	6.032	5.978	8.145	8.467	8.734	6.988
Deduct rental	100,000.00	1.475	1.469	1.527	1.584	1.609	1.639	1.551
Deduct interest	153,449.81	2.263	2.190	1.995	1.682	1.613	1.618	1.894
Balance available for dividends	$81,044.75	1.194	2.373	2.456	4.879	5.245	5.477	3.543
Dividends	120,000.00	1.769	2.351	4.275	5.070	5.149	5.246	3.976
Number of miles run by passenger cars								6,781,723
Number of passengers (including transfers)								39,158,626
Number of transfers								5,898,528

EARNINGS AND EXPENSES

The foregoing considerations throw light on what the position of the company would have been if its business had been more correctly conducted. They demonstrate that the Coney Island business is a profitable business handled at a rate of 5-cent fare for five days in the week and a 10-cent fare on Saturdays, Sundays and holidays. Whether a regular 5-cent fare would be remunerative to the company or would depress its income to a point where a reasonable return could no longer be secured upon the investment is a question that requires a close analysis of the company's operations. The basis for such an analysis is furnished in the accompanying table of revenue and expenses, wherein the quantities or amounts have been reduced to a car-mile basis.

The service rendered by a street railway company and the amount of its expenses may be measured by the number and frequency of the cars that it runs. In other words, the total distance traveled by revenue cars in a given period represents the amount of service given, and the unit of service is one car-mile. Certain other units of service, such as the car-hour, also have their value, but on the whole the car-mile affords the most satisfactory basis of comparing costs of street railway operation that is now available, especially when the comparisons are confined to a particular road. In his testimony before the commission the company's expert objected to the use of the car-mile unit on the ground that the company had replaced small cars with large cars, and thereby changed the significance of the car-mile as a unit of service. The company's reports to the commission, however, show that few changes of the kind mentioned have been made in the company's rolling stock in the last few years, and there is no reason to believe that those changes invalidate comparisons of car-mile costs between 1902 and 1907.

The statistics on which these car-mile ratios are based are derived from the annual reports of the company to the Railroad Commission, such reports being made and sworn to by the officers of the company. So far as the revenues are concerned there is no reason to question their substantial accuracy, as they are almost entirely composed of cash fares collected from passengers carried. The miscellaneous earnings, consisting of revenue derived from the sale of advertising privileges, rent of buildings, tracks and other street railway property, constitute a relatively small item.

Taking the figures of operating expenses as given in the foregoing table under the four headings of Maintenance, Operation of Power Plant, Operation of Cars and General

Expenses, it is possible to arrive at a fairly definite figure as to the average cost of operating a car 1 mile on the lines of the Coney Island & Brooklyn Railroad. In the six years embraced in the table, covering the period 1902 to 1907, during which a second fare was charged to Coney Island on Saturdays, Sundays and holidays, the general expenses (including the cost of management and the almost equally large item of damages and attendant legal expenses) averaged 3.126 cents per car-mile. In 1907 the general expenses amounted to almost precisely the same figure, and this may therefore be taken as the normal expense on this road. The operation of cars in 1907 cost 6.719 cents per car-mile, which is also the average for the whole period and may therefore be considered as not less than the normal cost. The operation of the power plant in 1907 cost 4.635 cents per car-mile as contrasted with 2.764 cents per car-mile in 1902. From the foregoing figures it is apparent that omission of proper maintenance and the great increase of power cost were the main causes of the deficiencies shown at the hearings. Losses on Coney Island business were not perceptibly responsible.

We will now proceed to consider also the operations of 1908. In the year ending June 30, 1908, there was a further rise in the cost of operation of power plant to 5.868 cents per car-mile, making a difference between 1902 and 1908 of 3 cents per car-mile, or $200,000 a year. Inasmuch as $200,000 would afford a dividend of 10 per cent upon the stock of the Coney Island & Brooklyn Railroad Company, the significance of this increase in the cost of power is sufficiently obvious without further analysis. While there has also been some increase in the cost of maintenance of the company's road and equipment, it is clear that the real seat of the company's financial difficulties is the enormously enhanced cost of its power supply. The company's increased expense in this direction could not well escape its notice, and it some time since planned to replace its antiquated power plant, which dates back to the early days of the electric railway business, with a modern system of power supply. The new power plant has now been in operation for several months, and the result appears in the following figures showing the cost of power supply (exclusive of maintenance) per car-mile run:

July	4.32 cents
August	4.50 cents
September	4.70 cents
October	5.00 cents
November	4.12 cents
December	2.82 cents
January	2.63 cents
February	2.42 cents
March	2.27 cents
April	1.92 cents
May	1.88 cents

In the ordinary course of business the cost of power per car-mile increases in winter, owing to the additional electric energy that is consumed in heating the cars or wasted by reason of the snow, ice or other impediments on the tracks. In the place of such an increase during the present winter the working expenses of the power plant have been reduced more than 2 cents per car-mile. If, therefore, it be assumed that the normal cost of power to the Coney Island & Brooklyn Railroad Company be 2.25 cents per car-mile for the entire 12 months of the fiscal year, the figures will be approximately correct.

The remaining item of operating expenses to be considered is the cost of maintaining the road and equipment. As to this cost the figures at hand afford little assistance, for the reason that they cover only such repairs as were obviously necessary. No allowance seems to have been made for the wear and tear that is not reparable, or for the growing inadequacy of equipment that has to be replaced before it is worn out. Assuming, for example, that the average life of a street car is 20 years, it is evident that one-twentieth of the capital invested in the car is consumed upon an average every year that it is in use, irrespective of the amount of money that may be expended in keeping the car in thoroughly good repair. No calculation of costs is at all satisfactory which omits the proper charges for such deterioration of physical property. The commission has recognized that fact in prescribing a uniform system of accounts for street railways which requires depreciation charges as a part of the operating expenses. Under this system of accounts, which will be in force July 1, 1909, the Coney Island & Brooklyn Railroad Company will be required to include proper depreciation in its operating expense accounts, and it would therefore be unjust for the commission to issue an order which failed to recognize the element of depreciation as an item of general cost. How much should be allowed for depreciation in the case of the Coney Island & Brooklyn Company is a matter that remains still to be investigated. The accounting order does not attempt to fix the rate of depreciation, but requires the individual companies to make an investigation as to the probable life in service of their operated properties, and on the basis of their experience formulate a rule as to the amount needed for preserving the capital assets unimpaired. Such rule as to the rate of depreciation has not yet been formulated by the Coney Island & Brooklyn Railroad, but is estimated to be 5 cents per car-mile, and this amount should either be spent or be put into a fund for use when needed.

The estimated car-mile costs of the Coney Island & Brooklyn Railroad may be recapitulated as shown in the following table:

Maintenance (including depreciation)	5.00 cents
Operation of power plant	2.25 cents
Operation of cars	6.72 cents
General expenses	3.13 cents
Total operating expenses	17.10 cents
Add taxes	.90 cents
Operating expenses and taxes	18.00 cents

Turning now to the income side of the ledger, it is found that for the year ended June 30, 1908, there were the following revenues from operation:

"City" fares (5 cents)	$1,455,655.33
Second (Coney Island) fares	89,769.78
Revenues from carrying mail, etc	800.00
Miscellaneous earnings	11,232.06
Total	$1,557,457.17

If the fare were reduced to 5 cents for every day in the year it is evident that the receipts from "second" fares in the above items would be eliminated, and the question arises whether the income from single fares would be correspondingly increased. It is also questionable whether, even if no change were made in the rate of fare whatever, the gross revenues would be maintained. There was a difference between the two years 1907 and 1908 of over $60,000, and for some time there has been a steady decrease. If this were continued throughout the year just closing the income would be very materially reduced.

REDUCTION IN TRAFFIC

It is true that other lines in Brooklyn have shown a falling off in the last two years which is doubtless due to general business depression and to the readjustment of traffic incident to the extension of the subway and the extension of Manhattan Borough companies in Brooklyn across the Williamsburg Bridge. While the falling off on other lines would seem to have been checked recently, there are special features affecting the Coney Island & Brooklyn Railroad lines which would seem to indicate that those lines will continue to feel the loss of traffic until the density of population shall have considerably increased in the territory adjacent to the outlying portions of the defendant's routes. The defendant's Coney Island line is paralleled on either side by the Brighton Beach line and the Culver line of the Brooklyn Union Elevated Railroad Company, upon which roads express service is maintained from Coney Island to Park Row. Within the last few years on each of these elevated lines obsolete steam engines have been superseded by third-rail equipment, the frequency of service has been greatly increased and the service otherwise improved. The defendant's DeKalb Avenue line also feels the competition of the Lexington Avenue line and the Myrtle Avenue line of the Brooklyn Union Elevated Railroad Company. On both of these last-named lines there has been a marked increase in frequency of trains and in the number of cars operated within the past few years, and the improvements at the Manhattan end of the Brooklyn Bridge permitting through elevated service to Park Row have made these lines more attractive to large numbers of passengers. With these conditions added to the increasing competition from the surface lines of the Brooklyn Rapid Transit system, the company seems liable to show a slow recovery from the falling off in earnings that has been evident for the past three years.

However, if we assume that this decrease would be stayed, that the decrease due to the elimination of the second fare would be offset by gains in other directions, and that the total income from operation would be, with a 5-cent fare, $1,550,000, we have certainly been generous to the public, and possibly too severe upon the company. In other words, it would seem likely that the total earnings would be less than $1,550,000 rather than more with a 5-cent fare for every day. Assuming that the company was able to earn this amount without any increase in car-mileage, we would have the following approximate results:

Total revenue from operation	$1,550,000
Total operation expenses	1,220,000
Net revenue	$330,000

This amount, which is available for rental, interest and dividends, would represent a return at 6 per cent upon $5,500,000, at 6½ per cent upon a little over $5,000,000, and of 7 per cent upon a little over $4,700,000.

RETURN ON THE INVESTMENT

There remains to be considered whether this is a fair return upon the capital invested in the street railway property. Neither the evidence produced at the bearings nor the reports of the company gave any trustworthy statement of the actual investment. Without information on this subject, however, no real progress could be made in determining the reasonableness of a 10-cent fare. It is plain that the rate that might result in loss on a large investment would be reasonable on a smaller investment. Total outstanding stock and bonds might or might not be a proper criterion.

Bion J. Arnold, who has been employed to appraise the properties, has reported to the commission that the present value of the physical property of the road, without including anything for franchise, good will, going concern, or development charges, plus such amounts as would be necessary to put the road in first-class operating condition, due to the fact that the road has been allowed to deteriorate, would be at least $5,000,000.

In the opinion of the commission, therefore, a 5-cent fare every day in the week would not produce a proper return upon the value of the road, plus a sufficient amount to bring it up to date, which amount must be expended by the company.

It is possible that a reduction of the rate to 5 cents would mean a considerable increase in the number of passengers carried, and consequently in the gross income; but it would also mean, probably, an increase in the operating expenses. Whether there would be an increase in the net income is problematical; and in view of the narrow margin allowed the company upon the basis of a 5-cent fare during the week and 10 cents on Saturdays, Sundays and holidays, the commission does not feel that it would be warranted in ordering a reduction merely upon an expectation so uncertain.

ALLOWANCE FOR REHABILITATION

It should be noted that the commission has considered, in the amount upon which a fair return should be allowed, a considerable sum for rehabilitation. The policy of the company for several years past has been to distribute substantially all of its surplus revenue to stockholders in the form of dividends. As has been pointed out, no provision was made for depreciation and the appropriations for maintenance were very inadequate up to two years ago. As a result the property of the defendant is still in inferior condition notwithstanding the recent improvements that have been made. While this condition should not be urged by stockholders as a valid reason against a reduction of fare if such reduction were found to be justifiable, still the commission is bound to give consideration to the necessity for improvements, as a part of its duty of protecting the public; and the commission is unwilling to take any action that would make it more difficult for the people of Brooklyn to obtain the service to which they are entitled. The present depreciated value of the property is very much below what would be the value of such a system in first-class operating condition. As the commission has considered that it is prudent to allow a sufficient amount to restore the road to standard condition, it will be its duty to compel the company to continue the rehabilitation of the property and it will see that replacements are ultimately paid for out of earnings before earnings are used for dividends. If a rate were fixed upon the present depreciated value it might be so low as to prevent rehabilitation. However, it should be frankly stated that if the company should not put its property in first-class operating condition the reasonableness of the fare could then properly be reconsidered.

INCREASED FARE ON WEEK DAYS

We now pass to a consideration of the operations of the company since on Aug. 31, 1908, it increased the fare on ordinary business days from 5 cents to 10 cents. The receipts from extra fares show an increase, but the total business done shows a decrease as compared with the previous year. We have carefully reviewed the operating figures so far as ascertainable since the new method went into effect, and although it is claimed by the company that the new operation has resulted in a substantial gain in the receipts for the company as a whole and also an improvement in the class of traffic, yet the figures obtained equally tend to show that the advance in the rate means a loss of business which just about balances the additional collections directly resulting. The company by giving a 5-cent fare on five days of the week invited many people to buy property and build homes near Coney Island. While this fact does not in any way amount to a contract between the company and the residents, it would appear that the practice of charging 10 cents on all days of the week should only be continued after a showing that the former practice of charging 5 cents on five days of the week was the main cause of the loss of net earnings. Even if there has been some increase in net earnings since Aug. 31, 1908, and even if it could be proved that a part of this is due to the increase in fare, the fact remains that the main causes of insufficient profits have been omission of maintenance and uneconomical power production. It is a matter of grave doubt, however, whether the old rate was not really more profitable for the company than the new rate, for the reason that the former single fare to Coney Island induced traffic that was carried in more or less empty cars and could therefore be handled at a very low cost; that is to say, the cars which in the morning brought people to their work in Brooklyn and Manhattan carried back on their return trip as passengers to Coney Island family parties that chose the relatively slow surface cars of the Coney Island & Brooklyn Railroad in order to save the extra fare charged by the elevated roads. It is significant that the proportion of children among passengers was apparently nearly twice as great on the single-fare days as on the double-fare days. When these people returned late in the afternoon this special traffic was in a direction opposite to the tide of travel away from work and was again handled at a low cost because carried in large part in cars that would otherwise have been run with small loads. It is a well-recognized fact among railroad managers, both passenger and freight, that an unusually low rate may be a profitable rate if it induces traffic to fill cars that would otherwise have to be hauled empty. In fact, the accepted theory of railroad freight rates is based on the idea of encouraging traffic to move at a low rate, provided that rate covers prime costs and makes some contribution toward meeting the fixed charges.

The action of the company in increasing the fare appears to us to have been unjustifiable. The increase appears also to have been unreasonable because it places an additional burden on the traffic with slight profit to the company or none at all. It appears to have been based upon a mistaken theory that recent loss of profits was due to Coney Island fare conditions rather than to the substantial causes that the analysis by the commission has revealed. The complaints, however, in the present proceeding relate only to the holiday fare. As a matter of proper procedure the scope of the present hearing is not broad enough to lay the foundation for an order dealing with the company's recent increase of fare on business days. The company should remedy the matter now that the impropriety of its action is called to its attention. It is alleged that the 10-cent fare is unlawful. The Coney Island & Brooklyn Railroad Company was organized on Dec. 6, 1860, under the General Railroad Act of 1850, and in the permission and consent granted to it by the Common Council of the City of Brooklyn on Jan. 21, 1861, it was provided that the fare within the City of Brooklyn should not exceed 5 cents. Under the law last cited the company was permitted to

charge a rate of fare not exceeding 5 cents per mile. Therefore the company was privileged to charge 5 cents within the City of Brooklyn and at the rate of 3 cents per mile for the distance outside of the City of Brooklyn. The distance outside the former city would be from Prospect Park to Coney Island 6 miles. All of the laws and franchises affecting this corporation have been placed before the commission and examined and we do not find that the legal right of the company to charge 5 cents within the former City of Brooklyn and 3 cents per mile outside has ever been abridged. It is, of course, understood that this statement is without derogation of the right and duty of the commission to prescribe a lower rate of fare whenever the rates charged may be found to be unjust or unreasonable.

We are therefore of the opinion that the fare of 10 cents on Saturdays, Sundays and holidays was not unjust, unreasonable or unlawful and that the complaints should be dismissed.

Respectfully submitted,
(Signed) E. M. Bassett, Commissioner.
July 1, 1909.

WIDER TRACK CENTERS IN CHICAGO

The agitation in Chicago for wider spacing between cars on adjoining tracks culminated last week in a resolution adopted by the Board of Supervising Engineers, fixing the spacing of track centers for all future work at 10 ft. 2 in. and the width of all new cars to be built hereafter at 8 ft. 6 in. Brief mention of the adoption of this resolution was made in the Electric Railway Journal of July 3, 1909, at the conclusion of an abstract of a communication by George Weston, member of the board, to the committee on local transportation of the City Council. The resolutions adopted by the Board of Supervising Engineers on June 29 are as follows:

Resolved, That the previous action of the board in fixing the standard distance between track centers at 9 ft. 8½ in. be and hereby is modified, so that the minimum distance between track centers shall be 10 ft. 2 in. for all track special work and track, the manufacture or construction of which has not actually progressed so far that it is impracticable to change it at the present time.

Whereas, The improvements which have been made in the art of car construction, and the demonstrated success of the pay-as-you-enter type of car, permit the construction of a narrower car than heretofore, with substantially equivalent accommodations to the traveling public; and

Whereas, The board has recently authorized the construction of new cars having a maximum width of 8 ft. 6 in., be it

Resolved, That it is the judgment of this board that all future cars to be hereafter constructed under the direction of this board for operation upon the surface lines in the city of Chicago shall not exceed 8 ft. 6 in. in width over all.

B. J. Arnold, chairman of the board, issued a statement explaining the action taken, in which he said:

In reaching this decision the board recognizes the fact that the maximum space obtained still makes it extremely dangerous for any person to be caught between passing street cars. The possibilities of serious injury, if not death, to any person who permits himself to get into this situation are such that the public should avoid it in every possible way. Even the distance of 20 in. cannot be obtained upon the tracks already reconstructed, nor so long as the present wider cars are operated. In the nature of the case this must continue to be done for a considerable period of time. The two companies concur now in the policy of wide spacing in order to obtain the benefit of comparative experience.

The Chemin de Fer du Midi has just given out the first contracts for the electrification of a section of its main line 400 km in length, between Toulouse and Bordeaux. The installation will use single-phase, 15-cycle current, and the initial section is expected to be ready for operation in about a year.

COMMITTEE ON TRANSPORTATION TO DENVER

President James F. Shaw, of the American Street & Interurban Railway Association, has announced a partial list of appointments on the general committee on transportation. The committee will be divided into small groups, each of which will be headed by a chairman, and each group will have general charge of conducting the special trains or cars from various cities or sections of the country. The following gentlemen have accepted the invitation to act as members of this committee:

Charles S. Clark and any gentlemen whom he wishes to have act with him will have charge of a special train from Boston, Mass., carrying all delegates from the New England States.

C. Loomis Allen, chairman; J. H. Pardee, James H. McGraw and any other gentlemen whom the chairman wishes to have act with him will conduct a special train from New York City via the New York Central Lines, which will carry delegates from New York City and points in New York State.

W. L. Conwell, chairman; Gen. George H. Harries, C. O. Kruger, William A. House, Thomas N. McCarter, George Keegan and any other gentlemen whom the chairman wishes to have act with him will have charge of another through train leaving New York City by way of the Pennsylvania Railroad and carrying special cars from Philadelphia, Baltimore and Washington which will take delegates from Pennsylvania and the Middle Atlantic States.

C. F. Holmes and W. W. Wheatley have accepted as members of the committee which will have charge of a special train from St. Louis through Kansas City. The chairman of this committee has not yet been selected. This train will carry delegates from points east of St. Louis as far as Indianapolis, Columbus, Cincinnati, Memphis and Louisville.

D. A. Hegarty has accepted as a member of the committee in chage of a special car or party from the Southwestern States, including Texas, Arkansas and Oklahoma. The chairman and other members of this committee have not been appointed.

W. A. Warnock and P. P. Crafts will act as a committee in charge of a car or party from the Central Northwestern States.

C. N. Black, chairman, S. K. Colby, John A. Britton and F. F. Bodler will constitute the committee in charge of a special car or party of delegates from cities in California.

E. E. Potter and F. G. Seixas will act together as a committee in charge of a party or car starting from Seattle, Wash., and carrying delegates from all of the Northwestern States.

Committees will also be appointed to take charge of a party from Canada and a special train from Chicago. The personnel of these committees has not yet been determined. The Chicago train will carry delegates from Chicago and vicinity and from points east of Chicago as far as Detroit, Cleveland and Toledo.

These sub-committees will have entire charge of all of the arrangements for the comfort and entertainment of those traveling on the special trains or cars and they will carry out a campaign this summer which it is hoped will result in good patronage of the special facilities to be provided.

In the matter of the railroad fares the association has received formal notice from the Western Passenger Association, which has jurisdiction over rates of fare from

Chicago to Denver, that the privilege has been extended to members of the association traveling to the convention to purchase summer tourist tickets good leaving between Oct. 1 and 5 from Chicago and good for the return trip up to and including Oct. 31. The rate on these tourist tickets is $30 from Chicago to Denver and return.

HOTEL RATES FOR DENVER CONVENTION

B. V. Swenson, secretary of the American Street & Interurban Railway Association, has issued convention bulletin No. 3, under date of July 1, which gives complete information about hotel rates in Denver during the week of the convention and other inteersting facts about the city and its surroundings. The text of the circular follows:

PLACE OF MEETING

Many of our members are, of course, familiar with Denver and its magnificent environment, but to those who are not doubtless some general information will prove interesting and instructive.

The city was founded in 1859 by prospectors who had gone to that section in the search for gold, and in the 50 years of its existence has risen with great strides, until today it ranks twenty-fifth among the cities of the United States in point of population, which aggregates 225,000 people within an area of 60 square miles. It is not only the capital of Colorado, but the commercial metropolis for the entire Rocky Mountain region, with 15 steam railroad lines entering the Union Station. The city has 14 parks, containing in the neighborhood of 1500 acres, and all connected by boulevards. A clean, well-built, up-to-date city, with the customary Western hustle, its prosperity is best shown in the fact that it has nearly 2500 factories, with annual payrolls of over $12,000,000, and producing annually products to the value of nearly $100,000,000, as well as by its seven national banks, seven State banks and three trust companies, the resources of its financial institutions amounting to $65,000,000. Much of Denver's development is due to the general custom among those who make their fortunes in Colorado of spending their money at home, which accounts in a great measure for the city's beautiful residences and well-paved, well-kept and well-lighted streets.

Perhaps no city in the country has been so favored by nature in beauty of climate, location and perspective. Weather Bureau reports for a period of 20 years show an average of over 350 sunshiny days, with a brisk, invigorating atmosphere and a minimum humidity. The periods of extreme cold rarely occur in Denver until after the Christmas holidays, and this weather seldom continues for more than three or four weeks during January and February. The city is peculiarly free from snowstorms, probably more so than any of the cities of the Northern States. Sleighing is almost unknown, as the snows which do visit the city occur during the night and soon disappear in the morning sun. The altitude of Denver is about 1 mile, and the outlook of the city covers a territory extending for 200 miles along the Rockies, from Long's Peak on the north to Pike's Peak on the south.

The side trips from Denver, both in number and scenic beauty, are perhaps equaled nowhere in the world, certainly not in America, and for the benefit of our members a later bulletin will give a résumé of the more famous and interesting of these excursions.

The transportation facilities of the convention city, it is hardly necessary to tell you, are most comprehensive and up to date. The splendid system of the Denver City Tramway Company operates about 175 miles of track, and, as is well known to our members, for excellence of equipment, facilities and methods of operation Denver's street railway system ranks among the leading railways of the country.

To those unfamiliar with Denver's hotel facilities and the ability of the city to accommodate large gatherings, the number of leading hotels shown in this bulletin may prove a surprise. The city is becoming more and more favorably known as an ideal convention place, and has entertained conventions of the leading societies, lodges and associations within the past few years, among these being the reunion of the Grand Army of the Republic with 125,000 visitors, the Order of Elks with 60,000 and the Knights Templar with over 40,000 delegates. Our members should rest content, therefore, that there will be ample room for everybody during the convention week, and also be assured of fair treatment in the matter of hotel rates.

The exhibits will be displayed in the new Auditorium, completed in 1908 and used for the first time by the National Democratic Convention. This building is unique in the fact that it is the first of its kind erected by any of our American municipalities. It is located within two blocks of the business district of Denver, and is, therefore, most convenient to all the leading hotels. The building covers an area of 260 ft. long by 168 ft. wide, with walls measuring between 90 and 100 ft. in height. It is of steel, with concrete floors and roof, and splendidly equipped in the matter of ventilation and illumination. The Auditorium itself and adjacent areas available for convention purposes provide an exhibit space of about 45,000 sq. ft., and from the information now available this space will be fully utilized by our Manufacturers' Association.

HEADQUARTERS HOTELS

In recent years it has been the opinion of the official representatives of the various affiliated bodies that each association should have its own headquarters hotel, and this plan has seemed to be most satisfactory to our members. In view of this, no departure has been made from this arrangement for the 1909 convention, and the hotels listed below have been selected as headquarters, it being understood that those in charge of the convention do not



The Auditorium, Denver

desire that these particular hotels be patronized to the exclusion of others, but, rather, used as general meeting places for those interested in specific lines of work.

The Brown Palace has been decided upon as the headquarters hotel of the American Association, and similarly of the Manufacturers' Association. The Savoy Hotel will be the headquarters of the Accountants' Association, and the Adams will be the headquarters hotel of the Engineers. The Claim Agents' Association will utilize the Metropole as headquarters, and the Transportation & Traffic Association will establish its headquarters at the Albany Hotel.

HOTEL RESERVATIONS

The hotels listed in this bulletin are those which have worked in sympathy with the Denver Convention League in the matter of our convention, and we respectfully suggest to our members the desirability of patronizing the hotels here shown.

The matter of making a proper distribution of the accommodations provided by the principal hotels has been given a great deal of thought and consideration, with a view of arriving at an absolutely equitable division as between the delegates of our own and affiliated associations. In line with this, we have requested the Denver Convention League to arrange that no specific assignment of rooms be made in these hotels before July 15, that the hotels on that date act on applications then in hand and

make tentative assignments, which are at once to be submitted to the office of the secretary of the American Association for approval. On receipt of this proposed distribution the secretary will take the matter up in detail with the secretary of the Manufacturers' Association, and if the assignments seem satisfactory, approval will be given and they will be returned to Denver with the request that notice be sent to each guest, giving full information of reservation made.

On Aug. 1 and 15 and Sept. 1 additional tentative assignments of rooms will be forwarded by the Denver hotels to the secretary's office, and action similar to the above taken. By this plan, it is believed, it will be possible to settle upon a distribution of hotel accommodations that will be entirely satisfactory to all concerned, and take care equally well of the representatives of the electric railway and the manufacturing interests.

Applications for hotel reservations should be made directly to the hotel at which you desire to stop. It will aid greatly in avoiding mistakes if the members, when writing, will indicate that their reservations are made in connection with the convention. In making applications explicit statements should be made concerning the kind of room desired —whether with or without bath—and the dates of arrival and departure from the hotel. The special rates are made with the understanding that the charges of the hotel will be for the full time of reservation, and that they are all to be made upon the European plan; in other words, for the room only, without meals.

In view of the plans above outlined, we respectfully urge our members to at once communicate to the Denver hotels their applications for reservations, in order that such requests may be considered in the assignments which it is proposed to make under date of July 15.

HOTEL LOCATION AND CAPACITY.

Name of Hotel.	Location.	No. of Guests.
Abbott	19th and Curtis	150
Adams	18th and Welton	350
Alamo	1411 17th Street	120
Albany	17th and Stout	600
Aldine	1013 17th avenue	175
American	16th and Blake	250
Anthony	1276 Logan street	20
Arno	1811 Grant street	50
Astor	1960 Broadway	75
Auditorium	14th and Stout	200
Belvedere	429 15th street	150
Bonacord	1422 Grant street	45
Broadway	1539 Broadway	100
Brown Palace	17th and Tremont	400
Carlton	509 15th street	112
Columbia	17th and Market	200
Congress	1520 Glenarm place	75
Dewey	1645 Welton street	160
Drexel	17th and Glenarm	70
Elk	1514 17th street	200
Elmore	1320 Stout street	60
Grand Central	17th and Wazee	100
Graymont	711 18th street	75
Harvard	501 Colfax avenue	80
Holland	1760 Pennsylvania street	50
Horton	1830 Grant street	10
Inter Ocean	16th and Blake	100
Kaiserhof	17th and Welton	250
Lafayette	17th and Lincoln	60
Law	18th and Stout	150
Lewiston	731 18th street	100
Markham	17th and Lawrence	250
Melrose	1742 Sherman street	40
Metropole	18th and Broadway	300
Midland	17th and Arapahoe	100
Miles	1853 Welton street	150
Montview	1446 Stout street	75
Orient	1726 Welton street	160
Oxford	17th and Wazee	600
Pierce	1302 California street	140
Plaza	15th and Tremont	200
Plymouth	16th and Broadway	150
Roslyn	607 14th street	150
Savoy	17th and Broadway	250
Shirley	17th and Lincoln	350
Shirley Annex	Broadway near 17th	350
Standish	1530 California street	250
St. Elmo	1433 17th street	80
St. Francis	411 14th street	120
St. James	1534 Curtis street	250
St. Thomas	1508 California street	40
Tours	Colfax and Lincoln	120
Tremont	411 16th street	100
Vallejo	1420 Logan street	75
West	1337 California street	180
Windsor	18th and Larimer	400

TRANSPORTATION

The matter of transportation is being vigorously pushed, but at this date it is not possible to give definite information on this point. The association has been able to positively secure for its delegates an extension of the summer tourist rates from Chicago to Denver, but the matter of a similar extension from the Eastern territory has not yet been decided, and positive announcement on this point cannot, therefore, be made in the bulletin. It is the intention, however, to issue immediately after this question is settled a bulletin devoted to the matter of transportation, and it is hoped to distribute this information on or before July 10.

SCHEDULE OF MINIMUM RATES BY THE DAY, EUROPEAN PLAN.

	Rooms Without Private Bath.		Rooms With Private Bath.	
	1 Person.	2 Persons.	1 Person.	2 Persons.
Adams	$1.50	$2.50	$3.00	$5.00
Alamo	1.50	2.00	2.00	4.00
Albany	1.50	2.50	3.00	4.00
American	2.00	4.00	3.00	6.00
Astor	1.00	1.50	1.50	2.50
Auditorium	1.00	2.00	2.00	4.00
Belvedere	1.00	2.00	2.00	3.50
Brown	2.00	4.00	3.50	5.00
Carlton	1.00	2.00	...	...
Congress	1.00	2.00	1.50	3.00
Drexel	1.00	2.00	2.00	3.50
Elk	.75	1.50	...	...
Grand Central	1.00	2.00	...	...
Graymont	1.00	2.00	1.50	3.00
Holland	1.00	2.00	2.00	3.50
Kaiserhof	1.50	3.00	2.00	4.00
Lafayette	1.00	2.00	2.00	3.00
Law	1.00	2.00	...	...
Madison	1.00	2.00	1.50	3.00
Metropole	1.50	2.00	2.50	3.50
Midland	1.00	1.50	2.00	3.00
New Broadway	1.00	2.00	...	...
Orient	1.00	2.00	2.00	3.00
Oxford	1.50	2.00	2.00	3.50
Pierce	1.00	2.00	1.50	3.00
Plaza	1.00	2.00	1.50	3.00
Savoy	1.50	2.50	3.00	5.00
Shirley	1.50	2.00	2.50	3.50
Standish	1.50	3.00	2.00	3.50
St. Elmo	1.00	2.00	...	...
St. Francis	1.00	2.00	2.00	3.50
St. James	1.50	2.00	2.50	3.00
Tours	1.00	2.00	2.00	3.50
West	1.00	2.00	1.50	3.00
Windsor	1.00	2.00	2.00	3.00

This proposed bulletin will contain as much detailed information as possible on railroad fares from various cities of the country, with equivalent Pullman rates. The bulletin will also contain information concerning transportation committees, which are now well under way, giving the names of committeemen and territory assigned. Program, meeting halls and other convention matters will be covered in later bulletins, as definite conclusions are reached.

SHOP FIRE PROTECTION AT MOBILE

The Mobile Light & Railroad Company has just completed the installation of a piping system and storage tank for protecting the shop buildings in case of fire. The storage tank has a capacity of 50,000 gal., and is mounted on a 100-ft. steel tower. From this tank an 8-in. main leads to an underground piping system surrounding the several shop buildings. The supply tank is fed with water from the city mains, and a 6-in. water connection also is available for directly feeding the underground piping in the shop yards whenever water is not available from the storage tank.

Eight large fire hydrants are located in the shop yards and are fed by a line of 6-in. piping. The hydrants are not nearer than 50 ft. to the buildings, so that they may be approachable at all times. Over each hydrant a special hose house with two large double doors is installed, and in each house is a 100-ft. length of hose connected to the hydrant. Additional hose is carried on a portable reel. In each of the shops and car houses are four standpipes, each with 50 ft. of hose connected with a 1⅛-in. nozzle. The hose at these standpipes is hung on a "jiffy" automatic hose rack, so that it is immediately available for use in case of fire.

The shop forces include a man who formerly served in the city fire department, and S. M. Coffin, master mechanic, has appointed this employee as assistant fire chief. Fire drills are conducted frequently, so that the men may deal systematically with any emergency call.

METHOD OF PLOTTING SPEED CURVES

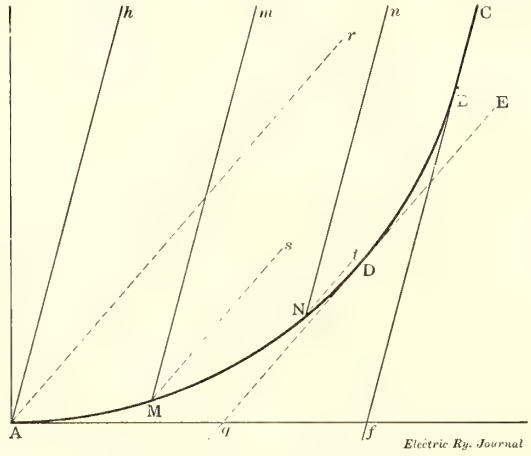
New York Central & Hudson River Railroad Company,

New York, July 1, 1909.

To the Editors:

In Mr. Farmer's article, "New Method of Plotting Speed Curves," on page 1131 of your issue of June 19, a description appears of a new method of finding the speed at any point of a distance-time curve. I beg to call to your attention the fact that this method is not entirely correct or of universal application. This is to be regretted, for such a simple and easy method as this appears at first sight to be would be a great labor saver.

In the accompanying diagram *A B C* is a distance-time curve with distance represented by ordinator and time by abcissæ. The scales of time and distance are omitted as



Distance-Time and Velocity Curves

not essential to this discussion and the shape of curves chosen, while unusual, is such as to emphasize the inaccuracy. The curve becomes a straight line at *B*, and lines *C B f* and *h A* are drawn parallel, according to the directions in the article referred to. The speed at the time corresponding to any point on the curve is then said to be proportional to the distance of that point from line *h A*. Take at random any point on the curve, as *M*, and call the speed at that point *S*. Draw line *m M* parallel to *h A*. At a distance from *h A* twice as great draw another parallel line *n N* cutting the curve at *N*. The speed at *N* is then *2 S*.

Now suppose a second distance time curve *A D E* to be precisely the same as the first curve up to the point *D*, where it becomes a straight line. It is obvious that the differences beyond *D* leave unaltered the speed and other characteristics in that portion of the curve to the left of *D*. As before, draw *Eq, r A, s M* and *t N* parallel. Following the rule that speeds are proportional to distances, from *r A*, and remembering that the speed at *M* is *S*, it is apparent upon inspection of the figure that the speed at *N* is about 1.7 *S*. But the speed at *N* is already known to be *2 S*.

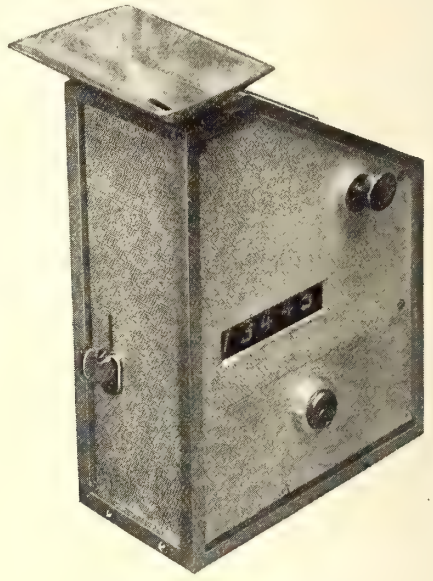
Taking as the most typical form encountered in practice, a curve of uniform acceleration, the errors by Mr. Farmer's method are found to be about 50 per cent at half-speed, decreasing at higher speeds, and at lower speeds running up to nearly double that value. R.

The first electrified section of the London, Brighton & South Coast Railway Company was opened for operation in May, and it is expected that electric service will be extended into Victoria Station by Aug. 1.

A NEW FARE BOX

The accompanying engraving shows a new fare box, which collects and registers nickels and at the same time allows the conductor access to the cash drawer for making change. The device was invented and is being sold by H. T. Werden, 1 Madison Avenue, New York City. It is known as the "Payee" fare box.

The nickels are dropped into the hopper on top of the box, and slide through the slot down a long slanting chute to the registering stop. This chute is provided with a glass top, so that both the passenger and conductor can see the coin as it drops. If a mutilated or counterfeit coin is



Registering Fare Box

dropped in the box and is detected by the conductor, he registers the fare and removes the coin from the cash drawer, returning it to the passenger. The slot in the hopper is just large enough to pass a nickel, and will not allow a coin of larger diameter to enter the chute. If a dime or penny drops into the hopper it falls through the slot into another passageway and drops out of the box in the cup shown at the left.

A detachable key operates the registering mechanism. The conductor grasps the box with his fingers and his thumb rests on the knob of the key. A slight push on the knob actuates the register and allows the nickels to fall into the cash drawer below. By means of two small pegs only one coin at a time is permitted to pass through the opening into the cash drawer. In the normal position one of these pegs projects out in the chute and stops the passage of a coin dropping down from the hopper. When the register knob is pushed this peg is withdrawn, but simultaneously the second peg is forced out above the lowest coin and prevents the second coin from dropping further. When the register knob is released the upper peg is withdrawn and the lower peg again forced out to the normal position.

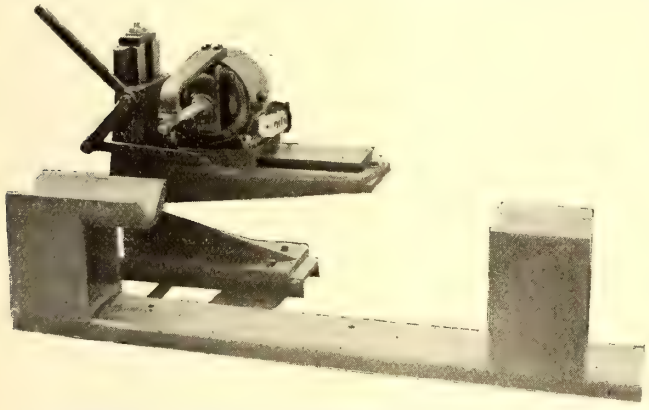
The box weighs only 10 lb. and is but 11½ in. x 7½ in. x 4 in. in size; hence it is readily portable. It is made of punched metal, is neat, secure and, it is claimed, will not get out of order. Each conductor may be given a "Payee" fare box and be held responsible for its registration and cash delivered, thus providing a simple method of checking up each conductor's receipts. Conductors are furnished

with a key which will open the cash box, so that they have available at all times an ample supply of change.

The box is held in place on the platform by a simple catch forming part of a base plate permanently bolted to the platform railing. The base plate is formed with shoulders at the sides, from which project at one end two fixed metal pins. A spring bolt is provided at the other end of the shoulders. Small holes are drilled in the box to engage with these pins. To fasten the box it is slipped into engagement with the two fixed pins and then the spring bolt is snapped into place. This attaches the box securely to the base plate.

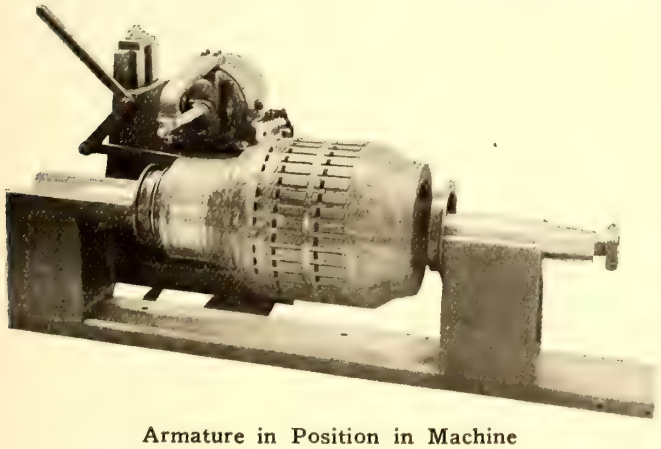
COMMUTATOR GROOVING MACHINE

The special commutator grooving machine shown in the accompanying engraving has recently been designed and placed on the market by the General Electric Company. It will accommodate all sizes of General Electric railway motor armatures built to date. It consists of sup-



Commutator Grooving Machine for G.E. Armatures

ports for the armature, the commutator of which is to be grooved, and a moving carriage, which carries the grooving motor. The armature supports are pillow blocks with V-shaped bearings, one of them being movable horizontally on the base. The carriage stand has a rough horizontal adjustment at its base, a vertical screw adjustment for the motor carriage slide arm, and an angular adjust-



Armature in Position in Machine

ment in the slide arm to be used in case the commutator bars are not exactly parallel to the shaft. The rotating saw is on the extended shaft of a CQ ¼-⅛ hp, 1200-r.p.m., 550-volt, direct-current motor. The shaft is long enough to permit of the use of two saws, allowing the grooving of two slots at the same time. Owing to the size of the motor, no starting resistance is required. The weight of the complete apparatus is 750 lb.

IMPROVED DESIGN OF SHEET STEEL GEAR CASE

The first design of Lyon sheet-steel gear case was patented in 1905. The experience gained during four years of manufacture has led to a number of changes in details which have increased the strength of the cases and reduced the maintenance costs. These changes consist principally in adding reinforcement at points of greatest strain. Cases requiring side brackets are now reinforced by a special steel plate placed on the inside of the case, this plate being larger in size than the base of the bracket. The end brackets on the case are also reinforced by sheet-steel plates on the inside. These reinforcements are made to lap, giving the case rgidity and preventing its coming out of alignment. The latest types of Lyon reinforceed cases are furnished with grease doors having compressed centers, which not only prevent the grease from flying out of the case, but also prevent dirt from working into the gears. In the design of recent cases, special attention has been given toward avoiding right angles in the metal, as it has been conclusively proved that metal bent at right angles is more liable to fracture than metal formed with rounded corners.

This improved type of case is now known as the Lyon reinforced sheet-steel gear case, and is being marketed by the Electric Service Supplies Company, Philadelphia, Pa.

GRAPHITE SHEET LUBRICATION

A new type of sheet lubrication for journal bearings has been put on the market by the Strong, Carlisle & Hammond Company, Cleveland, Ohio. It consists of solidified graphite cones or tablets which are molded on a copper wire cloth. In babbitting a box, a piece of this sheet is cut wide enough to fit not quite one-half way around the journal. It is then shaped to the journal and the babbitt metal is poured in in the usual way. Afterward the sides of the bearings are scraped, so that the journal will turn freely.

When oil is used, from 75 to 90 per cent of the quantity of the graphite sheet which would otherwise be employed is cut out, to avoid any tendency of the oil to wash loose particles of graphite out of the bearings. This method of babbitting boxes has been employed on one of the cars of the Northern Ohio Traction & Light Company and has given very satisfactory results. After a mileage of 23,375, the bearings were in such good condition that they were replaced for further wear.

Many letters have been written by residents of Philadelphia to the newspapers of that city regarding the recent traction situation. A signed letter published in a recent issue of the *Public Ledger* said in part: "If your paper would print a modest suggestion from a plain, blunt man, an humble citizen, anent the increase in fare on our street-car lines I believe it would end the horrible business, and not only that, but that it would prevent a repetition of it. My suggestion is simply that we build the suburbs in the center of the city, thus doing away with the necessity of street-car lines. It should be plain to the mind of even a police court judge that if the lines were taken away our fellow-citizens could save all their car fare. To show that my actions are in accord with my written sentiments, I have resolved to walk the longest way home instead of the shortest as heretofore. I claim that this is an act of wisdom, for by so doing I deprive the company of two fares instead of one."

ELECTRIC RAILWAY LEGAL DECISIONS

LIABILITY FOR NEGLIGENCE

Alabama.—Carriers — Injuries to Passengers — Actions — Pleading and Proof—Relation of Carrier and Passenger—Evidence—Negligence—Prima Facie Case—Master and Servant—Injury to Servant—Street Railroads—Care as to Licensees—Care as to Passengers—Railroad Company—Care as to Employees—Who Are Passengers—Employees of Carrier.

In an action against a carrier for injuries to a passenger, the allegation that plaintiff was a passenger on defendant's car at the time he was injured is a material allegation, and must be proved.

On mere proof of injury to a passenger, his prima facie right of recovery, under counts charging simple negligence, is established.

An employee of a street railroad company, riding on a car at the time of his injury by a collision, in addition to showing the collision and injury, must adduce some evidence tending to show negligence in order to recover.

The only duty owed by a street railroad company to a licensee on one of its cars is not to wantonly or intentionally injure him, or to exercise due care to avert injury after his danger becomes apparent.

A carrier owes to a passenger the highest degree of care.

A street company owes to one of its employees, riding on a car, the duty of exercising reasonable care not to injure him.

A section hand, injured while riding back and forth to work on a car, without charge, pursuant to a rule of the company, is not a passenger, but is in the exercise of a mere privilege connected with his employment.—(Birmingham Ry., Light & Power Co. v. Sawyer, 47 S. Rep., 67.)

Florida.—Railroads—Personal Injuries—Presumption of Negligence—Burden of Proof.

The statute provides that a railroad company shall be liable for any damage done to persons by the running of cars or other machinery, unless the company shall make it appear that its agents have exercised all ordinary and reasonable care and diligence; the presumption in all cases being against the company, but this provision does not create such a presumption as will outweigh proofs, or that will require any greater or stronger or more convincing proofs than in any other issue. The statute casts upon the company the burden of affirmatively showing that its agents exercised all ordinary and reasonable care and diligence to prevent the injury complained of.—(Jones v. Jacksonville Electric Co., 47 S. Rep., 1.)

Illinois.—Carriers—Street Railways—Passengers—Action for Injuries—Question for Jury—Evidence—Admissibility—Subjects of Expert Testimony—Appeal and Error—Exclusion of Evidence—Harmless Error.

Under the evidence in an action against a street railway company for injury to a passenger caused by a jerking of cars on the grip-iron on a grip car becoming caught, held proper to refuse to direct a verdict for the company.

In an action against a street railway company for injury to a passenger caused by cars jerking on the grip-iron on a grip car becoming caught, the company could not show that it had employees who had particular duties to perform, it being permitted to prove everything that was in fact done by any employee in the way of inspection, superintendence and care of the track and appliances, as no matter how many employees the company had, or what their duties were, the company would be liable to the passenger for their neglect of such duties, and since duties unperformed would constitute no defense.

In an action against a street railway company for injury to a passenger caused by a jerking of cars on the grip-iron on a grip car becoming caught, the company could not ask a witness as to the possibility of a car running into the tongue of a switch, since that was not a proper subject of expert testimony, and since there was no evidence for plaintiff tending to show that the grip caught on the tongue of a switch.

In an action against a street railway company for injury to a passenger caused by a jerking of cars on the grip-iron on a grip car becoming caught, it was not reversible error to exclude a question asked a witness for the company as to whether he had ever known of an accident occurring through anything getting into the cable slot, since there was no evidence tending to prove that anything got into the slot on the occasion of the accident, and since, if the purpose was to show that no such accident had happened before, the testimony would tend to show that something was wrong with the slot or appliance, raising an inference of negligence of the company.—(Wyckoff v. Chicago City Ry. Co., 85 N. E. Rep., 238.)

Iowa.—Carriers—Carriage of Passengers—Setting Down Passengers—Contributory Negligence.

Where an interurban railway conductor was advised by a passenger that he wished to alight, and saw the passenger moving toward the rear end of the car, and knew, or should have known, that the car had slackened its speed as if about to stop at the passenger's request, and the motorman had been given the usual signal to stop to discharge passengers, the conductor and motorman were bound to see that the passenger was not in the act of alighting before starting the car, which had not come to a full stop, with unusual force and violence.

An interurban railway passenger, who had signified his desire to alight, was not negligent as a matter of law in taking a position on the car step after the car had commenced to slow down.—(Heinze v. Interurban Ry. Co., 117 N. W. Rep., 385.)

Louisiana.—Street Railroads—Operation—Care Required—Collision with Fire Apparatus—Negligence of Motorneer.

It being important that the apparatus for its extinguishment should reach a fire promptly, and, the men and horses of the fire department being expected and trained to use the utmost expedition for the accomplishment of that purpose, the requirement that individuals and vehicles engaged upon less pressing missions shall not only accord them the right of way, but shall hold themselves in readiness to do so when they have reason to anticipate that fire apparatus may appear, is not unreasonable, and that condition may be said to exist when a vehicle, and more particularly a street car, which is confined to its track, approaches a fire engine house situated in close proximity to such track.

The motorneer of an electric car which passes immediately in front of a fire engine house is guilty of double negligence when he drives the car at full speed in approaching such house, and fails to see, in time to enable him to stop the car and avoid collision with an outcoming hose wagon, a signal given while his car is 144 feet distant from the engine house.—(Dole v. New Orleans Ry. & Light Co., 46 S. Rep., 929.)

Massachusetts.—Street Railroads—Injuries to Pedestrians—Contributory Negligence—Lighting—Mode.

As plaintiff was approaching a street on which defendant's street railroad was operated, her view of a car approaching from the north, by which she was subsequently struck, was and continued to be unobstructed from the time such car was 850 ft. north of the point where the accident took place until it reached such point. The car was lighted by incandescent lights inside and one on the dashboard. The accident happened on a dark, misty morning; but the fog was not such as to obscure objects like the car in question. Held, that plaintiff was negligent, as a matter of law, either in not looking carefully to see the car or in not looking from the proper position.

Where, in an action for injuries to a pedestrian in a collision with a street car, it was not shown that plaintiff knew or relied on the use of searchlights by the street car company on its cars, it was no excuse for plaintiff's failure to discover the car in time to avoid being struck by it that it was only equipped with an incandescent light on the dashboard, instead of a searchlight in use on some of defendant's cars for a year prior to the accident.—(Beirne v. Lawrence & M. St. Ry. Co., 83 N. E. Rep. 359.)

Michigan.—Master and Servant—Injuries to Servant—Assumption of Risk—Knowledge of Practice as to Inspection—Evidence—Admissibility.

A master may conduct his business in his own way, and, unless a servant wishes to assume the risk of the method adopted by the master, he should refuse to enter upon the employment, or leave it on discovering such method, and a servant, knowing the hazards of his employment as it is conducted, cannot recover for injuries received on the ground that there was a safer method which would have prevented the accident had it been adopted. Hence, where an experienced lineman employed by defendant street railway company knew that it was the practice of the company to make no separate inspection of trolley poles, but to rely on such as the linemen might make in connection with work required of them, and that all changes and repairs upon poles were made by his crew, he continued, if he did not accept, his employment with full knowledge of the facts, and he assumed the attendant risks.

In an action by a lineman against a street railway company for injuries from the falling of a decayed trolley pole, evidence that it was the universal custom of such companies to omit inspection other than that made by the repair crew is admissible on the issue of assumption of risk.—(Lynch v. Saginaw Valley Traction Co., 116 N. W. Rep., 983.)

Minnesota.—Street Railroads—Injuries to Persons on Track—Actions—Evidence — Sufficiency — Damages — Measure of Damages—Injuries to Person—Excessive Damages.

In a personal injury action, the evidence considered, and held sufficient to sustain the finding of the jury that the defendant was negligent and that the plaintiff was not guilty of contributory negligence.

When an injury to a woman results in a miscarriage, she is entitled to recover such damages as will fairly compensate her for the pain and suffering occasioned by the miscarriage, but not for the pain and suffering occasioned by the loss of the child.

The pain and suffering which the mother would have suffered when the child was born in the natural course of events cannot be deducted from the pain and suffering occasioned by the miscarriage, which resulted from the defendant's negligence.

The damages awarded held not so great as to show passion and prejudice on the part of the jury.—(Morris v. St. Paul City Ry Co., 117 N. W. Rep., 500.)

Missouri.—Damages—Excessive Damages—Carriers — Injury to Passenger—Instructions—Conflicting Theories—Presentation—General Instructions — Carriers—Action for Injury to Passengers—Instructions—Construction—Trial—Instructions—Sudden Jerks—Danger of Position—Nursing—Limitation as to Amount.

In an action for personal injuries, it appeared that plaintiff was an unmarried woman 33 years of age, in good health, earning $5 per week as a domestic; that blood poisoning set in soon after the injury, and plaintiff's physical condition made amputation impossible for over two months; that both flesh and bone of her foot sloughed away, finally necessitating amputation; that the injured limb would be 2 in. shorter than the other, necessitating a halting walk; that her doctor bill was $500; that she was bedridden for several months and was bound for expenses for medicine and nursing. Held, that a Judgment for $7,500 was not so excessive as to warrant setting it aside.

In an action against a railway company for injuries to a passenger, where plaintiff's testimony tended to show that the car had stopped at the proper place to receive passengers, that there was an implied invitation to enter, that while she, in the usual way and with proper care, was entering the car, there was a sudden movement forward throwing her down with one foot under the wheels, and defendant's testimony tended to show either that plaintiff was forced against and under the car by a crowd pushing to get on, or that she negligently undertook to mount a moving car before it reached the stopping place, and was injured by her own inadvertence, each party was entitled to instructions on their respective theories of the case.

An instruction which puts certain facts to the jury, and tells them that if they find that way plaintiff is entitled to recover, is a general instruction.

A general instruction for plaintiff, which, among other things, charged that, if defendant's servants in charge of the car received plaintiff as a passenger thereon, and if while she was on the run-board thereof, etc., they caused or suffered the car to start and move forward, etc., in the absence of contributory negligence, plaintiff could recover, in effect requires the jury to find that plaintiff was invited to enter the car, and had accepted the invitation, and is not open to the objection that it permits plaintiff to recover without a finding that the car had stopped when plaintiff sought to enter.

If the instruction was vague as to requiring the jury to find that the car had stopped when plaintiff attempted to board it, in order to recover, the jury could not be misled, where other instructions plainly required them to find that the car had stopped at a point where defendant usually received passengers, to entitle plaintiff to recover, and further charged that plaintiff must establish by the greater weight of evidence that she received the injuries in the manner she alleged, and that otherwise the verdict must be for defendant, and that, before they found for plaintiff, they must find she got on the run-board when the car was stopped, and that her injury must be found to be the result of a subsequent forward movement, and that if plaintiff was in a crowd, which was trying to board the car before it stopped, and plaintiff, notwithstanding warnings, attempted to board the car before it stopped, etc., or if the pressure of the crowd, combined with her attempt, threw her under the wheels, or if it was a mere accident without fault on either side, she could not recover.

Where plaintiff's testimony placed her with one foot on the run-board of an electric car and one on the floor of the car raising herself to pass into it at the time the car started up, it is not error in presenting her theory to assume that plaintiff was in a position of danger at the time of the alleged start.

In an action by a passenger for injuries, where the petition asks no specific amount under any head or item of damages, but the elements of damage are set forth with particularity, and a general verdict is prayed covering them all, an instruction putting the question of damages to the jury, as the petition did, is not bad, in the absence of a request for a more specific instruction.—(Flaherty v. St. Louis Transit Co., 106 S. W. Rep., 15.)

New York.—Street Railroads—Collision with Vehicle—Right of Way.

A driver on a street occupied by street-car tracks does not have an equal right of way with the street-car company, except at street intersections, on that portion of the street occupied by the tracks.—(Gilman et al. v. New York City Ry. Co., 107 N. Y. Sup., 770.)

New York.—Carriers—Injuries to Passenger—Evidence—Sufficiency.

In an action against a street railroad for the death of a passenger, evidence held insufficient to show that the driver of defendant's car intentionally pushed decedent from the platform.

Where decedent boarded the crowded front platform of a horse car, and the driver, with an involuntary motion, resulting from the necessity of properly managing his horses, pushed decedent from the platform, there was no liability on the part of the carrier.—(Dubnow v. New York City Ry. Co., 107 N. Y. Sup., 729.)

New York.—Carriers—Actions for Injuries—Sufficiency of Evidence—Contributory Negligence.

Where a street railway passenger, without waiting for the car to stop, jumped off and immediately started in the rear of the car to cross the other tracks, and a moment's notice would have apprised him, either by the corner lights of the car which struck him or by the sound, that the car was approaching, a finding that he was free from contributory negligence is against the weight of evidence.—(Wilson v. Rocheste & E. R. Ry. Co., 108 N. Y. Sup., 117.)

Washington.—Electricity—Actions for Injuries—Evidence—Sufficiency—Existence of Current—Source of Current Causing Shock—Injuries—Negligence—Maintenance and Repair of System.

In an action against an electric railway company for injuries to a city electric light trimmer from a shock caused by contact of the trolley wire through various other wires with the flexible wire by which the light was lowered, the evidence of the contact of wires, the shock, and the fact that a car had just passed held sufficient to show the presence of a current in the trolley wire at the time of the shock.

Proof of contact with defendant's trolley wire held sufficient to sustain a finding that it was the source of a current causing a shock, notwithstanding testimony that it might have come from some other source, where there was no direct proof of any other source.

Where a city operating an electric lighting plant removed a guy wire supporting a trolley wire from the railroad company's pole to its own pole, and the railroad company subsequently took down and replaced the trolley wire and refastened the guy wire to the electric light pole, but either failed to put in an insulator or failed to replace one that was missing, the railroad company was liable for injuries from an electric shock to an electric light trimmer received from the trolley wire through the guy wire and the flexible wire for lowering the light from the pole to which the guy wire was attached; it being the duty of the railroad company to keep its wires in reasonable repair and to correct faults which were dangerous to others.

Evidence held to sustain a judgment for an electric light trimmer for a shock from electricity escaping through a guy wire from a trolley wire to the cable for lowering the light.—(Garretson v. Tacoma Ry. & Power Co., 96 Pacific Rep., 511.)

West Virginia.—Carriers—Injury to Passengers—Negligence—Directing Verdict.

Where a passenger, while riding on an electric car seated on the floor between the seats with his feet resting on the running board, falls off while the car is rounding a curve, the mere fact that the car was crowded and running at the rate of speed usual under ordinary circumstances does not of itself show negligence on the part of the company.

Under such circumstances, the lower court is justified in excluding plaintiff's evidence and directing a verdict for the defendant.—(Wenzel v. City & Elm Grove R. Co., 61 S. E. Rep., 1001.)

CHARTERS, FRANCHISES AND ORDINANCES

Colorado.—Street Railroads—Grant of Franchise by Municipality—Term—Right of Appeal—Effect of User.

A grant by a city to a street railroad company of the right to construct and operate tracks in its streets, without any limitation as to time, is one at least for the term of the corporate life of the grantee.

Where a city granted to a street railroad company the right to construct and maintain tracks "along and across the streets of the city," and the company has constructed and put in operation lines in conformity to a system which contemplates their extension, and the building of branch lines as public needs may require or justify, the city cannot arbitrarily, and without cause, repeal the grant except as to tracks at the time constructed and in operation, and any ordinance attempting such repeal is void.—(Mercantile Trust Co. of New York v. City of Denver et al., 161 Fed. Rep., 769.)

Connecticut.—Eminent Domain—Proceedings to Take Property—Appeal—Effect as Supersedeas—Street Railroads—Location—What Constitutes.

Gen. St. 1902, § 3834, provides that any party to any proceeding relating to street railways, brought before the railroad commissioners on either original application or by appeal, aggrieved by the decision of the commissioners, may appeal to the Superior Court in the same manner as in appeals taken under section 3747, and with like effect. Section 3747 makes any appeal taken thereunder a supersedeas of the order appealed from until the final action of the court thereon. Held, that section 3834 is not limited to such proceedings as may be brought by every street railway under the general laws, but applies to proceedings brought in furtherance of the exercise of the power of eminent domain, which has not been granted to all of them, and that approval by the railroad commissioners of the location on, and the taking of, land for a street railway, became, under section 3747, of no binding force on appeals therefrom.

The location of a street railway, the charter itself not fully prescribing the precise location, is the definite and final selection and demarcation of its route by its board of directors.

Though the location of the route of a street railway must be made within the limits fixed by its franchise, such limits will be liberally construed to uphold the location made, and it is enough if the limits are substantially observed.—(New York, N. H. & H. R. Co. v. Stevens, 69 Atl. Rep., 1052.)

Georgia.—Eminent Domain—Injunction—Street Railroads—Location of Route—Estoppel—Evidence—Admissibility—Amount of Property that May Be Taken—Grounds of Relief—Inadequacy of Remedy at Law—Power to Take—Street and Suburban Railways—Words and Phrases—"Street Cars."

Under the facts of this case the plaintiff was not estopped from seeking to enjoin the defendant as prayed in its petition.

Where a railroad company has the right to condemn private property for public uses in the construction and operation of its road, it has a large discretion in the selection of a location for its route over such property, and, unless such discretion has been abused, it will not be controlled or interfered with by the courts.

(a) Upon the trial of a case wherein the owner of the property through which it is proposed to run such road complains that such discretion of the company has been abused by it, it is error to exclude testimony relevant and material upon the issue as to whether or not the company has acted in bad faith in the selection of such location.

(b) Where the route selected and sought to be condemned by such company for the location of its road ran near the cotton mill of the owner of the land, who introduced testimony to show that another route over such land was equally as practicable, feasible, and advantageous to the company and the public as the one selected, and that it contemplated in a short time making an enlargement of its mill, the plant of which was originally designed and constructed with the intention of subsequently making such enlargement, and which would have been designed and constructed at less cost if such intention had not existed, it was error to exclude testimony, offered for the purpose of showing that such company acted in bad faith in selecting the route it did select, to the effect that the portion of the land over which such route was selected was the only location on such land on which its mill could be scientifically and economically enlarged, and that to enlarge their plant at any other location on said land would necessitate the building of a new and independent mill which could not be operated in connection with the existing plant.

A party having the right of condemning private property for public purposes can only condemn such amount thereof as is useful, needful and necessary for public purposes.

(a) If such party, in condemnation proceedings, makes an effort to condemn more land than is necessary for public purposes, as the assessors in such proceedings can only determine the amount of compensation to be paid, the owner of such land has the right to have a court of equity intervene and enjoin the condemnation of such of his land as is not necessary for public purposes.

(b) Where a party has a right to condemn land for public purposes, it is not confined to such quantity as may be absolutely necessary or indispensable for public purposes; but such quantity as may be reasonably necessary may be condemned.

Upon the trial of a case wherein the owner of land seeks to have a party having the right of condemnation enjoined from condemning his land, it is not error to admit testimony of such condemnor that he made an effort before instituting such condemnation proceeding to acquire by contract the property sought to be condemned and failed in such effort.

Suburban and street railroad companies incorporated under the general law pursuant to Civ. Code 1895, § 2180, have power to condemn private property outside of the limits of incorporated towns and cities.

"Street cars," accurately speaking, are cars which traverse the streets of a town or city and carry passengers who get off and on at various points along the line. They have been considered as vehicles of street travel.—(Piedmont Cotton Mills v. Georgia Ry. & Electric Co., 62 S. E. Rep., 52.)

New York.—Easements—Prescription—Acquisition of Rights of Way—Evidence—Admissibility—Adverse Possession—Title by Prescription—Evidence to Overcome—Sufficiency—Right of Way—Abandonment.

In an action by an abutter to restrain the operation of an elevated railroad and for damages, evidence that more than 20 years prior to the action the railroad entered on the street under a charter from the rapid transit commission and the acts of the Legislature and of the municipality raised a presumption of lawful entry under a deed which had been lost.

In an action by an abutter to restrain the operation of an elevated railroad and for damages, a lis pendens and petition in condemnation proceedings, whereby a predecessor of the railroad sought to acquire title to a right of way in front of the premises in question, and also a judgment of condemnation and an order appointing commissioners, such proceedings having been instituted about five years after the erection of the elevated structure and the commencement of the operation of the trains, and the judgment of condemnation and order appointing commissioners having been entered several months thereafter, and it being thereby declared that the railroad's predecessor had not been able to acquire title to the easement required for the erection of its elevated structure, and that its offer to the owner of the premises had been rejected, were competent and material to rebut the presumption raised by evidence introduced by the railroad that there had been a lawful entry under a deed which had been lost.

But slight evidence to overcome title by prescription is required.

An increase in the length of elevated railroad trains, their number, change in the method of operation from steam to electricity, and as an incident thereto the laying of a third rail and building of a walk by the side of the elevated structure, do not constitute such an increase in the user or change of its character as to be deemed an abandonment of any right acquired under the original entry.—(Betjemann v. Brooklyn Union Elevated R. Co. et al., 111 N. Y. Sup., 567.)

New York.—Carriers—Regulation—Carriage of Passengers—Excessive Fares—Penalty.

A corporation, organized as a steam railroad under the general steam railroad act, operating as an electric street railway a road 5 or 6 miles long, and continuing to claim its right under the steam railroad act, instead of conforming to the law of street surface railroads, must conform to that act; and charging fares in excess of rates fixed by Railroad Law, Laws 1890, p. 1096, c. 565, § 37, renders it liable to the penalty imposed by section 39, provided the overcharge is not made through inadvertence or mistake.

A railroad company, charging excessive fares pursuant to plan and intention, rather than under legal advice, is subject to the penalty imposed by Railroad Law, Laws 1890, p. 1096, c. 565, § 39, for charging excessive fares, unless the overcharge was made through inadvertence or mistake.—(Petze v. Coney Island & B. R. Co., 111 N. Y. Sup., 532.)

News of Electric Railways

New Rapid Transit Proposal in New York

The Interborough Rapid Transit Company presented to the Public Service Commission, of the First District of New York, on June 30, a proposition for the addition of 68½ miles of new track to its lines, 44 of which would be subway extensions and 24½ would include third tracks and extensions of present elevated lines.

It is suggested that the most favorable way for the company to build the subways would be as an extension of contract No. 1, under which the present subway was built, the only change being that the company would furnish the money for construction instead of the city. The company, however, wants the Public Service Commission to grant it indeterminate franchises for the third tracking of the Third Avenue, Second Avenue and Ninth Avenue elevated lines, and conditions its building of subways on the granting of the elevated franchises and the adoption by the commission of the plan for the Steinway tunnel.

In detail the subway extensions proposed by the Interborough Rapid Transit Company, according to a statement issued by T. P. Shonts, president of the company, is as follows:

1. A four-track subway extension connecting with the existing subway at about Thirty-sixth Street and Fourth Avenue and running from that point under Lexington Avenue to about Forty-sixth Street.

2. A two-track subway extension connecting with the four tracks above proposed from a point near Forty-sixth Street, running north under Lexington Avenue to East 129th Street and the Harlem River; same to be used for purely local service and connecting with all of the existing subways and the subways that we now propose.

3. A two-track subway connecting with the proposed four-track subway in Lexington Avenue at about Forty-sixth Street and then under Third Avenue northerly, passing under the Harlem River to East 149th Street, the Melrose district of The Bronx, there again connecting with the existing subway to West Farms and devoted solely to express service of the most rapid kind.

4. A four-track subway extension on the West Side connecting at Times Square with the present subway and running under Seventh Avenue and Varick Street to Canal Street.

5. From Varick Street or West Broadway, a two-track subway extension, southerly by way of West Broadway, to Greenwich Street, southerly by way of Greenwich Street to the Battery, and there looped into the present subway.

6. A two-track subway, beginning at Varick Street or West Broadway, running easterly under Canal Street to and over the Manhattan Bridge to Nevins Street, in Brooklyn, and there connecting with the existing city's subway to Flatbush Avenue.

7. A two-track subway extension from Park Avenue and Forty-second Street through the Steinway tunnel into Long Island City, Queens County, at Van Alst Avenue.

These plans involve about 18 miles of new tunnel construction, with 44 miles of new track, and, if completed, the city would own a subway route which, beginning on the west side of The Bronx at 242d Street, the parade ground of Van Cortlandt Park, would run south along the west side of Manhattan to the Battery, and from there north on the East Side to East 180th Street, at the Zoological Garden in Bronx Park, with transverse connections from East 149th Street, the Melrose district of The Bronx, down Lenox Avenue to West 103d Street, through Forty-second Street from Fourth Avenue to Times Square, and at Canal Street, from Varick Street, or West Broadway, to and across the Manhattan Bridge, connecting with the city's subway at Nevins Street and running to Flatbush Avenue, Brooklyn, together with a passage through the Steinway tunnel into the Borough of Queens, the whole operating under a 5-cent fare.

The elevated extensions proposed are as follows:

1. A two-track elevated extension from Eighth Avenue and 149th Street on the West Side over the Macomb's Dam Bridge, with a third track beginning at about 162d Street, out Jerome Avenue to the reservoir, three blocks beyond the Fordham Road.

2. A two-track Second Avenue extension from Chatham Square to the City Hall, thus enabling Second Avenue passengers to go directly to the Brooklyn Bridge, and providing there a four-track terminal.

3. One new track for express service on the Second Avenue elevated to the Harlem River.

4. One new track on the Third Avenue road from Chatham Square to Forty-second Street, which, when connected with its present facilities, will provide an additional track for express service through to 149th Street.

5. A center track on the Ninth Avenue elevated, running from Cortlandt Street to Fourteenth Street, which, with certain station changes at 116th Street and 125th Street, will permit an express service on a third track from Rector Street to 155th Street, a distance of 9½ miles and thence along the proposed Jerome Avenue extension, a distance of 3 miles more.

6. Connect two of the existing tracks on the Queensboro Bridge to the Second Avenue elevated line at or near Fifty-ninth Street. Between Fifty-fifth and Fifty-ninth Streets the Second Avenue elevated line will contain four tracks. This will give an elevated railroad connection from the plaza of the Queensboro Bridge in Long Island City direct to the City Hall or South Ferry station of the Manhattan elevated roads via Second Avenue, together with a connection with the existing elevated roads in Manhattan Island and The Bronx, with a single 5-cent fare.

The company also proposes to lengthen the present subway stations with the use of the city's money. In closing it says it is willing to separate this proposition and the propositions for the elevated line work, and the proposition for the subway extensions, and is willing to go ahead with the third tracking of elevated lines, regardless of favorable action on the subway proposition, but the statement continues:

"As at present advised, we are hardly prepared to go on with the expensive subway extensions herein proposed without the additional support we would derive from the third tracking of the elevated roads. We feel, moreover, that we must make our propositions with respect to the Steinway tunnel, the extensions over the Manhattan and Queensboro bridges and the Jerome Avenue extension of the Sixth Avenue elevated line, which become practicable only if the Interborough Rapid Transit Company can conserve its credit by constructing the subways under the most economical plan possible, contingent upon the acceptance of our present proposition to build four-track subway extensions and to third track the elevated railroads."

President Shonts, of the company, in his letter to the commission, says:

"I think it must be conceded that no private company can safely undertake to build new subways with the increased cost of construction now prevailing, unless relieved of the burden of dealing with property owners for the right-of-way and of the heavy franchise taxes which might be imposed upon the property if privately owned. The favorable construction privileges contained in the original lease must also be extended to the new construction."

The subway plan of the company departs from the former plans of the commission by a diversion of two of the four tracks proposed for Lexington Avenue to Third Avenue. This is done, it is said, because of the narrowness of Lexington Avenue, which would entail heavy judgments against the city for property damages if four tracks should be built beneath that thoroughfare.

The Board of Estimate of New York approved on July 2 the report of its special subway committee to grant the request of the Public Service Commission for permission to advertise for bids on all the subway plans now before it.

The people of the State of New York, represented by the Public Service Commission, has recovered a judgment of $1 against Frederick W. Whitridge, receiver of the Third Avenue Railroad, as a penalty for building a loop at the Fort George terminal of the railroad without first obtaining permission of the commission. The suit was to recover a penalty of $5,000 a day for 15 days. For Mr. Whitridge Joseph H. Choate, Jr., said that permission had been asked from the commission, but that it was so slow in coming that, since the loop was a necessity, the receiver went ahead with the construction, not expecting any opposition from the commission.

Cleveland Traction Situation

The retail and wholesale boards of the Cleveland Chamber of Commerce have adopted resolutions condemning the course pursued by Mayor Johnson in prolonging the traction struggle through the passage of the Schmidt grants. The wholesale board has pledged its support to the committee of 100, and especially the retail members of that board, who have been attacked by the Mayor in his circular.

The executive committee of the committee of 100 has

been at work for several days on plans for the campaign against the Schmidt grants, but no details have been announced. It is expected that the real work will be begun about July 15 and that a whirlwind speaking campaign will be conducted until Aug. 3, the date of the referendum election. Business men, lawyers and others who are accustomed to talking in public will be enlisted in this work. All of Mayor Johnson's arguments will be answered. The local organization of street railway men will also take part in the campaign. They have no desire again to come under the superintendence of a company managed by Mr. Johnson.

Mayor Johnson has asserted several times that he would prove from the reports furnished by the receivers of the Municipal Traction Company recently that the 3-cent lines are paying expenses and making sufficient profit to pay dividends upon the investment. He has not gone into this matter, but says that 85 per cent of the lines in Cleveland will be operated at 3 cents if the Schmidt franchise is upheld. Every time he speaks in public the Mayor reiterates the statement that the Tayler ordinance means a 5-cent fare and that the committee of 100 favors the 5-cent rate. As a matter of fact, the Tayler ordinance provides for an initial fare of 3 cents which may be raised if the returns are not sufficient to furnish good service and pay dividends of 5 per cent on the stock of the company. The cost of transportation, however, is never to exceed the fare represented by seven tickets for 25 cents, except when paid in cash, and then the fare is to be five cents.

The Forest City Railway owes taxes amounting to $18,000, while the Low Fare Railway is indebted $400 for the same purpose for the year 1908. No provision has been made on the books of the Municipal Traction Company for the payment of the taxes and it is not known whether they will be classed as general or preferred claims. Some discussion has arisen as to the possibility of paying the general claims against the Municipal Traction Company, and the opinion of some attorneys is that those who have general claims will get only a very small dividend.

New Line Opened Between St. Paul and Minneapolis.—The new Fort Snelling Bridge across the Mississippi River at Minneapolis has been accepted, and the Twin City Rapid Transit Company has established a service of through cars on the new Snelling-Minnehaha interurban line from Hennepin Avenue and Fifth Street, Minneapolis, to East Seventh Street, St. Paul.

New Nebraska Line Opened.—The Nebraska Traction & Power Company, which is building an electric railway from Omaha to South Omaha, Ralston and Papillion, has placed the line in operation between Forty-fourth Street and Q Street, Omaha, and Seymour Lake. It is expected that service will soon be extended to Ralston and that in the fall the line will be in operation to Papillion.

New Mail Contract in Brooklyn.—A new agreement has been made between the Brooklyn Rapid Transit Company and the Post Office Department for the transportation of mail in Brooklyn between the general post office and the substations. It is understood that the company will hereafter receive about $42,000 a year for this service, as compared with a compensation of about $39,000 a year paid formerly.

Texas Occupation Tax Decision Upheld.—The Supreme Court of Texas on June 24, in the case of the Dallas (Tex.) Consolidated Electric Street Railway against the State, affirmed the decision of the lower courts holding that the Act of May 16, 1907, levying an occupation tax consisting of a percentage of the gross earnings of street railway companies does not repeal that part of the Act of 1897 which imposes an occupation tax on street railways of $2 per mile of road.

Large Steam Railroad Electrification Proposed in France.—The Chemins de Fer du Midi, one of the large steam railroads in France, has awarded the first of its contracts for the electrification of its main line from Bordeaux to Toulouse. The line to be equipped is more than 250 miles long. The single-phase system at 15 cycles will be used. The order for electrical equipment for the first section of the line, which should be in operation in about a year, was divided among a number of electrical manufacturing companies.

Franchise Must Go to Highest Bidder.—The Court of Appeals of New York has decided that a municipality must sell a railroad franchise to the highest bidder, whether such bidder is a corporation or an individual. The case in which this opinion was handed down involved the sale of a franchise for the construction of an electric railway on Eighth Street, Sixth Avenue and other highways in Troy. Two bids were submitted for the franchise, one by Joseph A. Powers, representing the Trojan Railway, and the other by the United Traction Company, Albany. The former bid was the highest by $1. Mayor Mann rejected the Powers bid and accepted that of the United Traction Company.

Franchise Valuations in New York.—The New York State Board of Tax Commissioners announced on June 30 that the aggregate special franchise valuation in the State this year, exclusive of four cities, is $578,458,837. The assessments for Albany, Binghamton, Mount Vernon and New Rochelle have not yet been fixed. Last year the total of these cities was $9,055,375. The total assessment for the entire State last year was $607,069,557. The decrease this year is due to the revision made in the assessments on the properties of the Consolidated Gas Company, New York, in compliance with the decision of the United States Supreme Court in the 80 cent gas litigation. The total assessment in Greater New York last year was $492,492,970, as against $474,501,900 for this year, a decrease of nearly $18,000,000.

Conductor Sentenced in Brooklyn.—Frederick Lehefeld, a conductor in the employ of the Brooklyn Rapid Transit Company, who was recently convicted of forgery, was sentenced by Judge Dike on June 28 to serve not more than 5 years and not less than 2½ years at Sing Sing. Before he sentenced Lehefeld, Judge Dike stated that he had investigated the case thoroughly and had learned that the prisoner had worked for 13 railway companies, and to each of them had given a fictitious name. His scheme was to write letters to the different companies endorsing himself for appointment and signing the name of an official of the company. By presenting a letter of this sort to the employment bureau, he generally secured work. In investigating the man's career it was discovered that he kept a diary in which he recorded his receipts for each day and the amount which he retained for himself.

Short Tunnel Advocated for San Francisco.—The board of directors of the Merchants' Association of San Francisco, which has been considering the transit situation in San Francisco, advocates that Twin Peaks be tunneled to provide a thoroughfare for street cars, wagon and automobile traffic and pedestrians as the readiest way in which to develop the southern districts of the city. The idea is to start the tunnel at about the junction of Market Street and Castro Street and to have it emerge near the almshouse tract and continue thence down the peninsula. The board also favors a street railway express service. In its report it says: "It is absolutely necessary that not only should the present car lines be extended but also that there should be some system of rapid transit provided with express trains that would travel with high speed and not stop except at intervals of four or five blocks, so that people could travel from the central portion of the city to the outlying districts in 15 or 20 minutes."

Meeting of General Managers' Association.—The general managers of the Fort Wayne & Wabash Valley Traction Company, the Norfolk & Portsmouth Traction Company, the Newport News & Old Point Railway & Electric Company, the Lexington & Interurban Railway and the Ohio River Electric Railway & Light Company, all of which are controlled by the same interests, met at Fort Wayne, Ind., on June 28 and 29 to discuss subjects of general interest and consider problems affecting the different properties. The program which was originally intended to take up a large part of the second day of the meeting had to be postponed until the association meets in Norfolk, Va., in August. While at Fort Wayne those in attendance at the meeting were the guests of C. D. Emmons, general manager of the Fort Wayne & Wabash Traction Company, who took them over the lines of the Fort Wayne & Wabash Valley Traction Company and to Lafayette, Anderson, Muncie and Bluffton on a tour of inspection of interurban railways.

Terms Proposed for Camden-Philadelphia Tunnel.—Members of the special committee of the City Council of Camden, N. J., city officials and a representative of Stern & Silverman, who are promoting the Camden Tunnel Railway, which proposes to build a tunnel between Camden and Philadelphia, conferred recently with E. G. C. Bleakley, counsel of Camden, on the proposed ordinance granting a franchise to the Camden Tunnel Railway. These terms have been proposed for the right to operate in Camden, but are subject to approval: At the end of three years the company will begin to pay the city an annual rental of $2,500 which is to be increased progressively each year until at the end of six years it will amount to $16,000 annually. These amounts are as follows: First year, $2,500; second year, $5,000; third year, $6,000; fourth year, $7,500; fifth year, $10,000; sixth year, $12,000; seventh year, $16,000 and thereafter annually the same amount. Unless work on the tunnel is commenced within one year and the entire system is completed within five years, the franchise is to lapse.

Financial and Corporate

New York Stock and Money Market

July 6, 1909.

After the three days' holiday the stock market to-day was sluggish with prices rather firmly maintained. The Harriman shares, especially Southern Pacific, led in the trading, due to the fact that foreign reports indicated heavy buying abroad. United States Steel common remained steady, in spite of the definite announcement that the plan for Paris listing had failed. Third Avenue stock was heavy during the earlier part of the day, receding to 16, but at the close recovered to the highest point of the day. Interborough shares were fairly active and prices were maintained. The bond market continues strong.

The money market is still easy, supplies plentiful and rates low. Quotations to-day were: Call, 1½ to 1⅞ per cent; 90 days, 2½ per cent.

Other Markets

There has been less activity in the traction issues in the Philadelphia market during the past week. There has been no pressure to sell Rapid Transit and prices have remained stationary on light trading. Quotations for Philadelphia Traction and Union Traction are practically unchanged.

The most active traction issue in the Chicago market has been Kansas City Railway & Light. Although the trading has been within narrow limits, prices within the week have advanced almost two points. There have also been limited sales of all the Chicago Railways issues.

In Boston there has been little trading in tractions. A few shares of Boston Elevated and Massachusetts Electric preferred have been in the market, but there have been no price changes worth mentioning.

United Railways bonds have been the only traction securities in evidence in the Baltimore market. The closing prices for these to-day were: incomes 57⅛, 4s 87 and refunding 5s 82½.

Quotations of various traction securities as compared with last week follow:

	June 29.	July 6.
American Railways Company	a45¾	a45½
Aurora Elgin & Chicago Railroad (common)	39½	a40½
Aurora, Elgin & Chicago Railroad (preferred)	a88	a87
Boston Elevated Railway	120	129½
Boston & Suburban Electric Companies	*16	*16
Boston & Suburban Electric Companies (preferred)	*71	*71
Boston & Worcester Electric Companies (common)	10	10
Boston & Worcester Electric Companies (preferred)	a56	52½
Brooklyn Rapid Transit Company	79½	79¼
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	87½	86¾
Capital Traction Company, Washington	a135	a139
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*4	*3
Chicago & Oak Park Elevated Railroad (preferred)	*14	*12
Chicago Railways, ptcptg, ctf. 1	a109	a113
Chicago Railways, ptcptg, ctf. 2	a38	a40½
Chicago Railways, ptcptg, ctf. 3	a28	a28
Chicago Railways, ptcptg, ctf. 4s	a10	a10
Cleveland Electric Railway	*78	*78
Consolidated Traction Company of New Jersey	a78½	a76½
Consolidated Trac. Co. of N. J. 5 per cent bonds	a106½	a106½
Detroit United Railway	a62	a62
General Electric Company	161¾	164¾
Georgia Railway & Electric Company (common)	a93	92⅞
Georgia Railway & Electric Company (preferred)	87	87
Interborough-Metropolitan Company (common)	16⅝	16¼
Interborough-Metropolitan Company (preferred)	50⅜	49⅜
Interborough-Metropolitan Company (4½s)	79⅞	80
Kansas City Railway & Light Company (common)	a49	51
Kansas City Railway & Light Company (preferred)	a84¾	83
Manhattan Railway	a147	a147
Massachusetts Electric Companies (common)	a13½	a13¾
Massachusetts Electric Companies (preferred)	71	70
Metropolitan West Side, Chicago (common)	a17	a17
Metropolitan West Side, Chicago (preferred)	a50	a48½
Metropolitan Street Railway	26	18
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	82⅝	83⅜
Northwestern Elevated Railroad (common)	a23	a23
Northwestern Elevated Railroad (preferred)	a69½	a70
Philadelphia Company, Pittsburg (common)	a42½	42
Philadelphia Company, Pittsburg (preferred)	a43	43
Philadelphia Rapid Transit Company	a28½	28⅝
Philadelphia Traction Company	a91½	91
Public Service Corporation, 5 per cent col. notes	a100½	a100½
Public Service Corporation, ctfs.	a88½	a89
Seattle Electric Company (common)	*112	*112
Seattle Electric Company (preferred)	*102	103
South Side Elevated Railroad, Chicago	a55½	a55
Toledo Railways & Light Company	a8½	a9
Third Avenue Railroad, New York	21	18
Twin City Rapid Transit, Minneapolis (common)	103⅝	a104
Union Traction Company, Philadelphia	a52½	a53½
United Railways & Electric Company, Baltimore	a11¾	11
United Railways Inv. Co., San Francisco (common)	a39	a39
United Railways Inv. Co., San Francisco (preferred)	a56½	56
Washington Railway & Electric Company (common)	a42½	a42⅝
Washington Railway & Electric Company (preferred)	a90⅝	a91
West End Street Railway, Boston (common)	92½	93
West End Street Railway, Boston (preferred)	104	*106
Westinghouse Electric & Manufacturing Company	85	a85
Westinghouse Elec. & Mfg. Company (1st pref.)	121¼	a124½

a Asked. *Last sale.

Report of Hudson & Manhattan Railroad

The report of the Hudson & Manhattan Railroad for the year ended June 30, 1908, as made public by the Public Service Commission, First District, shows the following income account from Feb. 26, 1908, to June 30, 1908, for the portion of line completed and in operation from Nineteenth Street and Sixth Avenue, New York, to Hoboken, N. J.:

REVENUES.		
Passenger revenue	$218,186.10	
Income from station privileges	3,492.64	
Other miscellaneous	736.87	
Total operating revenue		$222,415.61
OPERATING EXPENSES.		
Maintenance of way and structures	$37,267.16	
Maintenance of equipment	18,973.50	
Operation of power plant	77,771.20	
Operation of cars	65,527.06	
Damages (including legal expenses)	.....	
General expenses	30,141,69	
Total		229,680.61
Operating loss		$7,265.00
REVENUE FROM OUTSIDE OPERATIONS.		
From Hudson Terminal buildings	$110,048.57	
Less operating expenses	38,467.90	
	$71,580.67	
From other real estate	2,046.10	
		73,626.77
Operating income (revenue less expenses)		$66,361.77
Interest on bank balances, etc		647.96
Gross income		$67,009.73
DEDUCTIONS FROM INCOME.		
Preliminary expenses prior to opening to public	$7,148.55	
Preliminary expenses Hudson Terminal buildings	12,721.53	
	$19,870.08	
Less adjustment in stock material values	319.00	
		19,551.08
Surplus for period		$47,458.65

The downtown system which will extend from the Hudson Terminal at Church, Cortlandt, Fulton and Dey Streets, New York, to Jersey City, N. J., is still in course of construction. The entire length of the projected line is about 8.8 miles of double track and 8.1 single track. All taxes during the period of construction are payable by the construction company.

The cost of road and equipment stood on the balance sheet as of June 30, 1908, at $101,514,348.

The following additional information is furnished:

Miles of first track (in operation June 30, 1908)	3.31
Miles of second track (in operation June 30, 1908)	3.30
Total track mileage (electrically operated subway and tunnels)	6.80
Thereof, mileage in State of New York	4.22
Average number of cars operated	40 to 45
Total number of trips made (estimated)	27,840
Total passenger car-miles run	618,742
Passengers—number of 5-cent fares	4,363,722

Hearings on Third Avenue Railroad Reorganization

The hearing before the Public Service Commission of the First District of New York set for June 29, on the proposed plan for the reorganization of the Third Avenue Railroad, mention of which was made on page 50 of the ELECTRIC RAILWAY JOURNAL for July 3, 1909, was postponed until July 7. Frederick W. Whitridge, receiver of the Third Avenue Railroad, was unable to be at the hearing on June 29, and a number of stockholders requested additional time in which to consider the plan.

The argument of the bondholders' committee which drew up the reorganization plan was heard first at the hearing on July 7. John M. Bowers, counsel for the committee, pointed out the merits of the plan. He concerned himself largely with the legal side. According to Mr. Bowers, the plan follows the principles laid down in the reorganization of the Erie Railroad, in reducing the fixed charges against the company by having the holders of old mortgage bonds accept an income bond instead of a security involving a fixed charge on the property. Mr. Bowers presented in his argument the basis of the exchange of the new securities for the old by means of this table:

Old bonds, principal and interest	$40,640,000
Stock	16,000,000
Total	$56,640,000
To be issued:	
Refunding mortgage bonds	$[illegible]
Adjustment bonds	31,045,000
Stock	20,000,000
Total	$66,5[illegible]
Difference	9,[illegible]
To be used to raise cash of	[illegible]

The refunding mortgage and adjustment bonds in the

tabulation are those which it is proposed to issue for the old consolidated bonds, plus $6,000,000 of the refunding bonds, and $1,000,000 of the adjustment bonds, which are to be sold by the syndicate. Mr. Bowers said the plan appeared to be the only one under which the cash required could be raised, and that any other plan would involve wiping out the stock.

Mr. Whitridge followed Mr. Bowers. He said that he based the estimates submitted by him to the bondholders' committee as to the earnings of the property on the income of the Third Avenue system in the December and March quarters—the two worst of the year. The net earnings for December, after paying the interest on the existing $5,000,000 first mortgage bonds, a small amount of taxes, the interest on the receiver's certificates, and on about $6,000,000 additional of underlying liens, were $406,000 in round figures, and they were $177,000 for the March quarter. The net earnings for April were $106,000; the net earnings for May were $197,000, and for June would be less than for May. He felt justified in estimating, therefore, that the Third Avenue Railroad would begin its reorganized career with net earnings, after payment of interest on the prior liens, of about $1,500,000, and after deducting an allowance of $300,000 a year for depreciation, he felt that $1,200,000 would remain applicable to return on the securities to be reckoned with in the reorganization. Mr. Whitridge said that after the reorganization there would be some increases in operating cost, but that these would be offset by saving in other directions, such, for instance, as an item of $140,000 which he has paid out this year for lawyers. The development of traffic in the Borough of the Bronx, which has been neglected somewhat, would help the earnings of the company materially, as that borough is increasing steadily in population and many of the residents are largely dependent upon the lines of the company for transportation to and from the business section of New York.

It was pointed out that $1,552,000 would be required for the full interest on the 5 per cent income bonds proposed, and that there would be a deficit on this interest of $900,000, an amount which is due before there is any return on the stock. Mr. Whitridge was then asked upon what he predicated any estimate of value for the stock, on which the stockholders are asked to pay $25 a share. According to him, the matter of an estimate for the value of the stock is a subject for each holder to decide for himself. He said that he personally might think the stock to be worth next to nothing, but that the stockholders might think it to be worth $25 a share.

Camden & Trenton Railway, Camden, N. J.—Under the plan of reorganization of the Camden & Trenton Railway, approved by committees representing the first general mortgage bondholders, it is provided that a new corporation be formed to take over the property at foreclosure sale, which will take place shortly, to be known as the Riverside Traction Company, and that $124,500 of the preferred stock of the new company shall be sold at par for cash to provide working capital. The committees report that all of this stock has been sold for cash and that the full purchase price thereof has been paid to the West End Trust Company as depository. The remaining funds necessary for the rehabilitation of the road will be derived from the sale of first mortgage bonds. It is probable that between $300,000 and $400,000 will in this way be provided for capital expenditures.

Chicago (Ill.) Consolidated Traction Company.—The receivership of the Chicago Consolidated Traction Company and its underlying leaseholds has been formally extended by Judge Grosscup to the North Shore Street Railway. David R. Forgan and John M. Roach, receivers of the Consolidated Traction Company, were appointed receivers for the North Shore Street Railway and the receiverships were consolidated.

Cleveland (Ohio) Electric Railway.—Horace E. Andrews, president of the Cleveland Electric Railway, announced on June 29 that the $2,026,000 of Cleveland City Railway first mortgage 5 per cent gold bonds, dated July 1, 1889, which matured July 1, 1909, and the accompanying coupons, July 1, would, on and after July 1, 1909, be taken up by N. W. Harris & Company, New York, N. Y. The Cleveland Electric Railway has sold to N. W. Harris & Company, $2,128,000 of an authorized issue of $3,179,000 of 5 per cent gold bonds dated July 1, 1909, and due Jan. 1, 1912, but subject to call at par and accrued interest on and after March 1, 1910, on 60 days' notice. The new bonds will be secured by deposit of the bonds retired and also by a general lien on the entire property of the Cleveland Railway, subject to the outstanding bonds, and on payment of the $1,000,000 East Cleveland Railroad bonds (for which the escrow bonds of the under the new 2½-year mortgage are reserved) in March, 1910. They will be further secured by a collateral lien on the portion of the property now covered by that mortgage.

Conneaut & Erie Traction Company, Erie, Pa.—A plan has been proposed and assented to for the reorganization of the Conneaut & Erie Traction Company, now in the hands of Robert W. Watson, Harrisburg, as receiver. It is proposed to organize the Cleveland & Erie Traction Company as the successor to the Conneaut & Erie Traction Company. The Conneaut & Erie Traction Company had a capital stock of $800,000, $800,000 first mortgage 5 per cent bonds and about $400,000 second mortgage 5 per cent bonds. In the plan of reorganization the old first mortgage bondholders will receive $500,000 in new first mortgage 5 per cent bonds and $500,000 in 5 per cent income bonds. Holders of the old second mortgage will receive $500,000 in the new incomes and the capital stock of the new company. The capital stock will be placed in control of five voting trustees. One hundred thousand dollars of the new first mortgage 5 per cent bonds will be used to raise new money, as will also a like amount of the new incomes. The new money will meet all expenses of reorganization and leave $50,000 in the company's treasury as working capital. Receiver Watson will be president of the new company. Present plans of the new management are said to include a working agreement with the Cleveland, Painesville & Ashtabula Railroad, which is now controlled by the Cleveland, Painesville & Eastern Railroad, which will give the Cleveland & Erie Traction Company a through line from Erie to Cleveland.

Consolidated Railway & Power Company, Fayetteville, N. C.—Wm. D. McNeill, president of the Consolidated Railway & Power Company, has been appointed receiver of the company.

Interborough Rapid Transit Company, New York, N. Y.—Following the decision of the Public Service Commission of the First District of New York that it was unnecessary formally to grant authority to the Interborough Rapid Transit Company for the issuance of $10,000,000 of 5 per cent bonds for the retirement of an equal amount of three-year 5 per cent notes which fall due on March 1, 1910, but which are subject to call at 101, it was announced that the company had closed negotiations with J. P. Morgan & Company for the purchase of the bonds. This $10,000,000 bonds is the first lot of the $55,000,000 authorized in April, 1909, to be sold publicly. At the present time $30,000,000 of the bonds are issued but deposited as collateral under the $25,000,000 three-year 6 per cent notes, which were purchased last year at 97 by a syndicate managed by Morgan & Company.

Interstate Railways Company, Philadelphia, Pa.—The directors of the Interstate Railways Company have approved the plan of Geo. H. Earle, Jr., for the rehabilitation of the company. It is proposed that the 4 per cent bonds be deposited in trust for five years and the income of the company be used for necessary betterments. If any surplus is available after the expenditure of $500,000 or more per year for betterments, it shall go toward paying the interest. The amount needed to pay the 4 per cent interest on the $10,776,600 bonds, or $431,064 per annum, is to be obtained by the issue of 6 per cent script. Bondholders who prefer cash may so elect and the script they refuse will be sold to provide funds for the cash payments. The plan further provides that certificates of the Philadelphia Trust Company issued to the bondholders who recently deposited their bonds under agreement with E. B. Smith & Company will be accepted by the trustees in lieu of the bonds. The plan is to be declared operative when the committee decides that a sufficient number of the bondholders has assented by the deposit of their shares with the Real Estate Trust Company.

Long Island Electric Railway, Long Island City, N. Y.—The Long Island Electric Railway has asked the Public Service Commission of the First District of New York to approve a proposed reduction in its capital stock from $2,100,000 to $600,000. Some time ago the New York & North Shore Railway, with a capital of $1,500,000, was consolidated with the Long Island Electric Railway. This stock did not represent actual value, as the property had been mortgaged for $1,261,000, and most of it sold out later under foreclosure. Stockholders of the New York & North Shore Railway have turned over to the Long Island Electric Railway by voluntary surrender the $1,500,000 capital stock. It was decided to reduce the capital stock to an amount which actually represented the value of the property. The directors of the Long Island Electric Railway approved the measure last year, and holders of outstanding certificates have since acquiesced.

New Orleans Railway & Light Company, New Orleans, La.—On June 28, 1909, a general meeting of the stockholders of the New Orleans Railway & Light Company was

held at the offices of the company in New Orleans, La., for the purpose of considering a plan submitted by the directors of authorizing the issuance of $50,000,000 of 5 per cent 40-year first and refunding mortgage bonds. Out of a total of 300,000 shares of preferred and common stock entitled to vote 200,524 shares were cast, 182,490 shares voting in favor of the proposal and 18,034 shares against it. The purpose of the issue of bonds was fully explained in the abstract of the letter of Hugh McCloskey, president of the company, to the stockholders, published in the ELECTRIC RAILWAY JOURNAL of June 5, 1909, page 1058.

Northampton (Mass.) Street Railway.—The directors of the Northampton Street Railway have decided not to pay a dividend in July on the $400,000 stock. In January, 1909, 2½ per cent was paid; in 1908, 3 per cent semi-annually, and 3 per cent in July and 4 per cent in January, 1907.

Peoria (Ill.) Railway.—N. W. Halsey & Company, New York, N. Y., are offering at 98 and interest the unsold portion (less than $500,000) of a block of $1,500,000 "first and refunding" 5 per cent gold bond of the Peoria Railway, dated June 20, 1906, and due serially Feb. 1, 1910-1920, and subject to call at 105 on any interest date. The bonds are unconditionally guaranteed by endorsement, both as to principal and interest, by the Illinois Traction System.

Quebec Railway, Light & Power Company, Quebec, Que.—On June 25, George H. Thompson, president, and John Sharples, Wm. Shaw and Wm. Hanson, directors of the Quebec Railway, Light & Power Company, resigned. New officers have been elected as follows: W. G. Ross, of the Montreal Street Railway, president; Frank Ross, Quebec, vice-president; L. C. Marcoux, N. Bealleau, Wm. Price, M.P., and Frank Ross, Jr., Quebec; Robert Mackay, J. N. Greenshields and Rudolphe Forget, M.P., Montreal, directors.

San Diego (Cal.) Electric Railway.—The San Diego Electric Railway has purchased the South Park & East Side Railway, San Diego, which operates 3½ miles of line in San Diego.

Toledo, Bowling Green & Southern Traction Company, Toledo, Ohio.—At a meeting of the directors of the Toledo, Bowling Green & Southern Traction Company, on June 30, the officials of the company expressed themselves as being in favor of increasing the capital stock of the company by $750,000, issuing new bonds through the transfer of the bonds now held by the stockholders and lifting the receivership of and taking over the Toledo, Urbana & Interurban Railway. A plan for carrying this proposal into effect will be submitted to the stockholders of the Toledo, Bowling Green & Southern Traction Company at a meeting to be held at Findlay on Aug. 6, 1909.

Toledo Railways & Light Company, Toledo, Ohio.—The bondholders' committee of Toledo Railways & Light Company recently sent a letter to holders of the first mortgage 4 per cent consolidated bonds in which they said that the company would not be able to pay the principal or interest on the $4,866,000 bonds maturing July 1, and asking that no summary or drastic action be taken against the company because of the defaults. Practically all of these bonds are deposited with the committee, which has agreed not to institute foreclosure proceedings. This is the third default on the interest payments.

Virginia Railway & Power Company, Richmond, Va.—Under a decree directing the delivery of property and approving the deed of conveyance, Judge Edmund Waddill, Jr., of the United States Circuit Court, at Richmond, Va., on June 30 formally ended the receivership of the Virginia Passenger & Power Company, and at midnight the Virginia Railway & Power Company assumed control of the street railways of Richmond, Petersburg and Manchester, with the interurban connections. The company has organized as follows: Frank Jay Gould, New York City, chairman of board of directors; William Northrop, Richmond, president; Fritz Sitterding, Richmond, vice-president; Henry W. Anderson, Richmond, vice-president and general counsel; Guy Phillips, New York, secretary and treasurer; George B. Williams, Richmond, assistant secretary and assistant treasurer; R. H. Keim, Richmond, general auditor; A. B. Guigon, Richmond, assistant counsel; G. H. Whitfield, Richmond, general superintendent of light and power department; C. B. Buchanan, Richmond, general superintendent of railways.

West End Street Railway, Boston, Mass.—The shareholders' protective committee has sent out a circular letter stating that, at the request of the Boston Elevated Railway, the matter of consolidation has been referred by the Legislature to a commission composed of the Railroad Commissioners and the Boston Transit Commission, which will hear the parties interested and report to the next Legislature whether or not changes advocated by the committee are judicious and consistent with the public interest.

Traffic and Transportation

Regulations of Washington Commission Amended

At a general session of the Interstate Commerce Commission held at Washington, D. C., on June 21, 1909, a number of amendments and additions to the rules and regulations for the operation and equipment of street railway cars within the District of Columbia were adopted. Section 5 was modified so as to read as follows:

"No street car shall move at a greater rate of speed than 15 miles an hour in Washington, nor at a greater rate of speed than 20 miles an hour in the suburbs of said city. Street cars shall not exceed a rate of speed greater than 6 miles an hour at street crossings. When it is necessary for street cars to stop at street crossings they shall stop on the near side thereof; the front end of the car or train to rest on a line with the curb on the near side of the intersecting street, except where the mechanical appliances make it impracticable to do so: Provided, that in cases where stops are now allowed on both sides of a crossing, such stops may be continued if the railroad companies so desire: Provided, that cars moving south on Seventh Street, northwest, shall be allowed to stop on the far side of Rhode Island Avenue in lieu of the near side thereof, that cars moving east on New York Avenue, northwest, shall stop on both sides of Thirteenth Street when requested to do so, and that cars of the Capital Traction Company moving south on the Fourteenth Street line shall stop after rounding the curve at New York Avenue, northwest, in lieu of stopping before rounding said curve. No motorman or conductor shall refuse to stop to take up a passenger at any street crossing or other regular stopping place unless all the seats in the car or train are occupied. No motorman or conductor shall refuse to stop to let off a passenger at any street crossing or other regular stopping place."

It was ordered that the following be substituted for Section 1:

"Every street railway car other than trailers operated in the District of Columbia shall be equipped with front automatic or platform-operated projecting pick-up fenders and with automatic wheel guards. The front end of projecting fenders shall not have an elevation of more than six inches above the rail when in their normal position, and the front end of wheel guards shall not have an elevation of more than four inches above the rail when in their normal position. Wheel-guard gates shall not be more than five inches above the rail when in their normal position. Wheel-guard gates shall not travel more than six inches from their normal position before tripping the guard."

This section is to become effective on Sept. 1, 1909.

It was also ordered that Section 3, which says that platforms of street cars shall be guarded by gates of a construction and operation approved by the Interstate Commerce Commission, be amended so as to read as follows:

"Platforms of street cars shall be guarded by gates. That side of open or summer cars adjacent to the track opposite that upon which the car is running shall be provided with a guard rail."

This section is to become effective on Sept. 1, 1909.

It was further ordered that Section 4, regarding that fenders must be kept in thorough working order and in good repair when in use, be amended to read as follows:

"The fenders and wheel guards must be kept in thorough working order and in good repair when in use."

This section is to become effective on Aug. 1, 1909.

It was further ordered that Section 10, requiring that all new double-truck suburban or interurban electric cars placed in service in the District of Columbia on or after Jan. 1, 1909, shall be equipped with an approved type of air brake in addition to the usual hand brake, be amended so as to read as follows:

"All cars provided with four motor equipments which shall be operated in the District of Columbia on or after July 1, 1909, shall be equipped with air brakes in addition to the ordinary hand brake."

The following regulations were added:

"13. All motor cars must be provided with four sand boxes. A tube, not less than two inches inside diameter, shall lead from each box to the front wheel of each truck, terminating in front of and as close as practicable to the wheel, directly over the rail and not more than six inches above the rail.

This section is to become effective on Nov. 1, 1909.

"14. All sand boxes shall be kept in working order at all times and shall be kept well supplied with dry sand which shall be best suited to assure the proper flow of sand."

This section is to become effective on Oct. 1, 1909.

"15. Gears shall be provided with complete cases which

shall be kept in good repair. Gears shall be kept well greased and in such proper condition as to reduce to a minimum the noise occasioned by the operation of the same. Truck bolts and other parts must be kept tight to avoid undue noise."

This section is to become effective on Sept. 1, 1909.

"16. Brake beams and shoe hangers must be kept tight and no more lost motion in these parts than is absolutely necessary will be allowed."

This section is to become effective on Sept. 1, 1909.

"17. Brake chains must be tested proof and must be kept in good repair."

This section is to become effective on Aug. 1, 1909.

"18. Link-hanger and slide-brake beams must have a safety hanger bolted to the truck."

This section is to become effective on Dec. 1, 1909.

"19. Car floors, platforms and steps must be kept in good repair."

This section is to become effective on Aug. 1, 1909.

"20. All cars must be equipped with grab-handles properly located and secured."

This section is to become effective on Aug. 1, 1909.

"21. Fuse boxes and circuit breakers on all cars must be provided with covers."

This section is to become effective on Sept. 1, 1909.

"22. No live contacts which are in reach of passengers or pedestrians will be permitted."

This section is to become effective on Sept. 1, 1909.

"23. All cars in operation in the District of Columbia which are equipped with air brakes shall also be equipped with a hand brake, both of which shall be kept in operative condition at all times. The hand brake shall be tested at least once on every round trip at a fixed point to be selected by the railway company and indicated to the Interstate Commerce Commission."

This section is to become effective on Aug. 1, 1909.

New York Commission Disapproves Wheel Guard

As mentioned briefly on page 47 of the Electric Railway Journal of July 3, 1909, the Public Service Commission of the First District of New York has disapproved the type of wheelguard in use upon the lines of the Second Avenue Railroad and the Central Park, North & East River Railroad, New York, the action of the commission being taken upon the recommendation of Milo R. Maltbie of the commission, who conducted the hearings. In reporting against the wheelguard, Mr. Maltbie submitted an opinion in which he says:

"In view of the many cases in which this pilot wheelguard has not prevented persons from being severely injured or killed, in view of the large sums paid out for damages and claims, and in view of the fact that all other lines have substituted other types for the type in question, it would seem that there was a prima facie case against its continuance.

"Mr. McLimont, formerly the electrical engineer of the commission, testified that non-automatic, shearing wheelguards (the one under consideration belongs to this class) must be carried at a height above the track of not more than one inch in order to be effective.

"The receiver of the Second Avenue Railroad maintained that the condition of the paving and track made it impracticable to operate with less than 2½ inches as a standard, and it is generally admitted that 1-inch clearance is out of the question.

"The facts and evidence seem to prove, in conclusion, that it is impossible to maintain the pilot wheelguard now being considered at a height of 1 inch from the rails under existing conditions in New York, that such conditions render necessary a clearance of at least 2½ inches on the lines under consideration, that even when special attention is given to maintenance there will be frequent cases where the guard will not be in a condition to save life or to prevent serious injury, and that persons and particularly children have passed under the guard and were killed. Out of 23 accidents since Aug. 5, 1907, in which pilot wheelguards were involved, 15 were fatal. In 41 other cases where it is believed this wheelguard was involved, there were 10 fatalities.

"The automatic-trip wheelguard, upon the other hand—a type manufactured by many companies and of which there are many varieties—can be carried normally 4 or 5 inches above the rails, out of the way of all ordinary obstruction, thus requiring little attention or expense for maintenance. When the trip is struck by the person upon the track, the apron is released and forced to the pavement by a spring. The edge of the apron passes under the body, picking it up and carrying it along until the car is stopped. This type is in use in hundreds of cities and is being introduced by several companies in this city. Experience has proved its efficiency and practicability as a type.

"The commission is of the opinion that nothing is more important than the saving of human life, and that no street railway company can justify its action in equipping its cars with any but the most efficient designs. It may be added that the total expense to the two companies under consideration, made necessary by the installation of improved wheelguards throughout, would be about $4,000 immediately and less than $10,000 ultimately. Even from a financial point of view, the saving of one life would more than offset the cost of the entire installation."

C. E. R. A. List of Members

The Central Electric Railway Association issued under date of June 29, 1909, the following revised list of member companies with the number of miles of line they operate:

Members.	Number of miles.
Angola Railway & Power Company	4
Chicago, Lake Shore & South Bend Railway	77
Chicago, South Bend & Northern Indiana Railway	67
Cincinnati, Lawrenceburg & Aurora Electric Street Railway	32
Cleveland, Painesville & Eastern Railroad	60
Cleveland, Southwestern & Columbus Railway	169
Columbus, Delaware & Marion Railway	50
Columbus, Marion & Bucyrus Railroad	18
Columbus, Magnetic Springs & Northern Railway	18
Dayton & Troy Electric Railway	34
Dayton & Xenia Transit Company	27
Detroit, Monroe & Toledo Short Line Railway	56
Evansville & Southern Indiana Traction Company	33
Evansville Railways	49
Fort Wayne & Springfield Railway	22
Fort Wayne & Wabash Valley Traction Company	139
Grand Rapids, Holland & Chicago Railway	40
Indiana Union Traction Company	315
Indianapolis, Columbus & Southern Traction Company	59
Indianapolis, Crawfordsville & Western Traction Company	45
Indianapolis & Cincinnati Traction Company	103
Indianapolis & Louisville Traction Company	41
Kokomo, Marion & Western Traction Company	28
Lake Erie, Bowling Green & Napoleon Railway	20
Lake Shore Electric Railway	160
Lebanon & Franklin Traction Company	11
Lebanon-Thorntown Traction Company	9
Louisville Railway & Lighting Company	21
Marion, Bluffton & Eastern Traction Company	32
Michigan United Railways	117
Muncie & Portland Traction Company	32
Northern Ohio Traction & Light Company	140
Ohio & Southern Traction Company	5
Ohio Electric Railway	545
Sandusky, Norwalk & Mansfield Electric Railway	33
Southeastern Ohio Railway, Light & Power Company	15
Springfield, Troy & Piqua Railway	30
Terre Haute, Indianapolis & Eastern Traction Company	376
Toledo & Chicago Interurban Railway	41
Toledo & Indiana Railway	52
Toledo, Fostoria & Findlay Railway	49
Toledo, Port Clinton & Lakeside Railway	51
Toledo, Urban & Interurban Railway	51
Western Ohio Railway	112
Winona Interurban Railway	35
Total mileage	3,423

C. E. T. A. List of Members

The Central Electric Traffic Association issued under date of June 29, 1909, the following revised list of member companies which are using the 1000-mile interchangeable mileage ticket, with the number of miles of line they operate:

No.	Name of company.	Number of miles.
24.	Cannelton, Rockport & Owensboro Rapid Transit Company	..
3.	Chicago, Lake Shore & South Bend Railway	77
8.	Chicago, South Bend & Northern Indiana Railway	67
2.	Columbus, Delaware & Marion Railway	50
19.	Columbus, Marion & Bucyrus Railroad	18
14.	Evansville & Southern Indiana Traction Company	33
21.	Dayton & Troy Electric Railway	34
17.	Evansville Railways	49
9.	Fort Wayne & Wabash Valley Traction Company	139
10.	Fort Wayne & Springfield Railway	22
6.	Indianapolis & Louisville Traction Company	41
7.	Indianapolis, Columbus & Southern Traction Company	59
26.	Indianapolis, Crawfordsville & Western Traction Company	45
18.	Indiana Union Traction Company	315
13.	Kokomo, Marion & Western Traction Company	28
23.	Lake Erie, Bowling Green & Napoleon Railway	20
25.	Louisville & Northern Railway & Lighting Company	21
12.	Marion, Bluffton & Eastern Traction Company	32
20.	Ohio Electric Railway	545
27.	Southeastern Ohio Railway, Light & Power Company	15
4.	Springfield, Troy & Piqua Railway	30
22.	Terre Haute, Indianapolis & Eastern Traction Company	376
11.	Toledo & Chicago Interurban Railway	41
15.	Toledo, Fostoria & Findlay Railway	49
5.	Toledo, Urban & Interurban Railway	51
1.	Western Ohio Railway	112
16.	Winona Interurban Railway	35
Total mileage		2,304

The revised list will appear on all mileage tickets ordered after Aug. 1, 1909.

Memphis Street Railway Rewards Employees.—The Memphis (Tenn.) Street Railway recently distributed $3,000 among its employees as a reward for the faithful and conscientious performance of their duties during the Confederate reunion in Memphis in June.

Chicago Elevated Railway to Patrol Track.—The Northwestern Elevated Railroad, Chicago, Ill., has decided to install crossing gates at nine points in Rogers Park and to place two men on guard at each of these crossings. The company also proposes to secure police powers for three of its employees and have them patrol the right of way of the company and arrest trespassers.

Physical Connection Ordered Between Indiana Electric Railways.—The Indiana Railroad Commission having considered a petition and heard the evidence has issued an order that on or before Aug. 15, 1909, the Evansville, Suburban & Newburg Railway and the Evansville Terminal Railway shall establish a physical connection at the point of intersection of the roads in Newburg, Ind., and interchange freight after that date.

Coney Island & Brooklyn Railroad Changes Fare Zone.—The Coney Island & Brooklyn Railroad, Brooklyn, N. Y., has extended the 5-cent fare limits on its Coney Island lines so that visitors to Prospect Park may ride between any entrance to the park and Coney Island for a single fare. Heretofore the 5-cent zone for passengers island bound began at the Park Circle, which was also the second-fare point on the return trip from Coney Island. A special transfer ticket and identification check is issued to permit passengers on Franklin Avenue cars to transfer to Smith Street cars, Manhattan bound, and vice versa, at the Park Circle. It is about 6 miles from Prospect Park to Coney Island.

Folder of the Chicago, Lake Shore & South Bend Railway.—The Chicago, Lake Shore & South Bend Railway, South Bend, Ind., has published a folder and time-table of its line between South Bend and Chicago, printed in black on green paper. The company has recently inaugurated a fast 3-hour service between Chicago and South Bend, called the "Business Men's Special," which leaves South Bend at 7 a. m. and arrives at Chicago at 10 a. m. and returning leaves Chicago at 6:20 p. m. and arrives at South Bend at 9:35 p. m. The folder also contains a map of the "South Shore Route" and a map of the loop district of Chicago showing the principal business houses and the route of the road.

Trespassers at Rochester Warned.—The New York State Railways, Rochester, N. Y., is warning trespassers on its interurban lines running over private right of way individually of the risk they run in using the right of way as a thoroughfare. When a person is seen by the motorman of an approaching car on the company's right of way the motorman throws out of the window of the cab a sealed red envelope with the word "warning" printed in large, black letters to attract the trespasser's attention. In the envelope is the following notice: "All persons are forbidden to use the tracks or any portion of this company's right of way for footways or thoroughfares. The practice is dangerous and unlawful. All persons so doing are trespassers and will be subject to prosecution. The company is not liable for accidents or injury to trespassers."

Niagara Gorge Railroad Time Table.—The Niagara Gorge Railroad has issued an illustrated folder and time table. The cover is in duplicate and shows a view of the whirlpool rapids and the line of the company skirting the whirlpool. The route of the road is described and there is a large panoramic view of the territory in the vicinity of the Falls, Niagara Falls, N. Y., Niagara Falls, Ont., Whirlpool Rapids, Whirlpool, Lewiston, Youngstown-on-the-Lake, and Port Niagara Beach all being shown. There is also a brief description of all the places mentioned. A page entitled "Items of Interest to Tourists," contains information about the Whirlpool Rapids, Whirlpool, the age and volume of both falls, the power houses, etc. The publication is a work that is almost indispensable to travelers visiting the Falls who desire intelligently to understand the surrounding territory.

Trolley Trips in Two States.—This is the title of a folder which the Western New York & Pennsylvania Traction Company, Olean, N. Y., has issued, in which the attractions afforded along the line are described and illustrated. The road is an interstate line, and the territory through which it passes abounds in beautiful scenes. Rock City is all that its name implies, and is said to rank next to Niagara in its wealth of natural scenery. The principal office of the company is conveniently located at Olean, though a second office is maintained at Bradford. These two cities are the terminals of the mountain or Rock City route. The company owns and operates the city systems in Bradford, Olean and Salamanca. Treating Olean as the center, three chief routes radiate from it: A, over the mountain from Olean to Bradford; B, from Olean to Shingle House, and C, from Olean to Little Valley. A plan of Rock City shows the locations of the rocks, the Mineral Springs and the recreation park at that place. A map in colors shows the completed lines and the proposed lines of the company.

Folder of the Grape Belt.—The Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has issued an attractive folder describing its lines, which extend through the "Grape Belt," between Buffalo, N. Y., and Erie, Pa., a picturesque section of country lying along Lake Erie, which body of water the railroad skirts. Scenes in the cities and villages show the commercial activity so common to the territory traversed, while scenes at the lake resorts show that the residents are equally in earnest when they set about to amuse themselves. The most pretentious picture is a panoramic view of Buffalo Harbor. A map in colors 24 in. long and 8 in. wide shows the route of the Buffalo & Lake Erie Traction Company's line, the route of the Jamestown, Chautauqua & Lake Erie Railway's line, the lines of the steamboat companies operating on Lake Erie and the territory as far south in New York State as Jamestown. The cover is in colors and contains a reproduction of a scene in the business section of Buffalo. The folder is concluded with a list of the ticket offices of the company and their addresses.

Pittsburgh Railways Company Has Right to Connect with Railroads.—In an opinion handed down recently the Common Pleas Court No. 1, Allegheny County, Pa., dissolved the restraining order granted in May in the suit of A. H. Willis et al. and the Township Commissioners of Baldwin Township against the Pittsburgh Railways asking an injunction to restrain the Pittsburgh & Castle Shannon Railroad and the Pittsburgh & Charleroi Street Railway from connecting their tracks. The plaintiffs alleged that the consent of the Township Commissioners had not been given, as required by the Murphy bill passed at the last session of the Pennsylvania Legislature; that such a connection was forbidden by section 8 of the Street Railway Act of 1901, and that municipal consent was necessary, as was held in the recent decision of the Supreme Court of Pennsylvania in the case of Erie vs. Erie Traction Company. The case was argued before the full bench in Common Pleas Court No. 1, consisting of Judges Brown, Macfarlane and Ford. In its opinion the court held that the Pittsburgh Railways derives its powers from its special charter, granted in 1871, and does not need to look to the general railroad laws, such as the Murphy bill, for power to make this connection, and that the constitutional requirement of municipal consent for the construction of a street railway within any city, boro or township did not apply to this case, for the reason that the Castle Shannon Railroad was being connected with street railways which were already constructed with municipal consent and the cars were being operated by the company which owned or leased the tracks, for the construction of which municipal consent had been given.

Special Cars for Women Withdrawn.—The Hudson & Manhattan Railroad, operating under the Hudson River between New York and New Jersey, withdrew on July 1 the special cars for women which it has been operating since March 31, 1909, during the rush hours. The following notice telling about the discontinuance of the service was posted by the company in its cars and stations: "On and after July 1, 1909, the exclusive car for women operated from Hoboken to New York between 7:30 a. m. and 8:30 a. m. and from New York to Hoboken between 5:30 and 6:30 p. m. will be discontinued, as the patronage does not warrant further maintenance of this service." Subsequently William G. McAdoo, president of the company, issued this statement: "When the cars for the exclusive use of women were established on our line on March 31 last, we stated that it was an experiment, and that the company reserved the right to discontinue them if they should not be sufficiently patronized. We have made a long and thorough test, and regret to find that there is not a sufficient demand on the part of women for an exclusive car. The patronage has constantly diminished. We would have made these cars a permanent feature of our operation if the women had shown by their use of them that they were wanted or needed." Shortly after the Hudson & Manhattan Railroad placed special cars in service for women the Public Service Commission of the First District of New York asked the Interborough Rapid Transit Company to show cause at a public hearing why it should not operate special cars for women in the New York subway, and a report of the hearing was published in the ELECTRIC RAILWAY JOURNAL of May 1, 1909, page 853. The commission has not yet announced its finding in the matter.

Personal Mention

Mr. William F. McDermott, Chicago, Ill., has been appointed auditor of the Inter-Mountain Railroad, Denver, Col. Mr. McDermott was formerly associated with Lee Higginson & Company, bankers, Chicago, Ill.

Mr. H. H. Roseman has been appointed general traffic manager of the Illinois Traction System, Peoria, Ill., to succeed Mr. B. R. Stephens, whose resignation from the company was noted in the Electric Railway Journal of June 19, 1909.

Mr. H. C. Patterson has been appointed mechanical and electrical engineer of the Illinois Traction System, Peoria, Ill., to succeed Mr. H. C. Hoagland, resigned, who on July 1 assumed the duties of vice-president and general manager of the Missouri Central Railway, Columbia, Mo., as previously announced in the Electric Railway Journal.

Mr. J. W. Wolfe, master mechanic of the Ohio River Electric Railway & Power Company, Pomeroy, Ohio, has been appointed superintendent of the company to succeed Mr. I. L. Oppenheimer, who has recently become general superintendent of the Lexington & Interurban Railway, Lexington, Ky.

Mr. N. M. Argabrite, who for the past five years has been connected with the Winona Railway & Light Company, Winona, Minn., in the capacity of superintendent and later as general manager, has resigned from the company, effective on Aug. 1, 1909, to become general manager of the Public Service Operating Company, Belvidere, Ill., successor to the Belvidere Gas & Electric Company.

Mr. George F. Hosbury has been appointed district passenger and freight agent for the Lima-Toledo division of the Ohio Electric Railway, Cincinnati, Ohio, with headquarters in Toledo. Mr. J. F. Sadler has been appointed district passenger and freight agent, with jurisdiction over the Columbus-Zanesville division, the Columbus-Morgan division and the branches east of Springfield, and Mr. Harry P. Blum will have charge of the branches west of Springfield, together with the Dayton-Richmond and Dayton-Union City division, with headquarters at Dayton. Mr. Sadler will have offices at Columbus. Mr. F. E. Burkhardt remains as district freight and passenger agent of the company at Lima.

Mr. Edward Folger Peck, general manager of the Schenectady (N. Y.) Railway, who was elected president of the Street Railway Association of the State of New York, at the meeting at Bluff Point, N. Y., on June 29 and 30, was born in New Britain, Conn., in 1861. He entered the electrical field in 1880 with the American Electrical Company, New Britain, which subsequently became the Thomson-Houston Company. Mr. Peck was one of the first electrical experts to be entrusted by this company to install its apparatus, and was in charge of the Thomson-Houston Company's exhibit at the Franklin Institute Fair in 1884, the first exhibit devoted solely to electrical apparatus held in the United States. He afterward had charge of the exhibit of the same company at the World's Fair in New Orleans in 1884-1885. Mr. Peck resigned from the Thomson-Houston Company in 1885 to become general manager of the Citizens' Electric Illuminating Company, Brooklyn, N. Y., and continued in this capacity until 1897, when he entered the engineering and supply business in New York City under the name of the Peck Electrical Company. In 1899 Mr. Peck was appointed general manager of the Kings County Electric Light & Power Company, Brooklyn, a position he held until 1902, when he was appointed general manager of the Schenectady Railway. Mr. Peck has always taken a very active interest in the affairs of the Street Railway Association of the State of New York and has been a member of a number of its most important committees. During the past year he has been vice-president of the association. Besides being general manager of the Schenectady Railway Company Mr. Peck is president of the Electric Express Company, Schenectady, and is a member of the American Institute of Electrical Engineers.



E. F. Peck

Mr. I. L. Oppenheimer, whose appointment as general superintendent of the Lexington & Interurban Railway, Lexington, Ky., was noted in the Electric Railway Journal of July 3, 1909, page 54, entered the electric railway field in 1899, when he promoted the Ohio River Electric Railway & Power Company. Mr. Oppenheimer succeeded in financing this company and constructing the line as originally proposed in 1900, in which year he became identified with Mr. John Blair MacAfee and Chandler Brothers & Company interests, and he has been connected with them since that time. During this period and up to the time of accepting the position of general superintendent of the Lexington & Interurban Railway Mr. Oppenheimer was the head of the Ohio River Electric Railway & Power Company, and still remains a director of the company. This was one of the first electric railways in the United States to interchange carload freight with a steam railroad, a physical connection between it and the Hocking Valley Railway being made immediately after its completion. During the last two years Mr. Oppenheimer has also been identified with the Norfolk & Portsmouth Traction Company, the Fort Wayne & Wabash Valley Traction Company, the Newport News & Old Point Railway & Electric Company and the Lexington & Interurban Railway, being secretary of the board of general managers operating these properties. The company with which Mr. Oppenheimer has become connected controls 81 miles of city and interurban electric railway and does a general lighting business.



I. L. Oppenheimer

OBITUARY

John H. Miller, general manager of the Springfield (Ohio) Railway, died at his home in Springfield on June 29 as the indirect result of a stroke of paralysis which he suffered in January. Mr. Miller was connected with the Springfield Railway for nine years, and previously was superintendent of the Springfield (Ohio) Electric Light Company.

The Public Service Commission of the Second District of New York recently issued the following review of its work:

"The Public Service Commissions have entered upon the third year of their work, being enacted by an Act of the Legislature in effect July 1, 1907. The Second District Commission had upon the close of business on June 30, 1909, handled 2990 cases. Two thousand and three of these were treated informally, and 1721 of them disposed of and closed on the records during the two years' existence of the commission. In this period 987 cases were made formal and orders served in each case. Eight hundred and fifty-nine hearings were given at which formal cases were heard.

"The number of applications received for capitalization was 145 and the total amount authorized $155,708,925. Of this amount $111,200,500 were bonds, $19,454,600 capital stock and the remainder various kinds of evidences of indebtedness. Of the complaints taken up informally with the different corporations under the jurisdiction of the commission and settled without the necessity of formal orders there were 1414 in relation to railroads, 110 in relation to express companies and 197 in relation to gas and electric companies. The building of nine railroads and street railways has been authorized and permission to extend lines has been granted in 15 cases. The elimination of 25 grade crossings has been ordered, but work can proceed no further because the Legislature made no appropriation this year for continuing this work. Thirty-seven gas and electric corporations and two municipalities have been authorized to exercise franchises, and 15 companies have been given permission to assign, transfer or lease their properties to new corporations. The complaints handled by the commission cover a wide range of subjects, including practically every phase of operation, service and rates of railroad, street railway, gas and electric companies. The commission continues to receive large numbers of applications and complaints, but with its thorough organization is able to expeditiously dispose of matters which do not call for unusual examination and investigation."

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Attawaugan Street Railway, Hartford, Conn.**—Incorporated to build an electric railway from Dayville through Attawaugan, Ballouville and Pineville to Killingly and also from Attawaugan to Alexander's Lake. Capital stock, $50,000, preliminary.

Iowa & Omaha Short Line Railway, Walnut, Ia.—Incorporated to build an electric railway between Des Moines, Council Bluffs and Omaha, a distance of 140 miles. Headquarters, Pierre, S. D. Local office, Walnut. Capital stock, $1,000,000. Incorporators: G. W. Adams, Walnut, president; C. L. Kirkwood, North Branch, vice-president; A. L. Ingram, treasurer, and P. Kathmann, secretary, Treynor, and John A. Holmes, Pierre, S. D. [E. R. J., Feb. 20, '09.]

***Belleville & Mascoutah Traction Company, Mascoutah, Ill.**—Incorporated to construct an electric railway from Mascoutah to Belleville. Capital stock, $150,000. Incorporators: Emil J. Kohl, Adolph Knobeloch, Belleville; Gust. J. Scheve, E. R. Hagist and Peter W. Lill, Mascoutah.

***Carrollton, Missouri River & Northwestern Railroad, Carrollton, Mo.**—Incorporated to build an electric railway from Carrollton to the boat line on the Missouri River and to Northwest Carroll. Capital stock, $150,000. Directors: Herndon Ely, Lewis Ely, P. L. Trotter, S. J. Jones and W. R. Painter.

Hannibal & Northern Missouri Railroad, Jefferson City, Mo.—Chartered to build an interurban electric railway from Hannibal on the Mississippi River through Marion, Shelby, Macon and Adair counties to Kirksville, connecting Palmyra, Philadelphia, New York, Bethel, Sue City, La Plata or Biggs, a distance of 100 miles. Capital stock, $2,000,000. Incorporators: F. W. Latimer, Galesburg, Ill., president; Henry Funk, Clarence. Surveying has been done and it is stated that construction work will be begun during the summer. [E. R. J., March 27, '09.]

***Union Railway Gas & Electric Company, Camden, N. J.**—Incorporated under the laws of New Jersey in the interest of E. W. Clark & Company, Philadelphia, and Hodenpyl, Walbridge & Company, New York, to take over the Springfield (Ill.) Railway & Light Company, Peoria (Ill.) Light Company, Evansville (Ind.) Light Company and the Rockford & Interurban Railway, Rockford, Ill., under terms given on page 1139 of the ELECTRIC RAILWAY JOURNAL of June 19, 1909. The authorized capital stock is $18,000,000. Of this $12,000,000 is to be preferred stock bearing 6 per cent cumulative dividends and $6,000,000 is to be common stock. Incorporators: F. H. Hansell, John A. MacPeak and Joseph F. Cotter.

***West Tulsa Belt Railway, Guthrie, Okla.**—Incorporated to build an electric railway, 5 miles in length, in Guthrie, at an estimated cost of $20,000. Capital stock, $25,000. Incorporators: W. E. Hawley, C. L. Hoonker, Jr., H. C. Hall, John Haver and Gray Erick.

***Coos Bay & Inland Railroad, Portland, Ore.**—Incorporated to build an electric railway from Coos Bay to Roseburg, which later will extend to other points. Headquarters, Portland. Capital stock, $1,000,000. Incorporators: Jacob Haas, Geo. S. Taylor and Chas. Ringler.

Virginia Railway & Power Company, Richmond, Va.—Incorporated under the laws of Virginia as the successor to the Virginia Passenger & Power Company, Richmond Passenger and Power Company & the Richmond Traction Company, the properties of which it took over on June 30 in accordance with a plan mentioned on page 1140 of the issue of the ELECTRIC RAILWAY JOURNAL of June 19, 1909, and page 1177 of the issue of June 26, 1909.

FRANCHISES

San Francisco, Cal.—The Stockton street railway franchise has been sold by the Board of Supervisors to Frank D. Stringham and associates, who propose to organize a company and proceed with the construction of a railway involving a tunnel in Stockton Street between Sutter and Sacramento Streets and extensions to the water front and to the Presidio. [E. R. J., April 17, '09.]

De Kalb, Ill.—The City Council has granted to the De Kalb Midland Railway a 50-year franchise to build a street railway over certain streets of De Kalb. The franchise gives the railway the right to carry freight. This company is about to construct an electric railway between De Kalb, Elva, Waterman, Somonauk and Sandwich, a distance of 28 miles. John F. Pearce, Chicago, president. [E. R. J., July 3, '09.]

Kankakee, Ill.—The Chicago, Kankakee & Champaign Electric Railway has been granted a 50-year franchise by the City Council to construct an electric railway on Schuyler Avenue and River Street, Kankakee. [E. R. J., June 12, '09.]

Moline, Ill.—The Tri-City Railway, Davenport, Ia., has applied to the City Council for three 20-year franchises to build single or double-track street railways over certain streets in Moline.

Bluffton, Ind.—The City Council has granted a 50-year franchise to the Bluffton, Geneva & Celina Traction Company to build an electric railway eastward over Washington Street. The officials have agreed to have the railway between Bluffton and Geneva in operation within a year. [E. R. J., July 3, '09.]

Gladstone, Mich.—The Delta County Board of Supervisors has granted to the Escanaba Electric Street Railway a franchise to build an electric railway connecting the cities of Escanaba and Gladstone. [E. R. J., June 19, '09.]

New Brunswick, N. J.—The Jersey Central Traction Company has applied to the Middlesex County Board of Freeholders for an extension of its franchise to build its tracks across the Amboy Bridge. The company will put up a $5,000 bond to guarantee to start construction within 60 days after the extension is granted.

New York, N. Y.—The South Flatbush Railroad has withdrawn its application as filed on June 11 last for permission to construct a rectangular street railway from Avenue Q station of the Brighton Beach Elevated line of the Brooklyn Rapid Transit Company to Flatbush Avenue. The reason given for such a proceeding was that the company is to be reorganized, and later an amended application will be filed with the Public Service Commission. [E. R. J., June 19, '09.]

Southport, N. Y.—A franchise has been granted to the Elmira, Corning & Waverly Railroad to use 1 mile of the highway south of Southport for its proposed railway. [E. R. J., June 26, '09.]

Utica, N. Y.—The City Council has granted to the Utica & Mohawk Valley Railway franchises to build street railways on Whitesboro Street from Saratoga Street west to the city line and on Mohawk Street from Bleeker to Pleasant Street. Neither one of the franchises becomes operative until approved by the Public Service Commission and the franchise on Mohawk Street must by the terms of law be sold at public sale on July 30.

Concord, N. C.—The Board of Aldermen has granted to the Piedmont-Carolina Railway, Salisbury, a franchise to build a street railway in Concord. The company was required to put up $1,000 forfeit to begin work within 60 days. [E. R. J., Feb. 20, '09.]

Gahanna, Ohio.—The Columbus, New Albany & Johnstown Traction Company has applied to the City Council for a franchise to build a street railway over Mill, North and High Streets and Carpenter Road in Gahanna. [E. R. J., June 12, '09.]

Wilmington, Ohio.—The City Council has granted to the Cincinnati, Milford & Blanchester Electric Railway a franchise to build an electric railway over certain streets of Wilmington. The franchise provides that the company must commence work within six months and have the railway completed within a year.

Marshfield, Ore.—John R. Smith, secretary of the Coos Bay, Oregon & Idaho Railway, has applied to the City Council for a franchise to build a steam or electric railway and terminals in Marshfield. This company, which was formed to secure rights-of-way, is now making surveys from Coos Bay to Roseburg. [E. R. J., May 1, '09.]

***Marshfield, Ore.**—Application for a street railway franchise has been made by John R. Smith to the City Council. It is stated that a similar request will be made to North Bend Council.

Mifflin, Pa.—Application has been made to the Township Commissioners by the West Penn Railways for a franchise to build a street railway from Dravosburg to Coal Valley.

Aberdeen, S. D.—A. L. Ward, Aberdeen, advises that he has been granted a franchise to build a street railway in Aberdeen. Application has also been made for a charter. [E. R. J., June 2, '09.]

***Corpus Christi, Tex.**—Application has been made to the City Council by J. M. King, W. B. Tuttle, San Antonio, and I. A. Cohen, St. Louis, Mo., for a franchise to build a street railway in Corpus Christi. It is stated that the railway, which will be 4 miles in length, will cost approximately $75,000.

TRACK AND ROADWAY

Northern Electric Railway, Chico, Cal.—This company, which has franchises for a street railway in Yuba City, to be operated in conjunction with its Marysville line and its interurban system, has begun the construction of the lines, which will extend over Second, E and Bridge Streets and Cooper Avenue.

***Colfax, Cal.**—It is stated that W. S. Fletcher, Forest Hill, is interested in a plan to build an electric railway between Colfax and Forest Hill. It is the intention to carry both passengers and freight. Application will be made to the Board of Supervisors at once for the necessary franchise.

Ontario & San Antonio Heights Railroad, Ontario, Cal.—It is stated that this company is about ready to let a contract for the extension of its electric railway from Upland through Claremont to North Pomona, a distance of 6 miles. The extension will cost about $200,000. [E. R. J., May 8, '09.]

Sacramento & Sierra Railway, Sacramento, Cal.—This company, which proposes to construct an electric railway from Sacramento to Lake Tahoe via Orangevale Bluffs, has filed deeds for its right-of-way. It will cross the American River and extend to Seventh Street, where the terminal will be located. The company has purchased 80 acres of land adjoining the terminal site. Construction on the railway at Orangevale Bluffs has already commenced. [E. R. J., May 8, '09.]

Central California Traction Company, San Francisco, Cal.—H. J. Gray, Sacramento, has been awarded a contract by this company to build its proposed 3½-mile line to Agricultural Park. Work on this line will begin within 10 days, starting from the terminal at Eighth Street and J Street. Following this construction, bids will be asked within two months for construction work connecting the line at Agricultural Park with the present terminus of the company's line at Lodi, thus connecting Sacramento and Stockton.

***Meriden, Middletown & Guilford Railway, Meriden, Conn.**—At a recent meeting of the directors of this company it was voted to proceed with the construction of the proposed electric railway from Meriden to Guilford. Among those present were: Charles E. Jackson, Joseph Merriam, Middletown; A. H. Augur, Middlefield, and James H. White, Eugene L. Hall, C. F. Rockwell and Francis Atwater, Meriden. The directors voted to meet again at an early date to perfect an organization for the construction of the proposed railway.

Oil Belt Traction Company, Oblong, Ill.—It is stated that this company has completed plans and will be ready to place contracts for material for its proposed electric railway which is to connect Charleston and Bridgeport. U. L. Upson, Buffalo, N. Y., will have charge of the construction work. G. E. Groves, Oblong, is the promoter of the enterprise. [E. R. J., June 12, '09.]

Evansville & Mt. Vernon Electric Railway, Evansville, Ind.—Engineers have completed the survey of the proposed extension of this company's line to New Harmony, a distance of 18 miles. Building will, it is reported, be commenced during the fall.

Covington & Southwestern Railway, Kingman, Ind.—This company, which is building an electric railway from Kingman to Crawfordsville, has completed the grading to a point about 2 miles east of Kingman. The ties have been laid for a distance of about 3 miles. The company will lay 60-lb. Illinois steel rails. Fred Mollenkoph, Fort Wayne, engineer. [E. R. J., June 19, '09.]

***Portland, Ind.**—W. H. Ogan, Tipton, is said to be interested in a proposition to build an electric railway from Portland to Celina.

Centerville Light & Traction Company, Centerville, Ia.—It is announced that this company will build the proposed extension to Mystic, 7 miles, provided that the people will subscribe for $75,000 in bonds, at 6 per cent, secured by first mortgage on the property of the entire plant, lighting, heating and street railway. This was accepted by a committee representing the people.

Climbing Hill, Ia.—Robert H. Baldwin, locating engineer, has made his final report on the proposed electric interurban railway from Sioux City to Ida Grove, Ia. It will run southeasterly from Sioux City through Climbing Hill and Oto, to Ida Grove. Within a few days articles of incorporation will be filed and the right-of-way secured. Mr. Baldwin's report on the freight and passenger line as proposed, which has Sioux City for its western terminus, states that from an engineering and operating standpoint it is entirely feasible and would tap a section of territory now unserved by adequate transportation facilities. The line will be less than 55 miles between Sioux City and the projected terminals. A sentiment is expressed for a further extension in a southeasterly direction to Denison, Ia., and an investigation of such a route may be made after the permanent organization is completed. According to the report the line can be built for $22,000 a mile with a maximum grade of 2 per cent in but few places, and will practically serve 342 square miles of rich farming land. The population will be more than 1000 to a mile of road. As soon as certain details are attended to the preliminary and final surveys will be made through Woodbury and Ida Counties. [E. R. J., June 12, '09.]

Kansas City, Lawrence & Topeka Electric Railway, Rosedale, Kan.—The Board of Railroad Commissioners has granted permission to this company to issue $2,000,000 in securities to build its projected electric railway between Topeka and Kansas City, 67 miles. R. W. Hocker and J. A. Stewart, Kansas City, Mo., are interested in this proposed railway. [E. R. J., June 19, '09.]

North Missouri Central Railway, Mexico, Mo.—This company has awarded a contract to the Franklin Construction Company, Frisco Building, St. Louis, Mo., for the construction of a railway running through Mexico, to Columbia from Jefferson City, Mo., a distance of about 63 miles. The contract involves about $1,800,000. The Franklin Construction Company is in the market for about 160,000 oak or pine standard ties, also about 6300 tons of 60-lb. relaying rails, spikes, bolts, etc.

Morris County Traction Company, Morristown, N. J.—This company placed in operation on June 19 its new line between Elizabeth and Springfield.

Rockland Railroad, Nyack, N. Y.—It is stated that this company has completed plans for the building of its proposed 30-mile electric railway to connect Tappan, Suffern, Stony Point and Nyack. At a meeting of the stockholders at the office of the company, 165 Broadway, New York, the following officers and directors were elected: B. A. Hegeman, Jr., president; W. O. Jacquette, vice-president; A. C. Miller, second vice-president and general manager; Stafford S. Delano, treasurer; W. H. Coverdale, chief engineer, and Charles J. Hardy, secretary and counsel. Directors: H. A. Taylor, Edwin S. Bayer, F. V. Smith, H. H. Hewitt, K. B. Smith, Francis Dickson, M. S. Paine, Henry O'Neill and Theodore Hofstatter. [E. R. J., June 19, '09.]

Cincinnati, Dayton & Fort Wayne Railway, Dayton, Ohio.—This company has started surveying for its proposed Defiance-Hicksville-Fort Wayne extension. The surveys will be completed early in the summer and it is expected to begin work on the line in the fall. The route from Defiance to Hicksville parallels the Baltimore & Ohio Railroad, passing through the Bend, Sherwood and Mark Center to Hicksville. At Hicksville it is proposed to branch off to Fort Wayne.

Cleveland, Barberton, Coshocton & Zanesville Railway, Cleveland, Ohio.—This company has filed for record at Cleveland a $6,000,000 mortgage in favor of the Windsor Trust Company, New York, N. Y. The proceeds are to be used in building an electric railway from Cleveland to Zanesville, via Elyria, Barberton, Orrville, Millersburg and Coshocton. J. J. Breitinger, president. [E. R. J., June 26, '09.]

***Muskingum & Morgan Railway, Light & Power Company, Zanesville, Ohio.**—The promoters of this new company have perfected the following organization. Directors: Andrew McDonald, president; John J. Adams, vice-president; R. C. Burton, treasurer; W. H. Pierpont, secretary; James McDonald and W. H. Atha, all of Zanesville. The company contemplates building an electric railway between Zanesville and McConnelsville and also expects to furnish power and light to towns along the route.

Zanesville & Meigs Valley Traction Company, Zanesville, Ohio.—It is announced that this company will have the surveys for its proposed railway completed within 30 days. Financial arrangements are said to have been completed. The railway will extend from Zanesville through the Meigs valley to Beverly. E. R. Meyer, Zanesville, president. [E. R. J., April 24, '09.]

***Medford, Ore.**—It is stated that W. S. Dewing and Edward Woodbury, Kalamazoo, Mich., are interested in a proposition to establish an electric railway from the Pacific Coast through Medford to Butte Falls.

Waynesburg & Monongahela Street Railway, Waynesburg, Pa.—This company has filed a $5,000 bond with the Waynesburg Council and has begun construction work on the line in Washington Street. It will extend from Waynesburg to Monongahela River. W. J. Sheldon, Waynesburg, general manager. [E. R. J., June 19, '09.]

Cumberland Railway, Carlisle, Pa.—This company has awarded to the United Ice & Coal Company, Harrisburg, the contract for the removal of about 10,000 cu. yd. of earth on its proposed railway on Cemetery Hill, Newville, and 4000 cu. yd. near Plainfield. A contract was also awarded by the company for the furnishing of 13,000 tons of 70-lb. rails to the Pennsylvania Steel Company. The Carlisle Construction Company has the contract for the general work. [E. R. J., May 22, '09.]

Nashville Railway & Light Company, Nashville, Tenn.—The Secretary of State has granted an amendment to the charter of this company, whereby permission is given to build extensions from its present system over practically all the roads leading out of Nashville. [E. R. J., June 12, '09.]

Red Springs Street Railway, Mount Pleasant, Tex.—It is stated that this company has completed the laying of tracks between Mount Pleasant and Red Springs, a distance of 1⅛ miles. Cars have been received and the line will be placed in operation within a few days. It is the intention to extend the line to Pittsburg, 12 miles south, by next summer. [E. R. J., June 19, '09.]

Northern Texas Traction Company, Fort Worth, Tex.—It is said that this company is considering plans to extend its railway to Riverside at an early date.

***San Angelo, Tex.**—At a mass meeting recently held in San Angelo the proposition of J. J. Lanin and others to build an electric railroad from San Angelo to Sterling City was accepted. San Angelo is to donate $40,000 and right-of-way through Tom Green County, and the promotors state that in return the repair shops and headquarters will be located at San Angelo.

Uvalde (Tex.) Street Railway.—This company, which recently began operating a 3-mile street railway in Uvalde, is said to be considering a plan to extend the railway to Batesville, a distance of 20 miles. The company operates gasoline motor cars.

Whatcom County Railway & Light Company, Bellingham, Wash.—It is announced that this company will spend, during the summer, approximately $100,000 for improving its system in Bellingham. Track will be relaid with 73-lb. rails.

Grand Rapids (Wis.) Street Railway.—G. M. Hill, secretary of this company, has issued a call for a 10 per cent assessment on the stockholders of the company to raise funds for immediate use in constructing the interurban electric railway between Grand Rapids and Nekoosa. Graders and the construction material have been received and work will be started at once. The plan of the company is to extend the line to Stevens Point, Wausau and Merrill. [E. R. J., June 5, '09.]

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company has just placed in operation a new line, 8 miles in length, extending from the pavilion in Lake Park down Folsom Street, and thence west on Center Street until it forms a junction with the Fond du Lac Avenue line.

SHOPS AND BUILDINGS

Pacific Electric Railway, Long Beach, Cal.—This company contemplates building a comfort station, south of the Salt Lake depot in Long Beach.

POWER HOUSES AND SUBSTATIONS

Fort Smith Light & Traction Company, Fort Smith, Ark.—This company is enlarging its power house by the addition of a 500-kw generator. The work is being done under the supervision of H. M. Byllesby & Company, Chicago, Ill.

Twin City Rapid Transit Company, Minneapolis, Minn.—This company is erecting a one-story substation on East Seventh Street in Minneapolis. The cost will be $10,000.

Morris County Traction Company, Morristown, N. J.—This company has completed the foundations for a new power house on East Blackwell Street, Dover. The building will be 150 ft. x 100 ft. and will be built of concrete and brick.

Portland, Eugene & Eastern Railway, Portland, Ore.—It is stated that this company will build a power plant this year at Martin's Rapids, about 30 miles east of Eugene, furnishing power for all its railways as far north as Albany. J. O. Story, Portland, president.

Chattanooga (Tenn.) Railways.—This company has purchased and is installing in its main power station a 2500-hp cross-compound engine and d.c. generators. This company has also installed in its Ridgedale substation a 500-kw rotary converter.

Texarkana Gas & Electric Company, Texarkana, Tex.—This company has just installed in its power station a 300 kw General Electric rotary converter.

Manufactures & Supplies

ROLLING STOCK

Detroit (Mich.) United Railway is asking for bids on five interurban express cars.

Capital Traction Company, Washington, D. C., is reported to have ordered four city cars from the Cincinnati Car Company.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has purchased two sets of trucks from the Baldwin Locomotive Works.

Chicago (Ill.) Railways Company is planning to purchase 20 motor and 60 trail garbage dump cars. Plans and specifications for these cars have not yet been prepared.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has placed an order with the Cincinnati Car Company for 10 cars to be built under license of the Pay-As-You-Enter Car Corporation.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va., reported under date of July 3 that it is negotiating for the purchase of new cars, but that no definite action had been taken up to that time.

Columbus (Miss.) Railway, Light & Power Company, which was contemplating the purchase of several new city cars mounted on maximum traction trucks, has decided to purchase four second-hand cars.

Parsons Railway & Light Company, Parsons, Kan., has placed an order through the Dwyer Construction Company, Dayton, Ohio, with the St. Louis Car Company for seven 21-ft. single-truck semi-convertible city cars. Allis-Chalmers motors are specified.

Lawrence Railway & Light Company, Lawrence, Kan., has ordered from the St. Louis Car Company five 21-ft. single-truck semi-convertible city cars, equipped with Allis-Chalmers motors. The order was placed through the Dwyer Construction Company, Dayton, Ohio.

Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., announces that it will purchase a total of 26 city, 4 interurban passenger, 2 motor freight, 4 freight trailer and 10 gondola cars. The interurban cars are to be similar to the 300 type now in use. The freight cars will be the company's standard type.

Salt Lake & Ogden Railroad, Salt Lake City, Utah., has made no definite plans for rebuilding its 40 steam railway passenger cars for operation on its electrified line. It is expected that recommendations for rebuilding the cars will be made at an early meeting of the directors of the company.

Rogue River Valley Railway, Jacksonville, Ore., has changed its plans regarding the gasoline car for which it was reported to be in the market, and is arranging to build for itself at San Francisco, Cal., a small 25-passenger gasoline motor car to run on four wheels, the car to be made of an omnibus-truck body remodeled to suit railroad work. It is expected that the car will be completed in about three months.

Interborough Rapid Transit Company, New York, N. Y., has awarded contracts for 600 trucks for the 350 cars which it ordered recently, apportioned as follows: American Car Company, 170 trailer trucks and 190 motor trucks; Standard Car Truck Company, 40 trailer trucks and 60 motor trucks; St. Louis Car Company 40 trailer trucks; Wason Manufacturing Company, 100 trailer trucks. Orders for 100 trucks remain to be placed.

Long Island Railroad, Long Island City, N. Y., has prepared specifications for the 100 all-steel motor cars ordered from the American Car & Foundry Company, as mentioned in the ELECTRIC RAILWAY JOURNAL of July 3, 1909. The cars will seat 70 persons, will be 63 ft. 4¾ in. long over vestibules, 54 ft. 4½ in. body length; width over all, 9 ft. 11 in.; height from top of rail to sills, 41⅜ in. The bodies will weigh approximately 53,000 lb. each. Other details follow:

Air brakes	Westinghouse	Roofs	Welded steel
Control system	Westinghouse	Seats	H. & K. walkover
Couplers	Kiesel type	Seating material	Rattan
Curtain fixtures	Nat'l L. W.	Springs	Union S. & Mfg.
Curtain material	Pantasote	Step treads	Mason
Headlights	Dressel	Trucks	Steel P. R. R. Std.
Journal boxes	Symington	Wheels	Steel
Motors	2 West-308		

TRADE NOTES

Crocker-Wheeler Company, Ampere, N. J., has recently received an order from the Marshall (Tex.) Traction Company for a 125-kw 550-volt direct-current generator for use in electric railway service.

George E. Austin, president of the American General Engineering Company, New York, sailed for Europe July 1. Mr. Austin is to make an extended trip through England and the continent in the interest of his company's foreign business.

Stone & Webster, Boston, Mass., announce that Eliot Wadsworth was admitted on June 30 as a partner in the firm. The members of the firm now are: Charles A. Stone, Edwin S. Webster, Russell Robb, Henry G. Bradlee and Eliot Wadsworth.

Baldwin Locomotive Works, Philadelphia, Pa., a stock company organized under the laws of Pennsylvania, have purchased the entire property, business and good will of the long-established partnership of Burnham, Williams & Company, Philadelphia, and have assumed all their assets and liabilities. There will be no change in the management of the company.

Mead-Morrison Manufacturing Company, New York, has taken over the business of George W. McCaslin and John A. Mead & Company and now owns the sole rights to manufacture and sell the McCaslin overlapping gravity bucket conveyor for carrying coal, ashes, cement and other similar materials. The company has opened offices at 11 Broadway, New York.

Westinghouse Electric Manufacturing Company, Pittsburgh, Pa., has furnished equipment for lighting the tunnels and terminals of the Pennsylvania Tunnel & Terminal Company, operating the Pennsylvania Railroad tunnels under New York City and the rivers. This equipment is being installed in the Long Island City power house and consists of 2 turbine-alternator sets of 2500-kw capacity. The alternators will supply 3-phase, 60-cycle current at 440 volts.

Lindsley Brothers Company, Spokane, Wash., dealers in cedar poles and cross-arms, announce that C. P. Lindsley, formerly president of the company, has become interested in the Craig Mountain Lumber Company, Lewiston, Idaho, and will hereafter act as general manager of that company. E. A. Lindsley has assumed active management of the Lindsley Brothers Company at Spokane. G. L. Lindsley will remain as manager of Eastern sales with offices at 1261 Monadnock Block, Chicago. The company reports that its cross-arm factory which was opened at Portland, Ore., in 1908 is meeting with excellent patronage.

A. Bradshaw Holmes, secretary and treasurer of the Independent Pneumatic Tool Company and the Aurora Automatic Machinery Company, Chicago, Ill., died on June 30, 1909, from injuries sustained by accidentally falling from the piazza of the hotel at which he was living. He was 31 years of age and unmarried. Mr. Holmes was well known in the pneumatic tool business, having been connected with the Standard Pneumatic Tool Company and the Rand Drill Company for a number of years prior to his connection with the Independent Pneumatic Tool Company, of which corporation he had been secretary and treasurer since its organization.

Western Electric Company, New York, N. Y., reports that for the first half of its fiscal year ended May 31, the gross business was at the rate of approximately $46,000,000. This is an increase of 40 per cent over 1908 and at the rate of 87 per cent of the 1907 record, which was $53,000,000. The business for May, 1909, showed an increase of 60 per cent over May, 1908, and April, 1909, showed 50 per cent over April, 1908. For the past six months the increase of the company's orders was 30 per cent over the same period in 1908. The European business of the company gained 30 per cent over a year ago and was 12 per cent greater than in 1907, which previously held the high record.

Keystone Lubricating Company, Philadelphia, manufacturer of Keystone grease, reports the results of some recent tests under heavy pressure of this lubricant, which is composed of high-grade petroleum oils reduced to suitable consistency or "density." In these tests, which were made on the Olsen testing machine, the lubricant was supplied to a journal 3¾ in. in diameter, running in a babbitted bearing, and the pressure was increased by steps of 86.2 lb. per square inch up to the high maximum pressure of 431 lb., a full 60-minute run being made at each pressure. During the entire run at each pressure the lubricant maintained true fluid friction between journal and bearing, and withstood the temperature rise without a sign of any disintegration, such as oils and greases of animal or vegetable origin are liable to on account of their readiness to decompose. According to the manufacturers, this was due to the permanent consistency of the grease.

H. M. Byllesby & Company, Chicago, Ill., announce that C. E. Groesbeck, of San Diego, Cal., has been elected vice-president of the company and will hereafter have charge of the company's interests on the Pacific Coast. Mr. Groesbeck's headquarters will be at Tacoma, Wash., where the company has purchased and is operating the Tacoma Gas Light Company's property. The company is supervising the rebuilding by American District Steam Company, Lockport, N. Y., of all the underground steam-heating system of the Ottumwa Railway & Light Company, Ottumwa, Ia., in which work $100,000 is being expended. The Ottumwa Railway & Light Company has maintained an exhaust steam-heating plant for the last 20 years and it has proved so successful that the company recently decided to rebuild and extend the service. The system which is being installed is founded on the meter basis and it is to be provided with new underground drains. The back pressure will not exceed 3 or 4 lb. The rebuilding of the system will include the relaying of about 4 miles of steam mains.

ADVERTISING LITERATURE

Grip Nut Company, Chicago, Ill., has issued illustrated catalog No. 17, containing descriptions, illustrations of, and tabulated information regarding, its universal window fixtures and accessories.

Stone & Webster, Boston, Mass., have issued a circular dated July 1, describing a number of issues of investment securities of electric railway, gas and electric light companies controlled by them.

Scofield & Company, New York, N. Y., are sending out a pamphlet describing their "Equipoise" telephone arm for desk use and Peterson's desk companion for keeping inkwells and pencils on roll-top desks.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has prepared an attractive folder, "Electric Power for Domestic Purposes," which offers many valuable suggestions for the use of small motors in the home.

Glacier Metal Company, New York, N. Y., and Richmond, Va., has issued a four-page circular about its "Copper-Tin," a bearing metal for lining armature and motor bearings. The circular is addressed particularly to purchasing agents and master mechanics.

J. G. Brill Company, Philadelphia, Pa., publishes in the June number of its magazine an interesting article on the conditions which govern the type of car for city service in London, Eng. Another article describes some additions to the Brill plant at Philadelphia.

Joyce-Cridland Company, Dayton, Ohio, has just published a new catalogue describing various jacks of the lever type manufactured by this company, and also the mechanisms by which many of the automatic features are accomplished. Recent improvements in automatic geared jacks are also described.

Allgemeine Elektricitäts-Gesellschaft, Berlin, Germany, has issued a descriptive pamphlet on d.c. turbines from 45 kw upward, and another publication describing the power house of this company's turbine works in Berlin. The company has received orders for 18,782 kw in d.c. turbines, of which machinery totaling 9658 kw is in service.

Duff Manufacturing Company, Pittsburgh, Pa., has printed a new 16-page catalog describing the Duff-Bethlehem forged steel hydraulic jacks. The company is prepared to furnish jacks in all styles and capacities for a vertical or horizontal lift. Many of the different types are illustrated. Tables giving complete information for prospective purchasers accompany the text.

MacGovern, Archer & Company, New York, N. Y., show in their July list of electrical and steam machinery considerable apparatus directly applicable to railway work. Among these are G. E. Nos. 57, 1000 and 800 street railway motors, Westinghouse Nos. 56, 49 and 68 railway motors, and d.c. 500-volt generators up to 500 kw. The company also shows several types of cars which it has on sale.

Root Spring Scraper Company, Kalamazoo, Mich., shows its latest railway spring scrapers in a pamphlet which has just been issued. The scrapers are of several types to meet all city and interurban conditions. The spring attachment is one of the strong features of this device, as it will hold the scraper free from the track when not in use and is said to reduce the maintenance cost of scrapers fully 50 per cent. The company has also issued a circular giving a list of the repair parts of its five types of scrapers.

NEW PUBLICATION

Westinghouse ET Air Brake Instruction Book. New York: The Norman W. Henley Publishing Company, 1909; 242 pages, with index. Price, $2.

This is a manual on the No. 5 and No. 6 Westinghouse locomotive air brake equipment. It is printed in large, clear type and contains many excellent color plates which do much to make the subject matter clearer for the student who is unfamiliar with the details of the apparatus.

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Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

Hugh M. Wilson and Technical Journalism

As announced in our personal columns this week, Hugh M. Wilson, former proprietor of the *Electric Railway Review* and *The Railway Age*, has entered the manufacturing field, and we cannot chronicle this fact without expressing our appreciation of the high standards set and consistently followed by Mr. Wilson while engaged in technical newspaper work. He believed that to deserve and secure the support of the industries to which his journals were devoted they should not only record all of the important engineering and financial news in their respective fields, but should also assist so far as they could in solving the important problems of every character with which these industries were confronted. In carrying out this plan, Mr. Wilson's policy was essentially constructive, and while he did not hesitate to criticise faulty methods, he aimed always to combine with this criticism suggestions which would be helpful in securing the reforms which he desired. His ideal of a technical journal was that it should be a force, and a potent one, in any direction in which it could be useful in the field to which its energies were devoted. His connection with railway journalism was beneficial to those who were subscribers to his papers, to the manufacturers of railway apparatus who advertised in them and to all others who were connected with the industry. His journalistic experience and the knowledge of the railroad field thereby gained should be of great assistance to him in the new work in which he has embarked, and in his career as a manufacturer he will have the best wishes of his former associates in journalism.

Third Avenue Reorganization Problems

Considerable interest is being excited in New York by the proposed plan of reorganization of the Third Avenue Railroad Company, as outlined by the bondholders' committee and published in these columns. Briefly, the scheme contemplates a larger total par value in securities than now exists, as stock will be issued for the cash assessment to be paid by the present stockholders and bonds for the unpaid bond interest, but the fixed charges will be reduced, so that it is estimated that the company will be able to earn the interest on its funded indebtedness. According to F. W. Whitridge, the receiver of the company, the stock will possess very little present value, but will represent the expectations of the owners in the future prosperity of the company. In some quarters, the plan has been termed an injection of water, but if this is the case, the definition of watered stock will have to be modified from that which is usually accepted for the term. No claim is made that any part of the stock has been issued for less than its par value or the bonds for less than about par. But, through a number of circumstances, some of which are due to obsolescence of equipment, and some to conditions over which the company had no control, the physical assets no longer equal the capitalization. The case differs materially from that of a solvent corporation whose stock is in the hands of the public. Subscribers to the junior securities, whose assistance is necessary to carry through the reorganization, must be given the hope of large profits in the future if they are to forego an immediate return. On the other hand, the capitalization of future earnings and any material disproportion between capitalization and assets of a company are two of the principal charges which have been made against railroad corporations in the past. The Third

Avenue plan has met with considerable opposition from the stockholders, some of whom claim that they are being too heavily assessed in the proposed reorganization. The decision of the commission on the whole scheme will undoubtedly have a bearing upon other reorganization plans in New York City, so that the outcome has an importance which it might not otherwise possess.

Supervision of Street Railways in England and Prussia

The forthcoming report of the Public Service Commission, First District, New York, will contain two interesting articles by Robert H. Whitten, one on the supervision of street railways in England, and the other on their supervision in Prussia. These articles are available through advance publication, with a foreword prepared by the commission. This introduction states "that to an American the striking feature of State supervision of street railways in England and Prussia is that it is devoted chiefly to the prevention rather than to the correction of abuses." It then explains that all construction plans of electric railway companies in the countries mentioned have to be approved, even down to the smallest details, before a line is built, and commends such supervision strongly. But it does not add that this fact, with the necessity of securing the approval to construct electric railway lines, not from one body, but in most cases from a number of local authorities, has been one important reason for the small amount of electric railway track built in Prussia and England since electricity came to be applied to railway service. Thus in the United Kingdom only 1400 miles of electric railway track were constructed between 1898 and 1908, and the roads under private ownership increased only 230 miles, although this decade witnessed the principal part of the electrification of the British roads. During the same period approximately 23,000 miles were added to the electric railway trackage of the United States. The figures for the 10-year period for Germany are not available, but according to recent statistics, the street railway mileage in Germany at present is 2345, of which only about 83 per cent is electric. Several single States in this country have a larger mileage than either Germany or the United Kingdom.

Opening of the Downtown Hudson Tunnels

On July 19 the two submarine tubes under the Hudson River connecting the new terminal station of the Hudson & Manhattan Railroad Company at Cortlandt and Church Streets on Manhattan Island with the Pennsylvania Railroad station in Jersey City will be opened for traffic. Two weeks later trains are to be run to the Erie station in Jersey City and the Lackawanna station in Hoboken, connecting there with the Morton Street tubes, which were opened in February of last year. The opening of the downtown river tunnels and the connecting land tunnel under Jersey City and Hoboken will mark the completion of the major part of the Hudson Tunnels system, leaving yet to be finished the Sixth Avenue extension north from Twenty-third Street to the Grand Central Station and one or two projected extensions in Jersey City. The enterprise is chiefly remarkable for the large investment of nearly $70,000,000, subscribed entirely by private capitalists within the last eight years. The complete system of tunnels comprises only 9 miles of double track, but it reaches all but two of the steam railroad terminals on the New Jersey side of the river, and eventually will connect with the two railroad stations in New York City. From the nature of its route, crossing twice under the river, the traffic will be largely short haul. While there will be the same congestion of travel during the morning and evening rush hours that takes place on all other rapid transit lines in and around New York, the constant incoming and outgoing stream of passengers to and from the steam railroad terminals will, no doubt, provide a well-balanced load during the non-rush hours. The plan of operation is to run trains on a regular headway, increasing or decreasing the number of cars per train according to the traffic.

The new terminal station of the downtown tunnels, which is described elsewhere in this issue, has been designed with the view of segregating inbound and outbound passengers and avoiding conflicting channels of movement, both between the trains and the concourse and the concourse and the street. The use of separate loading and unloading platforms, center and end door cars and the four loop tracks give the station a capacity in excess of that of the single pair of tubes under the river. With trains running at 1½-minutes headway through the river tunnels, six minutes can be allowed for unloading and loading a train in the station. When the through service to Newark is begun and the Erie and Lackawanna commuter traffic must also be handled, the large capacity of the terminal station will probably be well taxed.

The Use of Condensers

How far is it justifiable to expend capital upon condensing plant in a power station? This is a problem that will rarely offer itself in respect of large stations with good load factors. In the case of small stations with small load factors the problem assumes a more intensive aspect. The justification for condensing to the power station man is one of a commercial order. In favor of it there is the direct economy of fuel and perhaps of feed water that has to be paid for: there is the increase of output from the rest of the plant—the engines and boilers—and this will vary in value according as the existing plant is or is not sufficient to deal with the present or prospective load with satisfaction. On the other side, there is the capital cost, which may be difficult to find, and there are the usual interest and other capital charges to be met annually. And there may be repairs. Labor may be saved in one part of the plant and expended in another part. The labor charges may be more or they may be less, according to whether existing labor is at present fully occupied or not, for one cannot reduce the firemen below one in number, though we may ease the duty on the one.

In considering the question of condensation the engineer will therefore take all points into consideration. If a condenser will effect an economy of 20 per cent in fuel it does not follow that this saving is always worth having. To save 20 per cent the plant must be large enough to do so when under full load. If the price of condensing plant varied exactly with its capacity and condensation were applied to a station with a load factor of 10 per cent and condensing plant cost $5 per unit of capacity, what would it cost for this particular station? Obviously ten times $5, or, in other words, the interest charge on the plant on the above assumption as to cost would amount to tenfold

what it would do for a steady load plant. So with depreciation and maintenance, all charges would be multiplied by the ratio of the cost of plants for 100 units and 10 units of power. A full scale plant may therefore cost so much as to be inadmissible. Can anything be done to modify it? All depends on the nature of the load. An electric railway load with occasional high peaks should certainly not be provided with a plant equal to dealing continuously with the maximum load. It may be but little in excess of the mean load. But it must not be so small that the rush of steam will cause a stoppage of the water flow in an injection condenser. With a surface condenser this does not occur. At most an overpressed condenser will yield a poor vacuum during the peak periods.

A load which has peaks of the more continuous order requires a larger condensing plant than the foregoing, but in all cases of low load factors it seems wise to moderate the expenditure on the plant so that while ample for the average load, it shall be only capable of giving a two-thirds or other selected vacuum on the peak loads. A distinct economy may thus be secured with an outlay that does not bear a very much greater ratio than one to what may be called steady load plant cost.

With a traction load it is not possible to vary the air pump speed so as to suit the load, for this changes so rapidly and frequently as to render this practically impossible. But with a lighting load it may be possible to vary the air pump speed over a wide range.

By such methods of design the range down to which a condenser may be applied with commercial economy will probably be extended considerably.

Violations of Rules on Interurban Railways

The recent deplorable head-on collision between two interurban cars in northern Indiana, in which 10 persons were killed and many others injured, affords a text for a timely preachment. The cause of the accident was disobedience of a positive meet order on the part of the crew of one car. All the evidence goes to show that the crews of both cars received and correctly repeated the meet order; that the orders were delivered 35 minutes before the collision occurred; that the crew of one car ran past the meeting point, stopped at a siding one-half mile beyond, then started out again and collided with the opposing car 1½ miles beyond the meeting point while running at high speed. But one of three conclusions can be reached after a consideration of these facts; either that the crew at fault forgot their orders; that they lost their bearings on the road; or that they deliberately disobeyed the order and took a chance on getting farther along the road before meeting the opposing car. The reliability of the dispatching system, the condition of the track and rolling stock or the speed of the colliding cars were not in any degree contributing causes. This was distinctly and solely a "man failure."

Individuals will err, often through ignorance, and occasionally through wilfulness. These errors do not always cause accidents. Ninety-nine times out of a hundred nothing happens, but the hundredth time is fatal. The principle of rigid and unceasing discipline is to prevent not the one hundredth error, but, if possible, every one of the other ninety-nine. If a man makes a mistake, or takes a forbidden course once and is not dealt with summarily, the probability is that he will repeat the mistake or the disobedience. The punishment in every case requiring discipline should fit the crime, and the seriousness of the crime should be reckoned not so much by what actually happens as by what might have happened.

The standard of discipline on electric railways should be, if anything, higher than on steam railroads. The single-track, high-speed interurban electric roads operate at higher running speeds and with greater traffic density than most single-track steam roads. It may be argued that a single car is more easily controlled than a long train, and that electric schedules are more regular than the mixed freight, passenger and extra schedules of the steam roads. This is admitted, but it is also true that the motorman of an interurban car, knowing how quickly his car responds to the movement of the controller or brake handle, is tempted to take chances that a steam railroad engineer would not assume. Also, the very regularity of the electric schedules fosters slovenly observance of many rules, which in an emergency, when cars are not running on schedule time, are vital to safe operation.

Some interurban lines have made a point of employing only former steam-road employees as trainmen, believing that better results could be obtained with experienced railroad men than with men recruited from other occupations. Other things being equal, this expectation may be, and no doubt is, realized; but experienced railroad men not only know the rules, but also know when they can violate the rules without being detected. If the discipline maintained on the electric road is in any respect less rigid, and the consequences of a disobedient act even a trifle less severe than on the steam roads from which the men were drawn, only one result can be expected. Running an electric car on a regular schedule of short runs is an easy job for an ex-employee of a steam railroad. He is inclined to look on it as such and treat it with a lack of respect which is reflected in every move he makes. Nothing can counteract this feeling and its inevitable results except iron-handed discipline, dealing out punishment as severe as any ever encountered in the man's experience on the steam roads for which he formerly worked.

One difficulty in enforcing strict discipline which is recognized by all railway officers is the attitude assumed by the blameless member of a car crew in attempting to protect the guilty member, either by failing to report breaches of rules or corroborating a fictitious explanation. There is only one remedy for this. When one member of a crew is detected in violating a rule, and the violation must have been plain to the other member, discipline should be administered impartially to both if the blameless member makes no report of the occurrence.

Another difficulty, which in many cases, no doubt, prevents administering severe punishment of long suspension or discharge for gross violations of the rules, is the scarcity of men who are competent to run cars. If within a short period three or four motormen out of a total of 10 or 12 should be discharged for cause, their places could not be filled immediately from the extra men ordinarily employed by a small road. Even at the risk of crippling the service, however, it would be better to turn out a man deserving of discharge rather than overlook his disobedience and invite his contempt.

OPENING OF THE TERMINAL STATION OF THE HUDSON & MANHATTAN RAILROAD

On July 19, at 10 a. m., the first train, carrying a number of invited guests, will run through the newly completed downtown tunnels of the Hudson & Manhattan Railroad Company under the Hudson River from the terminal station at Cortlandt and Church Streets on Manhattan Island to the Pennsylvania Railroad station in Jersey City. At 3 p. m. on the same day the tunnels will be opened to the public, and trains will begin running on a regular schedule.

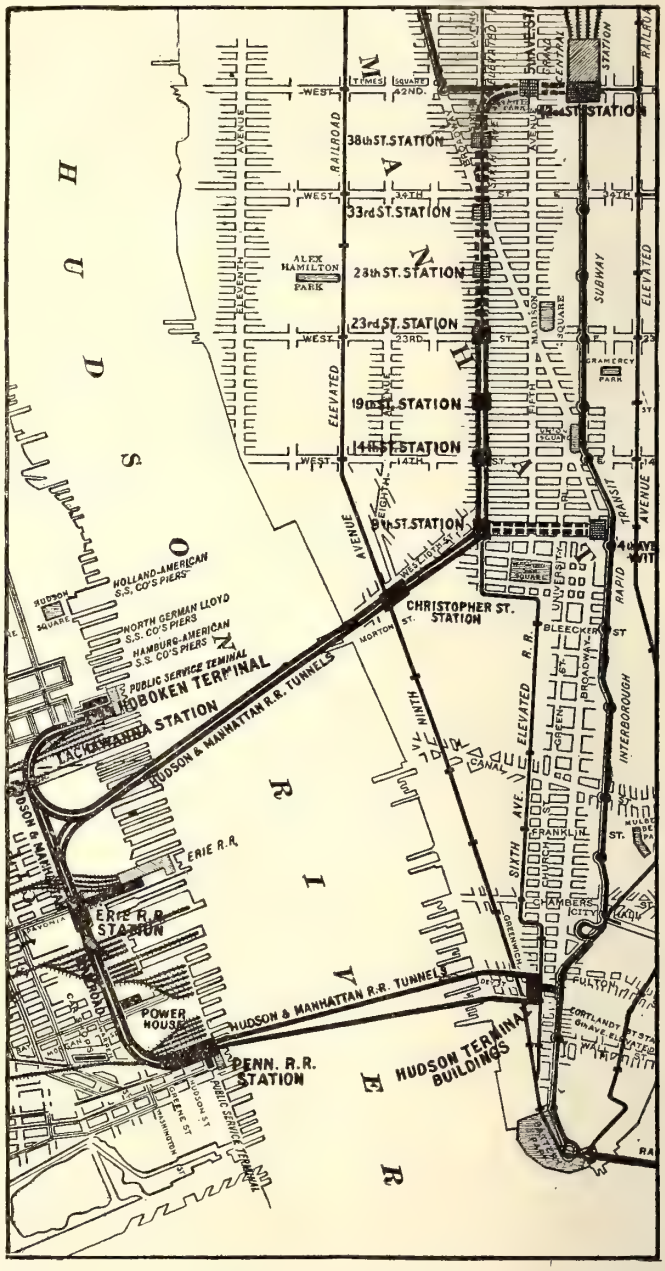
CONNECTIONS OF THE HUDSON TUNNEL SYSTEM

These downtown tunnels are the second pair of tubes under the Hudson River to be put in operation. The connecting land tunnels between the Pennsylvania and Erie stations in Jersey City and the Hoboken station of the Delaware, Lackawanna & Western will be opened on Aug. 2. When this latter section is put in operation trains will run through the tunnels completed in 1908 from Twenty-third Street and Sixth Avenue, Manhattan, to Hoboken and Jersey City, and thence under the river again to the downtown terminal at Cortlandt and Church Streets. This will provide uptown and downtown tube connections for three of the five steam railroad passenger stations on the New Jersey side of the river. The West Shore Railroad, with terminals at Weehawken, opposite Forty-second Street, and the Central Railroad of New Jersey, with terminals at Communipaw, opposite the Battery, will be the only railroads on the west side of the river not served by the present system of tunnels.

Two branch extensions of the Hudson tunnel system are nearing completion, and will be ready for operation in about six months' time. One of these is a double-track extension for shuttle service from the Ninth Street station on the Sixth Avenue line east to a connection with the Interborough Rapid Transit Company's subway at Astor Place and Fourth Avenue. The second is a tunnel for foot passengers from the Hudson Terminal Buildings to the Dey Street station of the Interborough subway under Broadway.

The present terminal of the Sixth Avenue line is at Twenty-third Street. Work is being pushed on the extension of this line northward, and it is expected that within six months the station at Twenty-eighth Street will be opened as a temporary terminal. A large retail department store is now being erected on the corner of Thirty-third Street and Sixth Avenue on property owned by the Hudson & Manhattan Railroad Company, and by the time the building is completed the Sixth Avenue extension will have been finished that far north, and a station to be built in the basement of this department store building will be opened as another temporary terminal. Plans are completed and work will be started this summer on the recently authorized extension of the Sixth Avenue line north from Thirty-third Street to Thirty-ninth Street, where a station will be located, thence diagonally across under Bryant Park to Forty-second Street. The tunnels under Forty-second Street will be on a level below that of the present Interborough subway. A station is to be built at Fifth Avenue, and also a terminal station on the south side of Forty-second Street between Park Avenue and Lexington Avenue, opposite the Grand Central Station. This extension is expected to be completed and ready for operation by Jan. 1, 1911.

On the New Jersey side of the river an extension is planned to follow under the right-of-way of the Pennsylvania Railroad from the station in Jersey City to Summit Avenue, where the tracks will emerge from the tunnels and run up on the railroad right-of-way across the meadows to Newark. It is the ultimate intention to operate trains from Newark over the Pennsylvania Railroad tracks as far as Summit Avenue, and thence by way of the tunnels direct to the downtown terminals in New York. Another contemplated extension on the Jersey side is south from the Newark tunnel to Communipaw, connecting there with the Central Railroad of New Jersey. This extension ultimately may be carried south to Bayonne and Staten Island. These two projects in New Jersey, however, will not be under-



Hudson Terminal—Map of Tunnel System and Connections

taken until after the completion of the extensions now planned on Manhattan Island.

The complete system of tunnels and the connections with steam railways and other rapid transit lines are clearly shown on the accompanying map.

RIVER TUNNELS

The twin tubes under the river from Jersey City to the Terminal Buildings have been built after the same design as that employed in the new part of the tunnels under the river at Morton Street. They are circular tubes formed by a segmental cast-steel lining bolted together in the rear

of the excavating shields as they were driven forward. The tubes are lined with concrete up to the level of the top of the cable ducts, but the top half is unlined. The diameter in the clear is 15 ft. 3 in. The land tunnels from the Pennsylvania station in Jersey City north to the junction with the first tunnels, which run to the Hoboken station of the Delaware, Lackawanna & Western, are also twin tubes lined with segmental cast-steel plates. The junction with the uptown tunnels south of the Lackawanna station is accomplished without grade crossings, so that there is no interference of traffic. There is only one station on this section, that under the Erie Railroad terminal. This station has exits and entrances from the street as well as from the concourse of the railroad station above. The station under the Pennsylvania Railroad terminal also has exits and entrances on the street and from the concourse of the station.



Hudson Terminal—View of Buildings from the River

The Erie station consists of a single island platform at the level of the tubes, with stairways leading up to a concourse above the tubes, on which are located the ticket offices. From this concourse stairways lead up to the street and the railroad station. There are also two electric elevators, having a capacity of 50 persons each, which carry passengers up and down from the level of the railroad station.

The station under the Pennsylvania Railroad terminal is 100 ft. below the level of the concourse of the railroad station, and provision has been made for carrying passengers up and down from both the street and the railroad station in hydraulic plunger elevators. Six of these elevators have been installed. Four elevators, with cars 10 ft. x 10 ft., holding 50 passengers, have a lift of 92 ft. 9 in., and rise to the railroad station concourse. Two elevators of similar size and capacity have a lift of 63 ft. 7 in., and carry passengers to the street entrances. The tunnels turn northward just beyond the Pennsylvania station, but the Newark extension tubes have been driven straight west for a short distance, and tracks have been laid in them. These short stub tracks will provide storage and switching space for the temporary shuttle service between Jersey City and New York pending the opening of the Jersey City tunnels north to Hoboken. They will be used for storage purposes only until the Newark extension is completed.

The two tubes under the river diverge after leaving the Pennsylvania station in Jersey City. The inbound tube runs up under Cortlandt Street, while the outbound tube runs under Fulton Street, two blocks north. The two tubes are connected on the New York end by the five loop tracks in the terminal station.

TERMINAL STATION

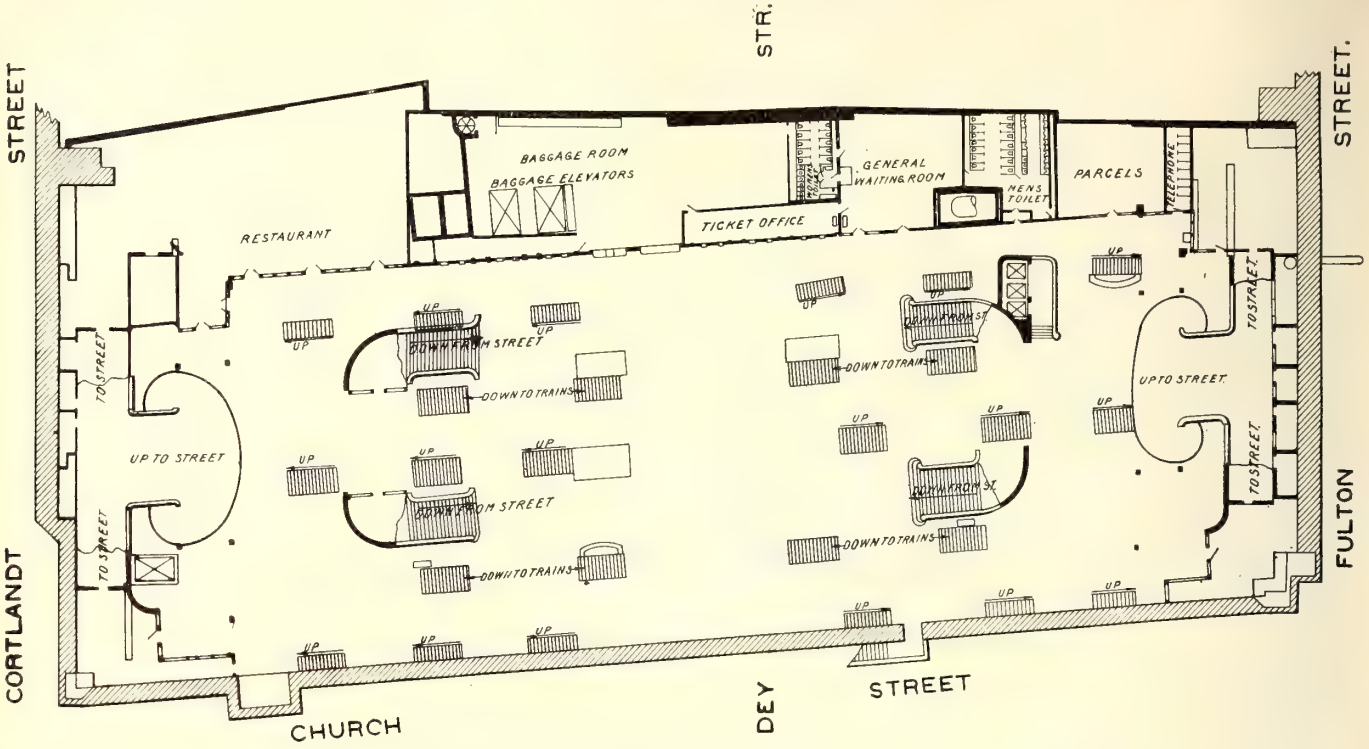
The new terminal station occupies three floors below ground of the enormous Hudson Terminal Buildings, fronting on Church Street and extending from Fulton Street to Cortlandt Street. These twin buildings, which are separated by Dey Street, are the largest office buildings in the world. They have a frontage on Church Street of 400 ft., a depth



Hudson Terminal—Concourse Level, Showing Stairways Leading to Train Platforms Below

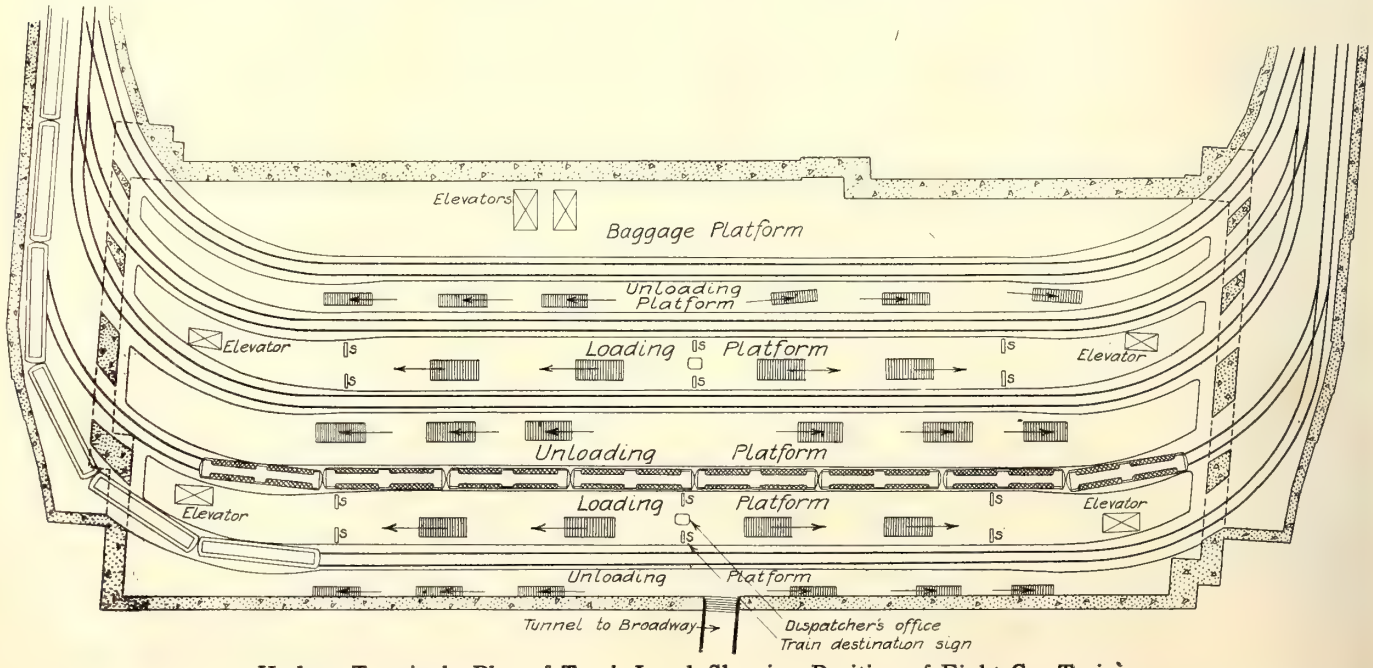
of 175 ft., and rise 22 stories above ground. They contain nearly 25 acres of floor space.

There are four main entrances and exits from the station concourse, which occupies the first level below the street. While the concourse was planned to have two main entrances and two main exits, all four may be used by either incoming or outgoing passengers. The accompanying plan of the concourse floor shows the arrangement of entrances and exits, which is designed to segregate the incoming crowds from the outgoing crowds, so as to prevent as far as possible any confusion or counter movements. The entrances to the concourse are from both sidewalks on Dey Street. Wide corridors in both buildings lead to stairways running down to the concourse level. These stairways divide at the landing half way down, and discharge inbound passengers in two streams, each directed toward the entrances of the two loading platforms on the track level. The exits from the concourse are broad curved inclines or ramps running up to the sidewalk on Cortlandt Street at one end and to Fulton Street at the other end. The stairways up from the unloading platforms on the track level direct their streams of passengers toward these exit ramps without mingling or crossing the streams of incoming passengers who are about to take trains.



Hudson Terminal—Plan of Concourse Level

The loop tracks, five in number, occupy the level immediately below the concourse, and below this is still another level, on which are located the substation, ventilating apparatus, workroom, miscellaneous storage space and the engine and boiler rooms of the power station which supplies the utilities of the buildings.

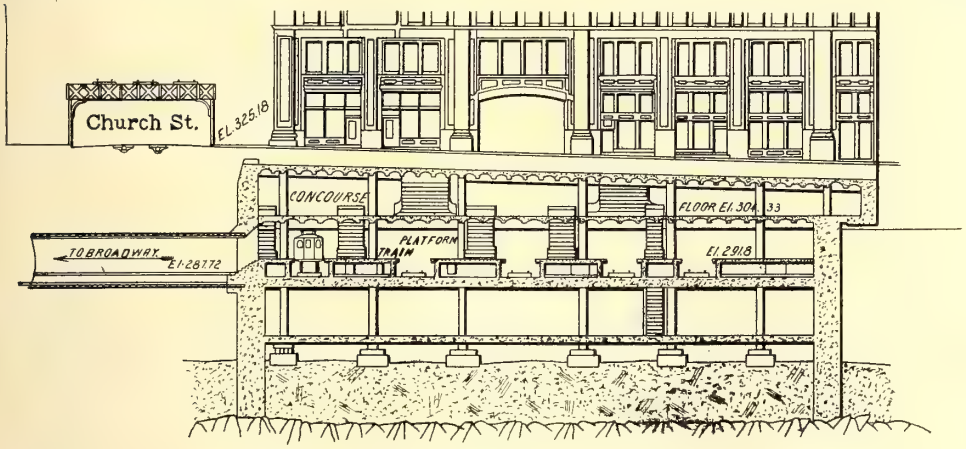


Hudson Terminal—Plan of Track Level, Showing Position of Eight-Car Train

CONCOURSE LEVEL

The public has free access to all parts of the concourse

floor. Much of the space on this floor is taken up by small shops and booths, in which almost every conceivable kind of merchandise will be sold. Included among the concessions for which space has already been rented are a meat market, drug store, trunk store, restaurant, etc. Both the Western Union and the Postal Telegraph companies have offices on the concourse and ample telephone service, with local switchboard operators, is to be provided in a convenient location next to the parcel room. The stands and booths are of uniform and attractive design, harmonizing with the simple but handsome finish of the main aisles and walls. They occupy the space between the building columns and in the corners, leaving unobstructed broad aisles leading to all the entrances and exits and the stairways to the train platform level. The walls and columns of the concourse level are painted light cream color above a white tile wainscoting. The wainscoting is surmounted by a molding of dark green tile, ornamented with circular medallions of conventional flower design. The concourse is brilliantly lighted with rows of ceiling clusters of incandescent lamps inclosed in ground-glass bowls.



Hudson Terminal—Cross Section at Dey Street

On the west side of the concourse floor will be a large restaurant, baggage room, ticket offices of the Pennsylvania, Lehigh Valley and Erie railroads, the terminals of which are reached by the tunnel trains, a general waiting room, with toilet rooms for men and women, and a parcel check room. The three steam railroads mentioned will sell through, commutation and local tickets. These three roads will also prepare their timetables for through and local trains so as to show arrival and departure from the tunnel station.

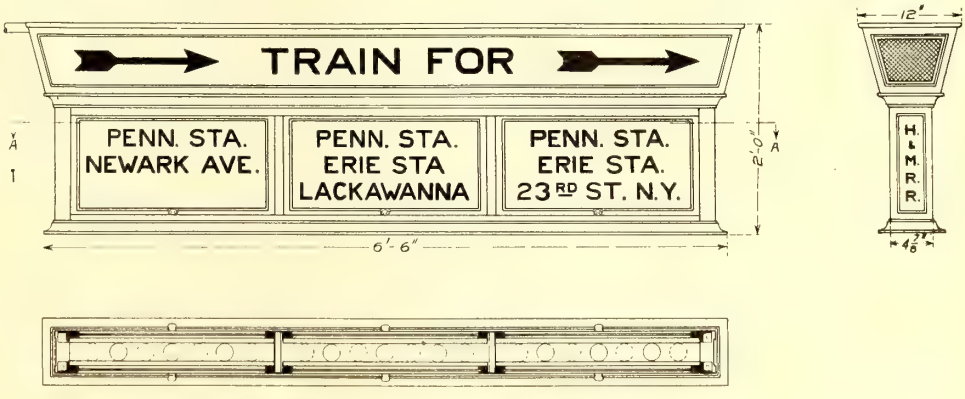
The women's toilet, rest parlor and check rooms will be most comfortable and elaborate, occupying together some 900 sq. ft. A large towel and a special cake of soap will be furnished to those who want them for 5 cents. Hairpins and other small toilet necessities will be provided gratis, and a maid will be in constant attendance. A long pier glass will also be one of the attractions of the waiting room. Except in the larger hotels of New York, no such conveniences for women have ever been provided.

TRAIN PLATFORMS

As will be seen from the plan of the track level, the station contains five tracks and six platforms. Only four of these tracks, however, will be used by passenger trains. The westerly track will be used for baggage trains and supply trains carrying coal to the power station of the building and removing ashes. The passenger cars to be operated in the tunnels are built entirely of steel and all have end doors and center side doors. The platforms in the station have been arranged to completely segregate passengers boarding and alighting. A train coming into any one of the tracks in the station is inclosed by a loading platform on one side and an unloading platform on the other side. The three doors on each side of the cars permit unrestricted entrance from one platform and simultaneous exit to the other platform without creating any confusion or interference. Separate groups of stairways leading to each platform from the concourse above prevent any interference in the movement of passengers up or down.

The station platforms are 370 ft. long, which permits the operation of eight-car trains. The entrance curves to the station loop tracks are of 90-ft. radius. The plan of the track level shows an eight-car train standing in the station. It will be seen that the length of straight track is sufficient to permit all of the cars to be entered or left without danger, from any one of the three doors on either side. The three platforms which serve tracks on each side are approximately 21 ft. wide. The two unloading platforms for the outside tracks, Nos. 1 and 4, are narrower in width. The supporting columns of the building rise through the platforms, but they are not symmetrically placed along the center lines. There is ample room, however, between the columns or the staircases and the edges of the platform to permit movement of passengers toward or away from the doors of the cars without jostling or crowding.

Four stairways lead down from the concourse to each of the two loading platforms and six stairways lead up from each of the unloading platforms. Ticket boxes are placed at the top of each of the stairways leading down to the loading platforms, so that passengers drop their tickets just before descending and boarding the trains. The ticket selling booths, 15 in number, are situated on the concourse floor, so as to be conveniently reached by passengers entering the station by any of the entrances or exits and before reaching the stairs to the loading platforms. The ticket booths are built of oak and, as will be seen in one of the illustrations, are triangular in shape, so as not to obstruct the entrances to the aisles leading to the stairways. A



Hudson Terminal—Train Announcer Sign

number of portable ticket booths mounted on wheels will be used during rush hours.

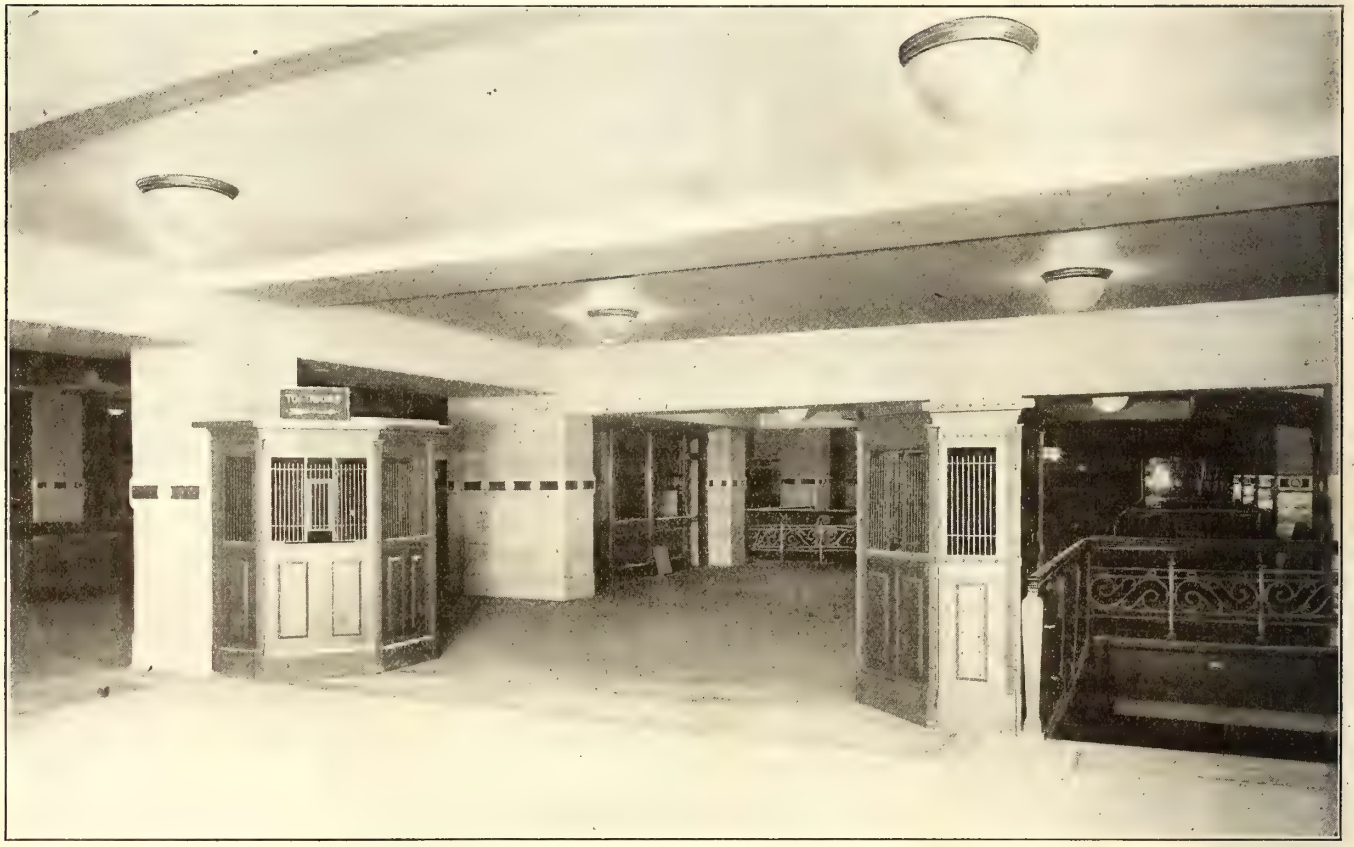
The train platforms are built of reinforced concrete with granolithic finish. The walls and columns on the platform level are covered with white glazed tiles from floor to ceiling. Frames for displaying advertising posters are formed by white tile moldings which harmonize with the plain white finish of the walls and will not accumulate dirt. These frames are built in on all four sides of the columns on the platforms, and at frequent intervals along the side walls.

LIGHTING

The platform level is lighted with five-lamp ceiling clusters inclosed in ground glass bowls. The edges of the platforms are also illuminated with rows of incandescent lamps. Most of the ceiling clusters are connected on the 240-volt, three-wire, direct-current light mains, which also supply the offices on the upper floors of the building. At frequent intervals, however, a cluster of five incandescent lamps, forming part of the ceiling illumination, is connected to the third-rail power circuit. This insures against total darkness in the station in case the lighting circuits to which most of the ceiling clusters are connected should fail. The lamps on the edges of the platforms are also connected to the third-rail power circuit. No automatic switches have been installed to cut in outside sources of current in case the local supply should fail, but the switchboard in the substation in the basement of the building is connected through a hand-operated cut-out switch with the mains of the New York Edison Company. This makes available almost instantaneously an independent source of current. A large storage battery which floats on the building lighting circuits affords a supply of current for short periods without any interruption to the lights in case the rotaries in the substation or the generators in the power house should momentarily fail.

BAGGAGE HANDLING FACILITIES

Inasmuch as the new tunnels will make connections with the steam railroad stations on the New Jersey side, provision was made for handling baggage as well as passengers to and from the terminal station. A baggage receiving and delivery room has been built on the street level facing on Dey Street. From this receiving room two hydraulic plunger elevators run down to the basement level under the train platform level. It was the original intention to run a baggage car as the last car of each passenger train, and baggage elevators were installed at both ends of each of the two loading platforms. These elevators run down to the floor below, where trucking passages are provided, leading to the two main baggage elevators running up through the westerly platform to the receiving room on the street level. Since the station was completed a change has been decided upon in the method of handling baggage, as it was thought that an attempt to operate baggage cars as part of the regular passenger trains would introduce chances for delay. The company is having built two special baggage cars, which will run as a separate train, loading and unloading only from the baggage platform on the west side of the station and making as many trips as are necessary during the day.



Hudson Terminal—Ticket-Selling Booths on Concourse Level

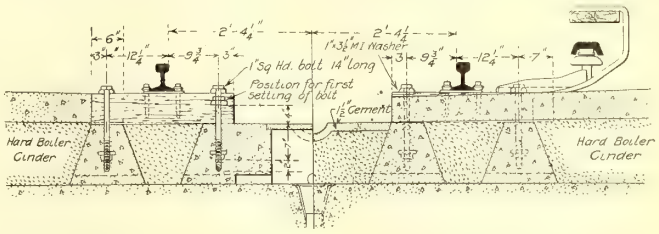
TRAIN ANNOUNCERS

The initial service in the downtown tunnels will be only to the Pennsylvania railroad station in Jersey City and return, but after Aug. 2 trains will be run on three routes: To the Pennsylvania station and Newark Avenue, Jersey City; to the Pennsylvania, Erie and Lackawanna stations, and to the Pennsylvania and Erie stations in Jersey City, returning under the Morton Street tubes to Twenty-third Street and Sixth Avenue. To avoid confusion on the platforms, illuminated train announcer signs have been installed, six on each loading platform. The construction of

these signs is shown in one of the drawings. The sign consists of a narrow box, 6 ft. 6 in. long, 2 ft. high and 5 in. thick, supported transversely from the ceiling near the edge of the platform. Both sides of the box are formed of three panels of ground glass, behind which are sheet brass stencils showing the three routes for trains. Mounted between each pair of panels are six incandescent lamps connected in groups of three. The panels are surmounted by a sign with two arrows pointing toward the track and reading, "Train For." The lamp circuits are controlled either from the signal cabin on the baggage platform or the dispatcher's office. As a train enters the station a switch is closed illuminating the proper route panel in all three signs on the side of the loading platform from which the train departs. Similar signs actuated automatically on the approach of a train, through contacts alongside the track, are being installed at all stations on the Sixth Avenue extension.

TRACK CONSTRUCTION

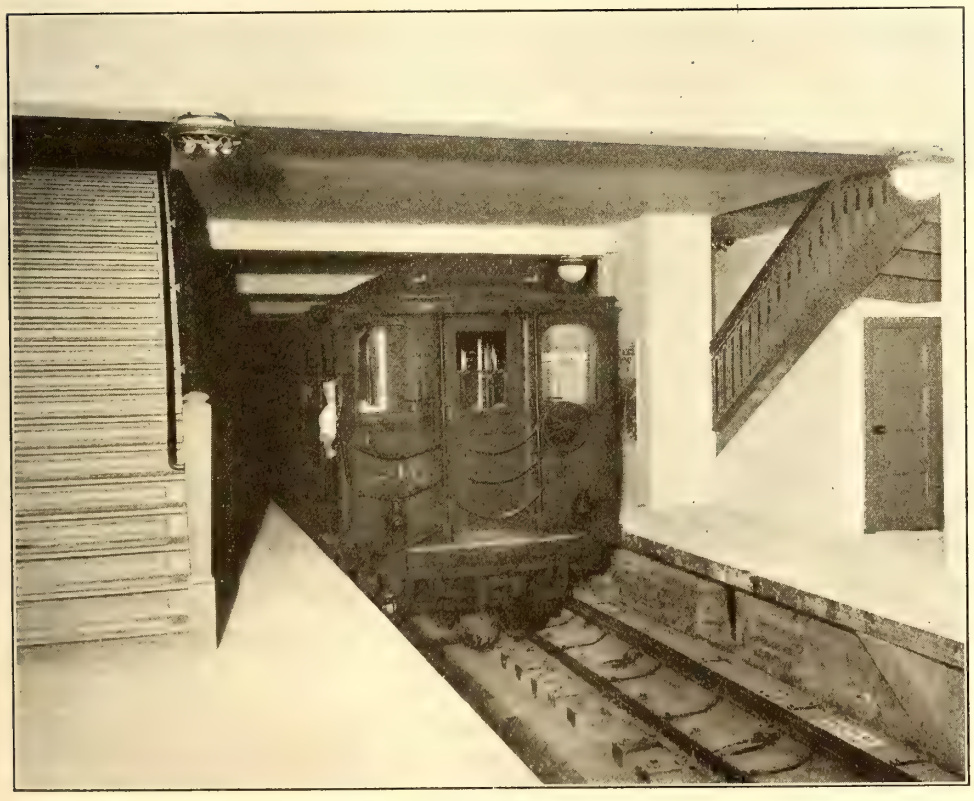
The track construction in the station is shown by one of the drawings. The substructure under each rail consists of two truncated triangular prisms of concrete. The anchor bolts for holding the short pieces of ties on which the rails rest are embedded in the concrete as it is set. These bolts are 14 in. long and are threaded for a length of about 5 in. Before setting in the concrete the nut and washer on the lower end are screwed up on the threads about 3 in. and the head of the bolt is held in position a distance of about 2½ in. below the top of the ties while the concrete is allowed to set. When the concrete is set the bolts are turned out of the nuts embedded in the concrete and the short pieces of ties, from 28 in. to 32 in. long, are put in place on top of the two concrete prisms, with a spacing of 18 in. center to center. The anchor bolts are then screwed down tight in the nuts embedded in the concrete and the space below the ties between the two truncated prisms under each rail and between the rails is filled up level with the bottom of the ties with hard boiler cinders. The space between the inside ends of the ties is then covered over with 1½ in. of cement. The space between ties under the rails and outside of the ends of the ties is filled in flush with the bottom flange of the rail with concrete laid on top of the boiler cinders. The rails are fastened to the short pieces of ties with tie plates held by two screw spikes. This construction provides a smooth, hard surface for the top of the roadbed, which can be washed off at frequent intervals. A gutter is formed in the center of the track sloping to drains connected to the sewer to carry off water.



Hudson Terminal—Track Construction in Station

The third-rail is an inverted channel section weighing 75 lb. per yard, and is mounted on porcelain insulators supported by malleable iron brackets bolted to every seventh tie. It is protected by a 9-in. plank mounted above it.

All special track work in the station is of Manard steel, furnished by the Pennsylvania Steel Company. The frogs are of solid construction and the switches are of the double-tongue type. Both tongues are connected to the switch-operating mechanism so that they work together.



Hudson Terminal—Train Standing in Station

VENTILATION OF STATION AND TUNNELS

Experience in the operation of the uptown tunnels of the Hudson & Manhattan system proved to the engineers that with trains running in separate tubes, which for the most part pass through soil saturated at all times with water, there was little difficulty in maintaining good natural ventilation in both the tunnels and the stations, and, furthermore, that the temperature of the air in the tunnels was uniformly cooler than that on the streets during warm weather. In designing the downtown tubes and terminal station, therefore, dependence was placed largely on natural ventilation. Fans have been provided in the station, however, to accelerate the movement of air if it is found necessary, and suitable chambers have been provided in the land tunnels on the Jersey side, so that ventilating apparatus can be installed in that section if found necessary.

The ventilation of the concourse and track level of the terminal station is entirely independent of the general ventilating scheme installed in the building for the offices on the upper floors. An intake tunnel has been driven under the inbound train tunnel for some distance toward the river and suitable openings connecting the intake tunnel and the

train tunnel have been provided. Air is drawn out of the inbound river tunnel through these openings and the intake tunnel by two fans located in the basement below the track level. These fans, which were furnished by the Massachusetts Fan Company, have a capacity each of 57,000 cu. ft. of air per minute. They are 160 in. in diameter and are driven by direct-connected motors. They exhaust the foul air drawn out of the tunnels into an uptake flue, which extends up to the level of the roof of the building. Adjoining this exhaust flue is a fresh-air flue, which also passes down to the basement level, and from which air is drawn for cooling the transformers and rotaries in the substation. No air is drawn from this flue directly into the terminal station. At the north end of two of the platforms of the station there have been installed motor-driven fans, each with a capacity of 15,000 cu. ft. of air per minute. These fans draw air out of the station and discharge it through suitable passages into the outbound tunnel some distance beyond the station. With the aid of these four fans it is believed that the piston action of the trains in the two tubes will be ample to maintain a satisfactory circulation of air in both levels of the station.



Hudson Terminal—Station Under Erie Railroad Terminal in Jersey City

SIGNALS

The installation of the interlocking switches and automatic block signals in the new tunnels was made by the Union Switch & Signal Company. Interlocking machines have been installed at the terminal station, the Jersey City station, and at the junction with the uptown river tunnels south of the Hoboken station. Between the limits of the interlockings both tracks have been equipped with automatic home and distant block signals and automatic stops. The distinguishing feature of the entire signal installation is the use of alternating current throughout, both for the track circuits and for the operation of all signal relays, signal lamps and locking circuits in the four interlocking machines.

The automatic block signals have been located so that trains running on a two-minute headway at the normal operating speeds in the different parts of the tunnel will always have a clear distant signal ahead of them. The automatic stops are connected on the two-block overlap system; that is, two block sections always separate one train from another. At the entrances to the stations the overlaps have been considerably shortened so as to reduce the delay in running into the stations to the minimum. The block signals consist of two circular iron casings mounted one above the other on the tunnel wall. The upper case or home signal shows on red and one green lens, behind each of which are two incandescent lamps connected in multiple across the lighting mains. The lower case or distant signal shows two similar lenses of yellow and green glass, behind each of which are mounted two lamps. The lamps burn continuously behind one of the two lenses in each case. Current is shifted from one pair of lamps to the other when the signal changes from stop to clear or caution to clear by auxiliary relays controlled by the track circuit relays. No slides or shutters are employed, and in this respect the signals differ from those installed in the uptown tunnels, which employ only one set of lamps and have a moving shutter which passes between the lamps and the lenses, blanking one lens to display the other.

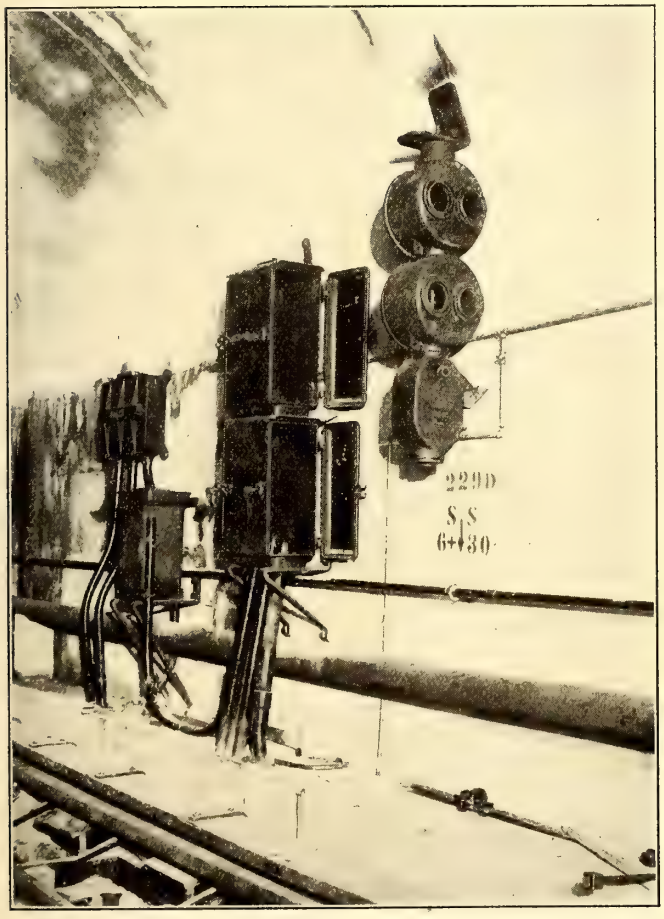
Double-rail, alternating-current track circuits are employed with inductance bonds at each cut-section. This is substantially the same system of track circuits as that installed by the Union Switch & Signal Company on the West Jersey & Sea Shore Railroad.

A compressed air supply pipe is carried through the tunnels to operate the automatic stops, which are of the electro-pneumatic type, substantially the same as those used

in the Interborough subway. The only difference is in the use of alternating-current magnets on the control valves.

The interlocking plant at the terminal station consists of a 23-lever standard electro-pneumatic machine mounted near the center of the baggage platform, on the west side of the station. This machine has eight levers which control eight switches and two derails, six levers controlling 14 signals, four levers for check locking between the terminal station and the Jersey City station and five spare levers. The interlocking signals are of the same type as the automatic block signals, and the switch-operating mechanisms are of the standard electro-pneumatic type, with alternating-current magnet valves. No detector bars are used on the switches, the switches being locked up in the machine by track circuit locking.

The principal signals in the station are the starting signals mounted on the north end of each of the platforms.



Hudson Terminal—Automatic Block Signals in River Tunnels

Similar signals are mounted on the south ends of the platforms for emergency use in case it is necessary to reverse the direction of traffic in the tunnels. These emergency starting signals are connected with repeating signals which are mounted in plain view of the motormen at the platforms. The remaining signals are the route signals at the entrances to the station loop tracks from the inbound main track.

The signal tower which contains the interlocking machine is located in such a position that the operator cannot see all of the trains in the station. This difficulty is overcome by the use of an illuminated track diagram mounted above the interlocking machine and showing by lights whether any section of the station tracks is occupied or unoccupied. The diagram consists of a ground glass plate, on which the tracks are marked, and behind it are groups of small incandescent lamps. These lamps burn when the tracks are unoccupied and are extinguished behind each section of the tracks shown on the diagram which is occupied by a train. The illumination of the diagram is controlled through relays inserted in the track circuits within the station limits. The illuminated diagram not only includes the station tracks, but also includes both of the river tunnels as far as the Jersey City station, and the movement of a train from the time it leaves Jersey City is continuously indicated in the diagram. Track circuits within the limits of the interlocking cover the entire length of each track and use only a single rail circuit instead of both rails, as in the automatic block sections.

At the Jersey City station a 17-lever electro-pneumatic machine controls the movements of trains through the junction to the Hoboken extension tunnel and the Newark Avenue tunnels. As already mentioned, the Newark Avenue extension tunnels have been constructed for a short distance to provide storage and switching tracks, and the interlocking machine has been installed at this point to handle the temporary shuttle service. When the tunnels to Hoboken are opened this machine will not be required under normal operating conditions.

Provision has been made for reverse movement of trains between the terminal station and the Jersey City station by the introduction of check locking between the two machines at each end of the tunnel. This, in effect, creates a single block section between the terminal station and the Jersey City station, which can be occupied by only one train at a time.

At the junction of the Jersey City tunnels with the Hoboken tunnels the tubes are at two different levels and two separate 11-lever machines have been installed, one for each track. Both of these machines, however, are mounted in a signal tower at the level of the north-bound track. Illuminated track diagrams have been provided in connection with both machines, and it is believed that there will be no difficulty in manipulating the machines, even though the operator cannot see the approaching trains on the south-bound track.

Current for the operation of the signals and interlocking plants is taken from 1100-volt mains leading from the power house in Jersey City. Small transformers are installed at each signal to step down this current to 55 volts, 25 cycles. Twenty-five-cycle current at a low voltage is used for the track circuits.

SUBSTATION

In the basement of the building, below the train platform level, a large substation has been constructed which will convert the high-tension alternating current from the power house in Jersey City into 600-volt direct current for the third-rail circuits on the New York side, and also will supply 240-volt, direct current for all lighting and power circuits in the Terminal Buildings. This substation occupies a space 87 ft. x 59 ft., and is entirely enclosed from the surrounding space on the lower level by heavy fire walls. It contains at the present time two 1500-kw G. E. rotary converters for the railway load and four 750-kw G. E. rotaries for the lighting and power load in the building and station. Foundations have been provided for two additional 1500-kw units, giving the station a total ultimate capacity of 9000 kw. Each of the railway units has a separate set of three 750-kw, air-cooled transformers, taking 11,000-volt, 25-cycle current from the transmission line leading through the river tunnels from the Jersey City power

house and delivering 390 volts on the secondaries. The rotaries deliver direct current at 625 volts to the third-rail feeders. The four lighting and power units supply all the lights in the buildings, as well as the elevator motors, electric pumps and ventilating fan motors. Each unit has three air-cooled transformers delivering current at 178 volts, which is converted into direct current at 240 volts. A three-wire distribution system is used throughout the building, giving 120 volts across the lamps. Potential regulators are attached to the circuits of each of the lighting and power rotaries.

The switchboard is on the operating floor at the north end of the room, and the oil switches on the high-tension line are mounted on a gallery above. Overhead crane runways divide the station longitudinally into two bays, each served by a hand-operated traveling crane. The station is lighted by Cooper Hewitt mercury vapor lamps suspended from the ceiling. Cooling air for the transformers is supplied by motor-driven fans, taking cool air from a fresh-air intake flue running down from the roof level of the building.

TRAIN SERVICE

The initial service in the downtown tunnels will be a regular 3-minute headway during the day and early evening. Five-car trains will be run during hours of light traffic, and during rush hours the number of cars per train will be increased to eight.

The traffic to be handled is very large. Careful studies indicate that the ferries to New Jersey carry 128 million passengers each year. It is estimated that the tunnels should carry at least 60 per cent of this traffic, or 77 million passengers, based on present travel. Allowing for the natural growth of traffic with improved facilities, the number of passengers which will be carried under the river within a few years will probably increase to 100,000,000 per annum. This traffic, of course, will be divided between the uptown and downtown tunnels. The maximum capacity of the tunnel system is estimated to be 220,000,000 passengers per year when eight-car trains are operated on 1½-minute headway.

The Pennsylvania Railroad has announced that all tickets to and from New York over its lines will be honored for passage through the tunnels to the terminal station only on and after July 19, the date of opening the tunnels. The ferry service from Jersey City to Cortlandt Street, Desbrosses Street and Twenty-third Street will be continued, and passengers will have the option of using either the boats or the tunnels. All tickets, whether commutation, local, excursion or through interline, will be honored at the terminal station for passage to Jersey City. In the opposite direction, tunnel coupons will be attached to all one-way and excursion tickets to New York from Philadelphia and points east of Philadelphia, which will be collected at the entrance to the elevators in the Jersey City station, where commutation tickets will also be punched. Passengers on through trains from the south and west will be supplied with tunnel tickets on application to the train conductor before arrival at Jersey City. For the present, baggage will not be handled through the tunnels. For each of the through trains leaving from Jersey City a special connecting tunnel train will leave the terminal station 5 minutes after the leaving time of the Cortlandt Street ferry and 10 minutes after the Twenty-third Street boat. The running time of trains to the Pennsylvania station in Jersey City will be 3 minutes, to the Erie station 6 minutes and to the Delaware, Lackawanna & Western station in Hoboken 10 minutes.

The men who have been conspicuous in the promotion of the Hudson Tunnel System are: Walter G. Oakman, president of the construction company, known as the Hudson Companies; William G. McAdoo, president of the Hudson & Manhattan Railroad Company, and Pliny Fisk and William N. Barnum, of the banking house of Harvey Fisk & Sons. The civil engineering features of the tunnels and the design of the stations have been worked out by Charles H. Jacobs, chief engineer, and J. Vipond Davies, deputy chief engineer, who have had direct supervision over the construction forces. During a part of the time since the work began as many as 6000 men have been employed. The design and installation of the power house in Jersey City, substations, third-rail, feeders and miscellaneous electrical equipment and also the rolling stock were in charge of L. B. Stillwell, consulting engineer, and Hugh Hazelton, electrical engineer.

The cost of the system when fully completed will be about $70,000,000.

FUNERAL CAR OF THE LOS ANGELES RAILWAY COMPANY

The Los Angeles Railway Company recently placed in service a funeral car designed and built in its own shops. The car body is placed on one of its standard double trucks, which are arranged for the narrow gage of 3.5 ft. It contains a compartment for the casket placed at right angles to the length of the car. This compartment is equipped with rollers similar to those of the usual hearse, and is provided with doors at either side of the car. A passageway opens from this compartment into the passenger compartment, from which the casket with its covering of flowers can be viewed. The passenger compartment, which is designed to seat 24 persons on wickerware chairs, can be subdivided at any desired point by means of heavy curtains to separate the immediate relatives from the other mourners.

Although no attempt has been made at drapery, the interior of the car has a neat chapel appearance, as the arched



Funeral Car of Los Angeles Railway Company

windows and ventilators are built of stained glass, and appropriate colors are used for the silk curtains. The exterior of the car has been given a gray color with gold trimmings, thus proclaiming the mission of the car in a modest way.

The car is equipped with two 50-hp Westinghouse motors, for the operation of which there is an isolated motorman's cab at either platform. When in service, the car is completely enclosed from front to rear, without any exposed platform or passenger step. It was designed by E. L. Stephens, master car builder of the Los Angeles Railway Company, and built under his direction in the company's shops.

INVESTIGATING THE CAUSE OF BREAKAGE OF HIGH-TENSION GLASS INSULATORS*

A few years ago an electric railway company in the Central States built a 30,000-volt transmission line about as shown in the accompanying sketch. Sections A-B-C-F were six wires, the balance three wires. The poles were spaced about 100 ft., and, allowing for double-armed poles, there were approximately 31,000 high-potential insulators on the 112 miles of transmission line. The 10-mile section B-C was first constructed, and in this section about 4000 glass insulators were used, of a type which will be designated as "A." Contracts for the balance of the line were let later, and for the remaining 102 miles approximately 27,000 glass insulators of a type "B" were bought. The two insulators were of somewhat different designs, but about the same size and weight:

	Insulator "A"	Insulator "B"
Outside diameter	7 in.	7½ in.
Total arcing distance, tie wire to pin	6⅝ in.	6 15/16 in.
Total surface leakage distance, tie wire to pin	11⅜ in.	10¼ in.
Distance on surface, tie wire to edge of skirt	4 in.	3¼ in.
Arcing distance, edge of skirt to pin	2⅝ in.	3 11/16 in.
Surface leakage distance, edge of skirt to pin	7⅜ in.	7 in.
Weight	4 lb. 12 oz.	4 lb. 8 oz.

Manufacturer "A" refused to make any electrical guarantees whatever. Manufacturer "B" guaranteed his insulators to withstand certain electrical tests, such as the salt water puncture test at 60,000 volts, a test between a wire tied to the neck of the insulator in the usual manner and the leadfoil-covered surface of the pin upon which the insulator was mounted at 90,000 volts, etc.

Insulator "B" was finally chosen for the 102 miles remaining to be constructed, for the following reasons: Willingness of manufacturer to make electrical guarantees; similarity in size and weight of the two insulators,

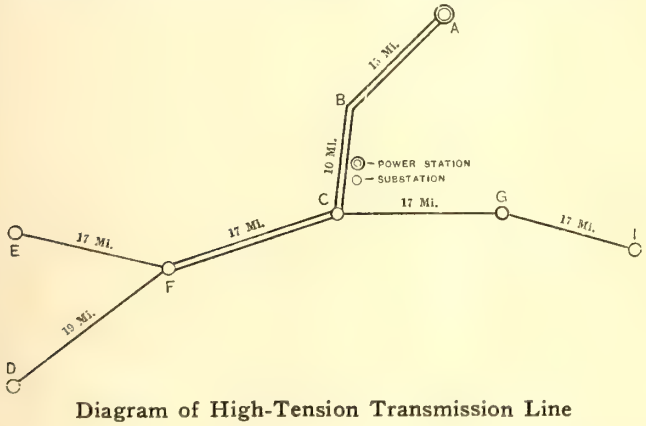


Diagram of High-Tension Transmission Line

"B" having the advantage as to greater arcing distance, which was considered important; and a much lower bid price on the "B" type insulator. The contract for 27,000 insulators furnished by manufacturer "B" specified the type and design of the insulator by its catalog or trade designation, and also specified that each insulator furnished should be capable of withstanding the electrical tests before mentioned. The contractor guaranteed the fulfilment of these specifications, and also that, "except where otherwise specified, material shall be of the first quality, and workmanship of the best."

*Abstract of paper by Albert S. Richey, E. E., and Frederick Bonnet, Jr., Ph. D., read before the Worcester Polytechnic Institute chapter of the Sigma Xi Society.

The transmission line having been built and operation started with a line voltage of approximately 30,000, the "B" type insulators began to break down. From the first accurate records were kept, showing in each case of breakdown the date, hour, length of time during which operation was interrupted, weather and temperature conditions, etc. Although there was no absolute uniformity, the breakages occurred most frequently in rainy weather. The following statement shows the total number of failures, by months, during the period in which the "B" type insulators were in service:

October (half month)	28	August	18
November	33	September	28
December	24	October	16
January	66	November	59
February	60	December	102
March	63	January	51
April	5	February	40
May	6	March (nine days)	9
June	24		
July	17	Total	649

This list includes only the "B" type insulators, of which the total number in service was about 27,000. During this period but one "A" type insulator failed in the same service, of a total of 4000 in use.

About 100 miles of electric railway was dependent upon this transmission line for power. Four of the six substations contained regulating storage batteries which were capable of carrying the ordinary total load on those substations for 20 to 30 minutes. Failure of power supply for even five minutes was sufficient to interfere with schedules, while a failure lasting 20 minutes or more meant their complete demoralization. If the defective insulator was in sections A-B-C-F, where the transmission line was in duplicate, it was sometimes possible to operate all substations through the remaining one of the parallel transmission lines. Often, however, both circuits would be affected; in this case, or if the trouble was in one of the other sections with but a single transmission line, all substations beyond the defective section were without power until the defective insulator was located and replaced.

The company repeatedly called upon the manufacturer to replace the "B" type insulators. At first this was met by a policy of delay, the manufacturer holding that a few defective insulators were to be expected in so large a lot. Later, he refused to replace the insulators, and the company, declining to pay for them, replaced them with "A" type insulators. Since that time the operation of the transmission line has been entirely satisfactory, and the number of insulator breakages has been normally low—a total of about 20 out of some 31,000 insulators in service for four years.

Following the traction company's refusal to pay for the "B" type insulators the manufacturer sued for payment. His claim was that a certain type of insulator had been specified and that type furnished, also that such tests as were specified in the contract had been made and successfully met. These claims the traction company did not deny, but raised the point that the guaranty as to workmanship and material had not been met, in that the insulators had been improperly, imperfectly or unevenly annealed. The effect of poor annealing was shown to decrease the specific resistance of glass, thus allowing more leakage current to pass through to the pin and abnormally heat the insulator; also to set up uneven and abnormal stresses in the glass, thus rendering it less able to withstand the mechanical strains due to expansion and contraction. This argument

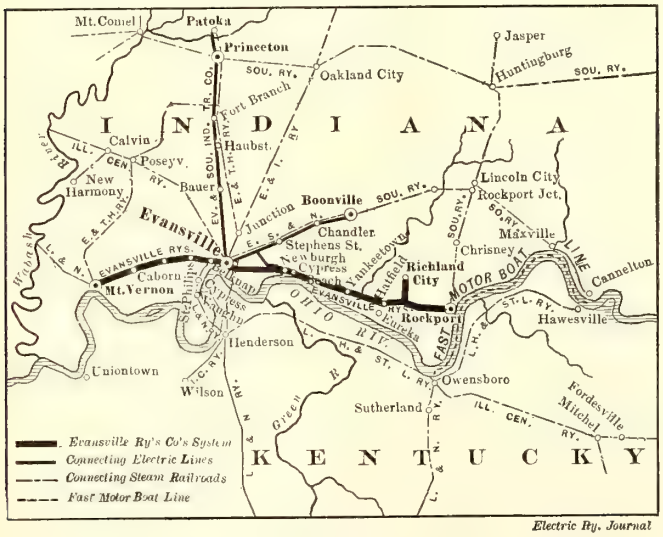
was strengthened by these facts: That insulators broke after current was applied to the line; that more insulators broke during rainy than during dry weather, and that the "A" type insulators on the same transmission line suffered practically no breakage during the time that the "B" type was breaking constantly.

Tests by polarized light proved type "B," although of the same chemical composition, was subjected to stresses caused by improper annealing, while in type "A" there was an almost entire absence of stresses. In carrying out the tests each insulator was so mounted that when it was rotated about its pin axis the same thickness of glass skirt was always presented between the polarizer and the analyzer, which previously had been arranged so as to allow no light to pass. Stresses in the insulator were indicated by the varying intensity of light and by color changes. The insulators showing stresses had been poorly annealed. Under service conditions they became heated on account of conductive leakage and were destroyed.

The polarized-light method is valuable in detecting poor insulators, although the tests can be considered as only qualitative.

COMBINATION LIMITED TROLLEY AND BOAT SERVICE

The Evansville (Ind.) Railways Company has recently installed a limited service in connection with a fast motor boat line serving towns on the Ohio River, both above and below Rockport, the eastern terminus of the interurban route. Two limiteds make the run each way daily from Evansville to Rockport, 31 miles, in one hour and four minutes. Local trains on hourly headway make the same run in 1 hour and 20 minutes. The boat service is operated between Rockport and Cannelton, 25 miles up the river, and Rockport and Owensboro, Ky., 10 miles down the river. Each limited connects with a boat for Owensboro. The Cannelton boat connections, with one exception, are local trains. The success of this service has been due largely to its regularity. The fast passenger motor boat which connects with the interurban trains is 90 ft. long and has a capacity for 150 passengers. The interior of the boat is attractively finished in leather, and it is driven by a 75-hp gasoline engine. The railway company has improved the wharf at Rockport so that the transfer from trolley to boat and vice versa is made without discomfort.



Electric Ry. Journal

Map of Evansville Railways Company System

the river south of Evansville and extends parallel with the river to Owensboro. The one-way steam fare is $1.50, while the electric fare is 85 cents. The round-trip steam fare is $3 and the electric round-trip fare is $1.45. The running time of the steam trains is 1 hour and 45 minutes, and of electric trains in combination with the boat service 1 hour and 55 minutes. This paper is indebted to W. H. Carson, general manager of the Evansville Railways, for the above information regarding this interesting combination of boat and trolley service.

PUBLICITY CAMPAIGN IN BIRMINGHAM

For the last two years the Birmingham Railway, Light & Power Company has been publishing a number of articles in the daily papers of that city in connection with a vigorous publicity campaign which it has been conducting. The service supplied by the company is lighting and power as well as railway, so that the announcements referred to both its lighting and railway interests, but most of them discussed matters relating to the railway service, as that is the one in which the relations of the company with the public are most intimate.

One of the announcements early this year was entitled "Some Facts About the Lighting Business." The point was made that if a man buys an automobile he figures that it will not last over two or three years, and improvements in manufacture are so constant that existing machines are relegated in a few years to the scrap pile. The company explains that this condition also holds true with a lighting plant, and states that with the exception of one small machine and a single boiler there are no machines in its power plant that were in operation in 1901. Since that time the company has installed 19,000 hp of boilers, with a corresponding equipment of generating apparatus, and has expended $1,696,000 in the equipment. Nevertheless, the rate for current has been reduced from 16 cents per kw-hour in 1905 to 12 cents for lighting and 7 cents for power. At the same time the company has improved its rolling stock, and its latest cars cost $8,200 each.

Another advertisement calls attention to the increase in taxes and licenses paid during the past years, and is as follows:

AN INCREASE OF 486.31 PER CENT IN OUR TAXES AND LICENSES IN 6 YEARS.

Will any other business firm or corporation in the State of Alabama show such an enormous increase in taxes and licenses as ours, 486.31 per cent in six years?

And in that time our earnings have only increased about 100 per cent, so that our taxes and license charges are increasing at a ratio almost five times as rapidly as our earnings.

In 1903 we paid $26,525 for State, county and city taxes, and licenses, and in 1908 we are paying $155,519.53, an increase of $128,994.53 in six years, or 486.31 per cent. The following table will show the amount of taxes and licenses paid each year, the amount of increase and percentage of increase over the preceding year:

Year.	Amount taxes, etc.	Amount increase over preceding year.	Per cent increase over preceding year.
1903.....	$26,525	.....	...
1904.....	35,879	$9,354	35.3
1905.....	42,311	6,432	17.9
1906.....	66,480	24,169	57.1
1907.....	127,911	61,431	92.4
1908.....	155,519	27,608	21.6
Total increase 6 years.....		$128,994	% inc. 6 yrs. 486.31

Thus it will be seen that taxes, licenses, etc., have grown out of all proportion to the growth of our business or the enhancement of our property value. Weigh these figures carefully and think of what a drain an increase of 486.31 per cent in taxes would be on your business in six years.

The statement above shows that we are doing more than our share toward paying the expenses of the State, city and county.

Another calls attention to the greater luxury and higher speed furnished by the modern cars, and cites the increased cost of living expenses, with the exception of lighting and transportation. The figures on the cost of foodstuffs and

the general expenses of living are quoted from the United States Bureau of Labor. This bulletin follows:

COST OF LIVING CONSTANTLY INCREASING; PUBLIC SERVICE IS CHEAPER.

Every housekeeper, every head of a family, every merchant, every man or woman who buys food, fuel or clothing knows that the cost of living has increased rapidly in the past 10 or 12 years, and is constantly increasing.

While that portion of your necessary living is growing more expensive, public service has been getting less and less costly all these years. By public service we mean gas, electricity and street car service. Our statement can be easily confirmed by turning to any records, or by exercising the memory a little. And while this service is being furnished to you cheaper, labor, fuel, raw materials, finished products and everything else that is used in the manufacture of gas and electricity and furnishing car service has become more expensive. More modern methods, better management and increased business enable us to reduce the cost of public service to you.

For instance, as late as July, 1905, electric current for lighting was 16 cents per kilowatt. Now it is 12 cents, a reduction in four years of 25 per cent.

At one time gas cost $2.65 per thousand cubic feet. In 1901 gas in Birmingham cost the consumer $1.65 per thousand. On the consolidation of this company it was reduced to $1.35 per thousand, and about a year later the cost was still further reduced to $1.10 per thousand, a reduction of 33⅓ per cent in less than eight years.

To-day the passenger on the street car rides farther for 5 cents than he did in 1901, and, in addition, receives a transfer which materially increases the earning power of his nickel. The following table shows the average fare per passenger earned by this company since 1902, showing that travel has grown constantly less expensive to the patron of the cars:

Year.	Earnings per passenger.
1902	.0520
1903	.0480
1904	.0480
1905	.0450
1906	.0440
1907	.0418
1908	.0412

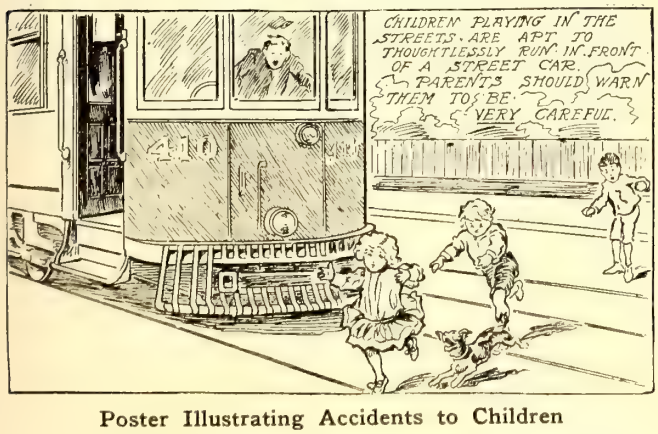
Since 1901 the amount received per passenger has decreased from .0520 cent to .0412 cent, a falling off of .0108 cent, which is a reduction of 20 per cent in the cost per ride to passengers. Transfers over all lines and the rapidly increasing use of transfers are responsible for the reduction.

On the other hand, foodstuffs and the general cost of living have advanced, as the following figures from the bulletins of the United States Bureau of Labor show:

Article.	How sold.	1904.	1907.
Dried apples	per pound	.1250	.1417
Dry beans	per quart	.1250	.1396
Rib roasts	per pound	.1750	.2104
Chuck steak	per pound	.1000	.1250
Round steak	per pound	.1500	.1667
Sirloin	per pound	.1788	.2050
Bread	per loaf	.0500	.0500
Bread	per pound	.0667	.0667
Canned beef	per pound	.1250	.1250
Butter	per pound	.3500	.3792
Chicken	per pound	.1925	.1933
Coffee	per pound	.2500	.2500
Meal	per pound	.0177	.0222
Flour	one-eighth barrel	.8458	.9125
Leaf lard	per pound	.1250	.1500
Leg mutton	per pound	.1700	.2167
Pork chops	per pound	.1563	.1813
Salt pork	per pound	.1250	.1425
Potatoes	per peck	.3136	.3375

To summarize our statements, you, as our customer or street car patron, are getting more service for less money and you are getting better service for less money, in nearly all cases, and in others you are getting better service for the same money, which is equivalent to the same service for less money.

In still another bulletin there is a graphical representation of the distance which a passenger can travel on the



Poster Illustrating Accidents to Children

lines of the company in 1909 for a single fare as compared with that possible 10 or 20 years ago.

The bulletins, however, have not all been devoted to financial matters. Several of them discuss the subject of accidents. One told what the company was doing to prevent accidents. It explained that every modern device has been applied, with the result that the company has practically eliminated certain kinds of accidents. In its campaign to reduce accidents it had applied automotoneers to the controllers to get rid of the sudden jerks often claimed in damage suits. It had placed guards on all bumpers to prevent people standing on them. It had published articles dealing with the most common kinds of accidents, and had warned the public against them. It had placed cards on the



Poster Illustrating Accident to Person Alighting from Car

cars, illustrating the right way and the wrong way of getting off the cars, and the management had frequently had earnest talks with the motormen and conductors, individually and in meetings, urging them to be careful. Finally, it had installed gates on all loop cars. The notice in regard to these gates is contained in the announcement following, which was illustrated by views of the platform, showing the gates closed and open.

GATES ON STREET CARS.

Commencing to-day we will inaugurate a new system for the prevention of platform accidents.

On all loop cars, commencing this morning, will be found wire gates which will be opened and closed by the motorman to allow passengers to get on and off the cars. There are gates on both the front and rear end of the cars, and the motorman closes the gates by a lever before he starts the car. This prevents any one from getting on the car after it has started. When the car is stopped, the motorman opens the gates with the same lever. When the gates are closed no one can get off the car.

We have studied this system as applied elsewhere and find that it secures excellent results in preventing platform accidents. We are installing it on all our cars as fast as they can be sent to the shops.

There is a double reason for trying to reduce accidents; the greatest being our desire to prevent suffering in all forms as caused by street car accidents, and in this effort the public should join us heartily, and the other reason is to reduce our annual expense caused by damage suits and claims growing out of accidents.

Before passing judgment on the gates, see how they operate, study the humanitarian question involved and bring the matter of accidents home to your own family. If the use of gates prevents accidents, we are mutually benefited and should be satisfied.

Two of the bulletins which illustrate two forms of accidents are also reproduced.

Another series of announcements related to the question of transfers. One was entitled "Two Uses of Transfers," and read as follows:

TWO USES OF TRANSFERS.

There are two ways to use a transfer—the right and the wrong.

We believe that fully nine-tenths of our patrons use transfers as they are intended to be used. The other one-tenth are abusing the privilege and violating the law.

Transfers are a convenience granted the public in order that they may use two different car lines for the price of a single fare, or which makes it possible to make a continuous journey although using more than one line. When persons accept a transfer they bind themselves to use that transfer themselves and not to give it to some one else. Only one person is entitled to use the transfer, the person who paid the cash fare. Only one person is entitled to give you a transfer—the conductor.

The courts have held that any person giving or receiving a transfer is violating the law. At first the use of the transfer was nominal, but it has grown wonderfully in the past two years, until to-day it seriously affects our revenue. Seventeen per cent of the passengers we carry use transfers; therefore it will be seen that the abuse of the privilege is a serious loss to us.

We only want to be treated by the public as the public would have us treat them. We are trying to do what is right and just on all occasions. Give us the same treatment that we give you.

If you are entitled to a transfer, we urge you to use one. We want you to have one. But if some one offers you one, you do wrong to accept it, just as the person who tenders it does wrong.

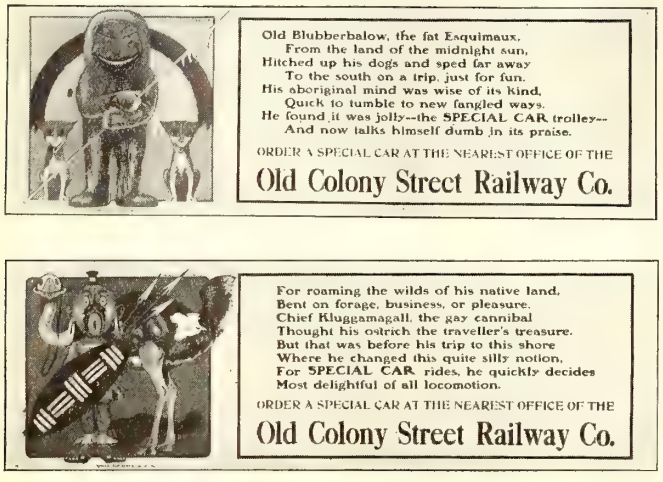
After all, it is merely another instance of applying the Golden Rule. Think of this if you have unconsciously been a member of the one-tenth who abuse the privilege.

Another cited the number of passengers carried on transfers since the year 1902, and showed that during the pre-

vious years the number who had used transfers amounted in fares to $1,160,480.15, and the average was $193,413.36, or $537.26 per day.

CARD POSTERS OF THE OLD COLONY RAILWAY

The accompanying illustrations show two very striking posters of a series advertising the special car service of the Old Colony Street Railway, Boston. Others described the feelings which Hoofitalot, the Hottentot, and Patagonian Pete would have experienced had they been able to have patronized these cars. These posters, and others, were used in the racks in the center of the cars last season, and, according to H. A. Faulkner, passenger agent, undoubtedly brought in considerable business.



Advertisements of Special Car Service

STATISTICS OF ELECTRIC RAILWAYS IN INDIANA

The accompanying table has been compiled from statistics contained in the annual report of the Indiana Railroad Commission for 1908. It gives various figures relating to traffic and unit earnings and expenses. Some of the companies in the State did not make reports to the commission containing uniform information, so that the records are not complete in each case. The effect of the interurban business on the average revenue per passenger carried is shown by the relatively large amount given in most of the companies, indicating that long distance travel is being rapidly developed.

ELECTRIC RAILWAYS OF INDIANA—REVENUE AND TRAFFIC STATISTICS, ENTIRE LINE

Names of Roads	Gross Earnings Per Passenger	Platform Expenses Per Passenger	Other Car Service Expenses Per Passenger	Cost of Power Per Passenger	Other Expenses Per Passenger	Total Revenue Passengers Carried	Total Car Mileage	Maintenance Way and Structures Per Car Mile	Maintenance of Equipment Per Car Mile	Platform Expenses Per Car Mile	Other Car Service Expenses Per Car Mile	Cost of Power Per Car Mile	General Expenses Per Car Mile
Angola Railway & Power Co.	$0 12.500	.....	.....	.....	.....	38,251	.....	.....	.....	.....	.....	.....	.....
Cincinnati, Lawrenceberg & Aurora Electric Street Railway	09.734	$0 01.047	$0 00.312	$0 01.318	$0 01.139	.....	564,005	$0 03.253	$0 01.951	$0 02.571	$0 00.767	$0 03.186	$0 02.798
Chicago, South Bend & Northern Indiana Ry.	06.122	01.143	00.346	01.196	01.490	9 068,691	2,438,102	00.721	02.548	04.245	01.287	04.445	02.112
Evansville & Mt. Vernon Electric Railway	22.300	01.160	02.150	04.700	08.600	.....	.....	.....	.....	.....	.....	.....	.....
Evansville & Southern Indiana Traction Co.	05.530	02.550	00.270	00.600	01.410	6,584,563	1,803,485	01.060	02.080	04.060	01.380	02.300	01.680
Evansville & Eastern Electric Railway	.....	03.800	02.400	05.000	00.600	202 436	.....	.....	.....	.....	.....	.....	.....
Ft Wayne & Wabash Valley Traction Co.	07.600	01.300	00.600	00.900	01.800	13,878,752	3,416,117	01.300	01.700	03.500	01.500	02.600	02.100
French Lick & West Baden Railroad	05.000	.....	.....	01.490	03.480	.....	.....	.....	.....	.....	.....	.....	.....
Indiana Union Traction Co.	12.420	01.270	00.840	01.420	03.640	12,693,625	6,695,538	02.210	01.970	03.020	02.010	03.040	03.950
Indianapolis, Columbus & Southern Trac. Co.	21.368	01.706	.....	.....	.....	.....	900,386	03.257	01.649	.....	.....	.....	.....
Indianapolis, Crawfordsville & Western Tr. Co.	24.210	.....	.....	.....	.....	.....	557,195	.....	.....	.....	.....	.....	.....
Indianapolis & Cincinnati Traction Co.	27.640	02.310	02.110	03.230	09.360	1,371,568	.....	02.450	02.030	02.040	01.870	02.690	03.960
Indianapolis & Louisville Traction Co.	20.083	02.315	02.372	04.207	07.967	258,699	417,662	00.793	01.271	01.434	01.486	02.606	02.851
Kokomo, Marion & Western Traction Co.	09.700	.....	.....	.....	.....	1,555,605	665,312	.....	.....	.....	.....	.....	.....
Lebanon & Thorntown Traction Co.	14.414	02.489	01.600	02.201	01.130	98,991	73,526	00.949	00.998	03.351	01.155	03.172	00.559
Louisville & Northern Railway & Lighting Co.	06.850	00.770	00.510	.....	00.060	1,801,274	761,885	00.080	00.820	01.880	01.260	.....	01.830
Louisville & Southern Indiana Traction Co.	04.800	00.840	00.220	00.830	00.190	4,992,895	1,118,631	00.390	00.930	04.260	01.100	04.190	00.970
Marion, Bluffton & Eastern Traction Co.	17.731	01.507	00.284	04.119	04.258	482,060	375,219	01.618	00.382	02.028	01.787	05.543	02.330
Muncie & Portland Traction Co.	17.770	01.290	00.850	03.430	04.060	.....	.....	01.020	00.790	01.980	01.300	05.280	04.440
Ohio Electric Railway	.....	.....	.....	.....	.....	21,296,203	9,899,427	.....	.....	.....	.....	.....	.....
Terre Haute, Indianapolis & Eastern Trac. Co.	10.780	01.340	00.700	01.490	02.790	18,553,757	7,581.770	01.340	01.780	03.280	01.740	03.600	03.730
Winona Interurban Railway	23.400	02.400	01.590	05.000	01.070	318,054	369,267	01.480	01.710	02.100	01.370	03.400	02.790

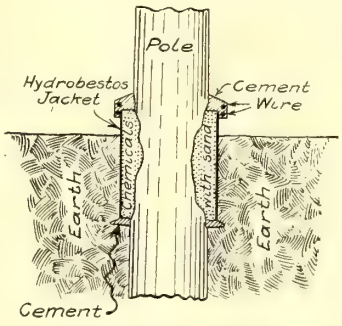
A NEW METHOD OF PRESERVING WOODEN POLES

In a paper read before the Association of Railway Telegraph Superintendents in Detroit, June 26, H. P. Folsom, of the Universal Pole & Post Preserving Company, Circleville, Ohio, described a new method of preserving wooden poles and posts from decay at the ground line. The unique feature of this method is in surrounding the base of the poles with a fiber cylinder which incloses a mixture of powerful germicides packed around the pole above and below the ground line.

In applying this method of preservation to poles which have begun to decay, a hole is dug around the pole to a depth of 14 in. below the ground line. All decayed wood is removed from the surface of the pole, and the bottom of the hole is then covered with a thin layer of Portland cement mixed with sand. A cylindrical jacket of "hydrobestos" about 4 in. larger in diameter than the butt of the pole is then put in place in the hole and the lower edge of the jacket is embedded in the cement. The two edges of the jacket are lapped over about 2 in. and fastened with a specially prepared cement. The hydrobestos jacket is made in the form of a sheet composed of a special mixture of asbestos and asphaltum. This mixture is subjected to a pressure of about 27,000 lb. per square inch during manufacture, and it is claimed that it is practically indestructible, being impervious to water, acids or alkali.

When the jacket is put in place around the pole the intervening space is filled with a germicide mixture, packed in dry. In selecting the germicide the aim was to use a mixture which was powerful and effective in destroying animal organisms, and which would not injure the fiber of the wood or be too costly to be practicable. The mixture ordinarily used consists of hydrated lime, rock salt (chloride of sodium) and a small quantity of sulphate of copper, mixed with coarse sand. After the germicide is in place in the shell or jacket, a reinforced cap or collar made of Portland cement and sand is formed around the pole on top of the jacket. For the reinforcement, one or more turns of the old telegraph or telephone wire are used. The reinforced cap protects the chemicals and the jacket from the action of rain and snow, and also protects the pole against damage from grass fires. The chemicals enclosed by the jacket are slowly dissolved by the natural moisture in the pole, and they pass into the cell structure of the wood by capillary attraction. This continuous absorption, it is claimed, destroys all fungi which may be in the pole at the time the preservative is applied, and the

jacket and cap prevent the lodging of other germs in the wood near the ground line. The reinforced cement cap gives a finished appearance to the pole, and experience has proved that there is little or no tendency for the concrete to crack or disintegrate, as there is no expansion or contraction in the pole which it surrounds. When applying this method of preservation to a small number of poles the men work in gangs of three. One man precedes the other two and digs around and cleans the poles. The other two men follow with a wagon containing the chemicals, and finish the treatment. If the poles are located along a railroad the material can be distributed in small sacks at each pole from a hand car. Three men can treat from 20 to 30 25-ft. poles per day. The cost per pole for labor and material is from 75 cents to $1. Some very large poles cost $1.50 to $2.50. A few poles were treated by this method nine years ago, and it is stated that the protecting sleeve is still in good condition.



Method of Applying Preservative

ADVERTISING BASEBALL AT FORT SMITH, ARK.

The Fort Smith Light & Traction Company, of Fort Smith, Ark., has adopted an unusual method of advertising games held at the home baseball park during the summer. A panel sign is placed on either side of an ordinary car, which is run over all the lines up to 4 o'clock on the days when games are played. These signs can be attached to any car which is not operating on schedule time, and if all passenger cars are in service it can be placed on a construction car.



Advertisement on Car

A curious error appeared in the New York *World* in a statement regarding the annual convention of the Street Railway Association of the State of New York. It said that at the meeting C. S. Sims, of the Delaware & Hudson Railroad, declared that a large number of electric railway motormen are now habitual users of cocaine, and are taking the drug in the form of snuff. The only speech which Mr. Sims made at the convention was at the banquet, when he responded to a toast, and the subject of cocaine was not mentioned in any way by him.

RECENT REGISTER PATENTS

Considerable interest has been excited by the issue on May 25, 1909, of two patents on register mechanism to Leo Ehrlich, of St. Louis, Mo., and assigned to the American Register Company, of St. Louis. These patents are numbered 922,867 and 922,868, and as the application for the first patent was filed Dec. 10, 1894, and that for the second patent Dec. 23, 1895, they have been dormant in the patent office for over 14 years and 13 years, respectively.

Patent No. 922,867 is for a machine which will register two or more classes of fares with separate totalizers, both registers being operated from the same lever, and a shifter being employed to connect the operating mechanism with one or the other register. The text describes two forms of double registers, one with a dial and two pointers, the other with two sets of numbered wheel registers. The patent has 92 claims, three of which are as follows:

(1) In a fare register the combination with the dial of the trip register of a plurality of pointers co-operating therewith to indicate different classes of fares, a single actuating device for said pointers and combined actuating and shifting or setting means operated by a single uniform movement to cause said device to actuate either pointer at will and register the corresponding class of fare.

(17) In a fare register the combination, with a multiple trip register for separately registering fares of different classes received during a trip, of a plurality of permanent registers for permanently registering fares of different classes, a fare indicator for indicating fares of different classes, and means for actuating by a single movement either desired number of the trip register and the corresponding permanent register and moving the fare indicator to indicate such class of fare.

(84) In a fare register the combination with a multiple trip register employing a plurality of registering devices, indicating different classes of fares, of a corresponding plurality of permanent registers, and means for actuating any one of the registering devices, together with its corresponding permanent register by a single movement, such movement being the same in degree for each class of fare and without previous adjustment.

Patent 922,868 describes a method of operating a double register by a rock shaft operated in one direction to register one class of fare and in the opposite direction to register another class of fare; also a method of attaching the register to the wall of the car by means of a plate with posts which fit into corresponding sockets on the register, the posts being fitted with flanged heads and, if desired, with locking screws.

The patent specifies that the rock shaft can be operated by one set of operating handles or by two sets, extending along opposite sides of the car. This patent has 50 claims, of which two are as follows:

(1) In a fare register the combination with the trip register wheel of a shaft permanently in gear therewith, a permanent register, a clutch member for connecting and disconnecting the shaft and permanent register, resetting means for the trip register, and means for shifting the clutch at each resetting of the trip register, to disconnect the permanent register from the trip register and permit the resetting of the latter.

(40) The combination with a fare register of an attaching plate adapted to be permanently secured to the wall of the car and provided with a series of integral posts having flanged heads co-operating with holes in the back plate of the register, and means co-operating with one of said posts for binding or clamping the register in position upon all of the posts, with the flanged heads of the latter engaging the back plate of the register and preventing its removal.

It is understood that these two patents have been acquired by the Ohmer Fare Register Company, of Dayton, Ohio.

EXHIBIT ARRANGEMENTS AT DENVER

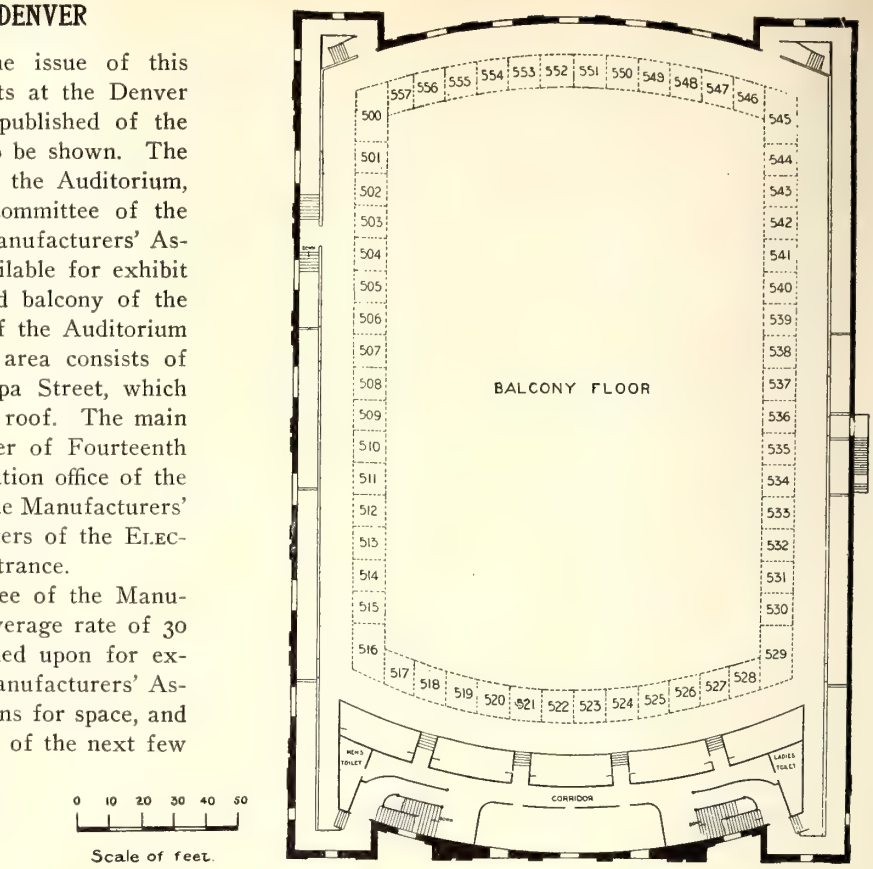
An announcement was printed in the issue of this paper for July 3 in regard to the exhibits at the Denver convention, and last week a view was published of the Auditorium in which these exhibits are to be shown. The accompanying diagram shows the plan of the Auditorium, as approved July 11 by the executive committee of the American Street & Interurban Railway Manufacturers' Association. As will be seen, the space available for exhibit purposes consists of the ground floor and balcony of the Auditorium and the areas on two sides of the Auditorium marked "Annex" in the diagram. This area consists of portions of Fourteenth Street and Champa Street, which will be boarded over and provided with a roof. The main entrance to the hall will be at the corner of Fourteenth Street and Curtis Street, with the registration office of the railway associations on the right, that of the Manufacturers' Association on the left and the headquarters of the ELECTRIC RAILWAY JOURNAL just inside the entrance.

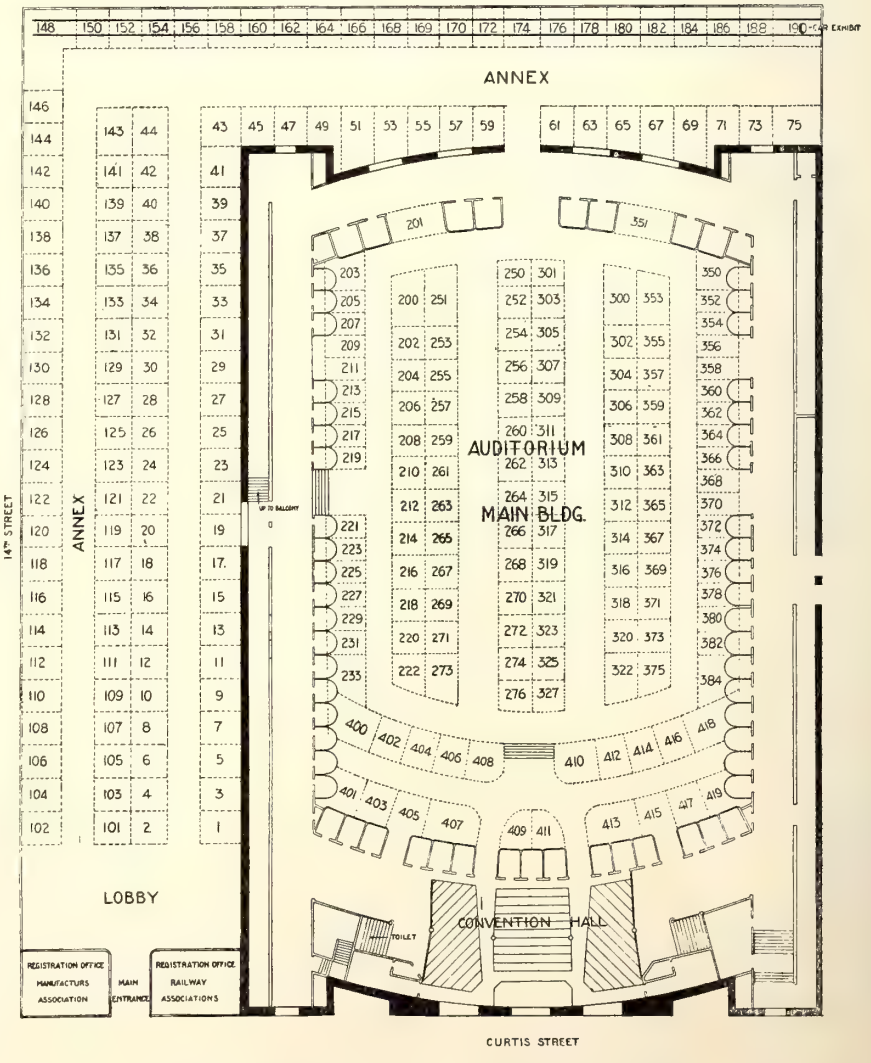
At a meeting of the executive committee of the Manufacturers' Association, held July 11, an average rate of 30 cents per square foot of space was decided upon for exhibitors. The exhibit committee of the Manufacturers' Association is now preparing blank applications for space, and these blanks will be sent out in the course of the next few days. It is very important that all intending exhibitors should forward their applications to the committee as quickly as possible. A date will be fixed for applications for space. This date will appear on the blank, and all applications received on or before that date will be treated alike. Applications received after that date will be treated on the principle of first come, first served.

The exhibits are in charge of Kenneth D. Hequembourg, vice-president in charge of exhibits, and general sales agent, Walker-Bennett Manufacturing Company, West Twenty-ninth Street, New York. The other members of the exhibit committee are: C. M. Atwood, Sherwin-Williams Company, Denver; R. M. Babbitt, ELECTRIC RAILWAY JOURNAL, Chicago; L. M. Cargo, Westinghouse Company, Denver; G. W. Cox, Electric Service Supplies Company, Keokuk, Ia.; Arthur T. Herr, American Brake Shoe & Foundry Company, Denver; H. J. Kenfield, *Electric Traction Weekly*, Chicago; Charles Knight, American Steel & Wire Company, Chicago; H. G. McConnaughy, Dearborn Drug & Chemical Company, New York; S. P. McGough, The Lorain Steel Company, Chicago; C. J. Olmstead, Westinghouse Traction Brake Company, Chicago; R. H. Thompson, The J. G. Brill Company, Denver; A. L. Wilkinson, Ohio Brass Company, Mansfield, Ohio.

The committee has issued the following circular in regard to exhibits:

The Denver Auditorium, with temporary buildings in Fourteenth Street and Champa Street, will provide about 35,000 sq. ft. of exhibit space, exclusive of aisles, on the main floor level with street,





Plan of Exhibit Space in Auditorium Building

and about 6000 sq. ft. in the balcony of the Auditorium, one flight up. Additional space can be secured on Champa Street if necessary by extending the temporary building.

The temporary buildings, called Annex, will be constructed of heavy canvas with board floor and suitable floor covering to match the color scheme, similar to Annex or Building No. 3 at 1908 convention on Million Dollar Steel Pier.

The exhibit committee is working with the railroads to secure a one-half rate from Chicago and St. Louis, or other Missouri River points. A meeting with the freight officials has been held, the result of which enables us to predict that we shall secure this concession. We have also under consideration from a Chicago forwarding and warehouse concern a proposition to consolidate all L.C.L. shipments at Chicago and Newark, N. J., wherein they claim they can save us between Chicago and Denver on

	Per cwt.
Electrical appliances, machinery and supplies	98c.
Class "A' machinery, from	98c. to $2.
Railway equipment and supplies	10c.
Street car material, Division B	18c. to 98c.

A proportionate saving on all consolidation L.C.L. shipments will result from consolidation at Newark, N. J. If we are successful in securing what is desired to make a large exhibit, the freight charge to Denver from Chicago, or other "Missouri River points," and return, including consolidation charges for L.C.L. shipments, will range from 97c. to $1.17 per cwt.

A much lower charge for carting shipments to the exhibit space has been secured in Denver than we have enjoyed at recent conventions.

The charges for furniture and other details will be about the same as last year.

The charge for exhibit space is 30c. a square foot, and includes practically everything enjoyed at the 1908 convention at Atlantic City.

The plan above shows the admirable layout secured, and with a large number of new hotels available, coupled with the enthusiasm shown by the railway officials and manufacturers in the Central, Western and Southern States, it is expected that a very large attendance will result.

Application blanks and detail circulars will be mailed as soon as arrangements have been completed.

Exhibit Committee,
(Signed) Kenneth D. Hequembourg,
Vice-President.

The Manufacturers' Association has just issued a 22-page pamphlet giving considerable information of interest to members of the association and those who are thinking of joining the association. It includes a history of the association, a list of the conventions at which the association has had charge of the exhibits, and all past and present officers of the association. The constitution and by-laws, a list of the members and a printed copy of the report of the treasurer is appended. This report shows the balance on hand Dec. 11, 1908, $6,851. Copies of this pamphlet are being distributed by Secretary Keegan.

The Pennsylvania Railroad is planning to set out more than 1,000,000 trees. This will make a total of 3,430,000 trees planted in the last three years to provide for some of the company's future requirements in timber and cross-ties. This constitutes the largest forestry plan yet undertaken by any private corporation. Heretofore the company's forestry operations have been confined to a limited area between Philadelphia and Altoona. This year, however, 65,000 trees are being set out on tracts of land near Metuchen and New Brunswick, N. J. In addition, there are to be planted within the next month 207,000 trees near Conewago, Pa., 186,000 in the vicinity of Van Dyke, 334,000 at Lewistown Junction, 7000 at Pomeroy and 205,000 at Denholm.

SPECIAL TRAINS FROM NEW YORK AND BOSTON TO THE DENVER CONVENTION

Since the announcement in the last issue of this paper of the appointment of the transportation committees to take charge of special trains to the Denver convention, the following plans for special trains from New York and Boston have been announced:

SPECIAL TRAINS FROM NEW YORK

It has now been decided to run at least two special trains from New York City, one over the New York Central Railroad and the other over the Pennsylvania Railroad. The New York Central train will run as a second section of the Twentieth Century Limited, and will leave New York at 3:30 p. m. on Thursday, Sept. 30. It will arrive in Denver at 4 p. m. on Saturday. If a sufficient number of applications are received for a second train over the New York Central lines, the second train will leave New York at 3:30 p. m. on Friday, Oct. 1, and will arrive in Denver at 4 p. m. on Sunday. The special train over the Pennsylvania Railroad will leave New York at 4 p. m. on Friday, arriving at Denver at 4:40 p. m. on Sunday. If there are sufficient applications, a second train will be run over the Pennsylvania Railroad at a time to be announced later. Both trains will be run via Chicago, but the routes, after leaving Chicago, have not yet been definitely determined.

Both trains will be made up in the same way. Each will consist of one baggage car, one buffet car, one observation car, one dining car and Pullman compartment and drawing room sleeping cars. The fare to be charged will be $60 from New York to Denver and return. Tickets can be purchased for this same amount to Pueblo and Colorado Springs, so that if any delegates are planning to visit either of the latter places while in Colorado, they should purchase their tickets to include these cities. The Pullman fares on each train will be: Berth $11, section $22, drawing room $39, stateroom in a compartment car $31. These charges are for one way only. An arrangement has been made with the railroad companies to make the following charges for meals served in the dining cars: Breakfast 75 cents, luncheon $1, dinner $1.25.

Those desiring accommodations on the New York Central train should apply to J. H. Pardee, who can be addressed in care of the American Street & Interurban Railway Association, 29 West Thirty-ninth Street, New York. Those who wish to travel on the Pennsylvania train should apply to W. L. Conwell, at the same address.

No attempt will be made by either of these committees to organize a special train for the return trip, as it is thought that some delegates will desire to return promptly, while others will undoubtedly wish to spend some time in Colorado, or else go farther West. The return tickets, however, are available on any of the trains on either line and by any route of the initial line. That is, the passenger by the New York Central train which goes via Chicago will be permitted to return via St. Louis if he so desires. The same privilege is allowed the passengers on the Pennsylvania train.

SPECIAL TRAIN FROM BOSTON

In addition to the New York trains, a special train will be run from Boston, under the auspices of the Massachusetts Street Railway Association. This train will be unique, because after the convention it will go to the Pacific Coast and visit Seattle, San Francisco and Los Angeles and other Coast cities. The exact route has not yet been determined, but will be announced later by Charles S. Clark, secretary,

Massachusetts Street Railway Association, who has charge of the train. While in the far Northwest the passengers on this train will have an opportunity to inspect the Stone & Webster properties at Seattle, Tacoma, Everett and Bellingham by invitation of Messrs. Stone & Webster. They will also be able to visit the Alaska-Yukon-Pacific Exhibition.

Soon after the date of the Denver convention had been changed to that which has now been selected, Mr. Clark received the following cordial letter from Messrs. Stone & Webster, and it was largely on account of this invitation, which, it is understood, includes all attendants at the convention, that the train was organized:

STONE & WEBSTER,
147 Milk St., Boston.

BOSTON, MASS., July 12, 1909.

CHARLES S. CLARK, ESQ., Secretary,
Massachusetts Street Railway Association,
70 Kilby St., Boston, Mass.

DEAR SIR:

We understand that the effort to change the date of the American Street and Interurban Railway Association Convention at Denver to one enough earlier to make it possible for such of the members as desires, after the convention, to go to the Pacific Coast and visit the Alaska-Yukon-Pacific Fair, which is now being held in Seattle, was successful, and in your opinion many of the delegates to the convention will be glad to avail of the opportunity to visit the Puget Sound country. As is generally known, the street railway and interurban companies, including electric and gas lighting companies at Seattle, Tacoma, Everett and Bellingham, Washington, are managed by the Stone & Webster Management Association for the owners, and illustrate, to a marked degree, the operation of public utilities companies in fast growing cities and towns in that country.

We should be glad to have you extend to such of the delegates as wish to go to the Puget Sound district a cordial invitation, and we will do our best to properly entertain those who make the journey. We believe they will be interested in the country and what it has to show.

Very truly yours,

(Signed) STONE & WEBSTER.

This opportunity, together with the very favorable rates for the round trip from Boston to Seattle and return will undoubtedly induce a great many to make this trip, especially those who have never visited the Pacific Coast. Mr. Clark announces that the railroad fare by this special train from Boston and return via Denver, Seattle, and through California, will not exceed $115, and it is expected that by chartering Pullman cars by the day that the meals and Pullman accommodations for the four weeks' trip, including the Denver convention, will not exceed a like amount.

The Boston train will consist of a combination baggage and buffet parlor smoking car (with bathroom and barber shop), a dining car, standard sleeping cars, a compartment car, and a compartment car with observation end. It will be lighted by electricity, and at all points visited will be side-tracked for occupancy by those persons who desire to make use of it. The party will have the exclusive use of all portions of the train from Boston until they return to Boston. This will avoid the annoyance of transfer from the train to a hotel at the various points visited. While en route members of the party will have access to their baggage at any time, as it will be in charge of a special baggage master.

The following route has been tentatively settled upon: At the close of the convention the train will leave Denver, passing through Colorado Springs, Pueblo, Canon City, the Royal Gorge of the Arkansas, and stopping at Glenwood Springs. A part of a day will be spent at Salt Lake City. The train will then proceed to Seattle, and the party, at the invitation of Stone & Webster, will spend several days visiting the exposition and electric railway properties there, Mt. Ranier, Victoria and Vancouver, B. C., or other points of special interest in the vicinity of Seattle. Two or more days will be spent in San Francisco, Los Angeles and other interesting places, the Mt. Shasta route of California, and possibly the Canadian Rockies will be traversed. To avoid any possible chance for discomfort, the accommodations for the party will be limited to 80.

The entire trip will be on the personally conducted plan, and the cost will include not only the railroad fares, but Pullman accommodations and meals en route.

A large number of New England street railway people have already engaged accommodations for the round trip. Those who cannot make the trip to the Coast will accompany the party as far as Denver. Some of those who have applied for accommodations on this train are:

James F. Shaw, president, American Street and Interurban Railway Association.
R. N. Wallis, president, Accountant's Association.
Paul Winsor, president, Engineering Association.
Charles C. Peirce, vice-president, Manufacturers' Association.
E. G. Connette, general manager, Worcester Consolidated Street Railway Company.
Mrs. Connette.
H. C. Page, vice-president and general manager, Springfield Street Railway Company.
Mrs. Page.
D. Dana Bartlett, auditor, Boston & Northern and Old Colony Street Railway Companies.
Mrs. Bartlett.
John R. Graham, president, Bangor Railway & Electric Company and Lewiston, Augusta & Waterville Street Railway Company.
Mrs. Graham.
H. E. Reynolds, assistant general manager, Boston & Northern and Old Colony Street Railway Companies.
Mrs. Reynolds.
W. W. Sargent, superintendent, Fitchburg & Leominster Street Railway Company.
E. P. Shaw, Jr., general manager, Boston & Worcester Street Railway Company.
Mrs. Shaw.
H. L. Wilson, treasurer, Boston Elevated Railway Company.
Mrs. Wilson.
Franklin Woodman, general manager, New Hampshire Electric Railways.
Mrs. Woodman.
Fred J. Allen, secretary, Atlantic Shore Line Railway.
Mrs. Allen.
Thomas Hawken, superintendent, Rockland, Thomaston & Camden Street Railway Company.
Mrs. Hawken.
C. E. Learned, superintendent inspection, Boston Elevated Railway Company.
Mrs. Learned.
M. H. Bronsdon, chief engineer, The Rhode Island Company.
Mrs. Bronsdon.
Senator Eben S. S. Keith.
Mrs. Keith.

Those desiring accommodations on this train should apply to Charles S. Clark, who can be addressed at 70 Kilby Street, Boston.

POINTS OF INTEREST IN OR NEAR DENVER

A few words in regard to the points of interest in and near Denver and the distances from Denver may be of value in this connection.

Denver itself is a beautiful city, as well as a great commercial center, with a population of 200,000. The first settlement made upon the site of the present city by white men was in 1858, only 51 years ago. It was made by gold seekers who stopped there to try placer mining, but the soil pans out too small an amount of gold to pay to work. A few years later this settlement, which was called Auraria, was consolidated with another one across the river, and the consolidated settlements were called Denver, in honor of Gen. James W. Denver, who was Governor of the Territory of Kansas when that territory included what is to-day the State of Colorado. The discovery of rich gold fields in the Rockies in the early '70's brought a great influx of prospectors, and later discoveries of valuable veins established the industry permanently. The State Bureau of Mines has a magnificent collection of Colorado ores in the basement of the State Capitol, which is well worth seeing.

It is probable that the delegates to the convention will be given a trip over the famous Moffat Road, which is one of the most magnificent scenic rides in the country. Four hours takes the train to the crest of the Continental Divide, 11,660 ft. above sea level. Passengers can spend some time at the crest and be back in Denver for dinner. This ride and the view from the Great Divide is something never to be forgotten.

Those who wish to remain over will find it well worth while to visit Colorado Springs, only 75 miles from Denver, where any number of days can be profitably spent, as the

region about there is filled with natural wonders. Ready access is gained to Pike's Peak, the Cheyenne Canons, Manitou, the Garden of the Gods, and railroad connection is made with the famous mining camps of Victor and Cripple Creek, 40 miles away, through marvelous scenery.

Manitou is 5 miles from Colorado Springs, and is situated at the base of Pike's Peak. A cog road hauls passengers to the summit of the peak (14,108 ft.), from which the view is superb beyond description. Manitou itself is beautifully located. The famous springs are within the town limits; they are enclosed by basins and the waters are free.

The Royal Gorge is situated 90 miles west of Colorado Springs, on the Denver Rio Grande, which railroad runs through the gorge. The rocks rise precipitously on either side from 1000 ft. to nearly 3000 ft. in height, with the Arkansas River running alongside the railroad. At one point the canon narrows to 30 ft. in width, while the perpendicular granite towers on either hand to a height of nearly half a mile.

The drives through the Cheyenne Canons and through the Garden of the Gods can be made easily from Colorado Springs, and are worth the time necessary, one day each. At Colorado Springs the principal hotel is the Antlers, where excellent accommodations can be secured.

THE TRAMWAYS OF BOMBAY, INDIA

Indian Industries and Power for February, 1909, contains an extended article on the electric railways of Bombay, India. The Bombay tramways were opened with animal traction in 1874 with money furnished by New York capitalists. New owners undertook electrification in 1906, and the first section of the system was opened to electric traction in May, 1907, and completed in May, 1908, by J. G. White & Company, Ltd., of London. The route mileage of the tramways is 20.38 miles, and is double track with the exception of ½ mile.

The general traffic conditions in Bombay differ widely from those in Europe or America, as a large proportion of the laboring class is too poor to ride frequently, while on the other hand most of the resident Europeans of the upper class and many rich natives keep their own carriages. The bulk of the tramway passengers, therefore, has to come from the middle-class traders, shop keepers and artisans. As wages and salaries are on a considerably lower scale than in other countries, the fares are necessarily low. The highest fare in the Bombay system on the ordinary cars is 1½ annas (3 cents), for which passengers can ride 7 miles. Half-fares are given only to children. The average fare is about 2 cents per passenger carried, and the traffic is at the rate of 1,574,000 passengers per route mile per annum. The operating expenses, exclusive of depreciation, average 9 cents per car-mile. The first-class fare is about 50 per cent higher than on the ordinary cars, but it apparently has not worked out very well, as the cheaper cars are so comfortable that the Europeans and upper-class Indians are satisfied to patronize them. The company, therefore, is gradually converting all its cars to that class. This is a rather interesting fact, as in the early days of horse traction there was considerable reluctance on the part of the high-caste Hindoos to mix with those of the lower castes; the lowest caste Hindoos, however, are not permitted on any cars. Owing to the narrow streets, the motormen are usually restricted to a schedule speed of 7 m.p.h.

The present power station consists of two 1000-kw turbo-generators and one 1000-kw reciprocating engine set. The new plant will have an initial installation of two 2000-kw turbo-generators. The substations are furnished with motor-generator sets and are suitable for either the railway or three-wire d.c. power and light distribution. Except in the case of elevators and industrial plants, the rates for supply are on the maximum demand system at 16 cents per kw-hour for the equivalent of the first hour's use a day of the maximum demand, and 4 cents per kw-hour for all further consumption. This rate averages slightly less than 8 cents per kw-hour, and is much lower than that obtaining in other Far Eastern cities.

An interesting feature of the overhead construction of the Bombay lines is the high clearance of 21 ft. to 21 ft. 9 in. required to avoid interference with the portable shrines or mosques carried during religious festivals. The tracks are standard gage, with manganese special work. The cars are of the single-deck type, and are supplied with Hudson-Bowring wheelguards. As most of the natives cannot read, destination markers consisting of colored disks in the day or colored lamps at night are provided in addition to the lettered destination signs.

The following statistics, showing the progress of the company's two departments, will be of interest:

TRACTION DEPARTMENT.

	1905—Horse Traction.	1906—Horse Traction.	1907—Horse and Electric.	1908—Horse and Electric.
Passengers carried	25,119,426	24,863,228	25,766,916	30,486,666
Car mileage	2,733,073	2,749,467	2,825,385	3,434,263
Gross passenger receipts	$470,488	$491,010	$512,744	$497,080
Average fare per passenger in cents	1.96	1.96	1.86	2.00

Note.—Electrification commenced in May, 1907, and completed in May, 1908.

ELECTRIC SUPPLY DEPARTMENT.

	1905—3 months' operation.	1906.	1907.	1908.
Lamp connection at end of year, equivalent 30 Watt	16,619	59,056	84,598	123,430
Gross revenue	$2,687	$40,998	$104,810	$232,263
Units sold	26,148	531,731	2,058,805	5,263,630
Revenue per unit sold in cents	10.14	4.16	5.02	4.32

The greater portion of the generating and tramway plant and the rolling stock was supplied by the Brush Electrical Engineering Company, Ltd., and the cables by Callender's Cable & Construction Company, Ltd. The manganese special work was supplied by Edgar Allen & Company.

NEW CARBON BRUSH

The Speer Carbon Company, of St. Mary's, Pa., is now making a new grade of carbon brushes, manufactured in accordance with the specifications recommended by the committee on maintenance and inspection of electrical equipment, at the convention at Atlantic City last year. These brushes are classed as grade H, and are manufactured in four different degrees of hardness for all classes of work. Grades H and H-1 are soft, and are intended for use on slotted commutators; grade H-3 has proved equally satisfactory on both slotted and non-slotted commutators; grade H-8 is for motors which require a very hard brush to cut the mica.

The manufacturers especially recommend grade H-3 brushes, which have more than surpassed expectations in factory tests and in actual service on several roads. It is claimed that they have given excellent service where other makes have failed. These brushes are said to be free from laminations, perfectly homogeneous, very close grained, low in resistance, high in conductivity, and, in fact, possessing every quality that can be put into a high-grade brush. Although the first cost is necessarily quite high, the manufacturers claim that the ultimate cost is low, as the new brushes will not scratch the commutator or chip or break under the most severe conditions.

News of Electric Railways

New Ordinance Drafted in Kansas City

The Metropolitan Street Railway, Kansas City, Mo., has accepted the modified ordinance of the sub-committee of the West Twelfth Street trafficway committee providing new terms to govern its relations with the city. The ordinance will be submitted to the whole trafficway committee, which will report the ordinance soon.

The principal provisions of the preliminary ordinance which was drawn as a basis for negotiations between the company and the city were given on page 1136 of the Electric Railway Journal of June 19, 1909. Since that ordinance was drawn many sessions have been held at which the matter has been discussed, with the result that a number of modifications have been made to the first draft. These have all been incorporated in the new act, which imposes briefly the following conditions:

The several companies now comprising the Metropolitan system shall be merged into one within one year after the acceptance of the ordinance, and the penalty for failure to consolidate within that time is a forfeiture to the city of $500,000. If the company accepts the ordinance it is to pay annually to the city during the 16 years of its unexpired franchise 50 per cent of its net profits or 5 per cent of the gross receipts in the event that the percentage on the gross receipts exceeds the amount that would be realized on the net. At the end of the 16 years of the unexpired franchise in June, 1925, the right of the city to buy the property for municipal operation, or to nominate a buyer, accrues. Every six months, twice a year, after 1925 the city can tender to the company the agreed price, based on a capitalization of $33,500,000 ($28,140,000 for the Missouri lines and $5,360,000 for the Kansas lines) plus any additions, or nominate a buyer, who is to pay the city 10 per cent premium for its option.

At the end of the 16 years of the unexpired franchise, during which the city is to participate in the revenues of the company (city's share estimated at from $10,000,000 to $14,000,000), the city agrees in return to continue the profit sharing arrangements for 16 years more, or an equal number of years, but reserving the right to enforce its option twice a year during the 16 years to buy the property or nominate a buyer and receive 10 per cent premium.

The franchise of the company in Kansas City, Kan., expires in 1923, and if it should develop that the franchise is not renewed then the value of the Kansas lines, if acquired by the Metropolitan Street Railway or any other company, is to be deducted from the general stated capitalization of $33,500,000, which includes the value of both the Missouri and Kansas lines.

After 1925 the city is to have the right to regulate the fares to be charged day and night. Prior to 1925 the city is authorized to reduce fares between the hours of 5 and 8 and 5 and 7 p. m. from its net receipts, and other hours of the day if it is so inclined. A new schedule of fare is agreed to by the company, and permits a child under 12 years of age to ride for half fare and under 7 years free if accompanied by parent or guardian.

The fare after 1925 is to be reduced by the city to a basis of permitting but 6 per cent profit to company's capital investment. Universal transfers are to be given within the corporate limits of Kansas City, Mo.; Kansas City, Kan.; Rosedale, Kan.; Argentine, Kan. The company must secure permission from the board of public works to sell unnecessary property, receipts of such sale to be deposited in bank and expended as directed by the board. The board of public works is to have direct control over all new extensions, the company to build two and one-half miles of double track or five miles of single track a year if so directed. All paving and work of construction is to be done to the satisfaction of the board of public works, the company to pave between its tracks and 18 inches outside the rails.

The company is to pay its share in the construction of viaducts and bridges where its cars cross at grade steam railroads or across streams, and is to waive any damages for the grading or regrading of streets on which it has tracks laid. It is also to hold the city harmless from damage. The city reserves right to permit any other street car company to operate cars over the tracks of the Metropolitan Street Railway for three consecutive blocks. The company is to pay personal injury claims out of gross receipts derived from operation. The board of public works is to have a voice in the regulation of salaries of the directors, officers, agents and attorneys of the company. The city is to be represented on the board of directors, thereby securing all the rights of a stockholder. The company is to pay one-third of the land damages and grading and one-third of the cost of the viaduct for the West Twelfth Street trafficway and to advance the city's two-thirds share of the land damages, grading and building of viaduct. The money advanced is to be paid back from the city's net revenues. The city reserves police power and right of regulation and control, and the company shall carry passengers over the extensions and the main line for the fare charged with full transfer privileges. The city is to have supervision of all future construction and equipment constituting extensions of and additions to plants and property provided for or required by this contract. The board of public works shall have the power to determine what work shall be treated as construction, reconstruction, equipment, extensions, new lines, or additions to plant or property.

The company shall at all times operate sufficient cars adequately to handle traffic, and within a year is to put into service 50 new cars, the city to have authority in the general routing of cars. After Jan. 1, 1914, the company is to deposit each and every year a sum equal to 4 per cent of its gross earnings to constitute a reserve fund for taking care of renewals, betterments and depreciations. If the city does not buy before 1941, or nominate a buyer, should any other company be given a franchise to operate a street railway it is first in duty bound to buy the property of the Metropolitan Street Railway. Every year after 1925 the company and the city are to set apart a sum equal to 4 per cent from the net receipts to be used for the reduction of capitalization. The city is to have an auditor at the company's headquarters, to have daily access to the books of the company and to make annual reports. The company is to file a bond in the sum of $100,000 with the city clerk to indemnify the city against all damages, judgments, decrees, costs and expenses which the city may suffer to privileges granted in the ordinance.

The ordinance is to be submitted to the voters of the city within 60 days after it is enacted, and is to become effective on Jan. 1, 1910. The expenses of the election are to be defrayed by the company.

Cleveland Traction Situation

Frank A. Scott, one of the receivers of the Municipal Traction Company under Judge Robert W. Tayler, has presented his resignation and will sail for Europe within a few days. Judge Tayler is on a vacation, but Mr. Scott talked the matter over with him before he left and this step was understood. The resignation will be formally accepted on the return of Judge Tayler about Aug. 1. In his letter Mr. Scott states that the special work which he was appointed to perform is about completed and that his services are not urgently needed. This work was to reorganize the accounting department, look after the finances and take such steps as necessary regarding the payment of claims. It is understood that Mr. Bicknell, who has cared for the physical property, primarily, will hereafter have complete charge of all matters and that no one will be appointed to succeed Mr. Scott. After his return from Europe Mr. Scott will become secretary and treasurer of the Warner & Swasey Company, manufacturers of telescopes and fine machine tools.

The committee of 100 has opened offices on the street floor of the Williamson Building, corner Euclid Avenue and the Public Square, where a force of clerks and stenographers are getting material into shape for the campaign against the Schmidt grant on Payne Avenue. A circular issued several days ago by the committee calls the attention of the public to the misstatements made by Mayor Johnson to the effect that the committee favors a 5-cent fare and that the Tayler plan will result in that rate, if adopted. It is shown that the Schmidt grant contains practically no provisions that are binding, and that if it is upheld by the voters, Mr. Schmidt will have a franchise that will allow him to do practically as he pleases on the short strip of road mentioned. All the conditions about which the Mayor has been speaking are contained in the extension grants and not in the original. The committee is not urging the adoption of the Tayler ordinance just as drawn, but favors the plan as it provides for service at cost after the owners have realized 6 per cent on their investment.

Herman J. Schmidt, to whom the Payne Avenue grant was made, has announced that he is organizing the Cleveland Traction Company, to which the grants will be transferred in case they are upheld. This company, he says, will do the necessary construction work. It will have a pre-

liminary capital of $10,000, but this will be increased to $2,500,000. Mr. Schmidt has stated that the new company will reimburse the people who owned stock in the Forest City Railway and exchanged it for stock of the Cleveland Railway.

On July 7 the Retail Board of the Cleveland Chamber of Commerce issued a circular containing what is called the merchants' platform, in which their ideas on traction matters are given. The first clause declares that the traction warfare should end; the second asserts that the plan formulated by Judge Tayler is the best that has yet been devised; the third says that the majority of the people are in favor of this plan; the fourth reiterates the right of citizens to express their opinions, without interference from any one, and the sixth deplores the fact that the Mayor of the city stooped to issue a boycotting circular which affected 15 local retail houses. The platform is signed by the executive committee of the board.

A meeting held by Dr. F. W. Walz, Democratic councilman from the First ward, who has withdrawn his support from the Mayor, was almost disrupted on the evening of July 9 by the determination of Councilmen Bernstein and Zinner to reply to Dr. Walz, who had stated that the meeting was held for the purpose of explaining his position to his own constituents and that he wished all questions or remarks confined to people living in the ward. Dr. Walz complains that an organized effort was made by the friends of the Mayor to break up the meeting.

Transit Affairs in New York

Samuel Rea, second vice-president of the Pennsylvania Railroad, and president of the Pennsylvania Terminal Company, addressed a letter to William R. Willcox, chairman of the Public Service Commission of the First District of New York, on July 9, urging the necessity of a subway on the west side of New York, in which he said in part:

"Referring to the many plans regarding new subways in New York which your commission is now considering, on behalf of the Pennsylvania Railroad Company, I beg to advise you that by next summer our New York tunnel railroad and the station at Seventh Avenue and Thirty-third Street will be opened to the public, and the necessity for subway accommodation in connection therewith is so imperative that we deem it our duty to lay the matter before you.

"We have taken every opportunity to bring before the authorities of the State and City of New York the necessity for rapid transit connection, but, notwithstanding the approaching completion of our railroad lines and station, no subway has as yet been constructed.

"We have always believed that the present subway was utilized to its full capacity, and for new subways required, as is now the case, the most economical and practical course would be to extend the present subway from Forty-second Street down the west side under Seventh Avenue to the downtown district, connecting with Brooklyn, and up the east side from Forty-second Street to the Bronx, with suitable crosstown connections, permitting of convenient transfers from one line to the other. From the time that the plan for a west side subway was approved by the predecessors of your commission—the Board of Rapid Transit Commissioners, who recommended it—the wisdom of that course has been conceded by those who have, not only as a public duty to the city and State, but because of their business affiliations, been observers for many years of the rapid transit situation.

"That board in transmitting to the Board of Aldermen for its approval in May, 1905, the Seventh Avenue route to which I refer stated that the completion of the Pennsylvania Railroad station, which would bring many thousand travelers hourly from New Jersey and Long Island to the neighborhood of Thirty-second Street, between Seventh Avenue and Eighth Avenue, should find the municipality prepared to distribute these multitudes to their ultimate destinations in the city.

"Your commission will appreciate that we are not merely observers of the situation, for our own system, including the Long Island Railroad, is spending more than $125,000,000 for the improvement of transportation facilities in and adjoining New York City, and the largest part of this expenditure is made in the district over which your honorable commission has jurisdiction, in securing convenient transit in and out of Manhattan Borough. We have provided a station in the heart of New York City, at Seventh Avenue and Thirty-third Street, which is unsurpassed in size and accommodations; we have two tunnels from that station under the North River, physically connecting the railroads of New Jersey, Pennsylvania, and the Western and Southern States with the City and State of New York; have provided four tunnels from that station under the East River directly connecting with the Long Island Railroad and all parts of Long Island.

"We now, therefore, respectfully call the earnest attention of your commission—the body legally existing for that purpose—as we did to your predecessors, to the responsibility of the citizens of this State, and especially of the City of New York, not only to advocate but to take all proper steps to secure convenient rapid transit facilities on the west side of the Borough of Manhattan which the necessities of the situation imperatively demand, and the importance of providing which at the earliest practicable date cannot, I am sure, be overestimated.

"We shall be very much obliged if the commission will kindly advise our company as to its views on this subject and what measures will be taken to relieve the situation by providing rapid transit facilities under Seventh Avenue, which the Pennsylvania Railroad Company through its Pennsylvania Tunnel & Terminal Railroad, a corporation of the State of New York, will be glad to further to the best of its ability.

"As this is a matter of urgent public interest we will advise the Mayor of the city of the transmission of this letter and request his co-operation. We also believe it advisable to allow this letter to be published and will in due course take such action."

Chairman Willcox, of the commission, replied to Mr. Rea under date of July 10 in part, as follows:

"I quite agree with you as to the necessity for thorough and prompt action in order to accommodate the travel that will result from the opening of your railroad and this station, and this commission has been giving very careful attention to this matter.

"It is quite true that the Board of Rapid Transit Railroad Commissioners, predecessor of this commission, laid out an extension of the present subway from Forty-second Street down Seventh Avenue in 1906. This route was included by that commission among the routes it offered to bidders in April, 1907, but no bids were received for such routes either from the Interborough Rapid Transit Company or from any other company.

"Accordingly, your criticism of the present situation might have been more properly sent to that company months ago than to this commission at this time. Although the Interborough Rapid Transit Company began advertising to the public in daily newspapers in April, 1909, that it was ready to go ahead in the matter of an extension down Seventh Avenue, it was not until July 18, 1909, that the proposal of that company for any such extension was received by this commission. It has not been put over until fall as indicated by some of the newspapers.

"Until extensive amendments were made to the Rapid Transit act by the last Legislature, approved by the Governor on May 26, 1909, it was not possible for any rapid transit construction to be made.

"In the matter of available municipal funds for rapid transit construction, I have to state that this commission sent to the Board of Estimate and Apportionment, in May, 1908, for its approval, certain contracts for subway construction in Brooklyn which required an appropriation at that time of about $3,000,000.

"The Board of Estimate and Apportionment was restrained by an injunction obtained by a taxpayer from taking any action on the application of this commission, on the ground that the debt limit of the city had been exceeded, and this matter is still undetermined by the courts. In view of this, the commission has not felt it practicable to submit any other proposals to the Board of Estimate and Apportionment requiring municipal funds for construction."

As a result of the letter of the Pennsylvania Railroad to the Public Service Commission regarding the proposed subway in Seventh Avenue, Arthur J. Baldwin, counsel for the Bradley-Gaffney-Steers Company, which has filed a proposal to build a subway system in New York, conferred on July 12 with Chairman Willcox of the Public Service Commission. While neither Mr. Willcox nor Mr. Baldwin would discuss the meeting, it was learned that the Bradley-Gaffney-Steers Company has under consideration a modification of its proposal to the Public Service Commission, so as to include the tunnel suggested by the Pennsylvania Railroad, and that it will file such an amendment in the near future.

Work of the Public Service Commission, First District

The Public Service Commission of the First District of New York completed its second year of work on July 1, 1909. In speaking of the work of the commission on July 2, William R. Willcox, chairman, said:

"Inasmuch as the greatest problems before the commission lie in the field of transportation, the bulk of our work has been directed largely to paving the way for new rapid

transit facilities and increasing and improving the service on existing lines. The commission has encouraged the entrance of competitors into the traction field and has framed a law, which was passed by the Legislature, amending the Rapid Transit Act so that New York City now has three ways of building rapid transit lines against one method allowed by the old law. It has also proposed and advocated the passage of a constitutional amendment, which will be submitted to the people next Fall, providing that bonds used for the construction of self-supporting rapid transit lines will not be included in computing the debt limit, thus adding about $100,000,000 to the city's borrowing capacity.

"During the last two years the commission has planned a new system of subways to connect the boroughs of Manhattan, the Bronx and Brooklyn, and as soon as the detailed plans and forms of contracts can be prepared—a work that will be pushed immediately—will advertise for bids for its construction. This system embraces the Broadway-Lexington Avenue route as laid down by the commission, extending from the Battery to and through the borough of the Bronx; the Fourth Avenue subway, extending from the Brooklyn terminal of the Manhattan bridge through Flatbush Avenue extension and Fourth Avenue, Brooklyn, to Forty-third Street, with branches to Fort Hamilton and Coney Island; the Canal Street subway, extending across Manhattan from the Hudson to near the East River, and the Broadway-Lafayette subway in Brooklyn, leading from the Brooklyn terminal of the Williamsburg bridge out Broadway and back through Lafayette Avenue to a junction with the Fourth Avenue subway. The commission has also prosecuted work on the Brooklyn Loop subway, which is to connect the Manhattan terminals of the Brooklyn, Manhattan and Williamsburg bridges, and which, when completed, will form an important part of the new system. It is hoped to complete the plans and contracts so that advertisements for bids for the construction of this system will be made in the Fall.

"It has been the fortune of the commission to witness the relief of the Brooklyn bridge crush by the extension of the city subway to Brooklyn, and by the practical elimination of delays caused by trolley cars.

"The present subway has claimed a great deal of attention from the commission. Its service has been improved in many ways, and the commission has recently ordered the equipment of all cars used in the express service with side doors. The commission has also provided for the lengthening of the station platforms in the subway, so that they will be able to accommodate 10-car express trains and 6-car local trains, the present platforms being limited to 8-car express trains and 5-car local trains. The speed control system, recommended by Bion J. Arnold, consulting engineer to the commission, has been tried with good effect and the Interborough Rapid Transit Company plans to extend it until the entire express service will be covered.

"When the commission was created it was found that the loss of life from accidents on railroads and street railroads within Greater New York amounted to nearly 600 persons a year. By the installation of airbrakes and the use of better life-saving devices, together with the overhauling of cars and the maintenance of their machinery in first-class condition, there has been a great improvement in this respect. For the last month reported only 32 lives were lost by such accidents, and if this ratio is kept up the total for the year will be less than 400—a saving of one-third over the annual record of two years ago.

"It is not the commission's fault that transfers on Fifty-ninth Street have not been restored. When these were cut off the commission held an investigation, which resulted in the passage of orders directing the Metropolitan Street Railway and the Central Park, North & East River Railroad to make joint rates for the transportation of passengers over their lines. The companies, however, resisted the order in the courts and obtained through writs of certiorari the right to have a judicial review of the commission's action. The restoration of transfers, therefore, is suspended pending this review."

New Franchise Drawn as Basis for Negotiations in Des Moines.—W. H. Baily, corporation counsel of Des Moines, Ia., has drafted a franchise to extend the rights of the Des Moines City Railway for 25 years as a basis of negotiations between the city and the company. The ordinance will be read before the Council and will then be submitted to the company. Until this has been done the provisions of the measure will not be made public.

Resolution to Re-Submit Municipal Ownership in San Francisco.—A resolution has been submitted to the Board of Supervisors of San Francisco, and referred by that body to the public utilities committee for consideration, to re-submit to the voters of San Francisco at an early date the question of reconstructing and conducting the Geary Street, Park & Ocean Railroad as a municipal enterprise. This question was before the voters on June 24, and as noted on page 48 of the Electric Railway Journal of July 3, 1909, was defeated.

Municipal Line at Calgary Opened—The municipal electric railway at Calgary, Alta, Can., representing an investment of about $500,000, was opened for traffic on July 5. The line consists of five miles of double track and seven miles of single track. Power is supplied from the municipal light plant of Calgary, which was extended to meet the requirements of the railway. Pay-as-you-enter cars are in use. A paid commission of three members, of which the Mayor is chairman, manages the city, and is in charge of the railway, with Thomas McCauley as their representative, with the title of superintendent.

Report of Accountants on Chicago Railways Company.—A report of Price, Waterhouse & Company concerning the accounts of the Chicago Railways Company has been made public. The investigation on which the report is based was made at the request of Mayor Busse of Chicago. The report from beginning to end was without censure, and pointed out that all the errors contributing to the $254,487.81 correction, insisted upon by the Board of Supervising Engineers, were caused by a misunderstanding of the ordinance requirements and mistakes which easily can be made in handling complex problems connected with traction accounts.

Columbus Terminal Ordinance Repassed.—The ordinance granting the Ohio Electric Railway, Columbus, Ohio, permission to erect its proposed union station has been passed in Council over the veto of Acting Mayor Rightmier. The measure provides that an interurban station to cost $175,000 shall be erected at Third and Town streets by Jan. 1, 1913. The ordinance was immediately referred to Mayor Bond, who declared he would announce his decision regarding the measure in a few days. The ordinance as passed provided for the abandonment of what is known as the loop, for the sale of seven tickets for 25 cents within the city and for an eight-year extension of the present franchise of the company.

Cascade Tunnel Electrification.—The work of electrifying the Cascade Mountain Tunnel of the Great Northern Railroad is practically complete, and the power houses will probably be ready for operation by Aug. 1, 1909. While no date has yet been fixed for putting the full electrical service into operation in the tunnels, it is expected that this will be done before the end of August. The present electrified line is about 6 miles long, including the yards and switches at the ends of the Cascade tunnel, which is almost 3 miles long. Already several work trains are operated in the tunnel by electric locomotives, but regular service will not be undertaken until the power stations are completed. If the present installation proves successful, the entire Cascade Mountain division of the Great Northern Railroad, which is about 60 miles long, will be electrified.

Electrolysis Report in Winnipeg.—Professor Herdt, of Montreal, the expert who was employed by the city of Winnipeg to inquire into the electrolysis situation in that city, has presented his report to the Board of Control. Briefly it recommended that the company do considerable rebonding, especially around special work, and should install some additional substations to reduce the amount of current returned on the rails. He states, however, that the company has already started to carry out these suggestions and has placed orders for the equipment of three substations and is planning to rebond a number of its important lines. The report is the result of a charge made some time ago by the city electrician that a fire had been caused in one of the principal sections of the city by stray railway current. This has been found not to be the case by Professor Herdt.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—The resolution requiring the joint committee of the Senate and the House which has under consideration the public utility matter to report by July 8 was not acted upon in the Senate and therefore was ineffective. Mr. Scott, Plymouth, said last week that he would not attempt to predict the date on which the report is likely to be made. Later he said that it was possible that the committee might report some time during the week of July 12. The judiciary committee of the House has reported favorably the amendment to the law regarding intimidation and boycott. This amendment modifies section 1296 so that it reads as follows: "Every person who shall threaten or use any means calculated to intimidate any person, to compel such person against his will to do or abstain from doing any act which such person has a legal right to do, or shall persistently follow such person in a disorderly manner or injure, or threaten to injure his property, with intent to intimidate him shall be fined not more than $100 or imprisonment not more than six months."

Financial and Corporate

New York Stock and Money Market

July 13, 1909.

Little change has taken place during the last week in the quotations for the majority of the securities listed on the New York Stock Exchange. The advances and declines by most stocks represented the restricted trading which makes the regulation summer market a dull one. News and gossip continued bullish; crop reports furnish additional basis for the support of prices on a level that anticipates future prosperity in all lines of trade. New York traction securities average a little lower than a week ago. Bonds are in excellent demand.

Rates for call loans in New York remain nominal, and throughout the country funds are plentiful. Rates to-day were: Call, 1¾ to 2 per cent; time, 2 to 2¼ per cent for 60 days, 2½ per cent for 90 days, 2½ to 2¾ per cent for four months, 3 per cent for five months, and 3¼ to 3½ per cent for six months.

Other Markets

Little activity has developed in traction issues in the Philadelphia market. Philadelphia Rapid Transit stock has fluctuated within about a point.

Trading in electric railway stocks in Chicago was quiet with the general market in that city. Kansas City Railway & Light preferred was quiet and receded only fractionally from the advance of the preceding week. Quotations for various elevated railroad securities were a trifle lower.

Massachusetts Electric Companies preferred improved in price in the Boston market, selling up from 70 to 72½, but one-half of this gain was lost under subsequent trading. Boston Elevated was a little easier.

United Railways & Electric funding 5 per cent bonds were stronger in the Baltimore market, selling at 85, an advance of 2½ over the preceding week. The 4s were practically unchanged at 87 and the income bonds were quoted at 57½.

Quotations of various traction securities as compared with last week follow:

	July 6.	July 13.
American Railways Company	a45½	45
Aurora, Elgin & Chicago Railroad (common)	a40½	39⅛
Aurora, Elgin & Chicago Railroad (preferred)	a87	a87
Boston Elevated Railway	129½	129
Boston & Suburban Electric Companies	*16	*15½
Boston & Suburban Electric Companies (preferred)	*71	*71
Boston & Worcester Electric Companies (common)	10	10
Boston & Worcester Electric Companies (preferred)	52½	a56
Brooklyn Rapid Transit Company	79¼	77¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	86¾	86
Capital Traction Company, Washington	a139	a138
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*3	*2½
Chicago & Oak Park Elevated Railroad (preferred)	*12	*10
Chicago Railways, ptcptg, ctf, 1	a113	a112¾
Chicago Railways, ptcptg, ctf, 2	a40½	a39½
Chicago Railways, ptcptg, ctf, 3	a28	a26¼
Chicago Railways, ptcptg,ctf, 4s	a10	a10½
Cleveland Electric Railway	*78	*78
Consolidated Traction Company of New Jersey	a76½	a76½
Consolidated Traction of N. J. 5 per cent bonds	a106½	a106½
Detroit United Railway	a62	a63½
General Electric Company	(64¾	164
Georgia Railway & Electric Company (common)	92⅞	a92¾
Georgia Railway & Electric Company (preferred)	87	89
Interborough-Metropolitan Company (common)	16¼	15½
Interborough-Metropolitan Company (preferred)	49⅜	47¾
Interborough-Metropolitan Company (4½s)	80	80¾
Kansas City Railway & Light Company (common)	51	a50
Kansas City Railway & Light Company (preferred)	83	84¾
Manhattan Railway	a147	a146
Massachusetts Electric Companies (common)	a13¾	13½
Massachusetts Electric Companies (preferred)	70	71¾
Metropolitan West Side, Chicago (common)	a17	a16½
Metropolitan West Side, Chicago (preferred)	a48½	a48
Metropolitan Street Railway	18	a20
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	83⅜	82
Northwestern Elevated Railroad (common)	a23	a22
Northwestern Elevated Railroad (preferred)	a70	a69
Philadelphia Company, Pittsburg (common)	42	a42
Philadelphia Company, Pittsburg (preferred)	43	43
Philadelphia Rapid Transit Company	28⅝	28⅝
Philadelphia Traction Company	91	91
Public Service Corporation, 5 per cent. col. notes	a100½	a100½
Public Service Corporation, ctfs	a89	a89
Seattle Electric Company (common)	*112	102
Seattle Electric Company (preferred)	103	103⅛
South Side Elevated Railroad, Chicago	a55	a55
Toledo Railways & Light Company	a9	a9½
Third Avenue Railroad, New York	18	17
Twin City Rapid Transit, Minneapolis (common)	a104	103½
Union Traction Company, Philadelphia	a53½	53
United Railways & Electric Company, Baltimore	11	12
United Railways Inv. Co., San Francisco (common)	a39	a38
United Railways Inv. Co., San Francisco (preferred)	56	a55½
Washington Railway & Electric Company (common)	a42⅝	a42½
Washington Railway & Electric Company (preferred)	a91	a90⅞
West End Street Railway, Boston (common)	a93	92½
West End Street Railway, Boston (preferred)	*106	104½
Westinghouse Electric & Manufacturing Company	a85	a84½
Westinghouse Elec. & Mfg. Company (1st pref.)	a124½	a124½

a Asked. *Last sale.

Third Avenue Railroad Reorganization

The final hearing before the Public Service Commission of the First District of New York on the plan for the reorganization of the Third Avenue Railroad, New York, was held on July 11. John M. Bowers, counsel for the bondholders' committee, said that the law of the State as he understood it gives the company the vested right to reorganize as it may see fit, the functions of the commission in this matter being only ministerial. In referring to the expenditures for the change of power from horse to cable and from cable to electricity, he said that they had been made with the consent of the stockholders. Referring to the disappearance of funds which, it is said, do not show in the physical property, Mr. Bowers said that an inquiry would prove enormously expensive, and that he did not feel that the mere statement of an officer of the company of occurrences after he had left its employ was sufficient justification for incurring the expense that an investigation would entail. J. M. Perry, representing the stockholders' committee, stated that he believed the majority of his clients are in favor of the reorganization plan.

At the hearing on July 7, counsel for the commission examined Receiver Whitridge as to numerous details in the plan of reorganization. It appeared in the course of examination that the plan was, as Mr. Whitridge expressed it, only an imperfect draft. Mr. Whitridge and Mr. Bowers promised that a more careful statement as to the exact standing of the property would be submitted at an early date. Chairman Willcox, of the commission, asked Mr. Whitridge if he considered it a good plan to issue, in new securities, 100 cents on the dollar for all of the old securities, besides raising some millions extra to provide money for immediate necessities, much of which has been already raised on receivers' certificates and expended. Mr. Whitridge said he thought that the plan was a good one. The receiver also testified that provision had not been made for the tort creditors, except in a comparatively few cases in which judgments had already been secured for damages due to accidents. It was brought to Mr. Whitridge's attention that in the transfer hearing some months ago he had testified that 10 per cent of earnings was needed for a depreciation fund, whereas in the present estimate only 5 per cent is allowed. He said that he thought that that would be sufficient for the present.

William N. Amory, who at one time was secretary of the Third Avenue Railroad, was the principal witness on July 8. Mr. Amory is a stockholder of the company, and said that he will not pay the stock assessment. He expressed the opinion that the Third Avenue Railroad cannot earn the interest demanded under the plan of reorganization.

Anderson (S. C.) Traction Company.—The property of the Anderson Traction Company will be offered for sale by J. A. Brock, special master, Anderson, S. C., at public auction in Anderson on Oct. 12, 1909, in accordance with the decree filed by the United States Circuit Court in the district of South Carolina in suit brought by the International Trust Company of Maryland.

Black River Traction Company, Watertown, N. Y.—William B. McKinley, Champaign Ill., president of the Illinois Traction System, has made overtures for the purchase of the property of the Black River Traction Company.

Chicago (Ill.) Railways.—It is reported that negotiations are under way for the sale of the property of the Consolidated Traction Company to Chicago Railways' interests. The underlying bondholders of the Chicago Consolidated Traction Company, however, are understood not to be satisfied with the overtures for the sale of the property so far made to them.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—The receivers of the Chicago & Milwaukee Electric Railroad are sending a letter as follows to the creditors of the company: "We are enclosing herewith check covering dividend of 50 per cent on your preferred claims as allowed by the court. We expect the court to order payment of the balance in about 90 days." The letter is signed by W. Irving Osborne, D. B. Hanna and George B. Moore, receivers.

Cincinnati & Columbus Traction Company, Cincinnati, Ohio.—It is understood that the majority of the holders of the $600,000 of first mortgage 5 per cent bonds of the Cincinnati & Columbus Traction Company which fell due on July 1, 1909, have consented to an extension of the time of payment to Jan. 1, 1910, at 6 per cent and interest. The reason for the extension is the desire of the bondholders to facilitate negotiations for the sale of the road to the Southwestern Ohio Traction Company, which has been or-

ganized with a nominal capital of $10,000 to carry out an extensive plan for interurban railways which John E. Bleekman, New York, and his associates have been working upon for some time. Reference to the organization of the Southwestern Traction Company was made in the Electric Railway Journal of April 24, 1909.

Gallatin Valley Electric Railway, Bozeman, Mont.—The Gallatin Valley Electric Railway, which is building a line between Bozeman and Salesville, has taken over the Bozeman Street Railway and merged it with the Gallatin Valley Electric Railway. New officers have been elected as follows for the Gallatin Valley Electric Railway: H. S. Buell, president; Charles B. Anderson, secretary and general manager; George Cox, treasurer; C. H. Thompson, general freight and passenger agent; A. J. Bush, roadmaster.

Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Ind.—On application of the Electrical Installation Company, Chicago, Harry J. Milligan, Indianapolis, has been appointed receiver of the Indianapolis, Crawfordsville & Western Traction Company.

Indiana Union Traction Company, Anderson, Ind.—The Indiana Union Traction Company has declared a semi-annual dividend of ½ of 1 per cent on the common stock of the company for the six months ended June 30, 1909. This is the first dividend to be paid on the stock since Jan. 1, 1908.

Interborough Rapid Transit Company, New York, N. Y.—Announcement is made that the subscription books for the $10,000,000 of 5 per cent bonds of the Interborough Rapid Transit Company, offered by J. P. Morgan & Company, New York, and Lee, Higginson & Company, Boston, have been closed, and that the issue has been largely oversubscribed.

Peninsula Railway, San Jose, Cal.—The Peninsula Railroad, the San Jose & Los Gatos Interurban Railway and the Santa Clara Interurban Railway have been consolidated as the Peninsula Railway, with a capital stock of $12,000,000. The directors of the company are: J. T. Burke, Paul Shoup, C. B. Seger, P. F. Dunne and F. E. Chapin.

United Traction & Electric Company, Providence, R. I.—The Union Trust Company, Providence, which at one time held 8875 shares of the stock of the United Traction & Electric Company, has exchanged a block of 6000 shares of the company, comprising all its holdings, for stock of the New York, New Haven & Hartford Railroad on the basis of the offer made by the New York, New Haven & Hartford Railroad to the larger stockholders of the United Traction & Electric Company, namely, five shares of the stock of the New York, New Haven & Hartford Railroad for eight shares of the stock of the United Traction & Electric Company. There is $8,000,000 of stock of the United Traction & Electric Company, and for the past seven years it has received dividends at the rate of 5 per cent per annum.

NEW PUBLICATION

Steam Power Plant Piping Systems. By William L. Morris, M.E., New York: McGraw-Hill Book Company, 1909; cloth, 481 pages and index. Price, $5 net.

This is the first publication bearing the imprint of the new McGraw-Hill Book Company. The author, who has had wide experience in designing power stations, presents his personal views as to the best method of handling certain problems rather than attempting to cover all the methods in general use. For this reason some of the detail plans described may not meet with the entire approval of other engineers holding different views. This much may be said, however, that the author has followed a rational and consistent theory throughout, namely, to so design all parts of piping system that repairs to any disabled line may be made without interfering with the regular service of the plant. The arrangement of the text and illustrations, some 390 in number, is unique. Beginning with general layouts of main piping, the author develops layouts of different systems for each of the separate auxiliary, as services, condensers and heaters, live steam drips, blow-off and exhaust piping, oiling systems, etc. Chapter 10 takes up live steam piping details. Each detail is given a distinguishing number beginning with 1 for the main, 2 for the engine branches, 3 for the boiler branches, etc. All details of the live steam piping are further designated by the prefixed letter A. Vacuum exhaust details are similarly classified in Chapter 11, and are given the prefix B. This method of numbering and lettering each detail is carried out in all of the following chapters. The numerous illustrations admirably supplement the descriptions of design and installation. The drawings in most instances have been made from original sketches of the author.

Traffic and Transportation

C. E. T. A. Joint Passenger and Joint and Local Baggage Tariffs

The Central Electric Traffic Association, under date of July 2, 1909, issued joint passenger tariff No. 2, cancelling joint passenger tariff No. 1, of rate for interchangeable 1000 mile ticket. The new tariff becomes effective on Aug. 2, 1909, and the interchangeable ticket will be honored between all stations of the roads participating in the tariff in Illinois, Indiana, Kentucky, Michigan and Ohio. A list of these roads was published on page 92 of the Electric Railway Journal of July 10, 1909. The rate for the ticket is $17.50. It is subject to the following conditions:

A. It is good for bearer or bearer and party.
B. It is limited to one year, expiring on the date cancelled in the margin thereof.
C. No detachment will be made for less than five miles for each passenger. Fractions of a mile will be counted as one mile.
1. A minimum of eight miles will be detached by the Indiana Union Traction Co. when used on limited trains.
2. No half fare detachment will be made on this ticket.
3. It will not be honored for city fares.
D. No portion of the mileage strip will be accepted for passage if presented detached from the cover, nor if not bearing same form and consecutive number.
E. This ticket is good for passage only on trains designated to carry passengers, and only to and from stations at which such trains are officially scheduled to stop on the line over which it may be honored for passage.
F. If this ticket is lost, mislaid or stolen, it can not be replaced, neither will notification of this loss be given to the conductors.
G. The purchase and use of this mileage ticket constitutes the acceptance of its condition by the purchaser.
H. In selling this interchangeable mileage ticket the company so doing acts as agent only, and assumes no responsibility beyond its own line.
I. One hundred and fifty (150) pounds of legal baggage, not exceeding $100 in value, will be checked on this ticket. If baggage is presented for checking for more than one passenger, detachment of baggage strip will be made to cover the distance traveled by each one. Baggage will not be checked until that portion of the mileage strip which has been used for checking has been used.
J. No free allowance for baggage will be made on the following lines: Columbus, Delaware & Marion Ry., Columbus, Marion & Bucyrus R. R., Evansville Railways Co., but fourteen (14) passenger miles will be detached for each piece of baggage regardless of weight or distance carried.
1. On the line of the Lake Erie, Bowling Green & Napoleon Ry. no free baggage will be allowed. A charge for 150 pounds will be 25 cents and 15 cents per hundred points for excess.
K. No extra charge will be made for the use of this ticket on limited trains.
L. All baggage in excess of the free allowance of one hundred and fifty (150) pounds will be handled in accordance with the rules and regulations as provided in I. C. C. No. 2, I. R. C. No. 2, O. R. C. No. 2, Central Electric Traffic Association Joint and Local Baggage Tariff No. 1, effective August 2, 1909.
M. A limited train is one that does not make country or cross road stops, but only makes city or town stops.

The association has also issued joint and local baggage tariff No. 1 covering joint and local rules and regulations and tables of excess baggage rates applying between all stations on the lines participating in the tariff in Illinois, Indiana, Kentucky, Michigan and Ohio, except those expressly designated. This tariff was also issued on July 2, 1909, and becomes effective on Aug. 2, 1909. The following rules and regulations will govern the handling of baggage and the collection of charges on excess baggage:

Section 1. Baggage may be checked on presentation of proper form of transportation to any destination shown on the lines of participating carriers, but only via route of transportation.

Section 2. In order to insure prompt forwarding, baggage must be presented for checking at least fifteen minutes before departure of train; but employees are required to use judgment and courtesy in applying this rule.

Section 3. Under no circumstances will baggage be checked by an agent without presentation by passenger of some legal and regular form of transportation, except baggage forwarded on C. O. D. checks when the entire amount will be handled as excess.

Section 4. Tickets used for checking of baggage must be cancelled by regular baggage punch or stamp before return to passenger. When baggage is checked short of destination, endorse on back of ticket, "baggage checked to ————" (giving name of destination or station to which baggage is checked).

Section 5. The participating carriers do not agree or guarantee to forward baggage to its destination on same train with passenger, or within a specified time limit.

Section 6. Baggage consists of the wearing apparel and such personal effects of passengers as may be necessary for their journey, and will be checked for transportation upon presentation of the proper transportation, if enclosed in locked receptacles, which will insure safe transportation, such as trunks, suit cases, valises, satchels, leather hat boxes, medium size boxes (containing personal effects and provided with suitable handles), sailor and emigrant bags.

Section 7. When transported between any two points between which the route is wholly within the State of Indiana, the following articles will be included as baggage: The samples, goods, wares, appliances and catalogues of commercial travelers or their employees, and used by them for the purpose of transacting their business and carried with them solely for that purpose, when securely packed and locked in substantial trunks or sample cases, of convenient shape and weight for handling. When any of the articles named in this paragraph are checked between any two points, between which the route is not wholly within the State of Indiana, it is done as a matter of courtesy and the carriers, parties to this tariff, will not be responsible for any loss or damage to contents, reserving the right to refer such passengers to the express companies or departments.

Section 8. Any of the articles named in sections 6 and 7, which are not enclosed in securely locked receptacles will not be received or

checked, except with the understanding that no liability will be assumed for the loss of or damage to the articles therein.

Section 9. The following articles will be checked at owners' risk and included in the weight of the passengers' baggage: Sample school desks and opera chairs properly encased for handling, tool chests, miners' packs, steamer chairs, invalid chairs, saddles in bags, surveyors' tools wrapped, baggage as described in section 6, in bundles when properly wrapped in canvas or other strong material (paper wrappers and pasteboard boxes of all kinds excepted), and securely roped, golf, cricket, base ball or other club paraphernalia.

Section 10. Trunks or cases marked "GLASS" or "FRAGILE," or in any other manner indicating that contents are of fragile nature and likely to be damaged by ordinary handling, will not be accepted for transportation in baggage compartments, unless fully released by signature of owner on regular form of release, relieving the carrier from all responsibility.

Section 11. Bicycles and tricycles (not motor cycles) may be checked and transported in baggage compartments, subject to the same charge as for 100 pounds of excess baggage, no charge less than 25 cents; except that for points wholly within the State of Ohio BICYCLES will be carried FREE. The charge for bicycles and tricycles is separate from and has no connection with that for excess baggage proper. Not more than one bicycle or tricycle will be checked for one passenger, between any two points within the State of Ohio. Lamps, cyclometers and tool bags, unless removed from bicycles or tricycles before such articles are checked, will be carried at owner's risk.

Section 12. Baby carriages, go-carts and baby sleighs, containing only necessary articles, such as pillows, robes or blankets, will be checked subject to same charge as for 100 pounds of excess baggage, no charge less than 25 cents. This charge is separate from and has no connection with that for excess baggage proper. Folded go-carts may be carried by passengers without checking.

Section 13. ARTICLES THAT MUST NOT BE CHECKED ARE: Animals, automobiles or motor-tricycles or similar vehicles, band boxes, bird cages, boxes or barrels of fruit, buggies, bundles, burial devices, explosive matter, furniture, gambling devices, game, groceries, goods of extraordinary value, household goods, jewelry, liquids of any class, machinery, merchandise, money, bonds and other securities, musical instruments, moving picture films, oil, gas or gasoline stoves, paper packages or pasteboard boxes, patent fence gates or ladders, perishable articles, pianos, piano movers, scales, sewing machines, shawl straps, tricycles with any cabinet attachments, trunks or valises with bundle attached, valuable laces, wagons or carts and other property liable to suffer damage from ordinary handling, or that can not be handled, loaded and piled the same as ordinary baggage. Refer parties presenting such articles to the freight or express agent.

Section 14. Perishable articles, jewelry, merchandise, money or property excessive in value, enclosed in baggage, will be at owner's risk of loss or damage, arising through any cause whatever, as it is not the intention of the participating carriers to become responsible for such, as baggage, and passengers should be so advised.

Section 15. If a trunk or case is presented which baggage agents have sufficient reason to believe contains jewelry, valuable laces or money, or any other articles prohibited in this section, they will refuse to check, referring passenger to express agent.

Section 16. Between any two points between which the route is wholly within the State of Indiana 150 pounds of baggage not exceeding $100 in value will be checked free for each passenger presenting full ticket or other full first class transportation, and not exceeding $50 in value for each passenger presenting half or child's ticket or transportation. See section 31.

Section 17. In all cases not covered by section 16, 150 pounds of baggage, not exceeding $100 in value, will be checked free for each passenger presenting full ticket or other first class transportation, and 75 pounds, not exceeding $50 in value, for each passenger presenting half fare ticket or transportation. No baggage will be checked free when the one way ticket fare is less than 25 cents. When the fare is less than 25 cents, the agent may check baggage under the rule by collecting the difference between the ticket fare and 25 cents. In such cases the agent will issue excess baggage check for the amount so collected. This collection is separate and in addition to any charge for excess weight, but may be included and shown on the same check covering any collection for excess weight on same baggage. See section 31.

Exceptions: On the line of the Lake Erie, Bowling Green & Napoleon Railway no free baggage will be allowed. The charges for 150 pounds or less will be 25 cents; 15 cents per hundred pounds excess, same to be handled same as excess, using excess checks on interline traffic.

Section 18. In checking articles named in section 7, all in excess of 150 pounds will be charged for at the same rate as excess baggage, regardless of number of tickets presented, except when it is clearly shown that the commercial traveler is regularly accompanied by an assistant or helper traveling with him and employed by the same firm, 150 pounds additional will be carried free.

Section 19. No piece of baggage weighing over 250 pounds will be accepted or checked as baggage.

Section 20. Baggage in excess of the FREE allowance authorized will be subject to a charge in accordance with the excess charges shown on tables in pages 10 and 11.

Section 21. All baggage must be weighed where possible. Agents will test and balance scales frequently. Ten pounds on any one lot may be allowed for possible variation of scales, but agents must positively refuse to receive or check a piece of baggage weighing over 260 pounds (this exception is not to be construed as allowing over 250 pounds to each piece, but is only allowed for variation of scales).

Section 22. When checking baggage, in case of doubt as to proper weight of same, if impossible to ascertain correct weight, notify agent at destination or transfer point to weigh and collect additional charges, if any.

Section 23. In case of doubt as to proper weight of baggage when received by agent at destination, weigh if possible and collect any additional charges and make full report to proper officer.

Section 24. Storage will be charged on each piece of baggage, either inbound or outbound, checked or not checked, remaining at any station over twenty-four hours as follows: The first twenty-four hours free; the second twenty-four hours or fraction thereof 25 cents; and for each succeeding twenty-four hours or fraction thereof 10 cents. Except baggage received any time Saturday will be held until same hour Monday, and baggage received any time Sunday will be held until midnight Monday without charge. This exception will also apply to all legal holidays. Baggage will be stored subject to the participating carriers' responsibility as warehousemen only, or may be, at their option, removed to and stored in a public or licensed warehouse at the cost of the owner and there be held at the owner's risk and without liability on the part of the participating carrier and subject to a lien for all lawful charges, including the same charges for storage. When baggage has been on hand the free allowance of time, fill out and attach a storage check. When charges are paid and baggage claimed by owner, deliver receipt, and make report to auditor. If baggage is not claimed within ten days, give advice of same to the proper officer.

Section 25. Dogs provided with properly fitting collar and strong chain, when accompanied by owner or caretaker, will be transported over the lines of participating carriers named herein only on local trains or on limited trains provided with baggage compartment, and at owner's risk. The charge for this service will be the full first class rate of fare with a minimum charge of 25 cents and a maximum charge of 50 cents between any two points on the lines of each carrier, party hereto. Vicious dogs must be crated and handled by express.

Section 26. Baggage checked to points on lines of participating carriers in this tariff where no regular agencies are maintained will be at owner's risk after unloaded at destination. The participating carriers assume no responsibility for protection, care or delivery of baggage unloaded at these points. Double checking will not be permitted. Where baggage is offered to be transported to any point where there is no agent, use a release check which requires passenger's signature to the release.

Section 27. When baggage accompanied by a passenger is received at a station where there is no agent, conductor will check same to point to which passenger pays fare and issue a regular check. (The duplicate check to be given to the passenger). If weight seems in excess of the FREE allowance, indorse check accordingly, calling attention of agent at destination to the fact.

Section 28.—In cases where passengers have lost their checks, collect 25 cents for each check, require them to fully identify their baggage by describing the principal contents and producing the keys to open it. If satisfied that the claimant is the owner, take receipt, with full name and address, and make report of the circumstances to the proper officer. While baggage is checked, passengers must not be permitted to open it.

Section 29. THEATRICAL—Wearing apparel, stage properties, musical instruments, scenery and small animals crated used in producing a theatrical performance, lecture, or other public entertainment upon the stage of a hall or theater may be transported in baggage compartments subject to limitation in aggregate weight or quantity and minimum number of passengers as follows: provided none of these articles is too bulky to be handled in baggage compartments:

For a company traveling on a ticket for ten or more passengers 150 pounds per passenger will be carried without charge. All in excess shall be charged for at the regular excess rates when transported in regular baggage compartments.

In all cases where animals belonging to theatrical companies are transported in baggage compartments, a release must be executed by the owner or shipper, releasing the participating carrier from all liability for damage or injury to such property, the release to be forwarded promptly to the proper officer.

Section 30. The following instructions cover the issuing and handling of excess baggage and C. O. D. tags:

(a) EXCESS BAGGAGE CHECKS printed on red tag board. One coupon for the auditor of the issuing road, one for the passenger, and one to be attached to the baggage. Whenever excess baggage is to be forwarded fill out one of these checks and attach to the baggage, handing duplicate to passenger and forward auditor's stub to the auditor in your regular report. When the same party has more than one piece of baggage and excess is to be charged, check all but one piece in the regular manner, issue excess check for the remaining piece, showing charge for the total excess on the one excess check. Also show in consecutive order the numbers of free baggage checks issued on this one check in space provided for same. This to enable receiving agent to properly account for all baggage on which excess is charged. Care must be used to see that the proper amount is collected and that the proper weights have been used. Agents receiving and delivering baggage under excess baggage checks will be careful to ascertain the exact amount of excess contained in the baggage and make notation thereof on the excess baggage check.

(b) C. O. D. BAGGAGE CHECKS are printed on blue tag board, and are to be filled out and issued in all cases where charges are to be collected at destination for transportation of baggage, storage, etc. When these checks are issued it is not necessary to issue the regular checks unless there is more than one piece to be checked, in which case follow the same plan as is done with excess baggage. Agents receiving baggage under C. O. D. checks will be very careful to collect all charges shown on C. O. D. baggage checks before delivering baggage to passenger, sending all duplicates to the auditor. Agents must be certain that there is an agent at point of destination before forwarding any C. O. D. baggage. The Toledo, Fosteria & Findlay Railway will not handle C. O. D. baggage.

Section 31. Baggage forwarded via the junction points shown below is subject to a charge for transferring between stations as follows:

Junction.	Between.	Charge per Piece for Transferring.
Crawfordsville, Ind.	T. H. I. & E. Tr. Co. and I. C. & W. Tr. Co.	$0 25
Genoa, Ohio	T. P. C. & L. Ry. and L. S. E. Ry.	10
Kokomo, Ind.	I. U. T. Co. and K. M. & W. Tr. Co.	25
Marion, Ind.	I. U. T. Co. and K. M. & W. Tr. Co.	25
	I. U. T. Co. and M. B. & E. Tr. Co.	15
Toledo, Ohio	Ohio Electric Ry. and All Electric Lines	25

In forwarding baggage via these points agents or baggagemen will collect amount of transfer and issue excess check to cover, marking it "For transfer at ————." If there is excess on the baggage so checked one excess check will cover both collections. Show the amount collected for transfer separate. If there is more than one piece of baggage for same passenger handle checks same as for excess checking as provided for in section 30a.

The baggage tariff is concluded with mileage tables of the Indiana roads, geographically arranged, excess baggage tables between stations in Indiana, excess baggage tables not for use locally in Indiana, and instructions to employers as to how to find the rate.

Reduction of Fare to Coney Island Asked on Week Days

J. Monheimer, who complained to the Public Service Commission that the fare of 10 cents between Coney Island and Brooklyn, charged by the Coney Island & Brooklyn Railroad on Saturdays, Sundays and holidays was unjust, unreasonable and unlawful, has since Commissioner Bassett rendered his opinion, as noted in the ELECTRIC RAILWAY JOURNAL of July 10, 1909, presented to the commission a request that the commission order the company to charge a 5-cent fare on week days. On the question of the 10-cent fare on Saturdays, Sundays and holidays the commission decided in favor of the company. The question of fares on week days was not involved in the complaint, and the commission declined to pass upon it, although Commissioner Bassett expressed the opinion that such an increase is unreasonable and unjustifiable and of slight profit to the

company, but that the company has a legal right to make such a charge.

Mr. Monheimer sets forth in his new complaint that he has been a resident of Coney Island for 10 years, and that up to Aug. 31, 1908, the Coney Island & Brooklyn Railroad only charged a 5-cent fare on week days, and 10 cents on Saturdays, Sundays and holidays. He adds:

"That the aforesaid rate of transportation to and from Coney Island (10 cents) is unjust, excessive and unreasonable, and is a detriment to complainant's property interests at Coney Island.

"That subsequent to Aug. 31, 1908, and since the rate of fare has been increased on week days, the real estate throughout the section where the increased rate of fare went into effect has materially diminished in valuation.

"That many residents of Coney Island who occupied apartments were compelled to move away on account of this increase of fare, as many of the people residing in the West Brighton section of Coney Island were people who traveled to and from Coney Island every day to their business and who could not afford to pay the increased rate of fare for transportation.

"That the people living in the West Brighton section have children who must attend school, and that many of these children, after they graduate from the public school at Coney Island, are compelled to ride to Brooklyn each week-day to attend the high schools in that borough.

"That for the past two years, and since the increase of fares went into effect, there have been more flats empty throughout the Coney Island section than at any other time prior to such increase of rate of fare. That it is the first time in many years that property owners throughout the Coney Island section have been unable to rent apartments.

"That your complainant, under the foregoing circumstances, respectfully asks this board that an order be issued to the Coney Island & Brooklyn Railroad compelling it to reduce its rate of fares from Coney Island to New York and New York to Coney Island, from 10 cents to 5 cents, except on Saturdays, Sundays and holidays."

The commission adopted a complaint order on July 13, directing the Coney Island & Brooklyn Railroad to answer within 10 days why it should not reduce its week-day fare to Coney Island from 10 cents to 5 cents.

Data Sheet of the A. S. & I. R. Transportation & Traffic Association

The committee on express and freight traffic of the American Street & Interurban Railway Transportation & Traffic Association has prepared data sheet No. 40, which is being sent to member companies over the signature of P. P. Crafts, chairman of the committee, with the request that the questions which it contains be answered and the sheet returned to B. V. Swenson, secretary of the association, as soon as possible, so as to be available for the 1909 convention. The information is to be regarded as strictly confidential and will appear in the tabulations in such a manner as to conceal its origin. The questions on the data sheet follow:

REVENUE FROM TRANSPORTATION.
CALENDAR YEAR, 1908.

Passengers	$.....	
Baggage	.....	
Parlor, chair and special cars	.....	
Total revenue		$.....
Mail	$.....	
Express	.....	
Milk	.....	
Freight	.....	
Switching	.....	
Total revenue		.....
Miscellaneous transportation revenue		$.....
Total revenue from transportation		.....

NOTE.—Do not include in above statement revenue from station and car privileges, parcel room receipts, storage, car service, telegraph and telephone service, rents of tracks and terminals, rents of equipment, rents of buildings and other property, power, or miscellaneous receipts, which items constitute revenue from operation other than transportation.

Length of line (actual distance between termini).
Miles single main track (owned and operated).
Miles double main track (single track miles owned and operated).
Miles total main track (single track miles owned and operated).
Miles sidings used for freight purposes.
Population served outside of terminals and large cities and towns.
Population served including same.
Passenger, baggage, parlor, chair and special car revenue per mile (length of line).
Per cent of total revenue from transportation.
Mail, express, milk, freight and switching revenue per mile (length of line).
Per cent of total revenue from transportation.
Total revenue from transportation per mile (length of line).
Freight car-miles operated.
Revenue from express, milk and freight hauled in freight cars per freight car-mile.
Tons express, milk and freight hauled.
Revenue per ton.
Tons express, milk and freight hauled one mile.
Revenue per ton mile.

OPERATING EXPENSES OF FREIGHT DEPARTMENT.

Salaries of solicitors.
Salaries of clerks.
Salaries of other officers and office employees charged to freight department.
Wages of conductors, motormen and other trainmen charged to freight department.
Rent of building, lights and telephones, charged to freight department.
Insurance and taxes.
Books, forms, stationery, etc.
Power. On what basis charged?
Maintenance of freight equipment.
Maintenance of track, roadway and overhead lines. On what basis charged?
Damage account (amount). Per cent of revenue.
Expense of wagon delivery, if any.
Other charges to freight department (enumerate).
Total.
If you operate over tracks of other companies in cities, what annual rental do you pay for hauling freight over same?
What is basis of rental?
What annual charges, if any, do you pay cities and towns for privilege of hauling freight over streets?
What is the basis of same?
What is your investment in freight terminals, buildings, yards, rolling stock, etc., necessary for conduct of freight business?
Do you apply the classification and distance tariff of the steam road classification committee for the territory in which your road is located, or do you apply your own classification and distance tariff?
If the latter, what is your reason for so doing? (Please enclose classification and tariff.)
Do you participate in joint rates with steam railroads?
Do you participate in haul with steam railways on two or more locals?
Do you rent privilege to steam railroad to operate over all or a part of your road on a wheelage or car mile basis?
What railways?
What is the basis of compensation to your road? (Please explain fully.)
What equipment do you furnish if you participate in joint rates, or does steam railway furnish equipment?
Do you haul freight trains by electric or steam locomotives?
Your reason for so doing?
Do you operate under contract with any of the old line express companies?
What express companies?
Do you permit express company to handle local business, *i. e.*, originating at and destined to points on your road in addition to foreign business, or do you confine the express company wholly to foreign business?
If the express company handles local business, how do you distinguish between express merchandise to be handled by it and freight merchandise to be handled by you?
Do you carry express matter so handled on freight, express or passenger car, or any combination of same?
How are you compensated by express company? (Please explain fully the basis of compensation, whether percentage of rates, tonnage, rental of cars and crew, or any other method. If for any reason you do not wish to divulge the rates paid by express company, please indicate the basis of compensation at least.)
What competition do you have in your freight business?
How do you meet such competition in rates, service, special inducements, etc.?
What terminal facilities do you provide, *i. e.*, yards, freight houses, etc.?
Do you own all these terminals, or do you rent them? Please explain fully.
What municipal or State restrictions prevent you from entering the freight and express business, or which are so burdensome as to prevent you from making a reasonable profit?
Given the above condition, what action have you taken to eliminate such objectionable restrictions?
Please give any further information which in your opinion will be valuable to member companies.
REMARKS:

Report of Wisconsin Commission on Traffic in Milwaukee

A program for the improvement of transportation in Milwaukee, designed to relieve the present congestion and looking toward permanent future convenience and facility in passenger traffic, has been outlined by the engineering department of the Railroad Commission of Wisconsin under the direction of Prof. W. D. Pence, engineer of the Railroad Commission, and R. W. Harris. The program suggests means for improvement of the service, both by act of the company and co-operative steps on the part of the company and public in general, involving changes in routing, additional cars, building new lines, various adjustments of incidents of operation, etc. This matter has been incorporated in a report which has been submitted to the commission by its engineer.

This investigation grew indirectly out of the complaint of the city of Milwaukee against the Milwaukee Electric Railway & Light Company relative to service and rates. In the formal hearings before the commission the conflicting evidence upon certain matters of a very technical nature rendered it practically impossible for the commission to reach an intelligent decision, hence the necessity for the independent field observations, which resulted in the above-mentioned report. These observations were carried out by a party of five men and covered a period of approximately six months. The report itself comprises 350 pages.

Two matters of technical importance, which have not heretofore been treated in such investigations, are those covering the determination of "comfortable load" and the promptness or alacrity of passengers in boarding cars. The latter matter was of such importance that corresponding

observations were made in a number of other cities, including Minneapolis, St. Paul, Duluth, St. Louis and Indianapolis.

With reference to the determination of "comfortable load," elaborate compilations covering observations of some 9000 cars at all hours of the day and at all important points of the system brought the engineers to the conclusion that the presence of "standing passengers" did not necessarily indicate overloading or an insufficient number of cars. It was demonstrated that a considerable number of passengers voluntarily stood up even when empty cars were available. Some interesting statistics on this point are given. The seating capacity of the ordinary car was 42 passengers. The results show that when the car contained from 5 to 14 passengers, 2 preferred to stand; 30 to 40 passengers, 6 stood; 35 to 39 passengers, 7 stood, and from 40 to 42 passengers, 8 preferred to stand. Thus, since the observations very clearly showed that eight persons preferred to stand when the car contained 42 passengers—that is, when every one could have had a seat—the comfortable load per car was fixed at 50 passengers, and this schedule was used throughout the program.

The observations in regard to the second subject—that of promptness—disclosed the fact that there is a certain sluggishness about the movement of traffic in Milwaukee that apparently might be corrected. Comparisons between Milwaukee and other cities previously mentioned are shown by the following table:

TIME IN SECONDS PER PASSENGER REQUIRED TO BOARD A CAR, WITH DIFFERENT NUMBER OF PASSENGERS BOARDING CAR AT SAME TIME.

	2	5	10	15	20	25
Indianapolis	1.75	1.25	1.00	0.95	0.91	0.90
St. Paul	2.20	1.56	1.15	1.05	0.97	0.98
St. Louis	2.60	1.58	1.15	1.00	0.96	0.97
St. Louis*	2.60	1.58	1.33	1.37	1.42	1.50
Minneapolis	3.20	1.75	1.25	1.05	1.00	0.98
Milwaukee	3.20	2.00	1.47	1.27	1.25	1.25
Duluth	4.00	2.00	1.54	1.10	1.00	1.00

*St. Louis refers to "pay-as-you-enter car."

The table shows that if more than 10 people board a car at once the time required is at present greater in the case of the "pay-as-you-enter" car than it is with the ordinary car, and this difference steadily increases with the number boarding the car.

An average of a large number of observations taken at the principal junction points in Milwaukee shows that a car is liable to be held up nine seconds due to a variety of causes. This, together with the time required to stop a car on signal, led the engineers to the conclusion that a 20-second headway was the fastest that could be maintained and have the cars run on schedule.

Freight Rights Granted.—The Springfield & Eastern Street Railway has been granted authority to carry baggage and freight in Monson by the Massachusetts Railroad Commission.

Arbitration in Texas.—The employees of the Beaumont (Tex.) Traction Company and the officers of the company have decided to submit to arbitration the differences between them.

Report in Waiting Room Case.—Upon the suggestion of the city of Worcester, the petition of the Board of Aldermen relative to the establishment of waiting rooms by the Worcester (Mass.) Consolidated Street Railway has been filed without prejudice by the Massachusetts Railroad Commission.

Inland Empire Booklet.—The Inland Empire System, Spokane, Wash., has issued a booklet describing places of interest in the panhandle of Idaho. It is printed in colors and contains several excellent half-tone illustrations of Cœur d'Alene and other towns located in that district. The publication contains 16 pages, but only one page and an insert map are devoted to the interests of the Inland Empire System.

Extension of Pay-As-You-Enter System in Buffalo.—The International Traction Company, Buffalo, N. Y., placed 12 pay-as-you-enter cars in service on its Buffalo lines on July 11, and has announced that eventually the entire system will be equipped with cars of this type. At present the International Traction Company is operating pay-as-you-enter cars successfully over the Niagara, Grant, Hoyt and Elmwood Avenue lines.

First Grade Crossing Hearing in Indiana—The Railroad Commission of Indiana has received and filed the first petition under the new law asking for an order by the commission to eliminate a grade crossing. The petition was filed by the Pennsylvania Railroad, and seeks to compel the Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., to eliminate the grade crossing between its line and that of the Pennsylvania Railroad, four miles south of Indianapolis. The commission set July 14 as the date for the hearing.

Accidents in Brooklyn.—Ten persons were hurt in a collision between a special race track train of the Long Island Railroad and a three-car train of the Brooklyn Rapid Transit Company at the Neck Road station of the companies at the Sheepshead Bay race track on July 9. The accident is said to have been caused by the failure of the engineer of the Long Island train to observe a signal that was set against him. In a collision between two cars of the Brooklyn Rapid Transit Company on July 11 on the Williamsburg Bridge seven persons were injured.

Mileage Tickets Issued by Buffalo & Lake Erie Traction Company.—The Buffalo & Lake Erie Traction Company, Buffalo, N. Y., on July 1 issued a 300-mile mileage book for $5.25, which will be good for interstate business to and from any point on the line between Buffalo, N. Y., and Erie, Pa. The books are transferable, and can be used for any number of people when the person to whom the book is issued is a member of the party offering the book for passage. A commutation book has also been issued which will be sold at the rate of 1¼ cents per mile or any fraction thereof for interstate travel. It will be good for 54 single trips, but must be used within 30 days and is not transferable. J. C. Calisch, general manager of the company, states that there is considerable demand for this class of ticket, and he thinks that it will prove advantageous to the company and to the public.

Bonuses for Employees in Washington, D. C.—The Capital Traction Company, Washington, D. C., has distributed $1,600 in bonuses to 226 of its motormen and conductors for efficient service during the past year. The awards amount to $50, $75 and $100 each, according to the length of service of the men. Employees are divided into three classes: Class A, consisting of those who have served the company for two years; class B, those who have served the company for five years, and class C, those who have served the company for 10 years. The records which are kept show a minimum of accidents or other troubles due to the action or non-action of the conductors and motormen. It is from these records that the awards are made, the selection of honor men being in the hands of a board, consisting of the president, the second vice-president, the general manager and the superintendents of the five divisions of the company.

Folder of the Inter-Urban Railway.—The Inter-Urban Railway, Des Moines, Ia., has issued a 36-page folder in which the attractions afforded along the line are described and illustrated. The company has just inaugurated a new hourly service between Des Moines and Colfax, a famous health resort. Trains leave Des Moines at 8:30 a. m. and 5:30 p. m., returning from Colfax at 10:05 a. m. and 7:05 p. m. The folder also contains information regarding rates for excursions, the season schedule of the Des Moines baseball club and a list of events for the season 1909. Illustrations are shown of Beaver Park, on the Beaver division, about 27 miles from Des Moines. This park is maintained by the company for the exclusive use of its patrons, to whom admission to it is free. Panoramic views are presented of Fort Des Moines, Des Moines and Ingersoll Park. On the back cover there is a map showing the route of the road. Frank S. Cummins, Des Moines, is traffic manager.

Hudson & Manhattan Railroad and Pennsylvania Railroad to Interchange Traffic.—It is announced that arrangements have been entered into between the Pennsylvania Railroad and the Hudson & Manhattan Railroad, operating under the Hudson River between New York and New Jersey, whereby passengers on the Pennsylvania Railroad will be transferred to the lower tunnel of the Hudson & Manhattan Railroad and transported to New York when that line is placed in operation on July 19. The ferry boat service of the Pennsylvania Railroad between Jersey City, Cortlandt Street, New York, and between Jersey City and Desbrosses Street, New York, and Jersey City and Twenty-third Street, New York, will be continued, but it is said that during the non-rush hours fewer boats will be run in the future because of the diversion of traffic to the tunnels. It will be possible after July 19 to purchase tickets to all points on the Pennsylvania Railroad at the ticket windows of the Hudson & Manhattan Railroad in the Hudson Terminal Buildings, New York, but for the present at least baggage will be checked only from the ferry stations. Hereafter the timetables of the Pennsylvania Railroad will give four leaving times for trains from New York—the leaving time from the Hudson Terminal Buildings as well as from Twenty-third Street, Desbrosses Street and Cortlandt Street.

Time Table Issued by the Chicago & Milwaukee Electric Railroad.—The Chicago & Milwaukee Electric Railroad, Chicago, has published a time table giving its summer

schedule, which went into effect June 17, 1909. Eight limited trains, having cafe, parlor and observation cars, are operated daily between Milwaukee and Evanston. Meals are served a la carte on all limited trains. General information regarding the rate of fare, redemption of tickets, baggage regulations and special service is given in the first half of the time table. The publication also contains a list of cities under which are centered the principal railroad and steamship connections, theaters, public parks, amusement resorts, places of interest, hotels, health resorts, lakes, rivers, clubs, universities and colleges. A special theater service is operated between Chicago and Milwaukee, the "Milwaukee Special" leaving Evanston for Milwaukee and intermediate points at 12:15 a. m., and the "Chicago Special" leaving Milwaukee for Evanston and intermediate points at 11:30 p. m. The time table is concluded with a list of places that can be reached between Chicago and Milwaukee, the time of departure of the trains and the rate of fare between points. A feature of the booklet is a blank sheet for memoranda after every page of text. The front cover is illustrated with a picture of a three-car train in colors, and on the back cover is printed a map of the route of the road, showing connections with other interurban lines. E. H. Vivian, Highwood, Ill., is traffic manager of the company.

Decision in Albany Freight Case.—The Public Service Commission of the Second District of New York has rendered its decision in the complaint of Philo N. Bebee and other Albany merchants against the Electric Express Company and the United Traction Company, Albany, as to the rates charged for transportation of express matter between Albany and Schenectady in the former case, and Albany and Troy in the latter case. In the Electric Express Company matter the commission decides that the complaint be held not sustained so far as the 100 lb. rates between Albany and Schenectady are concerned, but that on and after Aug. 1, 1909, the Electric Express Company desist from charging its present minimum rate between Albany and Schenectady and put in operation a minimum schedule which shall not exceed for all classifications, no wagon service, one wagon service and two wagon service, 15 cents on packages of 50 lb. or less, on packages of over 50 lb. 25 cents, and that these minimum rates be inclusive of any charges whatsoever for picking up and delivering packages. In the case of the United Traction Company as to rates between Albany and Troy the commission holds that the complainants have not sustained their case so far as the 100 lb. rates between Albany and Troy are concerned, but orders that on and after Aug. 1, 1909, it shall put in operation between Albany and Troy a minimum schedule which shall not exceed for all classifications, no wagon service, one wagon service and two wagon service, 15 cents on packages of 50 lb. or less, 20 cents on packages over 50 lb., and that the minimum rate named shall include any charges whatsoever for picking up and delivering packages.

Report of the Montreal Benefit Association.—The Montreal (Que.) Street Railway Mutual Benefit Association has issued its sixth annual report for the year ended April 30, 1909. It shows that 554 members were disabled through sickness or injury in 1908-9, as compared with 546 in 1907-8; that 1318 visits were made by physicians to disabled members during 1908-9, as compared with 1114 for 1907-8; that 6385 consultations were given by physicians to disabled members in 1908-9, as compared with 6828 for 1907-8; that 5367 prescriptions were issued for 1908-9, as compared with 5661 for 1907-8; that $9,457 was paid for sickness and injury in 1908-9, as compared with $7,321 for 1907-8; that $1,697 was paid for medicine in 1908-9, as compared with $1,707 in 1907-8; that $225 was paid for pensions in 1908-9, as compared with $161 in 1907-8, and that $6,566 was paid for death and burial insurance in 1908-9, as compared with $4,791 in 1907-8. The association was organized on Oct. 1, 1903, and was incorporated in 1904. The statement is made in the report that $27,192 has been paid out in death benefits since the organization of the association and that $44,511 has been paid for benefits in cases of sickness and injury. In addition to this there is the amount paid in pensions, medicine, medical attendance, etc. The accumulated reserve fund of the association as shown in the report is $54,237, divided as follows: Reserve for sickness and injury fund, $3,808; reserve for death and burial fund, $14,732; reserve for pension fund, $31,909; reserve withdrawal fund, $3,787. The report acknowledges a special Christmas donation from the Montreal Street Railway of $3,000, which makes the total contributions received from the company $13,910. This amount, and $13,008 received in fees and dues from the members and $10,395, the proceeds of a picnic to the employees and interest on investments and bank deposits, made the total revenue for the year $37,314. Against this were charged total expenses of $24,400, leaving a surplus of $12,913.

Personal Mention

Mr. E. M. Bassett, of the Public Service Commission of New York, First District, is visiting Buffalo, Chicago, Milwaukee, Minneapolis and St. Paul to inspect the public utilities in those cities, particularly the electric railways.

Mr. W. R. Willcox, chairman of the Public Service Commission, of the First District of New York, sailed for Europe on the *Mauretania* on July 15. Mr. William McCarroll, of the commission, will act as chairman during Mr. Willcox's absence.

Mr. C. H. Johnson has been appointed superintendent of the railway department of the Bangor Railway & Electric Company, Bangor, Me., to succeed W. H. Snow, deceased. Mr. Johnson entered the employ of the Bangor Railway & Electric Company in July, 1895, as a conductor and subsequently served as an inspector for the company. For the last four years, he has acted as assistant superintendent of the company.

Mr. J. O. Harrison has been appointed superintendent of motive power of the Fort Dodge, Des Moines & Southern Railway, Boone, Ia., to succeed Mr. H. B. Sutton. Mr. Harrison was formerly connected with the Evansville, Suburban & Newburgh Railway and previous to that was connected with the Evansville Street Railway, which was taken over by the Southern Indiana Traction Company. Mr. Harrison has also had considerable experience with steam railroads. For six years, he served as an engineer on the Louisville & Nashville Railroad and for four years was roundhouse foreman for that company. He is the inventor of a fender.

Mr. George Kuemmerlein, Jr., has been appointed superintendent of transportation of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis. Mr. Kuemmerlein entered the employ of the Milwaukee Street Railway, which was succeeded by the Milwaukee Electric Railway & Light Company, on Sept. 15, 1893, and has served with the company and its successor since that time in turn as clerk, dispatcher, assistant superintendent of transportation and acting superintendent of transportation. Mr. Kuemmerlein's father, Mr. G. M. Kuemmerlein, has been identified with the Milwaukee Electric Railway & Light Company and its predecessors for 35 years. Mr. George Kuemmerlein, Jr., is, of course, thoroughly familiar with conditions in Milwaukee, on account of his long connection with the company.

Mr. W. A. Gibbs, district manager of the Ohio Electric Railway, with headquarters at Springfield, Ohio, has resigned from the company, effective on Sept. 1, 1909. Mr. Gibbs is a New Englander by birth and a graduate electrical engineer. He was appointed to the Zanesville Light & Railway Company, Zanesville, Ohio, in 1905, and was made manager of the Columbus, Buckeye Lake & Newark Traction Company when the property was acquired by the Schoepf interests in 1906. In 1907 the properties of the Schoepf interests in Ohio were consolidated as the Ohio Electric Railway and Mr. Gibbs was made district manager with jurisdiction over the Buckeye Lake and Newark line, which became the eastern division, and the lines of the central division. In the fall of 1908 Mr. Gibbs had his jurisdiction extended over the Dayton and Richmond & Dayton and Union City lines of the Ohio Electric Railway, succeeding Mr. F. J. J. Sloat, resigned.

Mr. Paul H. Smith has been appointed superintendent, electrical engineer and purchasing agent of the Pittsburgh & Butler Street Railway, Pittsburgh, Pa., to succeed Mr. W. M. Kessler as superintendent and Mr. G. B. Nicholl as electrical engineer. Mr. Smith was graduated from Lehigh University with the degree of electrical engineer in 1902 and for the last seven years has been connected with the Westinghouse Electric & Manufacturing Company. He served for this company at first in the New York territory and later as district engineer of the company in Cleveland, where he had charge of engineering work in connection with a number of interurban electric railways in that section. Mr. Smith was subsequently made district engineer of the Westinghouse Electric & Manufacturing Company for the southwest with headquarters in St. Louis, and was appointed to the Pittsburgh & Butler Street Railway from this position. He has entire charge of operation, maintenance of way, and powerhouses and repair shops of the Pittsburgh & Butler Street Railway.

Mr. H. H. Roseman, whose appointment as general traffic manager of the Illinois Traction System, Peoria, Ill., was noted on page 94 of the Electric Railway Journal of July 10, 1909, was born at Vincennes, Ind., on July 7, 1869, and was educated at the Vincennes University. When 15 years old he took a position as clerk to the master mechanic of

the Baltimore & Ohio Southwestern Railroad at Vincennes. In 1886, Mr. Roseman moved with his parents to Evansville, Ind., and became connected with the Evansville & Terre Haute Railroad as messenger at the freight offices. Mr. Roseman continued through various railroad positions and in 1894 was appointed assistant to the receiver of the Evansville & Richmond Railroad, and in 1895 he was made general passenger and freight agent and auditor and treasurer of that road. In 1897 the Evansville & Richmond Railroad was reorganized as the Southern Indiana Railway and Mr. Roseman was made general traffic manager of the company which position he held until March, 1905, when he entered the employ of the Chicago, Cleveland, Cincinnati & St. Louis Railroad in charge of the freight traffic on the Cairo Division, from which he resigned to enter the employ of the Illinois Traction System.

Mr. Hugh M. Wilson, formerly president of the Wilson Company, publisher of the *Electric Railway Review* and *The Railway Age* until June 1, 1908, was on July 3 elected a director and vice-president of the Barney & Smith Car Company, Dayton, O., and will enter on the duties of this office Aug. 1. Mr. Wilson has only recently returned to the United States after nearly a year spent in foreign travel. He was born June 29, 1866, at Jacksonville, Ill., and is a graduate in the class of 1887 of Illinois College, by which, in 1904, he was given the honorary degree of M.A. Soon after graduation he entered newspaper work, first with the Jacksonville *Daily Journal,* then with the Minneapolis *Evening Star,* and later with the *Mississippi Valley Lumberman* and the *North Western Railroader.* He became connected with the latter paper in May, 1891, as associate editor, but also devoted a great deal of time to the business side of the work, and on Sept. 15, 1891, when the *North Western Railroader* was combined with *The Railway Age* he became secretary and treasurer of the consolidated paper. Subsequently he was appointed manager and in 1899 was elected president of *The Railway Age.* During the International Railway Congress in 1905 the daily issue of this paper was made the official journal of the congress, and for its successful work in reporting the proceedings of these meetings Mr. Wilson was decorated a Chevalier of the Order of Leopold by the King of the Belgians. In May, 1906, he organized the Wilson Company, and the same month purchased the *Street Railway Review* from the Kenfield Publishing Company. The following July this paper was renamed the *Electric Railway Review,* and the following January it was changed from a monthly to a weekly. The Wilson Company continued to publish the *Electric Railway Review* until June, 1908, when it was purchased by the McGraw Publishing Company and consolidated with the STREET RAILWAY JOURNAL. Mr. Wilson always took an active part in both the editorial and business departments of the papers with which he was connected, and for two years served as a member of the executive committee of the American Street & Interurban Railway Manufacturers' Association.



Hugh M. Wilson

OBITUARY

William Forbes Emerson, who in April, 1909, was appointed by Stone & Webster, Boston, Mass., to take charge of their interests in Chicago, died in Chicago on June 24. Mr. Emerson was born in Concord, Mass., 25 years ago and was graduated from Harvard with the class of 1906. He was a son of Dr. Edward W. Emerson, Concord, and a grandson of Ralph Waldo Emerson. He entered the employ of Stone & Webster in October, 1906, and since March 1, 1907, had been connected with the securities department of the firm.

The Public Service Commission of the First District of New York has sent to the Board of Estimate and Apportionment a letter asking that a special committee consider moving platforms during the summer months. The proposition the commission has in mind is for a moving platform subway as submitted by E. P. Ripley, president of the Atchison, Topeka & Santa Fe Railroad, and Max E. Schmidt, president of the Continuous Transit Securities Company, to run from Tenth to about Forty-second Street.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Peninsular Railway, San José, Cal.—Incorporated under the laws of California as the successor to the Peninsular Railroad, San José & Los Gatos Interurban Railway and the Santa Clara Interurban Railway, which have been consolidated. This company will comprise all the present and contemplated railway systems on the San Francisco peninsula from that city to San José, via intermediate towns. The total estimated length of the railways controlled by this company is 222 miles. Capital stock, $12,000,000. Incorporators: J. T. Burke, Paul Shoup, C. B. Seger, P. F. Dunne and F. E. Chapin.

Springfield, Beardstown & Quincy Railway, Petersburg, Ill.—Chartered to construct an electric railway from Springfield to Quincy via Beardstown. Capital stock, $25,000. Incorporators: Henry Colly, Robert Bone, Charles W. Houghton and John Hurie, Petersburg; George Harnsberger, Springfield; W. T. Gates, St. Louis, Mo. [E. R. J., July 3, '09.]

***Hannibal & Jefferson City Interurban Traction Company, Mexico, Mo.**—Incorporated to build an interurban railway from Jefferson to Hannibal, 120 miles. Capital stock, $4,620,000. Incorporators F. T. Hodgdon and C. H. Northam, Hannibal; J. O. Allison, New London; S. C. Gill, Perry; C. C. Heizer, Santa Fe; J. A. Botts, Moline; S. J. Buckner, Judge Mathias Crum, Mexico; Judge T. F. Murry, Hereford; J. A. Stewart, Columbia; J. H. Atkinson, Fulton.

Clarion & East Brady Electric Railway, Clarion, Pa.—Application for a charter has been made by G. E. Arnold, R. M. Werner, T. S. Arnold, I. N. Langham and E. W. Witherell to build an electric railway from Clarion to East Brady via Sligo and Rimersburg, a distance of 25 miles. [E. R. J., April 24, '09.]

***Cairo & Nashville Interurban Railway, Nashville, Tenn.**—Incorporated in Tennessee to build an electric railway from a point on the Kentucky and Tennessee line in Obion County through Paris, into Nashville. Capital stock, $25,000. Incorporators: T. C. Rye, J. C. Sweeney, D. B. Sweeney, J. C. Sweeney, Jr., and C. E. Steaks.

***Russell-Prater Railway, Bessie, Va.**—Incorporated in Virginia to build a railway 12 miles long in Dickenson County to connect with the Carolina, Clinchfield and Ohio Railway. Capital stock, $25,000. Incorporators: Leon Isaacson, Brooklyn, N. Y., president; C. M. Crawford, Ironton, Ohio, secretary; J. E. Hager, B. E. Whitman and C. F. Hager, Ashland, Ky.

***Parkersburg & Pocataligo Valley Railroad, Parkersburg, W. Va.**—Incorporated to build an electric railway from Parkersburg to or near Charleston. Capital stock, $5,000. Incorporators: C. P. Craig, E. C. Gooden and Jos. Williams, St. Marys; R. E. Bills and Jno W. Dudley, Jr., Parkersburg.

FRANCHISES

Oakland, Cal.—Application to the City Council for a franchise has been made by the South Pacific Coast Railroad to build an electric railway from its Webster Street terminal to San Pablo Avenue at Twenty-first Street.

San Diego, Cal.—The City Council has granted to the San Diego Electric Railway an extension of its franchise to Jan. 1, 1910 to complete its railway on B Street to the San Diego Bay.

Elkhart, Ind.—The City Council has granted to the St. Joseph Valley Traction Company an extension of its franchise, until Oct. 4, in which to complete its East Jackson Street line into the city. [E. R. J., April 3, '09.]

Boone, Ia.—E. E. Hughes, president of the Boone, Webster City & Interurban Railway, has been granted a franchise for an electric railway in Boone. [E. R. J., Jan. 16, '09.]

West Orange, N. J.—The Board of Freeholders has granted to the Orange Mountain Traction Company a 50-year franchise to extend its tracks on Northfield Avenue between Cable Road Avenue and Walker Road. [E. R. J., June 5, '09.]

***Clovis, N. M.**—E. J. Howard, J. D. Hammett and A. R. Hammett, Moberly, Mo., have applied to the City Council for an electric railway franchise.

New York, N. Y.—Justice Ingraham, in the Appellate Division of the Supreme Court, has handed down a decision upholding the Board of Estimate in granting a franchise

to the South Shore Traction Company to build and operate a street railway over the Queensboro bridge. The decision was a reversal of the refusal by the Public Service Commission to confirm the franchise granted to the South Shore Company by the Board of Estimate.

*Troy, N. Y.—In accordance with the action of the Court of Appeals in the case of the Trojan Railway vs. the United Traction Company and the City of Troy, Mayor Elias Mann, of Troy, has awarded the franchise for a street railway in Lansingburg to Joseph A. Powers, who has transferred his title to the Trojan Railway.

Columbus, Ohio.—The Indiana, Columbus & Eastern Traction Company has applied to the City Council for a franchise to extend its street railway on Town Street between Third Street and Scioto Street and to connect with the main tracks at Third and Scioto Streets, where it proposes to construct a terminal station.

Wilkes-Barre, Pa.—The Wilkes-Barre & Wyoming Valley Traction Company has been granted permission by the City Council to extend its track on Scott Street. It is the intention of the company to construct a railway between Wilkes-Barre, Parsons, Miner's Mills and Hudson.

*Florence, S. C.—P. A. Willcox, John L. Barringer, Wm. J. Brown and S. S. Ingram have applied to the City Council for a franchise to build a street railway system in Florence. If the franchise is granted a park at Black Creek is proposed.

*Chattanooga, Tenn.—The County Court has granted to Bowdre Brown, representing a syndicate of capitalists, franchises to build electric railways on streets in the suburbs around Chattanooga. These franchises include a railway to East Chattanooga via Harrison Pike, a railway to Rossville, Ga., another to St. Elmo and a fourth railway to Alton Park and Mountain Junction, connecting with the proposed incline railway up Lookout Mountain.

Seattle, Wash.—D. C. Conover and E. P. Moran have been granted a franchise to construct an electric railway from Bellevue to Lake Sammamish. [E. R. J., April 17, '09.]

*Seattle, Wash.—J. R. McLaughlin and Paul C. Murphy have applied to the County Commissioners for a franchise to construct an electric railway over certain country roads to Laurelhurst. It is planned by the applicants to build an electric railway along the west and north shores of Union Bay, using Twenty-third Avenue to enter the city, and to connect with the Seattle Electric Company.

TRACK AND ROADWAY

Birmingham & Edgewood Electric Railway, Birmingham, Ala.—This company, which has been organized to build an electric railway from the end of the South Highlands line to Red Mountain, has completed preliminary arrangements and will soon award the contracts. All necessary franchises and right-of-way has been secured. It will be about 3½ miles long and will have a grade less than 6 per cent. The Board of Revenue has appropriated $10,000 to be used in cutting through Red Mountain, according to plans that have been prepared by the company. G. T. Brazleton, secretary. [E. R. J., June 5, '09.]

Northern Electric Railway, Chico, Cal.—This company is making preparations for an extension of its railway from Hamilton City to Yuba City by way of Princeton and Colusa.

Pacific Electric Railway, Los Angeles, Cal.—This company has recently opened the new 10-mile line connecting Santa Ana and Huntington Beach. A 45-minute service will be maintained.

Denver-Greeley Electric Railway, Greeley, Col.—It is announced that this company has commenced work in Greeley on its electric railway from Denver to Greeley. J. D. Houseman, general manager. [E. R. J., June 19, '09.]

Atlanta, Griffin & Macon Electric Railway, Atlanta, Ga.—This company has completed its surveys and has secured its right-of-way for the electric railway between Atlanta and Macon via Griffin. Franchises have been secured from every city through which the railway will pass. Power for the railway will be furnished by the Central Georgia Power Company, which is completing the construction of a dam and power plant on the Ocmulgee River, which will have a capacity of 21,000 hp. The Georgia Securities Company has been organized as a holding company for the railway. [E. R. J., Feb. 13, '09.]

Belleville & Interurban Railway, Belleville, Ill.—This company has filed with the Union Trust & Savings Bank, East St. Louis, Ill., as trustee, a mortgage to secure an issue of $100,000 first mortgage 6 per cent gold bonds. The purpose of the company is to build a 10-mile electric railway from Belleville to Smithton. Jacob Gundlach and Thomas A. Bell, St. Louis, Mo., are said to be interested in this project. [S. R. J., Nov. 9, '07.]

Illinois Traction System, Champaign, Ill.—The City Council of St. Louis, Mo., has approved the $100,000 bond of this company to guarantee the careful observance of regulations relating to streets crossed or used by its railway.

*Fairfield, Ill.—At a meeting of the business men of Fairfield and Burnt Prairie, Ill., held in Fairfield on July 5, the subject of building an electric railway from Carmi to Fairfield by way of Burnt Prarie, a distance of 25 miles, was favorably discussed. George W. Brown, Burnt Prairie, who is said to be backed by Kansas City capitalists, is interested.

*Yorkville & Morris Electric Railroad, Yorkville, Ill.—This company has been organized to build an electric railway from Yorkville to Morris, 22 miles, and will soon let the construction contracts. The survey is already made and most of the right of way obtained. The company is desirous of making financial arrangements with some company regarding first mortgage bonds. H. G. Palmer, Aurora, president.

Galesburg & Rock Island Traction Company, Rock Island, Ill.—This company has filed for record at Monmouth, a mortgage to the Empire Trust Company, New York, N. Y., as trustee, to secure an authorized issue of $1,500,000 of 40-year 5 per cent bonds, dated May 1, 1909. The proposed electric railway will be about 41 miles in length, connecting Galesburg and Rock Island. [E. R. J., May 22, '09.]

Indianapolis, Cloverdale & Vincennes Traction Company, Indianapolis, Ind.—E. M. Bowman, president of this company, announces that the directors have let a contract to J. J. Burns & Company, Chicago, for the construction of the proposed railway surveyed from Indianapolis to Vincennes by way of Mooresville, Eminence, Cloverdale, Worthington and Linton. It is estimated to cost $18,000 a mile. [E. R. J., June 27, '08.]

Wabash & Northern Traction Company, Warsaw, Ind.—J. A. Barry, who is interested in this company, which proposes to build an electric railway from Warsaw to Wabash, Ind., reports that the preliminary work for building this line will soon be begun at Warsaw. The franchise granted to Mr. Barry in Warsaw calls for the completion of tracks over the streets in Warsaw and for 5 miles south by Jan. 1, 1910. [E. R. J., May 29, '09.]

Des Moines, Winterset & Creston Electric Railway, Des Moines, Ia.—This company has awarded to the Engineering Construction & Securities Company, 171 La Salle Street, Chicago, Ill., the contract for the engineering and construction of an interurban railway from Creston to Des Moines, extending through Macksburg and Winterset. An engineering corps will be put in the field during the next few days. [E. R. J., July 3, '09.]

Atchison Railway, Light & Power Company, Atchison, Kan.—This company is having surveys and estimates made on 5½ miles of extension of its street railway in Atchison. J. W. Waggener, general manager, and Fred. Giddings, engineer.

*Paducah, Ky.—William Kershner, vice-president and general manager of the American Engineering Company, Indianapolis, has made the people of Golconda, Unionville, Brookport, Metropolis and Joppa, Ill., a proposition to build an interurban railway through these towns, to extend from Golconda to Joppa. It is estimated that the line would be 60 miles long and that it would cost $20,000 per mile. He asks the citizens to raise 25 or 40 per cent of the cost of construction.

Arkansas Valley Interurban Railway, Wichita, Kan.—J. B. Hodgson, constructing engineer, has been directed by this company, to begin at once the preliminary work of surveying the proposed electric railway which is to connect Wichita with Newton and Hutchinson, as well as Burton and Valley Center. [E. R. J., June 12, '09.]

Battle Creek, Coldwater & Southern Railway, Battle Creek, Mich.—It is stated that this company is to let contracts during the summer for building its railway from Battle Creek southeast to Coldwater, a distance of 28 miles. Surveys and financial arangements have practically been completed. C. E. Flynn, president of the Conneaut & Erie Traction Company, Erie, Pa., president. [E. R. J., Feb. 20, '09.]

Interstate Railway, Kansas City, Mo.—On July 9, the Circuit Court of Jackson County, Mo., granted a restraining order, enjoining the Geo. Townsend-C. F. Enright Syndicate and the Missouri River & Cameron Railroad and their agents and associates from attempting to build a road or in any manner interfering with or trespassing upon the right-of-way of the Interstate Railway, which last-mentioned company is preparing to build a double-track electric interurban railway between Kansas City and St. Joseph.

The Interstate Railway has already secured about 80 per cent of the right-of-way, and is preparing to begin construction this month. **S. B. Martin,** secretary. [E. R. J., May 15, '09.]

***Hannibal & Jefferson City Interurban Traction Company, Mexico, Mo.**—This company has been organized for the purpose of building an interurban railway from Jefferson City to Hannibal by the way of Columbia, Mexico and Perry, with branches to Fulton and other points in Callaway County. It has taken over the interests of the Mexico, Santa Fe & Perry Traction Company, which was incorporated over a year ago to build an electric railway between Mexico and Perry. The contract for the construction of the proposed line has been awarded to the Missouri Engineering Company, St. Louis, a newly organized corporation, with a capitalization of $100,000, which is headed by De Groot Van Baekeman, representing the James Stewart Construction Company, New York, N. Y. It is the purpose of the construction company to begin work at once. The line will be 120 miles long, 103 miles of which is located and ready for construction. The sum of $10,000 per mile has been subscribed and 96 per cent of the right-of-way has been purchased and the deeds therefore recorded. Franchises have been secured in Columbia, Fulton, Mexico, Santa Fe, Perry, Center, New London and Hannibal, while an ordinance for a franchise granting the use of the streets will be introduced at the next meeting of the Jefferson City board. The motive power has not yet been decided upon.

Hannibal & Northern Missouri Railroad, Palmyra, Mo.—This company was recently organized under the laws of Missouri to build an electric railway from Hannibal to Kirksville, Mo., by way of Palmyra. The line when completed will be practically 100 miles long. It is reported that E. P. Roberts, of the Roberts & Abbott Company, Cleveland, Ohio, has made a personal investigation of the conditions and has secured a contract for doing the engineering work on this proposed railway. A corps of engineers is said to have started making the preliminary surveys for the line. Officers: Frank W. Latimer, president and treasurer; Nathaniel Board, vice-president; Joseph W. Latimer, secretary. [E. R. J., July 10, '09.]

Butte (Mont.) Electric Railway.—This company will commence, at once, to construct about 2 miles of extensions on its railway system in Butte. One branch will extend over Oregon Avenue and the other will extend to East Meaderville. J. R. Wharton, Butte, manager.

Brooklyn Rapid Transit Company, Brooklyn, N. Y.—This company has applied to the Public Service Commission for permission to change its cable railway running from Borough Hall to the Wall Street Ferry to overhead trolley.

Utica (N. Y.) Southern Railroad.—This company has applied to the Public Service Commission of the Second District for permission to increase its capital stock from $600,000 to $1,000,000, the $400,000 increase to be preferred stock, and for authority to issue $968,800 capital stock, of which $568,800 is to be common stock; also for consent to issue a mortgage for $1,820,000 and for authority to issue an equal amount of bonds to be secured by this mortgage; also for permission to extend the route of its proposed electric railway from Hamilton to Norwich. E. H. Risley, Utica, secretary. [E. R. J., June 26, '09.]

Muskingum & Morgan Railway, Light & Power Company, Zanesville, Ohio.—William H. Pierpoint, secretary, confirms the report that this company will build an electric railway from Zanesville to McConnelsville via Duncan Falls, Philo, Gaysport and Rokeby. The company expects to furnish power for lighting. Capital stock, $10,000. Officers: Andrew McDonald, Pittsburgh, Pa., president; John J. Adams, vice-president, and Rufus C. Burton, treasurer, Zanesville. [E. R. J., July 10, '09.]

***Nipissing Central Railway, Cobalt, Ont.**—This company, which has been chartered to build an electric railway from Cobalt to Haileyburg, has awarded the building contract to the Nova Scotia Construction Company, Sydney, N. S. The proposed railway is intended to connect eventually with North Bay. Work is to be started at the Cobalt end.

Port Arthur & Fort William Electric Railway, Port Arthur, Ont. (Municipal).—The City Council has decided to build an extension of its street railway and bids will soon be asked for construction material. W. P. Cooke, chairman.

***Lebanon, Ore.**—It is reported that the Mealey Brothers, Foster, will soon undertake the construction of an electric railway from Cascadia to Lebanon. It is also proposed to extend to Scio, Stayton and Salem.

***Pendleton, Ore.**—It is stated that the County Farmers' Union has decided to build an electric railway to the Columbia River, terminus to be either at Cold Springs or at Umatilla, line to be from 20 to 40 miles long. A committee was appointed to investigate rights of way and other matters, to report in two weeks' time.

***Ellwood City, Pa.**—It is stated that the construction work of the proposed street railway from Ellwood City to Beaver Falls, 12 miles, will be started during the summer. A bridge is to be built across the Beaver River at a cost of $75,000. Rights of way have been practically secured and financial matters have been arranged. H. W. Hartman, Ellwood City, promoter.

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.—It is reported that this company, which connects with the Hagerstown Electric Railway at Shady Grove, will begin during the summer the construction of a 12-mile extension from Chambersburg to Shippensburg via Red Bridge, where it proposes to establish a park. The company also has under consideration plans for the building of an extension of the railway from Pen-Mar to Blue Ridge Summit via Lake Royer.

Brookings & Sioux Falls Railway, Brookings, S. D.—It is reported that this company, which is building a 65-mile electric railway from Brookings to Sioux Falls, is planning to extend it through to Bushnell. About 16 miles are ready for track. Neal Stewart, president.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company has opened its extension from Milwaukee to Burlington.

Sparta-Melrose Electric Railway & Power Company, Sparta, Wis.—The second grading contract of this proposed railway between Sparta and Melrose has been awarded to Brogan & Hayes, Green Bay. The contract includes a bridge over Black River, 1000 ft. long and several smaller bridges. [E. R. J., May 29, '09.]

SHOPS AND BUILDINGS

Tampa (Fla.) Electric Company.—This company is now installing an automatic sprinkler system at the West Jackson Street storerooms. The system is the Grinnell automatic sprinkler equipment with variable pressure alarm valve and alarm gong, and is to be connected with a low-duty pump and the city water mains.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—This company is said to have selected a site at Third Street and Main Street, Mishawaka, on which to erect an interurban railway station.

Michigan United Railways, Lansing, Mich.—The contract for constructing the new interurban depot and substation at Mason of this company has been awarded to M. A. Mahoney, Lansing. The building will be built of brick with cut stone trimming and a reinforced concrete roof. It will be one story high and the tower two stories. The dimensions of the building are to be 24 ft. x 66 ft., and the tower 20 ft. x 24 ft.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—This company has awarded to F. B. Burness, Kansas City, Mo., the contract for a two-story car house to be built at Tenth Street and Pierce Street. Construction will be started within two weeks. The building will be of reinforced concrete construction and will cost $150,000.

Northern Texas Traction Company, Fort Worth, Tex.—This company is about to begin work on its car house in Fort Worth, which is to be enlarged. New tracks will be laid to connect with the building. The company also expects to build a one-story brick station in Dallas, to cost, it is estimated, about $15,000.

POWER HOUSES AND SUBSTATIONS

Chicago, Ottawa & Peoria Railway, La Salle, Ill.—This company is about to increase the capacity of its power plant. Two 400-hp tube boilers will be installed.

Northern Texas Traction Company, Fort Worth, Tex.—This company is installing at its Handley power house a complete sprinkler system, rewiring the plant and putting new concrete floors in parts of the building.

Big Bend Transit Company, Spokane, Wash.—This company, which proposes to build an electric railway along the Spokane River, from Spokane to the Columbia River steamboat landing, has just completed an extensive survey of the river and site for a 60-ft. dam under the direction of L. F. McCoy, engineer. The Narrows will be used as a power site.

Northwestern Gas & Electric Company, Walla Walla, Wash.—This company has placed an order with the Allis-Chalmers Company, Milwaukee, Wis., for a 1000-kw steam turbine.

Kenosha (Wis.) Electric Railway.—This company has placed an order with the Allis-Chalmers Company, Milwaukee, for a 300-kw steam turbine.

Manufactures & Supplies

ROLLING STOCK

Detroit (Mich.) United Railways has requested proposals for 50 pay-as-you-enter cars.

Texarkana Light & Traction Company, Texarkana, Ark., is making inquiries for 6 single-truck city cars.

Chicago (Ill.) Railways is preparing specifications for rebuilding 324 of its St. Louis type of cars for pay-as-you-enter operation.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, ordered the 7 cars reported in the Electric Railway Journal of July 3, 1909, from the Niles Car & Manufacturing Company, Niles, Ohio.

Goldsboro (N. C.) Traction Company, which is completing 2½ miles of line in Goldsboro, is in the market for at least 2 cars and desires quotations on both open and closed, single-truck cars and trailers.

Grand Junction & Grand River Valley Railway, Colorado Springs, Col., has purchased from the Colorado Springs & Interurban Railway the equipment for which it was recently reported in the Electric Railway Journal to be in the market.

Interborough Rapid Transit Company, New York, N. Y., placed the order for 170 trailer trucks and 190 motor trucks, mentioned in the Electric Railway Journal of July 10, 1909, with the American Locomotive Company and not with the American Car Company, as was stated.

Southern Pacific Railroad, Los Angeles, Cal., which company was reported in the Electric Railway Journal of Dec. 5, 1908, as planning to purchase 80 or more large electric cars for operation on the Oakland and Alameda electrified lines, will soon place an order for 116 cars, it is reported.

Wheeling (W. Va.) Traction Company has prepared specifications for 8 new cars, 45 ft. over all with 7½-ft. platforms. The cars will be fitted with steel-frame flooring and the car body construction will be novel, as the company is considering the use of 9-in. steel girder for a side plate, to extend to the end of the hood so as to form a cantilever projecting beyond the body corner posts to assist in supporting the platforms.

TRADE NOTES

L. E. Elwell Company, Detroit, Mich., announces that its address hereafter will be 536 Enterprise Avenue, Riverside, Cal.

Bausch & Lomb Optical Company, Rochester, N. Y., was presented on July 8 a handsome bronze tablet in memory of Henry Lomb, who died about a year ago, by its employees.

R. R. Thompson & Company, Brooklyn, N. Y., have removed from the Nassau Trust Building at 356-8 Fulton Street, that city, to the Cambridge Building, at Fifth Avenue and Thirty-third Street, New York.

Kincaid, Waller, Manville & Dawson, London, Eng., have changed their address from 29 Great George Street, Westminster, London, to St. Stephen's House, Victoria Embankment, Westminster, London, S. W.

Henry A. Mentz, 714 Hennen Building, New Orleans, La., consulting engineer, would like to receive, from manufacturers and dealers, catalogs, circulars, etc., descriptive of railway, light, power and industrial apparatus and supplies.

Allis-Chalmers Company, Milwaukee, Wis., announces that Edward G. Dewald, heretofore manager of the water-wheel department of the Platt Iron Works Company, Dayton, Ohio, has become identified with its hydraulic turbine department, as special representative for the Pacific Coast, with headquarters at 599 Mission Street, San Francisco.

Electric Storage Battery Company, Philadelphia, Pa., announces that H. B. Marshall, who has been connected with its Chicago sales office in the Marquette Building for many years, has been recently appointed contract agent, in charge of the St. Louis office in the Wainwright Building. Taliaferro Milton, formerly contract agent of the St. Louis office, has been appointed engineer of the Chicago sales office of the company.

H. M. Byllesby & Company, Chicago, Ill., announce that C. E. Groesbeck, San Diego, Cal., has been elected a vice-president of the firm, with headquarters at Tacoma, Wash. Mr. Groesbeck will be in charge of the company's interests on the Pacific coast and in the States of Idaho and Montana. Byllesby & Company also announce that they have taken over the property of the Tacoma (Wash.) Gas Light Company. H. M. Byllesby & Company have also appointed H. Almert, an engineer of long practice in Chicago, manager of its department of examinations and reports. The Byllesby organization has also been increased by the appointment of W. R. Thompson as assistant to the chief engineer. Mr. Thompson was recently with the Public Service Commission, New York, and formerly with Westinghouse, Church, Kerr & Company.

Westinghouse Storage Battery Company, Pittsburg Pa., was incorporated at Albany, N. Y., on July 12, with a capital of $1,750,000, including $250,000 in 6 per cent preferred stock. The incorporators are: H. H. Westinghouse, Samuel B. Dusinberre, George C. Smith, H. Cool and John G. Greenburgh. Heretofore the Westinghouse storage battery has been an interest of the Westinghouse Machine Company, having been developed in a storage battery department of that concern, and regularly placed on the market about two years ago, in types for all classes of storage battery application, from signal service to power station use. The plates are of the Planté type, consisting of thin ribbons attached to the top and bottom of the plate frame or to panel cross-bars.

J. G. Brill Company, Philadelphia, Pa., announces that George Brill, second son of J. G. Brill, founder of The J. G. Brill Company, after 16 years' service with that company, has retired to seek relaxation in travel and personal work. His son, Byron O. Brill, who has been his assistant in the lumber department, will take his place. George Brill has a large number of friends in the railway and lumber fields who will regret his retirement but will applaud his judgment in taking leave of official cares when in the prime of life and capable of enjoying in full a well-merited vacation. Mr. Brill sailed July 10 for an extended European trip. Prior to his departure, he was the guest of honor on July 7 at a dinner given by James Rawle, president of The J. G. Brill Company, at the Radnor Hunt Club, Bryn Mawr, to the department heads of the company and friends and associates of Mr. Brill.

Westinghouse Companies, Pittsburgh, Pa., judging from the improved conditions of trade, appears to be assured before the close of 1909 of approximating, if not actually exceeding, the record of 1907. The Westinghouse Air Brake Company, Wilmerding, Pa., has received a large number of orders for brake apparatus and friction draft gear. As an index of the improved conditions at the Union Switch & Signal Company, Swissvale, Pa., this plant is now employing about twice the number of men it did a year ago. In June the Westinghouse Electric & Manufacturing Company enjoyed an improvement of 25 per cent over its business of May. A large order for railway motors secured from the Manhattan Elevated Railroad is noteworthy. Switchboards and auxiliary supplies amounting approximately to $500,000 have also been ordered by the Pennsylvania Tunnel & Terminal Company for the New York terminals and tunnels of the Pennsylvania Railroad. In line with the encouraging improvement noted by the Westinghouse Machine Company, the Philadelphia Rapid Transit Company has recently placed orders for 2 steam-turbine equipments, of 6000-kw and 12,000-kw capacity, respectively. Daniel E. Manson, who has resigned as manager of the Boston office of the Westinghouse Electric & Manufacturing Company to engage in engineering work with a corporation of which he will be vice-president and manager, was tendered a farewell dinner in Boston, July 13, by the officers and associates of the Westinghouse Electric & Manufacturing Company. Mr. George E. Bates, of the Boston office, will succeed Mr. Manson as head of the Westinghouse sales force for the New England district.

ADVERTISING LITERATURE

Frank Ridlon Company, Boston, Mass., has issued its regular monthly list of second-hand electrical equipment for July.

Arnold Company, Chicago, Ill., is sending out a post-card panoramic view of the locomotive and car repair shops which it has recently completed for the St. Louis & San Francisco Railroad, at Springfield, Mo. The shops were put in operation July 5, 1909.

William B. Hough Company, Chicago, Ill., is sending out a folder entitled "The Advance Agents of Prosperity," which calls attention to its Ransom concrete mixers, Wrightwood hoisting engines, contractors' industrial, mine, concrete and special work cars, Hercules buckets and M-B special open-hearth steel reinforcing bars. The company's concrete mixers can be supplied either with electric motor or with engine drive.

H. W. Johns-Manville Company, New York, N. Y., has issued an illustrated folding postal card entitled "Stucco Suggestions," showing a number of residences where J-M asbestos stucco has been used. A circular, enclosed in the card, contains specifications for mixing and applying stucco. The H. W. Johns-Manville Company has also issued a folder on its Leak-No metallic compound, a cheap pipe joint cement sold in powdered form. Half-tone illustrations accompanied by short text illustrate the use of Leak-No in factory work, by plumbers, steam and gas fitters, and for automobile repairs and other purposes.

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DATE ON WRAPPER shows the month at the end of which the subscription expires. The sending of remittances for renewal prior to that date will be much appreciated by the publishers.

Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

Evils of Congestion

The committee on congestion of population in New York has just issued a bulletin which is one of the strongest arguments possible for the extension of rapid-transit facilities. After reciting some of the well-recognized evils of tenement life on the east side of New York, as well as some of those which are not so well known, the committee points out the fact that a large part—36 per cent—of the working population residing in these districts is employed in the manufacture of clothing and millinery and in laundries. Most of the clothing is made in sweat shops, and those who use it run a serious risk from contagious diseases. Such a condition is almost inseparable from tenement life where sweat shops abound, and it is safe to say that the conditions found in New York are duplicated, though they may not exist to the same extent, in other large cities. Legislation can do little in cases of this kind. The only effective way of dealing with this problem is to eliminate the cause, and of all the remedies that of good transit facilities is the only one which strikes at the root of the evil.

Data on Freight and Express Traffic

Data sheet No. 40, designed by the committee on freight and express traffic of the American Street & Interurban Railway Transportation & Traffic Association to produce statistical information bearing on revenues and expenses, which shall be used without disclosure of the names of companies giving the information, should result in a compilation that will be of great value. The responses of the companies will not, of course, be complete, because many of the companies make no attempt whatever to separate their operating expenses as between freight and passenger service. Where efforts are made to segregate the expenses chargeable to freight service alone, the equity and reliability of the arbitrary bases of division are sometimes open to question. However, whatever information is obtained bearing on this important subject will represent the foundation on which the judgment of the management of each property providing freight and express service rests in determining the profitableness of the business, and it will help some puzzled managers in reaching a conclusion as to whether the territory which their lines traverse is likely to yield sufficient traffic to justify experiments.

Street Railway Facilities at Railroad Terminals

A suggestive letter from Samuel Rea, second vice-president of the Pennsylvania Railroad, to the Public Service Commission of New York, First District, urging the necessity of a subway on the west side of Manhattan Island, was published in the last issue of this paper. Mr. Rea evidently appreciates fully that the great throngs of passengers which his system expects to land in its new terminal at Thirty-third Street and Seventh Avenue, Manhattan, after completion of this costly improvement next year, will be virtually dependent upon new subway transit facilities, and he therefore urges that all proper steps possible be taken to meet the necessities of the situation. The subject of adequate street railway facilities at a large railroad terminal is one whose importance cannot, in the interest of the traveling public or the community, be overestimated; it is more serious in degree, but not in character, in New

York than in other cities, because of the greater congestion of population and density of traffic which exist here. Several parties are concerned in the provision of good street railway facilities at a steam railroad terminal, and it is difficult to say which one is most interested or affected if those facilities do not meet a fair standard of public convenience. An accessible railroad terminal is one of the most encouraging aids in the development of long-distance traffic; an inaccessible terminal is a constant detriment. The traveling public prefers to patronize, other things being equal, the roads with terminals that may be reached with convenience and without much expenditure of time, and any added facilities for this traffic are for the direct benefit of the citizens.

If the street railway company considers the standpoint of revenue only, it may be calculated that a large proportion of the railroad terminal business would be short-haul; but the broader point of view to take is that the station traffic includes a large number of visitors from other cities, who form their impression of the street railway, and therefore in part of the city which it serves, from the facilities they find. Differing from these standpoints is that of the community which, if progressive, wants visitors to leave with a favorable opinion; and if the volume of business does not afford sufficient revenue to justify the street railway in maintaining a desirable quality of service, it would be in the interest of the community to grant concessions in other directions that would equalize the loss. The unquestioned benefits that may be secured from the best street railway service possible between railroad terminals and business, residence or hotel districts have failed to receive proper consideration at a critical time in the history of some of these improvements.

Paint Specifications

Specifications in general are intended to outline for the benefit of the manufacturer the requirements of the purchaser and to serve as a basis for estimating the prices named in an accompanying contract. They may be divided into two classes: first, those which state in a general way the purchaser's requirements as to quality and quantity of material and such other details as are necessary to guide the maker in selecting his own methods of manufacture best suited for producing the desired result; and, second, those which add to the general requirements precise instructions as to composition of materials, methods of manufacture, tests to determine acceptance and other restrictions of a similar nature. It is only to be expected that the more rigid the specifications are made under which material is purchased, the higher the price will be. Under some circumstances, however, rigid specifications, resulting in higher prices, may be economical in the end, but in other instances a rigid specification not only causes higher prices, but may result in the delivery of material actually inferior to that which could have been supplied at a less cost under less severe restrictions. In the purchase of transmission wire, for example, tensile strength, ductility and electrical conductivity are the essential requirements. It will pay the purchaser to insist on a given minimum standard for all of these characteristics and to test each reel or shipment, subject to rejection if it fails to meet the requirements. In the purchase of paints, however, a rigid specification is detrimental to the best results in the end.

The value of any specification lies chiefly in the ability to check each requirement and insist on its fulfillment. It is useless to specify exact methods of manufacture unless the raw materials are also specified, and both are useless if the purchaser has no means of checking up either one. Paints are complex mixtures of widely different elements, and their exact analysis is an extremely difficult task for the most experienced chemists. Even when the chemistry is known the variations in the methods of manufacture may have a decided effect on the resistive properties of the paint, and this feature can only be followed up by an inspector at the factory. This would be feasible, perhaps, if very large quantities were purchased at one time, but few railways buy enough paint in a whole year to warrant the expense of this kind of inspection for a single order. Furthermore, if a chemical analysis is made, it should be done only by an experienced paint chemist who knows how to interpret his results. If water is found it does not necessarily follow that water has been added to the paint as an adulterant. Some of the pigments commonly used contain water of combination which cannot be driven out during the process of grinding and mixing, but which shows up at once in a chemical analysis.

So difficult is paint analysis recognized to be that one large steam railroad company which has adopted a policy of purchasing all supplies under rigid specifications and maintains for its exclusive use an elaborately equipped testing laboratory, has prepared its paint and varnish specifications in such a way that a really inferior product is furnished under them, simply because the better grades contain so many elements that an accurate analysis cannot be made of them. This railroad, in following out the plan of purchasing everything on a strictly competitive basis, is straining a point in the matter of quality of paint and varnish for the sake of absolute uniformity and the maintenance of an open market. The average street railway cannot afford to do this. The honesty and repute of the paint maker from which it buys is sufficient guarantee of results, provided always that good paints of established merit are bought. It will not pay to haggle over a few dollars' difference in the price of unknown brands and reputable brands. Buy the best, even if the price is somewhat higher, for the chances are all in favor of the higher-priced paint being the better paint.

A Weak Spot in Interurban Service

The maintenance of a fast schedule is one of the prerequisites of success in operating an interurban line in competition with other transportation agencies. Such a statement would be a truism were it not for the fact that the difference between a high schedule speed from terminus to terminus and very fast running on the private right-of-way is sometimes overlooked. The latter is no doubt necessary in many cases to overcome the handicap of terminal difficulties, but the investment in power station, distribution system and car motors, and the structural strength required in rolling stock for really high speed running, are much greater than many promoters of interurban railways appreciate. As a financial proposition, the high-powered road

which can use its full resources over only a short portion of its total running time is clearly handicapped over a somewhat slower line in point of maximum speed, but one which manages to maintain good running time from end to end on account of wise and progressive arrangements for its service in and out of terminal cities.

There is nothing new in this problem of the speed of interurban cars in city terminals, but its neglect in practice justifies renewed reference to it. Something is plainly wrong when it takes the cars of a fast line as long to run through 7 or 8 miles of urban territory as it does to traverse 30 or 40 miles of intermediate country. Perhaps there is no remedy for such a condition in many instances, but the manager who is keen to secure every possible passenger will not settle back contented until he has made certain that improvements cannot be effected. The obstacles to even a fair rate of speed into and out of terminal cities are well known to be the obstruction of regular and special cars of the local system, circuitous routes, vehicle traffic on the highways, inadequate feeder capacity for the needs of the heavier through cars, waits for crews to be changed, delays in taking register readings when system boundaries are reached, etc. In general, they can usually be summed up as being caused by a disposition on the part of the city system to treat the interurban cars as a part of its own local service, according them neither special rights nor extra care in the maintenance of the fastest local running time consistent with safe operation.

The interurban manager may readily plead that he is without control of the local situation, but as the stress of competition becomes keener the only way out of the problem is to have a conference with the local management and try to root out some of the more glaring difficulties which hold down the movement of the through cars. If an expenditure of money is required for some of the improvements necessary, it may be a better investment for the interurban road to share the cost of bettering that part of the local system over which its cars run than to spend the same amount in doubling the motive power of its rolling stock. What is needed is not the speed of a limited express train through the outlying streets of the terminal city, but the maintenance of a good average rate of movement with the fewest possible number of stops and slowdowns that will take care of the reasonable demands of the through travel. It might cost less to permit the interurban crews to run through to the city terminus, with an extra conductor or inspector of registers from the local system, than to adhere so generally to the present system of changing crews at system limits.

The Cost of Accidents

At the convention of the International Association of Accident Underwriters, held last week at Niagara Falls, attention was attracted to the tremendous aggregate expense of casualties and to the large proportion of them which could be prevented by care. According to Dr. W. H. Tolman, a conservative estimate of the number of accidents which in this country result fatally or in partial or total incapacity for work, is 500,000 each year. If we assume an average disability for each victim of one year and an average earning capacity annually of only $500, the casualties cause in loss of services an economic drain on the country of $250,000,000 a year. This is considerably more than the amount paid annually in pensions by the United States, but by no means constitutes all of the expense. If to this should be added the value of the labor of the higher-priced men and the cost of the courts in considering accident cases, the aggregate is very much larger. Thus in New York City alone, 60 per cent of the time of the jury trial and first appeal courts is occupied by the consideration of accident cases, and the salaries of the judges and the wages of the court attendants, exclusive of administrative expenses and supplies, cost the taxpayers of the city in 1908 $4,000,000. Of course, no part of this sum is any direct aid or compensation to the victim of the accident.

Strictly speaking, every accident could be avoided by care on the part of somebody, but eliminating those accidents which are sometimes called unavoidable because they are not caused by what is termed gross negligence, there is no doubt that a very large percentage of the injuries which are now a drain upon the earning capacity of the country could be greatly reduced. The only way in which this can be accomplished is to inculcate so generally the idea of the necessity for caution that the public, as well as those engaged in the direction of the different industries, may take all precautionary steps possible. Many employers of labor have already shown that they realize the importance of action of this kind. Thus the United States Steel Corporation has for some years had a central committee of safety, whose duty it is not only to insure the introduction of the best methods of preventing accidents and safeguarding employees, but also to obtain and disseminate among the employees of the company information and suggestions in regard to protecting themselves and those who might be injured by the machinery. The New York Edison Company has a somewhat similar organization, as well as elaborate emergency staff, with a complete system of first aid to the injured. Among the railway companies this same plan has also been followed to a large extent by issuing instructions to employees regarding the prevention of accidents and the care of the injured. In some cases, like Milwaukee, an ambulance car has been equipped and a complete hospital outfit has been provided with attendant physicians and nurses, for the use of employees or others who may be injured on the premises or lines of the company and can be taken to the company's hospital more quickly than to any others in the city.

While great progress has been made in this direction by railway companies so far as their own forces are concerned, it seems as if still more could be done in instructing the general public regarding the necessity of precautionary measures. The railway companies can do something along these lines by posting in their stations and other public places notices like those used by the Red Cross Society and published in a recent issue of this paper. But other factors like the daily newspapers and the municipalities must assist if much is to be accomplished. Every accident means an injury not only to the victim, but to the community, which always has to bear a part of the expense. So long as human judgment is fallible accidents cannot be entirely eliminated, but it would seem as if they might be reduced in amount over those which now occur.

ROLLING STOCK STANDARDIZATION IN BROOKLYN—SPECIFICATIONS FOR CASTINGS, FORGINGS AND COMPOSITIONS, INCLUDING THE DETAILS OF STANDARD TRUCKS AND FITTINGS

One of the later phases of the standardization work of the Brooklyn Rapid Transit Company is represented by the series of metal specifications prepared with the view of securing the safest and most suitable equipment. The subject has not been treated from the mere cents per pound standpoint, but with due regard for the engineering requirements of each class of service. For this reason the specifications are worthy of the earnest study of all railways which have not had the means or opportunity to give this matter the thorough treatment which it deserves. The materials for which individual specifications have been prepared in the order given are the following: Steel tires; steel castings; wrought iron; steel forgings for driving axles, trailer truck axles and armature shafts; composition castings; cast-steel gears; steel pinions; elliptic and semi-elliptic springs; and drop-forged steel coupling links and pins. In addition to the foregoing, special forms are prepared for complete trucks and other equipment when bids are called for on new rolling stock.

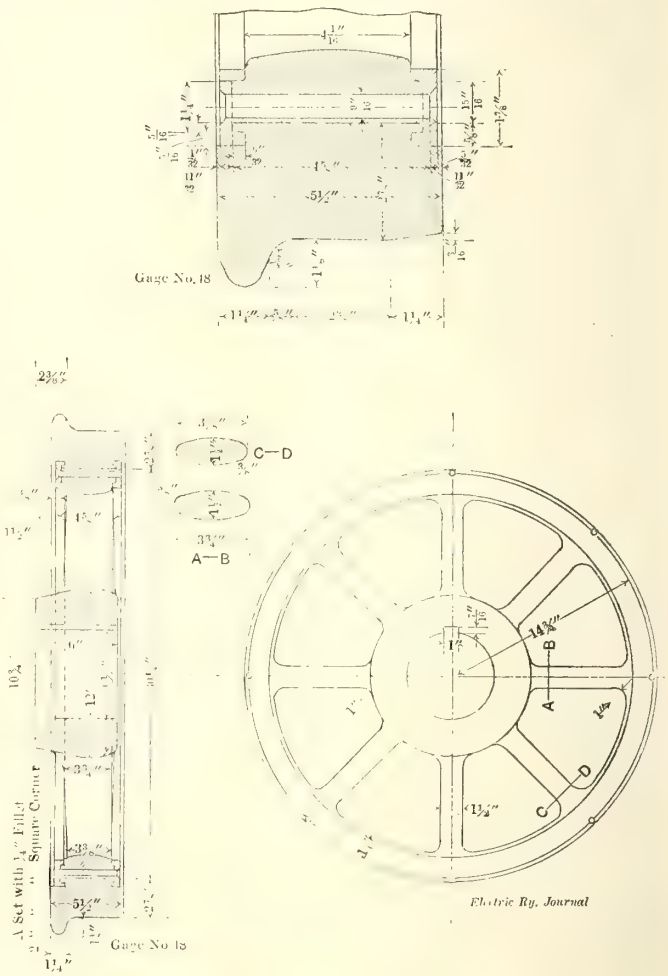
STEEL TIRES

The steel tires are of open-hearth or crucible steel and in general conform to the standards outlined in Bulletin No. 14 of the American Society for Testing Materials. The chemical composition is limited as follows: Manganese, not to exceed 0.80 per cent; silicon, not less than 0.25 per cent; phosphorus, not to exceed 0.05 per cent, and sulphur, not to exceed 0.05 per cent. All tires must have a tensile strength of not less than 110,000 lb. per square inch and their elongation in 2 in. must not be less than 10 per cent. One test per melt is required to be cut cold from the tire or test ingot which must receive approximately the same working and heat treatment as the tire. The tires must be stamped with the maker's brand and serial number; the railroad company's order number and the material number marked in white. All tires must be free from cracks, flaws or other injurious defects and conform to dimensions ordered. Where tires are not inspected at the mills the manufacturer must send a certified report of the physical and chemical tests to the superintendent of equipment when each shipment is made.

The steel tires covered by the foregoing are 2⅞ in. thick and are used on 38 Baldwin trucks installed under some elevated cars of the 900 type and under electric locomotive No. 4. The wheels used under the elevated cars are 36 in. diameter and carry 9000 lb. when the car is light. The elevated cars are operated up to a maximum speed of 40 m.p.h. The wheels used for the electric locomotive are 37 in. diameter, carry 14,250 lb. and are run at speeds up to 40 m.p.h.

STEEL CASTINGS

The open-hearth or crucible-steel castings to be specified for future rolling stock conform in general to the standards laid down in Bulletin No. 16, American Society for Testing Materials. In their chemical composition these castings must not have over 0.05 per cent of phosphorus or over 0.05 per cent of sulphur. Such castings must have a tensile strength of not less than 60,000 lb. per square inch, an elastic limit of not less than 27,000 lb. per square inch, an elongation of not less than 22 per cent in 2 in. and a reduction in area of not less than 30 per cent. It is required that coupons for the tests shall be cast on at least two castings from each heat and that the tests shall be made from a ¾-in. round cut from the coupon. Each casting must have the melt number plainly stamped with sunk figures and the railroad company's pattern number cast with raised figures. Each test piece must have the melt and order number stamped on it. All castings must be annealed by heating uniformly to about 850 deg. C., or 1560 deg. Fahr. No castings must be shipped until it is certain that the proper crystallization has been obtained. This is characterized by a fine granular section, a sample of which must be furnished upon request. Castings must be true to patterns and free from slag, blow-holes, shrinkage cracks and sand. Bearing surfaces must be solid, and no porosity is allowed in positions where the resistance and value of the casting for the purpose intended will be seriously affected. Defective castings are returned at the



Brooklyn Specifications—Steel-Tired Spoke Center Motor Truck Wheel

expense of the manufacturer. Tests, when required, are made at the foundry and no charge for such tests is allowed.

WROUGHT IRON

The wrought iron to be specified in the future is known as Burden's Best, and must be free from steel scrap. The physical requirements for both rectangular and round sections are given herewith: Tensile strength per square inch, not less than 48,000 lb., rectangular, or 50,000 lb., round; elastic limit per square inch, not less than 25,000 lb., rectangular, or 25,000 lb., round; elongation in 8 in., not less than 20 per cent, rectangular, or 25 per cent, round. A reduction of 1000 lb. per square inch in tensile strength is allowed below the above figures when it is necessary to machine test pieces. Bars are required to bend cold, with-

out signs of fracture or cracking, through 90 deg. to a curve whose radius equals the thickness of the piece. At least one sample in three must bend through 180 deg. without cracking. Bars when nicked evenly and bent back by light blows must show a generally fibrous fracture, free from steel or coarse crystalline spots. Not over 15 per cent of the fractured surface must be granular. Two test pieces, 20 in. long, are taken for test from each 200 bars or less. The bars must be marked in white lead with the railroad company's order number and the specified mark given on the order. All bars must be practically straight, smooth, free from cinder spots, blisters, cracks, slivers, injurious flaws and imperfect edges. Round iron must conform to the limit gages adopted by the Master Mechanics' Association and rectangular iron must not vary more than .03 in. from the size ordered. Bar iron which fails to meet the above requirements is subject to return at the manufacturer's expense.

STEEL FORGINGS FOR DRIVING AND TRAILER TRUCK AXLES AND ARMATURE SHAFTS

The specifications for steel forgings for truck axles and armature shafts conform to those of the American Railway Master Mechanics' Association and the American Society for Testing Materials. The material is open-hearth steel with the following chemical limitations: Phosphorus, not to exceed 0.05 per cent; sulphur, not to exceed 0.05 per cent, and manganese, not to exceed 0.60 per cent. The tensile strength must not be less than 80,000 lb. per square inch, the elongation not less than 20 per cent in 2 in., and the reduction in area not less than 25 per cent. One test per melt is required. This is taken from the forging or from a full-size prolongation of the same, halfway between the center and the outside, parallel to the axis of the forging. The standard turned test specimen, ½ in. in diameter and 2 in. gage length, must be used to determine the physical properties. Coupons for test must be left attached to the forging, but so nearly cut through that they may be detached with hammer and cold chisel on the arrival of the railroad company's inspector. The superintendent of equipment of the railroad company must be notified in advance when forgings will be ready for inspection, and no shipment must be made before tests have been completed and the inspector advises that the forgings are satisfactory. Drillings or turnings from the tensile specimens are used to determine the chemical properties where check analysis is necessary.

Each forging must be plainly stamped on one end with the melt number and with the name or initials of the manufacturer, with stamps not less than ⅜ in., and must have the order number plainly marked with white lead. All forgings must be free from seams, cracks or other defects and must conform to sizes ordered. When called for forgings must be rough-turned all over with a flat-nosed tool, cut to exact length and centered for a lathe with 60-deg. centers. Forgings, when specified to be either rough-turned or hammered to shape, must be made with sufficient accuracy to allow for finishing all over at ⅛ in. less than specified rough diameter. Forgings failing to meet the above requirements, or which prove defective on machining, will be rejected and returned at manufacturer's expense for replacement free of cost to the railroad company.

COMPOSITION CASTINGS

Five different alloys are used for composition castings, as follows: Journal bearings, check plates and various other bearings are of bearing metal, No. 1 composition; car trimmings, trolley wheels and various power-house castings are of bronze, No. 2 composition; signal bells are of bell metal, No. 3 composition; steam fittings, valves and cocks are of steam metal, No. 4 composition, and miscellaneous castings, motor and control parts are of yellow brass, No. 5 composition.

The analyses of the five compositions are given in Table I:

TABLE I

Composition	Copper Per cent	Tin Per cent	Lead Per cent	Zinc Per cent	Maximum impurities Per cent
No. 1, Bearing metal.	77.00	8.00	15.00	....	1.0
No. 2, Bronze	88.40	5.50	2.80	3.30	1.5
No. 3, Bell metal....	82.00	18.00	....	....	1.5
No. 4, Steam metal..	85.00	5.00	5.00	5.00	1.0
No. 5, Common brass.	67.00	....	....	33.00	1.5

NOTE: A variation of 10 per cent is allowed from the specified amounts of tin, lead and zinc.

Mixtures with scrap of the percentages indicated are permitted as shown in Table II:

TABLE II

Composition	Copper Per cent	Tin Per cent	Lead Per cent	Zinc Per cent	Maximum scrap Per cent
No. 1, Bearing metal.	38.50	4.00	7.50	....	50
No. 2, Bronze	62.00	3.80	1.90	2.30	30
No. 3, Bell metal....	82.00	18.00	....	....	..
No. 4, Steam metal..	59.50	3.50	3.50	3.50	30
No. 5, Common brass.	....	....	....	....	100

NOTE: All scrap must be of the same composition as the metal for which it is used, and where the amount of scrap, as shown above, cannot be obtained, new metals must be used in proportion.

Inspection must show that the castings are free from segregation, oxidation, dirt, sand, cavities and any other injurious defects. All castings that do not meet the requirements of these specifications are returned at the manufacturer's expense. Any labor performed on castings found defective after machining or finishing is charged to the manufacturer.

CAST-STEEL GEARS

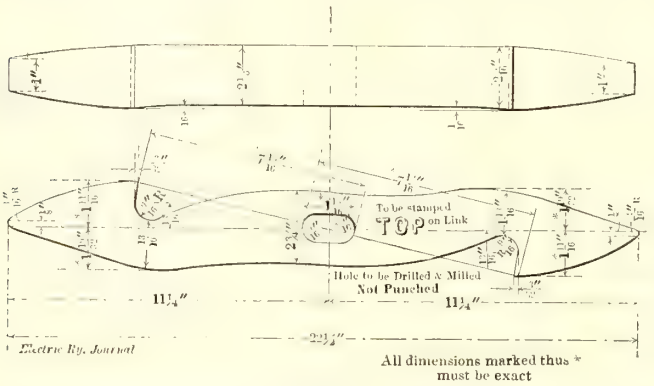
Cast-steel gears are of open-hearth or crucible steel and must not contain more than 0.05 per cent of phosphorus or more than 0.05 per cent of sulphur. The tensile strength must be not less than 70,000 lb. per square inch, the elastic limit not less than 35,000 lb., the elongation in 2 in. not less than 16 per cent and the reduction in area not less than 25 per cent. Coupons for test must be cast on at least two castings from each heat and tests must be made from a standard ½-in. x 2-in. test piece. The test piece must be removed from the casting and tested in the presence of the railroad company's inspector. Each gear casting must have the melt number stamped thereon with steel figures, and the finished gear must have the railroad company's order number stamped with steel figures on the side of the rim. All gear castings must be annealed by heating uniformly to about 850 deg. C., or 1560 deg. Fahr. No castings must be shipped until it is certain that the proper crystallization has been obtained, this being characterized by a fine grain. The gears must be true to patterns and free from slag, blow-holes or shrinkage cracks. The finished surfaces must be solid and no porosity will be allowed in the teeth. The face of hub and rim must be finished; bore must be "rough-bored" unless otherwise specified. The gear teeth must be Brown & Sharpe standard involute, made with special cutters for the number of teeth and degree of pitch shown on the plans accompanying the order. Gears that are found defective upon re-

ceipt or those that fail in service, due to imperfect material or workmanship, are returned to the manufacturer, who must give full credit for the original value of the same.

STEEL PINIONS

All steel pinions are of open-hearth steel of individual billets hammered to size for each pinion. The principal difference from the gear metal is in the use of manganese, which must not exceed 0.6 per cent; phosphorus and sulphur, must not exceed 0.04 per cent each. The tensile strength of the pinion material must be not less than 80,000 lb. per square inch, the elastic limit per square inch not less than 40,000 lb. per square inch, the elongation in 2 in. not less than 22 per cent and the reduction in area not less than 35 per cent.

One test per melt is required. This is taken from the forging, halfway between center and outside and parallel to the axis of the forging. The standard turned test piece, ½ in. in diameter and 2 in. gage length, must be used to determine the physical properties. Coupons for test must be left attached to the forging, but so nearly cut through that they may be easily detached upon the arrival of the railroad company's inspector. The purchasing agent of the railroad company must be notified in advance when forgings will be ready for inspection and the cutting of



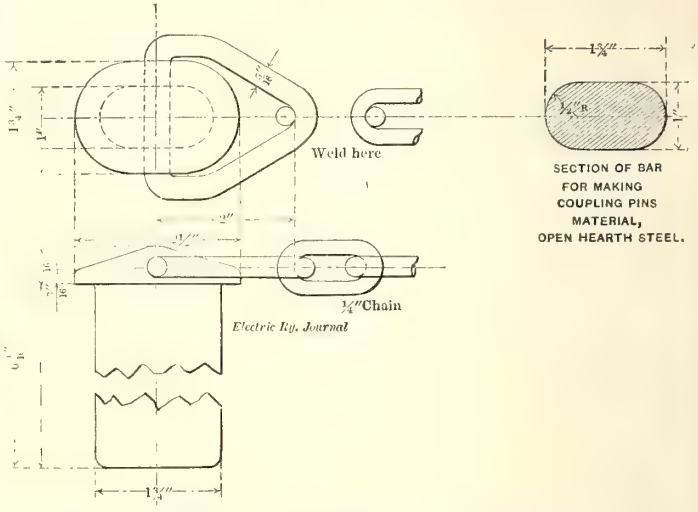
Brooklyn Specifications—Standard Coupling Link for Van Dorn No. 4A and No. 18 Drawheads

the pinions must not commence before the inspector advises that the forgings are satisfactory. Drillings or turnings from the tensile specimens are used to determine the chemical properties where check analysis is required. Each forging must be plainly stamped on one end with the melt number and finished pinions must have the railroad company's order number and the initials of the manufacturer stamped on one end.

All pinions must be free from seams, cracks or other defects and must be finished to the exact sizes shown on the plans accompanying the order. The bore must be accurately and smoothly reamed. The teeth are Brown & Sharpe standard, involute, made with special cutters for the number of teeth and pitch shown on the plans accompanying the order. Pinions that are found to be defective upon receipt or those that should fail in service, due to imperfect material or poor workmanship, are returned to the manufacturer, who must give full credit for the original cost of the material.

ELLIPTIC AND SEMI-ELLIPTIC SPRINGS

Car springs, whether of the elliptic and semi-elliptic type as now ordered on requisitions, are of crucible or open-hearth steel containing the following ingredients: Carbon, 0.90 to 1.10 per cent; manganese, 0.25 to 0.50 per cent; silicon, 0.15 to 0.25 per cent; phosphorus, not to exceed 0.05 per cent, and sulphur, not to exceed 0.05 per cent. At least 25 per cent of each lot of springs is subject to test. The trial consists in applying one and one-half times the maximum specified load with the ends of the semi-elliptic springs supported on swinging or roller bearings. When released from one and one-half times the maximum specified load, the springs must not be more than 3/16 in. higher nor more than 3/16 in. lower than the specified height, and must not take a permanent set when free. The plates must fit closely together at all times and deflect uniformly under the test loads. Each spring must be stamped on one side with the maker's mark and date made (month and year) and the railroad company's order number. The plate must be free from lamination and other defects and must not vary more than .03 in. in width nor more than .02 in. in thickness. The bands must not vary more than ¼ in. in length, 1/16 in. in width or 1/32 in. in thickness. The distance, center to center, must not vary more than ¼ in. from drawings. When so desired the springs may be tested at the mills free of cost to the railroad company. When springs purchased to



Brooklyn Specifications—Coupling Pin and Links for Van Dorn 4A and No. 18 Drawheads

these specifications are shipped without inspection by the railroad company's representative the manufacturer must make specified tests and report the results to the superintendent of equipment, Brooklyn Rapid Transit Company.

The manufacturer must furnish the railroad company with a certified report of the analysis of the steel used in each lot of springs. When springs are ordered in pairs the variation in height under specified loads must not exceed 1/16 in. in the same pair. Springs that fail to meet the requirements specified above are returned at the manufacturer's expense.

OIL-TREATED, DROP-FORGED STEEL COUPLING PINS AND LINKS

The drop-forged steel coupling pins and links are of open-hearth steel, containing: Phosphorus, not to exceed 0.04 per cent; sulphur, not to exceed 0.04 per cent; manganese, 0.50 to 0.60 per cent, and carbon, 0.35 to 0.45 per cent. The link must be heat treated to bring the tensile strength up to approximately 100,000 lb. per square inch and the elastic limit to approximately 60,000 lb. per square inch. The oil tempering and annealing must be done as follows, after the links have been machined and milled: Heat links to about 800 deg. C., plunge in oil and reheat to about 500 deg. C. All pins and links must be free from seams, cracks or other defects and must conform to sizes given on the railroad company's plans.

The forging must be performed by alternately striking on opposite sides so as to produce smooth and true forgings and eliminating die seams as far as practicable. The slotted hole in the coupling links must be accurately located and drilled and milled, not punched. Each link or pin must be plainly stamped with steel dies with the manufacturer's initials and each lot shipped must be tagged with the railroad company's order number. The links must have the word "TOP" stamped on the top side, as indicated on plan. The inspection is made before the heat treatment is applied either at the manufacturer's works or at the railroad company's shops, as advised by the railroad company. This inspection is made from one sample selected from each heat. If tests are carried out at the manufacturer's works no charges are made for cutting test pieces or the use of testing machines and the railroad company's inspector must have free access to all parts of the shops where the links or pins are being made.

TRUCK SPECIFICATIONS AND JOURNAL WEIGHTS

In addition to the forgoing individual specifications general specifications are prepared from time to time covering complete trucks except wheels and axles. Those which are reproduced relate to the following trucks: Surface passenger motor, maximum traction, elevated motor and elevated trailer. The accompanying table of the weights

WEIGHTS OF JOURNALS.

Truck.	Size of journal.	Weight on journal car light, lb.	Weight on journal with full load, lb.	Weight per sq. in. of journal bearing car loaded, lb.
Surface passenger, short wheel base, double.....	3¾ in. x 7 in. M. C. B.	5,025	6,900	292
Surface passenger, maximum traction driver....	3½ in. x 7 15/16 in.	4.412.5	5,950	192
Surface passenger, maximum traction, pony....	3 in. x 7 15/16 in.	2,562.5	4,100	226
Surface service, diamond frame, double.....	4¼ in. x 8 in. M. C. B.	4,267.5	9,267.5	299
Elevated passenger, '07 type, motor.....	5 in. x 9 in. M. C. B.	7,829	10,435	251
Elevated passenger, trail truck on motor cars....	4¼ in. x 8 in. M. C. B.	6,357	8,794	283
Elevated passenger, all other motor trucks, excepting '07 type.....	4¼ in. x 8 in. M. C. B.	6,580	9,017	290
Elevated passenger, trail car truck.....	3¼ in. x 6½ in.	3,350	6,106	362

NOTE.—The heaviest equipment is used in each case for computing weight for journal.

on the journals of these and other trucks will be found of interest in connection with the specifications for the truck parts and the bearings. The minimum weight per square inch when the car is carrying its maximum load varies from 192 lb. on the driver journal of the surface passenger short wheel-base trucks to 362 lb. on the journals of elevated passenger trucks.

SURFACE PASSENGER CAR MOTOR TRUCK SPECIFICATIONS

The following details will give briefly the size and grades of metals specified for motor trucks ordered during 1906 for surface passenger cars of the Class 4100-4300-4500 types. The trucks were of the M. C. B. swing-bolster type, with inside-hung shoes, side bearings and rigid nose suspension, as shown in the accompanying engraving. The car body weighed when fully equipped about 23,000 lb. The weight of the maximum passenger load was assumed at 17,000 lb. and the trucks were to be built so that under these loads the difference in the height of the empty and loaded car should not exceed 2 in. The total weight of car and trucks is 52,000 lb. The general dimensions of this truck were: Wheel base, 4 ft. 10 in.; height from rail to top of car body centerplate with weight of empty car body, 29¾ in.; height from rail to top of side bearings, 31¾ in.; gage of track, 4 ft. 8½ in., and diameter of wheel, 33 in. The contractor guaranteed to replace without cost to the railroad company any parts which might become worn out or broken because of faulty design, material or construction, within one year from the date the truck was put into service, excepting wheels, axles, journal brasses and brake shoes.

The wrought iron furnished under this specification was to have been made originally by the puddling process, and as furnished might consist of new muck bar iron or of a mixture of muck bar iron scrap, but free from a mixture of steel scrap. The bar iron was to be smoothly and truly rolled to the ordered dimensions and free from slivers, depressions, cracks and burned edges. The bar iron had to conform to the following tensile, nicking and bending tests: Rectangular iron less than 3 in. wide and having less than 1½-in. cross-sectional area to be tested in full size as rolled. Iron more than 3 in. wide or having a cross-section of more than 1½ in. was to be reduced to that width or area by turning or by planing, but when practicable, tested in full thickness. Round iron having a diameter of 1⅜ in. or less was to be tested as rolled and that measuring more than 1⅜ in. was to be reduced to that dimension. All other shapes were to be reduced to the most convenient size up to 1½ in. in area. The testing of very irregular shapes and very small rods was optional. The length of the test section was 9 in. and the elongation was measured between marks originally 8 in. apart. All of the iron of one size in the shipment was subject to rejection if the average tensile strength of the specimens representing it fell below 47,000 lb. or exceeded 53,000 lb. per square inch, or if any single specimen showed less than 45,000 lb. per square inch. In the case of flat bars, which had to be reduced in width, an allowance of 1000 lb. was made in the tensile strength, making the rejection limit 46,000 lb. per square inch. All of the iron of one size was to be rejected if the average elongation in 8 in. fell below the limit given: Rounds ½ in. and over, 20 per cent; rounds less than ½ in., 16 per cent; flats, pulled as rolled, 20 per cent, and flats, reduced, 16 per cent. In the nicking and bending tests the iron was held firmly in a vise, nicked lightly on one side and then broken by a succession of light blows on the nicked side. When broken it had to show a general fibrous structure with not more than 25 per cent crystalline and free from steel admixture. If more than one bar in five thus tested showed steels in whole or in part, all of that size were to be rejected.

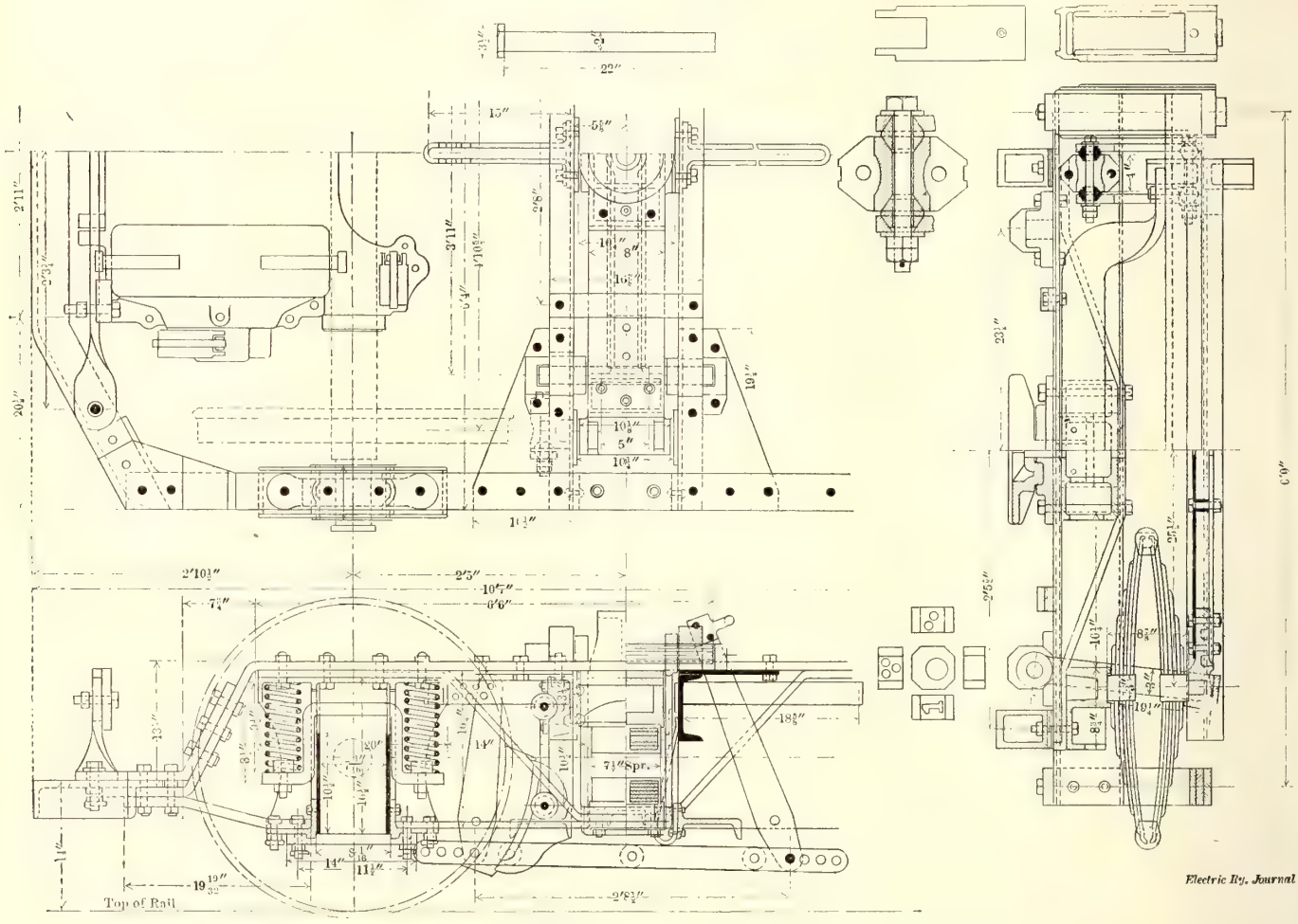
Steel bars were specified to be of soft, open-hearth steel, tensile strength 55,000 lb. to 60,000 lb. per square inch, elastic limit of not less than one-half the ultimate strength, elongation 27 per cent cold, or quench bends 180 deg. flat on themselves without fracture of outside of bend. Gray iron castings were to be made of clear tough gray iron exhibiting a uniform and closely grained fracture, free from any white, mottled or vitreous appearance. They were to be soft enough readily to be cut, drilled or chipped, and when struck on a corner or edge with a hammer the metal was to indent and not break off. Malleable iron castings were to be made of clean high-grade metal, evenly annealed throughout. Coupons for tests were to show an ultimate strength of 40,000 lb., an elastic limit of 20,000 lb. per square inch, an elongation of at least 2½ per cent and a reduction area of not less than 6 per cent. They were to be capable of bending to an angle of 90 deg. without

showing a fracture on the convex side. All steel castings were to be annealed. A coupon for testing was made with every cast of steel and after annealing a test was made from a ¾-in. round piece cut from the coupon. The test piece was to show an ultimate strength of at least 70,000 lb., an elastic limit of not less than 35,000 lb., an elongation of at least 15 per cent in 2 in. and a reduction of area of 20 per cent at the point of fracture. The bearing surface of any steel casting when finished was to be free from visible blow-holes exceeding 1 in. in any direction, nor exceeding ½ in. in area. The length of the blow-holes was gaged by a straight line laid in any direction and was not permitted to exceed 1 in. in 1 ft.

The truck frame was put together with 0.875 in. diameter bolts driven into 0.870 in. diameter reamed holes. The top chord was 4-in. x 1-in., soft steel; bottom chord, 4-in. x ¾-in., soft steel; U-frame, 4-in. x ¾-in., soft steel; pedestal tie, 4-in. x ¾-in., soft steel; end brace, 4-in. x 1-in.; end frame, 4-in. x 4-in. x ⅝-in., angle 15.7-lb. Carnegie A-21; transom, 7-in. x 17.25-lb. channel Pencoyd 73-C; gussets, ½-in. soft steel boiler plates; pedestal, steel, and pedestal cap, 4-in. x 1-in., soft steel.

The bolster top and bottom plates, both 8-in. x ¾-in., soft steel, were secured at the ends with an accurate joint and at center of bolster a malleable-iron filler casting machined top and bottom was fitted between both plates and fastened with four ⅞-in. turned bolts driven into reamed holes. This center casting projected ½ in. beyond the bolster edges to form in the center of the truck a chafing surface about 8 in. long and 7 in. deep. Suitable chafing plates were also provided at both ends of the bolster. The spring plank was a 6-in. channel weighing 10.5 lb. per foot, with a 1½-in. hole drilled in the center for driving out the king pin. The elliptic spring seat was of malleable iron; elliptic spring cap, gray iron; bolster fillers, malleable iron; spring plank rocker, cast steel, and swing hanger pin fulcrum, cast steel. The side bearings were gray iron castings with removable shims for height adjustment. The truck center plate and body center plate were of cast steel, turned on the working surface and planed. The body center plate was furnished planed, turned and drilled, ready for attachment to the car. The truck center plate was flanged over the sides of the top member of bolster for 4 in. from each end, the flanges being ½ in. thick and ⅜ in. deep and planed to fit the bolster.

The brakes for these trucks are inside hung, with special rolled beam B-118, 15-lb., made by the Buffalo Brake Beam Company.



Brooklyn Specifications—Surface Passenger Truck for 42-ft. 6-in. Cars

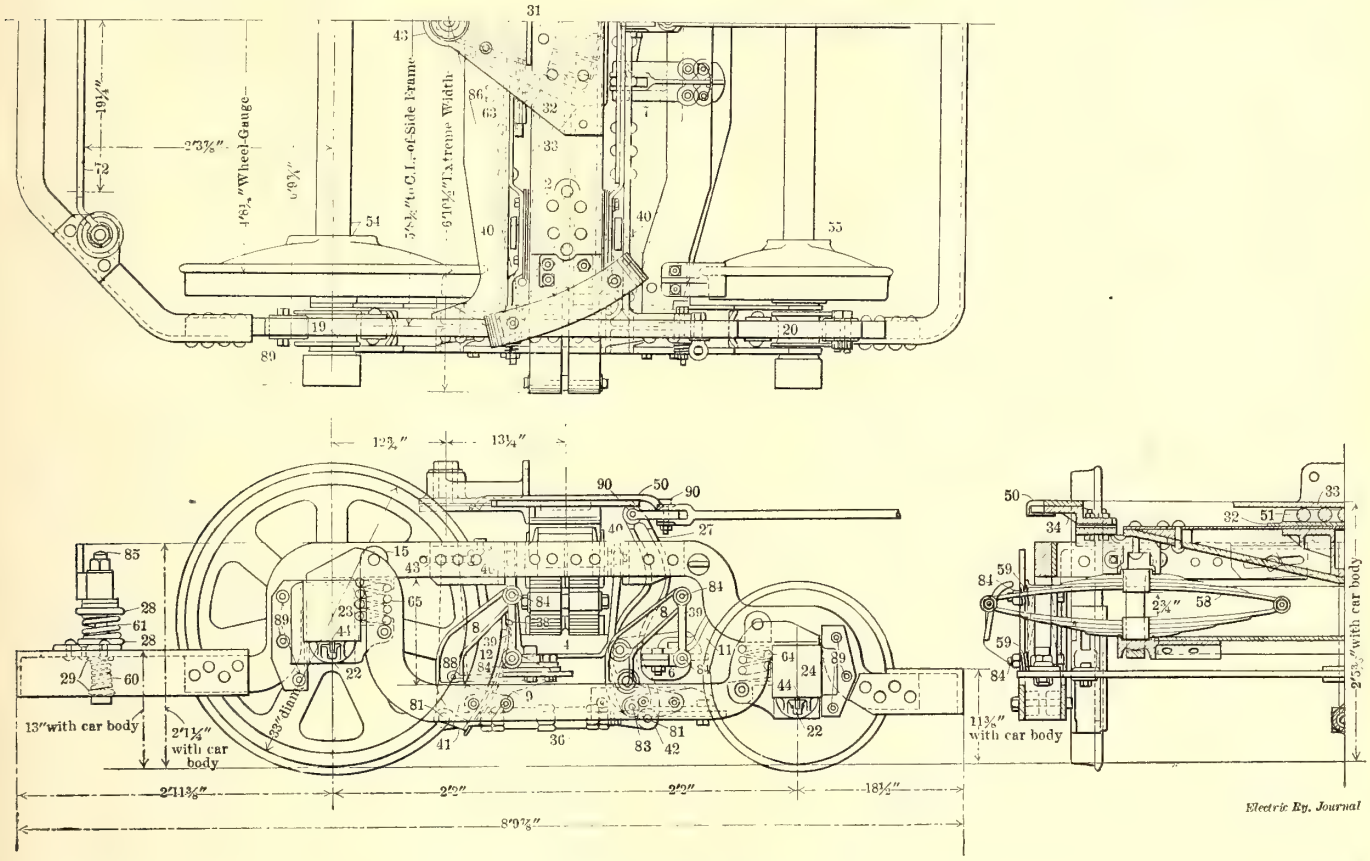
The springs comprised double elliptic bolster springs and a coil spring on each side of each pedestal, supported by a yoke spring strap of soft steel bar over the journal box; also a light coil spring under each journal box. A soft steel motor suspension bar 5 in. x 1 in., bent upward at the ends and bolted to the end frame, without springs, was provided at each end of the truck.

MAXIMUM TRACTION TRUCK

The latest semi-convertible cars, with 28-ft. bodies, have been equipped with the type O-45 maximum traction trucks made by the Standard Motor Truck Company. The details of construction of these trucks are shown in the accompanying illustration and bill of material. These trucks are furnished with double elliptic springs, which give them good riding qualities. The brake rigging is hung from brackets attached to the equalizer bars, to provide

even shoe wear and to keep the shoes on the same point of the wheel, irrespective of the weight on the truck. The car body swivel plates have conical rollers, which allow the truck to take curves easily and with less friction on wheel flanges.

the American Locomotive Company. Many details were changed, however, in conformity with Brooklyn Rapid Transit practice. Important features are the cast-steel gussets which tie the side frames and transoms and embrace in one casting the swing-link bearings, brake hanger



BILL OF MATERIAL.

Mark	Description	Material	No. per Truck	Mark	Description	Material	No. per Truck
1	Bolster Center Filler	Mal. iron	1	38	Brake Shoe Key	Wrought iron	2
2	Bolster Filler	Mal. iron	2	39	Brake Hanger	O. H. steel	8
3	Bolster Spring Cap	Mal. iron	2	40	Bolster Hanger Pin	O. H. steel	4
4	Bolster Spring Seat	Cast steel	2	41	Bottom Brake Rod—L. H	Wrought iron	1
5	Brake Beam Bracket—Driver	Cast steel	2	42	Bottom Brake Rod—R. H	Wrought iron	1
6	Brake Beam Bracket—Pony	Cast steel	2	43	Dead Lever Guide	O. H. steel	1
7	Brake Beam Fulcrum	Cast steel	4	44	Journal Box Lid Bolt	Wrought iron	4
8	Brake Hanger Bracket	Cast steel	4	45	Release Spring Bolt	Wrought iron	1
9	Brake Head	Mal. iron	2	46	Release Spring Hook Bolt	O. H. steel	1
10	Brake Shoe, 20"—R. H	Cast iron	1	49	Damper Washer	O. H. steel	2
11	Brake Shoe, 20"—L. H	Cast iron	1	50	Side Bearing Wear Plate	O. H. steel	2
12	Brake Shoe, 33"	Cast iron	2	51	Roller	O. H. steel	5
13	Car-Body Side Bearing—R. H	Cast steel	1	54	Driver Wheel and Axle		1
14	Car-Body Side Bearing—L. H	Cast steel	1	55	Pony Wheel and Axle		1
15	Equalizer Spring—Cap	Mal. iron	4	58	Double Elliptic Spring		2
16	Journal Bearing—Driver	Brass	2	59	Brake Hanger Spring		3
17	Journal Bearing—Pony	Brass	2	60	Bottom Motor Spring		2
18	Journal Box—Driver—R. H	Cast iron	1	61	Top Motor Spring		2
19	Journal Box—Driver—L. H	Cast iron	1	62	Brake Release Spring		1
20	Journal Box—Pony—R. H	Cast iron	1	63	Damper Spring		2
21	Journal Box—Pony—L. H	Cast iron	1	64	Equalizer Spring—Pony		2
22	Journal Box Bolt Lever	Mal. iron	4	65	Equalizer Spring—Driver		2
23	Journal Box Lid—Driver	Mal. iron	2	66	Journal Box Spring		4
24	Journal Box Lid—Pony	Mal. iron	2	69	Dust Guards—Driver	White wood	2
25	Journal Check Plate—Driver	Brass	2	70	Dust Guards—Pony	White wood	2
26	Journal Check Plate—Pony	Brass	2	72	Motor Suspension Bar		
27	Live Lever	Cast steel	1	80	Live Lever Top Brake Pin		2
28	Motor Spring Cap	Mal. iron	4	81	Live and Dead Lever Bottom Brake Pin		2
29	Motor Spring Seat	Mal. iron	4	82	Live and Floating Lever Fulcrum Brake Pin		1
30	Release Spring Worm	Mal. iron	2	83	Floating Lever Top and Bottom Brake Pin		4
31	Spider	Mal. iron	1	84	Brake Hanger Pins		8
32	Swivel Plate—Bottom	Cast steel	1	85	Motor Suspension Bolt		2
33	Swivel Plate—Top	Cast steel	1	8	Bolster Damper Spring Bolt		1
34	Truck Side Bearing—R. H	Cast steel	1	87	Bolster Damper Spring Bolt		1
35	Truck Side Bearing—L. H	Cast steel	1	88	Dead Lever Fulcrum Bolt		1
36	Turnbuckle	Mal. iron	2	89	Side Frame Wearing Piece Bolt		12

Brooklyn Specifications—Maximum Traction Truck, Type O-45

SPECIFICATIONS FOR ELEVATED PASSENGER MOTOR TRUCKS

The latest type of motor truck used by the Brooklyn Rapid Transit Company, as applied under class 1400 semi-convertible elevated cars, was briefly described and illustrated in the STREET RAILWAY JOURNAL of Nov. 9, 1907. The truck follows the interurban standards of the builder, brackets or lugs and the brake release-spring brackets. This feature eliminates several small castings, with the attendant bolts and rivets. One change required by the clearance conditions was the dropping of one end of the top frame to clear the car body's platform. The trucks are of the two-bar equalizer and swinging bolster design, with inside-hung

shoes, roller side bearings and inside nose suspension without springs for Westinghouse No. 300 motors. Two of these trucks carry an elevated car 48 ft. 11 in. over all, with a load of 28,465 lb. at the center plate. The weight of each truck is 12,000 lb. The weight of the car body equipped is 37,730 lb., and the motor end alone 18,190 lb. The car seats 53 passengers, and is figured for a maximum of 139 passengers averaging 150 lb. each.

The general dimensions and clearances are: Length, 10 ft. 9 in.; wheel base, 6 ft. 8 in.; center to center of side frames, 6 ft. 4 in.; center to center of car body side bearings, 5 ft.; top of rail to top of car body center plate, 34¾ in. (car light); top of rail to top of truck side bearings, 34¾ in. (car light). The wheels are of the Schoen solid steel type, 34 in. diameter, 4⅛ in. width of tread; 1⅛ in. height of flange; 2 in. thickness of rim at thinnest point; 1⅜ in. thickness of flange from back to gage line. The axle diameters are as follows: Gear seat, 7 13/16 in.; wheel seat, 7¾ in.; motor bearings, 6½ in. The journals are 5 in. x 9 in.

The truck framing includes the following list of parts, made mostly according to the specifications of the builder:

PARTS OF MOTOR TRUCK FOR CLASS 1400 ELEVATED CARS

Top side frames	4 in. x 1½ in., soft steel.
Side frame truss	4 in. x ¾ in., soft steel.
Pedestal tie bars	4 in. x 1 in., soft steel.
End braces	4 in. x 1 in., soft steel.
Bolster plates	8 in. x ¾ in., soft steel.
Equalizers	5 in. x 1 in., soft steel.
Pedestals	4 in. x 1⅜ in., wrought iron.
Center braces	4 in. x 1⅜ in., wrought iron.
Transoms	9 in. x 25 lb., channel.
End frames	4 in. x 4 in. x ⅝ in., angle.
End frame gussets	½ in., steel plate.
Spring plank	4 in. x 5.25 lb., channel.
Transom gussets	Cast steel.
Elliptic spring caps	Malleable iron.
Bolster fillers	Malleable iron.
Bolster wear pieces	Malleable iron.
Side bearings	Malleable iron.
Side bearings fillers	Malleable iron.
Brake heads	Malleable iron.
Center plates	Cast steel.
Swing link rockers	Cast steel.
Brake shoes	Steel back.
Journal boxes	Symington.
Journal brasses	B. R. T. specification.
Springs, elliptic	34-in. centers.
Springs, coil	7¼ in., O. D.

The specifications for wrought-iron and steel castings do not differ materially from those of the Brooklyn Rapid Transit Company except as to test conditions. The other specifications may be summarized as follows:

Soft Steel: To be open hearth manufacture, to contain not over 0.06 per cent of either phosphorus or sulphur; tensile strength per square inch, 52,000 lb. to 62,000 lb.; elastic limit per square inch, not less than one-half tensile strength; elongation in 8 in. not less than 25 per cent; test pieces to bend 180 deg. flat without fracture on outside of the bent portion, either hot, cold or cherry red.

Spring Steel: To be crucible or open-hearth manufacture, to contain 0.90 to 1.10 per cent carbon, 0.25 to 0.50 per cent manganese, 0.15 to 0.25 per cent silicon; phosphorus, not more than 0.05 per cent; sulphur, not more than 0.05 per cent; copper, not more than 0.05 per cent. Bars must not vary more than 0.01 in. in thickness and 0.02 in. in width, and be free from seams, hollow spots, cracks on edges and laminations.

Elliptic and Semi-Elliptic Springs: The chemical specifications for this purpose are the same as for spring steel, but no reference is made to copper. The springs are tested by applying one and one-half times the specified load, with the ends of semi-elliptic springs supported on swinging or roller bearings. When released, the springs must not be higher nor more than ⅜ in. lower than the height specified, and must not take a permanent set when free. Plates must be free from laminations and other defects, and must not vary more than 0.03 in. in width nor more than 0.02 in. in thickness. The bands must not vary more than ¼ in. in length, 1/16 in. in width or 1/32 in. in thickness.

SPECIFICATIONS FOR ELEVATED PASSENGER CAR STANDARD TRAILER TRUCKS

The following paragraphs cover the metal requirements of the elevated trailer trucks ordered in 1907 for the class 1400 cars:

The trucks built under these specifications were of the M. C. B. swing bolster type, with inside-hung brake shoes, with the frame suspended on double equalizing bars. The weight on the truck center plate with the car body light was given as 17,600 lb., and with maximum passenger load 27,900 lb. The total deflection of both elliptic and helical springs from height with car body empty to height with full passenger load was not to exceed 2 in. The general dimensions were as follows: Wheel base, 5 ft. 6 in.; height from rail to top of car body center plate, with car body light, 34¾ in.; height from rail to top of side bearings, with car body light, 34¾ in.; gage of track, 4 ft. 8½ in., and diameter of wheels, 31 in. The contractor guaranteed to replace without cost any part which might become worn out or broken because of faulty design, material or construction, within one year from the date the truck was put into service, excepting wheels, axles, journal brasses and brake shoes.

The frame was put together with 0.875 in. diameter turned bolts driven into 0.870 in. diameter reamed holes. The top chord was 4-in. x 1-in. soft steel; bottom chord, 4-in. x ¾-in. soft steel; side frame truss, 4-in. x ¾-in. soft steel; pedestal tie, 4-in. x ¾-in. soft steel; end brace, 4-in. x ½-in. soft steel, and end frame, 4-in. x 4-in. x ½-in. angle, 12.8-lb. Carnegie A-23; transom, 9 in., 20-lb. channel Carnegie C-4; gussets, ⅜-in. soft steel boiler plate; pedestal, cast steel; pedestal cap, 4-in. x ⅝-in. soft steel. The bolster top and bottom plates were both 8-in. x ¾-in. soft steel, secured at the ends with an accurate joint. All holes for rivets were reamed the exact size of rivet, and at the center of the bolster two malleable iron filler castings, machined top, bottom and sides, were fitted between both plates and fastened with four ⅞-in. turned bolts driven into reamed holes. The spring plank consisted of a 4-in. channel, 5.25 lb. per foot, and a bottom bar of ⅞-in. x 3-in. soft steel. The links supporting the spring plank were made in one piece, without welding, and the square holes in the top of the links were not punched, but drilled and slotted. The elliptic spring seat was of malleable iron, elliptic spring cap of gray iron, bolster fillers of malleable iron, bolster link rocker of cast steel and the swing hanger pin fulcrum of cast steel.

The truck center plate and body center plate were of cast steel, turned on the working surface and planed. The body center plate was furnished planed, turned and drilled ready for attachment to the car. The truck center plate was flanged over the sides of top member of bolster ⅝ in. in depth and planed to fit the bolster. The brakes were inside hung, with a steel brake beam of B-17, 17.5-lb. Carnegie type. The springs comprised double elliptic bolster springs and single-coil equalizing springs designed for the loads and limiting deflections previously given.

CO-OPERATION BETWEEN THE OPERATING AND THE CLAIM DEPARTMENTS

BY R. H. SMITH, GENERAL MANAGER, ALBANY & HUDSON RAILROAD

The prevention of accidents is just as important in the economical management of railway properties as the reduction of cost per thousand car miles in the mechanical department. To this axiom every progressive railway manager who has followed the work of F. W. Johnson, superintendent of the Bureau of Accident Prevention of the Philadelphia Rapid Transit Company, the pioneer in this line, must agree. The only excuse the writer has for taking up this subject at this time is that he is keenly alive to the value of accident prevention work, and for several years was fortunate enough to be connected in an operating capacity with the system on which Mr. Johnson first stepped outside of the routine of the claim department, and began his successful crusade against accidents. The plan of applying the machinery of the claim department to the problem of anticipating and preventing accidents should need no defense, and the efforts expended in drilling employees into a more perfect state of efficiency by means of bulletins and lectures have already shown results sufficiently gratifying to attract the attention and receive the approbation of the most conservative officials. That more railways have not already taken up this work is due, in the opinion of the writer, to the fact that the average manager is too busy with his multifarious duties to keep in touch with this and similar topics which have been discussed in the technical journals. The alert claim agent who is anxious to take up prevention work, however, should fortify himself with all the available ammunition in the shape of facts and figures showing the value of the system, and start out first of all to reform his general manager.

The old-fashioned claim adjuster who placidly salved the pains and bruises of the unfortunate with amounts representing herculean efforts in reducing operating cost, and then lapsed into a state of coma until the next call, is doomed to become extinct. With him will go the old theory of the claim department: "The transportation department did it; why should we care?" and the companion reflection, "The more money we must spend, the more valuable and indispensable we are."

The claim agent of to-day, when not actually investigating claims or attending court cases, is actively at work devising means for preventing accidents. He makes a careful study into the causes of these accidents, analyzes in a most thorough manner the avenues through which the larger portion of his damage payments are made, and tries to apply a remedy. The average transportation official, whose duties are mostly of a purely operating character, does not have the time to conduct a course in accident prevention and, in the writer's opinion, for many other reasons, is not the proper person to have charge of such work. To require the superintendent to assume the burden of this work would be somewhat like adding the proverbial "last straw." The claim agent is a specialist in this line. The duty of preventing accidents seems to logically fall to this expert, who has before him the accident data necessary to uncover the weak points, and he is undoubtedly best qualified to suggest corrective measures and shape the general policy of the campaign against accidents. He may discover that a considerable number of accidents have been due to lack of proper training of employees, or he may ascertain that the accidents have been occurring on one particular line where the speed of the cars may be greater than on other lines. His obvious duty in such cases is to bring these matters to the attention of the superintendent for such action as the importance of the case demands. In doing this, however, he must not lose sight of the fact that the superintendent is human, and in all cases where the question of authority might be raised all possibility of unpleasantness should be dissipated by frank and friendly discussion.

This brings us to a consideration of the matter of co-operation between the transportation and the claim departments, and raises several questions as to where the authority of the claim department should begin and end. Instruction of employees by the claim department, together with the posting of bulletins and the promulgation of various other schemes devised for the purpose of reducing accident expenses produces a situation which, for the best interests of the company as a whole, demands that the line of demarkation between departments be made more flexible than is usually considered wise. By this it is not meant that either department shall ruthlessly encroach upon the obvious duties of the other, but rather that a feeling of good fellowship should exist between the two departments which will make either head yield to the reasonable desires of the other.

It is safe to say that the average superintendent, being an advocate of strict discipline, is jealous of his rights and looks with disapproval upon the proposition of turning his employees over to another department for instruction, and is equally disinclined to allow any overlapping of authority. This is the situation which confronts the claim agent after he has had his successful interview with the general manager. After winning one, he must do likewise with the other. The general manager is too busy to straighten out such matters, and the situation is one which can be best handled by the claim agent, who must stand behind his own arguments. To be most successful in his work, he must first enlist the support of the superintendent. This is the starting point where he must bring his personality into play and instill into his fellow worker the belief that he has no desire to usurp the powers of the other, but merely seeks the co-operation which is absolutely essential to success.

Some transportation officers have been known to take the attitude that they will not tolerate the claim department interfering with discipline by dealing direct with the men. The apprehension thus displayed seems to be due to a misunderstanding as to just what "interference" consists of. Certainly, if the claim department can show that by its proposed system of education the company will derive substantial benefits, and the superintendent cannot or will not find time to do this work, the claim department should be given the necessary authority to proceed. The claim agent is vitally interested in the instruction and conduct of car crews inasmuch as the financial expense of his department is large or small according to the efficiency of the crews. Looked at from this standpoint, the dreaded "interference" seems to be more a matter of right than of unwarranted meddling. The claim agent does not ask the superintendent to relinquish any of his functions or responsibilities; neither does he desire to uproot discipline, deprive any fellow worker of prestige, or belittle him in the eyes of his men.

Another bone of contention may be found in the hesitancy of the superintendent to allow the claim agent to post notices of caution and instruction signed by him as claim

agent. As a general proposition and for disciplinary reasons all notices of any character should be signed by the superintendent; but the writer, while looking with disapproval on any practice tending to lower the standard of discipline, believes that the sole signature of the claim agent proves in practice to be too small a matter to cause dissension, and that the best solution of the difficulty is to have the signature of both officials affixed. This will indicate to the men that both departments are working in harmony and that the notices are sanctioned and will be enforced by their immediate employer. The signature of the superintendent or general manager alongside of that of the claim agent cannot help but have a salutary effect, which will be shown by a more general compliance with the instructions. The superintendent who insists that his signature alone shall appear upon these notices which are edited and printed solely by the claim deparament fails to offer his full share of co-operation.

The operating questions involved in this educational work, and the handling of operating subjects as between the instructor and the employees, is a matter which should be worked out amicably between the superintendent and the claim agent. It is at this point that co-operation is absolutely essential, and it is the writer's belief that the superintendent should wave aside his fears, link arms with the man who should be one of his strongest allies, and work with him to eliminate from the company's expense account a large proportion of the money spent annually in the settlement of accident claims. Those who are doubtful concerning the advisability of allowing prevention work to overlap the authority of the superintendent in a few minor respects should broaden out and remember that the inevitable benefits to be derived will be for the good of both departments and the company from whom all are earning a livelihood. If the number and severity of the accidents are substantially reduced, the transportation department, through its co-operation in the work, will get proper credit for the results obtained.

Does accident prevention work conducted by the claim department tend to upset discipline by placing the employees under the jurisdiction of two departments? This question is raised by the superintendent, who sees danger in allowing any one not connected with his department to deal directly with the men. He fears that the discipline of his organization will be disrupted, and that the men will chafe under the idea of having two "bosses." Furthermore, the employees may feel that the claim agent has a voice in the handling of operating matters, with the result that the superintendent finds his authority less strong over the men under him.

Strict discipline, tempered with a generous amount of sound judgment, is absolutely essential in the successful handling of railroad employees. An arrangement which makes employees responsible to any but the person who is instrumental in their employment would be ruinous to discipline. This should not be lost sight of in the consideration of this subject. All controversy on this point is at once eliminated, however, when it is mutually agreed that the claim department shall have no hand in the disciplining of employees, but that its recommendations along these lines will receive careful consideration by the immediate superior of the offending parties, usually the superintendent. The claim agent, in conducting his educational work, should exercise great care to avoid creating the impression that the men are responsible to any person but the superintendent, and should not attempt disciplinary methods, as this lies solely within the jurisdiction of the superintendent. If both officials are pulling together in the proper spirit no results injurious to discipline will be experienced.

Acquaintanceship among employees formed by the claim agent in conducting the educational work is undoubtedly productive of good. The men see the man and become acquainted with the mind and personality back of the bulletins of instruction. What is still more important, by being placed in actual contact with the claim agent, the car crews become imbued with the enthusiasm of the instructor, and are left with a more lasting impression of the importance of the topics presented to them for consideration.

The claim agent, following out his plan of prevention work, is a stimulus and spur to the superintendent, who, with the knowledge that every condition or practice which might bring about an accident will be called to his attention by a letter from the claim department, begins to make better use of his eyes in this particular direction and arouses his street inspectors into a condition of greater activity. He receives a letter from the claim agent that a certain crew "laid over" at the end of the line 10 minutes, another to the effect that Conductor Jones was operating his car with the platform chains unhooked, a certain motorman was making it a practice to engage in unnecessary conversation, and that Conductor Brown had left the car just before it came to a standstill, etc. It might seem that the claim agent who reports such occurrences is taking upon himself responsibilities not connected with his department, but it is very apparent that the acts complained of are conducive to accidents in one form or another, and therefore the claim agent's reports are entirely within the scope of his department. It is impossible for street inspectors to notice all such infractions of the company's rules; therefore the superintendent should accept this information without offense, discipline the careless employees, and stimulate his street force. These reports from the claim department to the superintendent bring about a healthy condition of alertness on the part of all concerned.

The methods of breaking in and examining new men vary greatly according to the size of the road and the ideas of the operating officers. It is safe to say that in a great many instances, on small roads in particular, new employees are placed upon the cars with but brief instruction by some member of the operating staff on the subject of the proper handling of accident cases. The examining officer is an operating man, and naturally touches only the high spots connected with accident work. An accident occurs, and the novice in charge of the car comes out of the fray suffering from nervous exhaustion. He has forgotten his witnesses and knows nothing about the injured party other than that he was taken away in a carriage by a man wearing a brown hat. The modern claim agent, with his characteristic energy, takes hold of such a situation as this and, with the assistance of the superintendent, works out a plan of instruction which results in good accident reports and ultimately a great financial saving. It is difficult to see how any operating man can take serious exception to this progressive work now being undertaken by the claim departments everywhere, and it is undoubtedly due to a misconception of the plan in general that operating officials have stood upon their dignity and placed themselves on the defensive against accident prevention work.

A great deal depends upon the tact and judgment exercised by the claim agent in his relations with the superintendent and in his dealings with the men. It is a somewhat delicate situation, but it is safe to say that efficient

claim agents, who are students of human nature as well as of accident work, will not be found wanting when it comes to meeting the superintendent half way on matters of disagreement. Let the operating men discard the idea that the claim agent is "knocking" his department and assist the work in every way possible.

DISCUSSION OF HEIGHT OF CAR STEPS IN TORONTO

It will be remembered that, following the report of the committee on standards at the meeting at Atlantic City of the American Street & Interurban Railway Engineering Association, there was a long discussion on the height of car steps. In this discussion J. F. A. Wyse, engineer of Ontario Railway & Municipal Board, made a protest against the use of a 17-in. step. He said that a number of prominent physicians in Toronto had decided that the high steps used on the cars of that city were injurious, if not dangerous, to passengers.

On Sept. 10 last the subject was brought officially before the Ontario Railway & Municipal Board through the application of Dr. H. McMurchy, who requested the board to pass an order fixing the height of the first step on all cars at from 9 in. to 12 in., and the heights of all others at from 7 in. to 9 in. Notice of this application was sent to all electric railway companies under the jurisdiction of the board and to the clerks of the different municipalities. The only municipalities who took an active interest in the matter were the city of Toronto and the then city of West Toronto. The board then ordered a hearing, at which a number of physicians, including several representatives of the faculty of medicine at Toronto University, advocated steps not to exceed 12 in. in height. The testimony of officers of the Toronto Railway Company was also taken.

Walter McRea, mechanical superintendent, Toronto Railway Company, testified that it was impossible with the limitations in Toronto as to width of tracks and devil strip to radiate all curves and bring the car floor any lower than at present. The clearance between the motor and the car floor is now 5 in. and the company employs 33-in. wheels. These wheels had been adopted because a 30-in. wheel would not allow sufficient clearance for the motors; in fact, even with a 33-in. wheel the motors become polished at the bottom from rubbing on the pavement. The 33-in. wheel is also much more desirable in winter for keeping the rails clear of snow than a wheel of smaller diameter.

Michael Powers, master car builder, Toronto Railway Company, stated that the company had many curves of a 35-ft. radius. At present the first step on the company's cars was from 15 to 16 in. above the top of the rail, the second step 15 in. and the third step 11 in. The car steps now project 24 in. beyond the track. The gage is 4 ft. 11 in. On the closed cars there is one more step, that from the platform into the car, than on the open cars, but this is not possible with the open cars because the step would project so far into the street that it would be a serious obstacle to vehicles and the general public.

Donald Campbell, manager, Preston Car & Coach Company, made the following statement as to standard dimensions of the Toronto cars: Wheels, 33 in.; flange, 5/8 in.; floor, 1 in.; minimum clearance above motors, 2¾ in.; total without cross framing, 37⅜ in. The minimum thickness of cross-framing used has been 1¼ in., enforced with angle iron, making a total of 38⅝ in. as the minimum height with no margin for safety. If 1 in. is allowed for safety the height of 39⅝ in. is obtained. Mr. Campbell recommended a height for the two upper steps of 14 and 11 in. with an average height for the middle step of 15 in., but stated that a variation of at least 2¾ in. should be allowed for the lower step on account of the settling of the springs.

At the request of the board the Toronto Railway Company equipped a double-truck open car with an additional step to test the feasibility of having the first step no higher than 12 in. from the ground, but the steps projected so far into the street as to be dangerous and it was found that the adoption of this additional step would also involve a reconstruction of the car houses and repair pits. The company also equipped as an experiment a car in which the floor was brought to within 38 in. from the ground, but the board reached the conclusion that this allowed no margin of safety for the operation of the brake rods and the compressed-air piping.

In conclusion, the board passed on June 25 the following regulations regarding new cars, but not applying to the cars at present in use:

The steps on all cars hereafter constructed and used by the Toronto Railway Company and all other street and electric railways under the jurisdiction of this board shall have steps conforming to the following regulations:

On closed single-truck cars the height of the first step above the ground shall be not less than 12 in. nor more than 15 in.

On closed double-truck cars the height of the first step above the ground shall be not less than 14 in. nor more than 16 in.

On open single-truck cars the height of the first step above the ground shall be not less than 12 in. nor more than 15 in., and the distance between the first and second steps and the second step and the floor of the car shall measure 12 in. and 9 in. respectively.

On open double-truck cars the height of the first step above the ground shall be not less than 14 in. nor more than 16 in., and the distance between the first and second steps and the second step and the floor of the car shall measure 12 in. and 14 in., respectively.

OPENING OF THE DOWNTOWN TUNNELS OF THE HUDSON & MANHATTAN RAILROAD

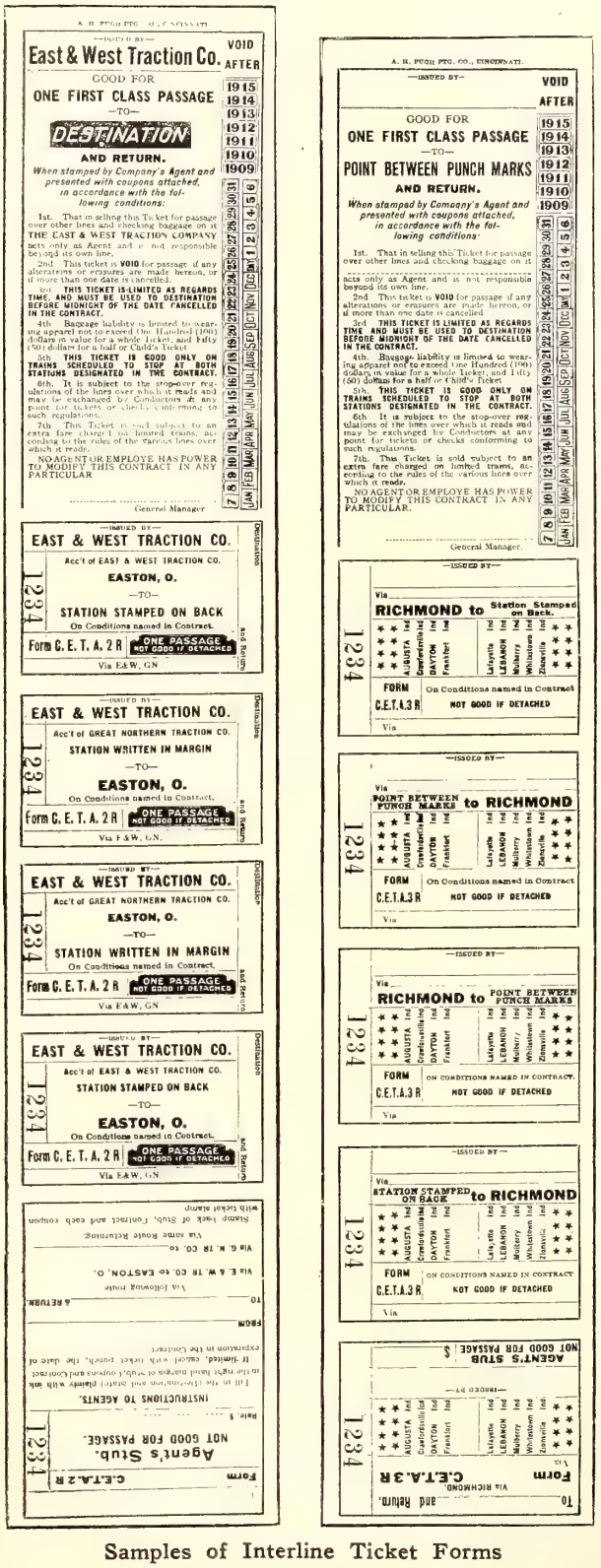
On July 19, at 10:25 a. m., the first official train, carrying about 2000 invited guests, was operated through the downtown tunnel of the Hudson & Manhattan Railroad from the terminal station at Cortlandt and Church Streets, Manhattan, to the Pennsylvania Railroad station in Jersey City. The tunnels were thrown open to the public at 3 p. m. The invited guests on the official trip were carried on three trains of seven cars each and a fourth of five cars. They were officially sections of one train and sent out at three-minute intervals. The first car carried Governor Fort, of New Jersey, and his staff; acting Mayor Patrick F. McGowan, of New York; Attorney-General Edward R. O'Malley, of New York State, and James W. Wadsworth, Speaker of the New York Assembly; William G. McAdoo, president, and Charles M. Jacobs, chief engineer of the Hudson & Manhattan Railroad, together with other officials of the railway company and construction company.

The running time of the first train was 2 minutes and 40 seconds. In Jersey City the party was carried to the City Hall in automobiles. Here Otto Wittpen, Mayor of Jersey City, Governor Fort and Charles M. Jacobs made addresses and Wm. G. McAdoo read a message from President Taft, in which the President expressed regret that he could not be present. At 11:30 a. m. a reception was held in the Aldermanic chamber of the City Hall.

The City Hall, plaza and other buildings in Jersey City were decorated with flags and bunting.

INTERLINE TICKETS AND JOINT BAGGAGE CHECKS OF THE CENTRAL ELECTRIC TRAFFIC ASSOCIATION

The new joint passenger tariff, No. 2 of the Central Electric Traffic Association, which was referred to in the Electric Railway Journal of July 17, page 124, will be put into effect on Aug. 2. This tariff covers the new interchangeable mileage ticket and also the sale of single and round-trip interline tickets. The association has adopted for this purpose eight standard forms of interline tickets, two of which are shown in the accompanying engravings. The other six forms are quite similar to the two shown as regards the conditions named in the contracts attached at the top and in the methods of cancellation and indicating destination. The one-way first-class tickets are printed on green paper; the round-trip first-class single tickets are printed on gray paper; the one-way coupon party tickets are printed on light blue paper, and the round-trip coupon party tickets are printed on pink paper.



Samples of Interline Ticket Forms

The one-way and round-trip single tickets are of three different forms. The first form, which is shown herewith, is printed with the name of the railroad company issuing the ticket at the top, and also the junction points. The destination is written on the margin of each of the coupons which are good for passage between junction points printed thereon, and is also written at the top of the ticket. This ticket is issued only for journeys by routes over which there is enough traffic to justify the printing of separate lots of tickets. The second form is a skeleton interline ticket containing two or more skeleton coupons to be filled in with the name of the issuing road, the name of the road honoring the coupons, the starting point of the journey and destination. The third form of ticket is a skeleton form for use on branch lines connecting with certain trunk lines of heavy traffic within the Central Electric Traffic Association territory. The name of the issuing road and the starting point is left blank, but the names of the junctions on the trunk line roads are printed on the ticket and the destination is indicated by a punch mark on each coupon.

Each interline ticket has attached to it an agent's stub on which the price of the ticket is indicated, and also the destination, as well as the route.

These tickets will be used by all members of the Central Electric Traffic Association for interline traffic after Aug. 2, 1909, replacing the present diversified forms of tickets in use.

The full text of the new regulations covering the checking of baggage was printed in the Electric Railway Journal of July 17, page 124. Two of the cuts on page 146 show two of the forms of baggage checks which will be used. For baggage which is checked free, a plain duplex form is used consisting of the string coupon and duplicate coupon printed on a manila card. When excess baggage charges are paid in advance, the check used is printed on a red card consisting of three coupons. The face of each coupon contains blank lines for entering the point from which baggage is checked, the point to which baggage is checked, route, free baggage check numbers, number of passengers, excess weight and amount of excess baggage charges collected. On the back of the coupons are printed instructions to baggage agents, and both the string check and the duplicate check contain the following release of liability for any errors arising in the delivery of the baggage to its destination:

RELEASE.

I hereby agree that in consideration of its carrying my baggage the ..... Co. is released from any responsibility regarding delivery of said baggage. I agree to call for said baggage at the baggage car door immediately on its arrival at destination, and I further agree should I fail to call for baggage as agreed, the

..... Co. is authorized to carry it to the next station beyond, where it has proper storage facilities, and that I will pay the charge for such carriage, service and storage.

.....,

(To be signed in ink). OWNER.

The company shall in no case be liable for the loss of or damage to baggage to exceed the sum of $100 for a full-fare passenger or $50 for a half fare or child passenger.

On the back of the string check are printed the following instructions to baggage agents: "Please send this string check to the general office of your line as soon as released from the baggage." Additional instructions are printed on the back of the duplicate check as follows:

This is a duplicate check and also a receipt for excess charges paid for baggage bearing number of checks as shown on face of string check of corresponding number.

Receiving agent will forward this duplicate and receipt to general office of his company.

Receiving agents will certify to the total weight of the baggage as covered by the check numbers shown on the face of string check of corresponding number.

On the back of the agent's stub are the following instructions:

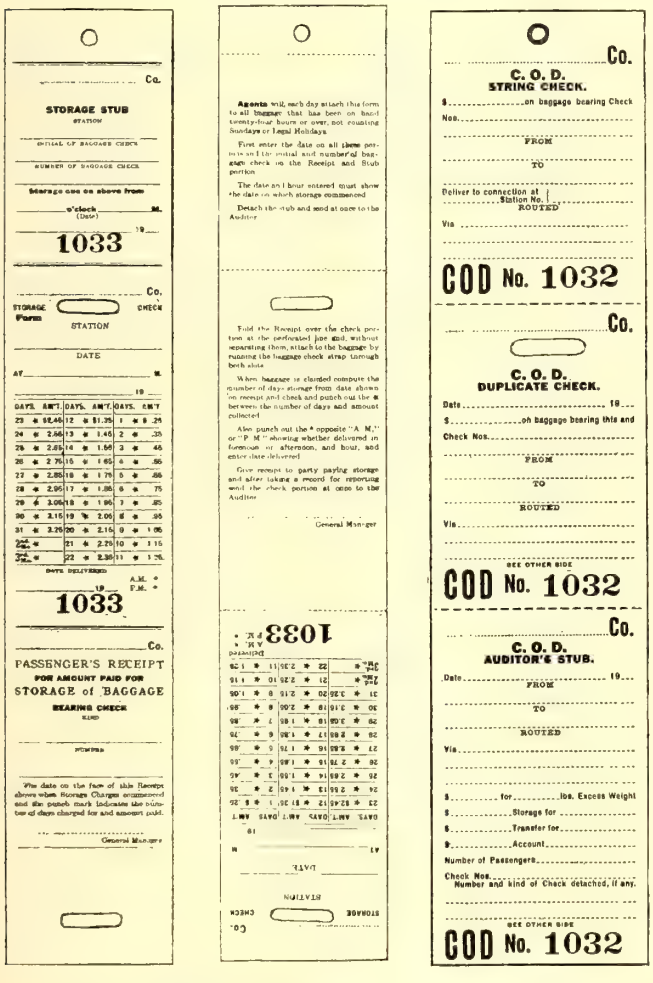
Agents will be held strictly accountable for the proper filing out of these cards with INK.

The route and destination in each coupon must exactly correspond with the route and destination of the passage ticket on which the baggage is checked.

After being properly filled out, detach the next coupon (or duplicate check) and hand it to the owner of the baggage, and attach the string check to the baggage.

One of these excess baggage checks only will be used as a check on any one lot of excess baggage.

Regular checks will be used for the other pieces. Agents must keep these stub cards in a safe place for immediate reference, if necessary, and send them to the general office with report of excess baggage collections. These cards must be used in consecutive order.



Front and Back of Storage Receipt

Front of C. O. D. Baggage Check

When any amount is to be collected on baggage before delivery a blue C. O. D. check is used, the face of which is reproduced in one of the engravings. The back contains the following information and instructions to agents:

Number of pieces covered by this check.

.....

Bearing Check Nos. .....

.....

.....

This card is a duplicate check for piece of baggage bearing corresponding string check and a notification of the amount of charges that must be paid at destination before baggage will be delivered. The amount should be credited as follows:

$.....for.....lbs. excess weight.
$.....Storage for .....
$.....Transfer for .....
$.....Account .....

The receiving agent will remit the amount collected to his company and report the collection to his auditor, who will include the same in monthly report of excess baggage to the auditor of the issuing company giving the number of C. O. D. check.

(Signed) .....
General Manager.

TO AGENTS:

.....

Agents will use great care in filling out these cards, so they will be fully understood by all concerned.

The route and destination on each coupon must exactly correspond with the route and destination of the passage ticket on which the baggage is checked.

In cases where passenger is ahead of baggage, or the checks are issued by a transfer company, agents will detach one of the string checks and use instead a C. O. D. check, enclosing the duplicate C. O. D. check to the agent at destination, and send the string check, which has been detached from the baggage, to the general office with a letter of advice.

Carefully note in the space provided on the string check the kind and number of the check or checks held by the passenger.

Forwarding agents will send this stub to the auditor as soon as issued.

(Signed) .....
General Manager.

When storage charges are collected on baggage, a storage receipt is issued to the passenger of the form shown in the engraving. This receipt is printed in such a way that both the passenger's receipt and the agent's stub may be punched simultaneously when the two coupons are folded over each other. The punch marks indicate the number of days on which storage charges have been made and also the gross amount of the storage charge.

MEETING OF THE EXECUTIVE COMMITTEE OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

A meeting of the executive committee of the American Street & Interurban Railway Transportation & Traffic Association was held July 19 at the headquarters of the association, 29 West Thirty-ninth Street, New York. There were present President C. Loomis Allen, of Utica; R. I. Todd, of Indianapolis; G. L. Radcliffe, of Schenectady; G. W. Parker, of Detroit; Henry C. Page, of Springfield, Mass., and Secretary B. V. Swenson. The meeting was for the purpose of deciding upon the program to be followed at the convention of the association at Denver.

The program of the Transportation & Traffic Association this year will be made up entirely of the reports of the standing committees of the association and the discussions arranged by them. There are six of the committees, as follows: (1) Committee on passenger traffic, (2) committee on interurban rules, (3) committee on express and freight traffic, (4) committee on city rules, (5) committee on transfers and transfer information, (6) committee on the training of transportation employees. It was tentatively decided to take these up in the order named, and the following program was decided upon:

First session, Monday, Oct. 4, from 2 to 5 p. m. Address of president, report of the executive committee, report of secretary and treasurer, report of the committee on passenger traffic.

Tuesday, 9:30 a. m. to 12:30 p. m. Report of the committee on interurban rules, report of the committee on express and freight traffic.

Wednesday, 9:30 a. m. to 12:30 p. m. Appointment of the committee on nominations, report of the committee on city rules, report of the committee on transfers and transfer information.

Thursday, 9:30 a. m. to 12:30 p. m. Report of the committee on nominations, report of the committee on the training of transportation employees, general business, election of officers, installation of officers, adjournment.

The reports of the different committees promise this year to be unusually interesting and instructive. The committee on passenger traffic, in addition to its report, will make an exhibit of different circulars used by railway companies to stimulate traffic, timetables, maps and other company publications. A great many companies have gone extensively into the publication of these circulars, and it is thought that this symposium will be a surprise to many

who have not followed out the recent developments in this direction.

The committee on interurban rules has held two meetings, the last one at Washington, at which time the existing code of rules for interurban railways was very carefully considered in detail. The final rules will now be printed in pamphlet form and will be sent to the members of the association at an early date, with requests for further suggestions and final criticisms. The committee will hold another meeting to consider these suggestions, and its report will summarize its final conclusions.

The committee on express and freight traffic held a meeting at Chicago on July 13, and hopes to be able to present at the convention a tabulated statement of existing conditions and methods of conducting the electric freight and express business in different parts of the country. The data sheets sent out by the committee are being returned rather slowly, but it is hoped that a sufficient number will come in to enable the committee to present suggestions and make recommendations which will be of value. In addition, the committee is planning to have two papers on the subject of the transportation of express and freight, presented by member companies whose experience and recommendations should be very valuable to the association. These papers will not only describe the conditions existing on the properties with which the speakers are connected, but in the territory immediately surrounding them. One paper will also make recommendations in regard to tariffs, accounting methods, forms, etc. The other will pay particular attention to methods of solicitation and handling of claims.

The plan of the committee on city rules is very similar to that of the committee on interurban rules. It has held two meetings, one on March 27, the other on June 7, and at the latter meeting a proposed code of rules was tentatively decided upon. This code, which contains a few modifications from that published in the Electric Railway Journal for June 12, is now being printed, and will be mailed to member companies of the association, who will be asked for suggestions and criticisms. The committee will hold a meeting to consider these suggestions, and expects to be able to present at Denver a final code of rules for adoption. It is also proposed to have at least three papers discussing this code of rules.

The committee on transfers and transfer information is giving its attention to the best form of transfer law. One of the large member companies of the association has been paying a great deal of attention recently to the legal aspect of transfers, and has been successfully prosecuting a number of persons for the wrongful use of transfers. This campaign has led to a study of the transfer laws of the State in which the company is situated, as well as to some interesting legal decisions, and it is believed that the information thus secured will be of a great deal of benefit to other member companies, especially if it points the way to framing a law which will prevent the abuse of transfers.

The report of the committee on the training of transportation employees will be based largely upon data sheet No. 39, which asked the member companies to indicate to what extent their current practice coincides with the recommendations of the committee as set forth in the 1908 report, and if they found it impossible to follow the committee's recommendations to give their reasons. About 100 replies to this data sheet had been received up to July 1. These replies, with those which have been received since July 1, are being tabulated. From the information thus obtained the committee expects to make a series of recommendations. In addition, one of the members of the committee will present a discussion on the various forms of discipline, giving the advantages and disadvantages of suspension and of the merit and demerit system, and also the value of heart-to-heart talks, etc. It is expected that another member of the committee will discuss the subject of relief and pension work as helping to raise the standards of the men. A third paper will discuss the question of the selection of employees. A fourth paper will be devoted to the training of the men, the value of written and oral examinations and the development of the moral, mental and physical standard of the men.

MEETING OF THE WAY COMMITTEE

A meeting of the committee on way matters of the American Street & Interurban Railway Engineering Association was held July 14 in the board room of the Pittsburgh Railways, 435 Sixth Avenue, Pittsburgh. Those present were E. O. Ackerman, chairman, engineer of maintenance of way, Columbus, Ohio; J. H. Hanna, chief engineer, Washington, D. C.; M. J. French, engineer of maintenance of way, Utica, N. Y.; J. M. Larned, engineer of maintenance of way, Pittsburgh, Pa.; Martin Schreiber, engineer of maintenance of way, Newark, N. J. A communication was received from G. L. Wilson, engineer of maintenance of way, Minneapolis, Minn., who was not able to attend.

The committee held a closed session in the morning and an open session in the afternoon at 2 o'clock. The latter was attended by F. Uhlenhaut, Jr., chief engineer, Pittsburgh Railways, and the following representatives of manufacturers: F. J. Drake and E. B. Entwistle, of the Lorain Steel Company; V. Angerer and William McClain, of William Wharton, Jr., & Company; Charles A. Alden and J. T. Hill, of the Pennsylvania Steel Company, and E. A. Condit, Jr., of the Rail Joint Company. These gentlemen addressed the committee on the specifications of open-hearth rail, gage of curves and the present status of the use of manganese rail. The data will be embodied in the committee's report at Denver. A vote of thanks was extended to the visitors for their interest and kindness in assisting the way committee in their work.

The committee continued its deliberations on Thursday at 9 a. m., and adjourned at noon. In the afternoon, by the kindness of the officers of the Pittsburgh Railways Company, an inspection tour was made over the local company's property.

NEW YORK TRANSPORTATION COMMITTEES COMPLETED

At a joint meeting in New York of the two committees having charge of the special trains to Denver from New York City, held July 20, the complete committees were announced by the chairmen.

C. Loomis Allen, chairman of the committee in charge of the New York Central trains, stated that that committee now consists of: C. Loomis Allen, Utica & Mohawk Valley Railway, chairman; J. H. Pardee, J. G. White & Co.; J. H. McGraw, Electric Railway Journal; E. F. Peck, Schenectady Railway Company; H. C. Page, Springfield (Mass.) Street Railway Company; J. M. Wakeman, Electric Railway Journal; J. A. Kucera, Electric Railway Journal; J. J. Mahoney, General Electric Company; H. S. Bradfield, New York Car Wheel Company; Bertram

Berry, Heywood Brothers & Wakefield Company; J. V. Meek, H. W. Johns-Manville Company; Joseph Cunningham, Allis-Chalmers Company; Elmer P. Morris, E. P. Morris & Company.

The complete committee in charge of the special train from New York over the Pennsylvania Railroad consists of: W. L. Conwell, Westinghouse Electric & Manufacturing Company, chairman; Gen. George H. Harries, Washington Railway & Electric Company; Thomas N. McCarter, Public Service Railway Company, Newark; William A. House, United Railways & Electric Company, Baltimore; Charles O. Kruger, Philadelphia Rapid Transit Company; George Keegan, Interborough Rapid Transit Company, New York; W. K. Beard, Electric Railway Journal; J. S. Doyle, Interborough Rapid Transit Company, New York; W. G. Gove, Brooklyn Rapid Transit Company; H. C. Evans, Lorain Steel Company; Cornell S. Hawley, Consolidated Car Heating Company; William Wampler, American Locomotive Company.

Secretary Swenson, of the American Street & Interurban Railway Association, has announced the appointment of an additional committee to organize a party from the Central West. This committee consists of Robert I. Todd, president, Indianapolis & Northwestern Traction Company, and C. D. Emmons, general manager, Fort Wayne & Wabash Valley Traction Company.

MEETING OF COMMITTEE ON POWER GENERATION

The committee on power generation of the American Street & Interurban Railway Engineering Association held a meeting at the Engineers' Club, Philadelphia, on July 19 and 20, to formulate the scope and arrangement of their forthcoming report to the convention in October. Those present were G. H. Kelsay, superintendent of power, Indiana Union Traction Company, Anderson, Ind., chairman; William Roberts, superintendent of motive power, Northern Ohio Traction & Light Company, Akron, Ohio; James D. Andrew, superintendent of power stations, Boston Elevated Railway Company; William S. Twining, chief engineer, Philadelphia Rapid Transit Company; Fred Heckler, superintendent of motive power, Lake Shore Electric Railway Company, Fremont, Ohio; Charles Hewitt, superintendent of motive power, Philadelphia Rapid Transit Company, and E. D. Dreyfus, representing the Westinghouse Machine Company. The only absent member of the committee was A. S. Byrd, superintendent of power plants, Montreal Street Railway Company, Montreal, Canada.

The committee report this year will cover three subjects: low-pressure turbines, flue gas analysis and steam meters. The subject of low-pressure turbines was considered first by the committee. The chairman reported that he had received operating data relative to nine installations of low-pressure turbines throughout the United States. Not all of these installations are in electric railway power houses. The replies to the questions contained in the circular letter have been tabulated, and will be included in full as part of the committee report. The committee asked Mr. Dreyfus, of the Westinghouse Machine Company, to compile a brief introduction to this part of the report, setting forth the claims made by the manufacturers regarding the performance of low-pressure turbines in general and outlining the field of their application. This introduction will not be a theoretical discussion of the design and operation of low-pressure turbines, but will be a simple exposition of the manufacturers' claims of what can be accomplished in the way of increased economy and output by installing them in combination with existing reciprocating engine plants. The second part of this section of the committee report will consist of a tabulation of the operating data received in response to the circular letter sent out by the chairman, and the conclusions of the committee, based on the operating data secured, as to whether or not low-pressure turbines in general have fulfilled the claims of efficiency and capacity made for them by the manufacturers. The work of analyzing the operating data and formulating conclusions has been assigned to Mr. Twining, who has had personal experience in the operation of two low-pressure turbines at the Thirteenth Street power house of the Philadelphia Rapid Transit Company.

The second part of the committee report will take up the question of the value of making flue gas analyses and the results obtained with CO_2 recorders. The committee has obtained considerable information on this subject.

The subject of steam meters will be rather briefly treated in the report, because the investigations of the committee have shown that there are only a few steam meters in use in railway power houses, and that so far the development of the steam meter has been rather unsatisfactory.

On Monday the committee were the guests at luncheon of William S. Twining, and after luncheon were taken to the Thirteenth Street power station of the Philadelphia Rapid Transit Company to inspect the two 800-kw Curtis exhaust steam turbines which have been in operation at that plant for some time.

ACCIDENT CLAIM FROM PASS-HOLDER

BY HOWARD C. LAKE, OF THE NEW YORK BAR

The right of an employee of an electric railway company to recover for injuries sustained while riding on a pass has lately been decided by the Supreme Court of the State of Washington in three very interesting companion cases which arose out of the same accident. In the opinions reference is made to the conflicting views in the various States named and the general conclusion reached that where the pass was given, not as a gratuity, but as part consideration for the employee's wages, he was a passenger for hire so that the provisions of the pass waiving his right of protection as such were void as against public policy.

A man named Harris, employed as a foreman of a bonding gang, was injured while riding on one of the passenger trains running between Seattle and Tacoma. He was accompanied by his son Otto, a minor. Harris lived midway between the two cities and was required in the performance of his duties to travel over the line with his crew. The railway company furnished him with a pass which he and his gang were accustomed to use in going from place to place. This pass read as follows:

"Puget Sound Electric Railway. Quarterly ticket. 1906. Pass W. L. Harris and five men, bonders. Void after Dec. 31, 1906. No. 641. W. S. Dimmock, manager." Upon the back of the pass was printed the following:

Conditions. This free ticket is not transferable, and if presented by any other person than the individual in whose name it is issued, if altered by erasures, additions or interlineations, or in case any questions arise between the conductor and the holder as to its validity or the right of the bearer to use it, the conductor will take up this ticket, collect fare, and report the case to the superintendent. The signature of the holder of any pass presented and not taken up must be written upon the blank (Form A-901) provided for that purpose when presented by the conductor with the spacings properly filled in, when the conductor will take up the blank and ring for it upon the register as a ticket. The person accepting this free ticket agrees that the Puget Sound Electric Railway shall not be liable under any circumstances, whether of negligence by its agents or otherwise, for any injury to the person or for any loss or damage to the property of the passenger using the same. I accept the above conditions. W. L. Harris. This pass will not be honored unless signed in ink by the person for whom issued.

The son, Otto, was a member of his father's gang. The

accident was a head-on collision and occurred through the negligence of a flagman. The father, Harris, died of the effects soon after. At the time of the accident he did not have his pass with him, but he had signed the form A-901 referred to in the pass. The conductor was also killed. There was evidence that the conductor had not punched the blank form No. A-901 as was his custom, but it appeared to be reasonably certain that Harris was riding by virtue of his pass. The widow had a judgment against the railway company, which was affirmed on appeal. The manager of the company, Mr. Dimmock, was also sued as a party defendant, upon what theory it does not appear, but the judgment recovered was against the company only.

An appeal was entered by the company because of the clause on the pass exempting the company from liability. The jury decided that the pass was not a gratuity, but was a part consideration for the wages of the deceased, and this finding of fact the Appellate Court naturally declined to disturb.

The following rule from a leading work was cited in the opinion: "The decisions are not in harmony as to the effect to be given to a provision in a free pass exempting the carrier from liability for injuries caused by its negligence or that of its servants. According to one view such an exemption is contrary to public policy and not enforceable." As sustaining this view a number of cases are cited, among them Alabama, Iowa and Minnesota authorities. The rule then continues: "In other jurisdictions the view is taken that there is no violation of law or public policy by an agreement on the part of the passholder that the carrier shall not be liable for injuries caused to him by its negligence or that of its servants" and this holding is said to have been followed in the United States Supreme Court and in Indiana, Maine and elsewhere.

The State of Washington held to the last-named rule some years ago where the pass was a mere gratuity, but in a case decided thereafter had expressly stated that if the employee's transportation constituted a portion of the consideration for his services he became a passenger for hire "just the same as anybody else who parts with anything of value for transportation." In accordance with its previous decision the court held that the transportation of Harris was not a gratuity, but constituted a part consideration for his services; that he was a passenger for hire and entitled to protection as such passenger, a protection which public policy does not permit him to waive. There was evidence that after Harris boarded the train he was traveling upon the time of the company. Many authorities hold that employees carried free under such circumstances are not to be considered as passengers. But the Washington court held that this made no difference if he had paid his fare and it was reasonably certain that he did.

Finally, the court held that the verdict of $15,000 while large, was not excessive, the deceased being at the time of his death 41 years of age, earning on an average $115 a month, and being bright, active, industrious and of good habits.

The son's verdict was for $2,000 and the same points were presented as in the father's case, the decision in which was controlling. The boy was held to be rightfully on the train as a passenger and was entitled to be carried as such unless it was shown by the company that he had waived his rights as a passenger. This was not proved to be the case.

A third case was brought by the widow for expenses and loss of earning capacity of her minor son Otto during infancy, for which it was held that she could recover. This case, unlike the other two, was tried by the court without a jury and was based on the facts found in the other cases.

GRAND RAPIDS RAILWAY DESIGNS PRIZE FLOAT

A gold cup for the most artistic float in the civic pageant held in Grand Rapids on June 10 was awarded to the Grand Rapids Railway Company. Hundreds of floats were in line, most of them being advertisements for some local concern. The float which won first prize for the railway company was one typifying the Japanese nights which are regu-



Prize Float in Grand Rapids

lar features of the Ramona resort at Reed's Lake in summer. The float represents a large gondola drawn by four white swans. In the rear, attached with flowered ropes, are two small canoes containing small girls dressed in white. White was the color scheme, thousands of paper flowers being used. The float was drawn by six milk-white horses.

SHELTER STATION OF EVANSVILLE SUBURBAN & NEWBURGH RAILWAY

The Evansville Suburban & Newburgh Railway, operating lines from Evansville to Newburgh and Evansville to



Concrete Block Shelter Station

Boonville, has constructed 18 hollow block concrete shelter stations. One of these stations is located at each cross road on the line. The station is built of hollow concrete

blocks, 8 in. x 8 in. x 16 in., outside measurements, each block being faced with a waterproof facer. The designs of the blocks are different in each station. The stations are 10 ft. 8 in. wide and 8 ft. deep, with cement floor. The inside walls are finished with a smooth floating coat of cement, the top being ceiled with ¾-in. ceiling, painted a light blue.

The roof is made of ⅞-in. flooring, which is covered with one layer of roofing paper and finished with imitation tile metal shingles painted terra cotta red. The roof extends over the front of the building 3 ft., and at the front edge a boxed gutter leads into a down spout at one side.

The opening in front of the building is 5 ft. 4 in. wide, without a door. One opening on each side, for a window, is glazed with a 4-light glass. Each station contains a seat around the inside wall.

In front of each of the stations is a cinder platform 5 ft. wide and 20 ft. long, the curbing of which is of concrete.

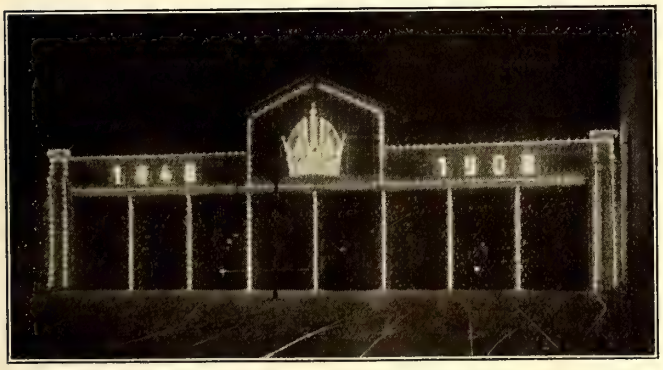
With one exception, the stations are located on the north side of the track, giving a southern exposure to the fronts of the buildings.

The Railroad Commission of Indiana, in its annual report, published recently, referred to these sheds as creditable to the company and useful to its patrons.

The foregoing description and the accompanying illustration were received from Gus Muhlhausen, manager of the company.

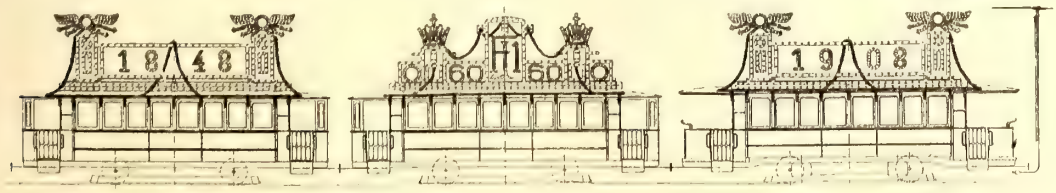
DECORATIVE ILLUMINATION IN VIENNA

The Vienna Municipal Tramways took an active part in the jubilee which was held in Vienna last December to celebrate the sixtieth anniversary of the accession to the throne of Emperor Francis Joseph I. Through the courtesy of L. Spängler, manager of the Vienna tramways system, views are published of the illuminated train of



Illumination of Car House

cars which traversed the lines of the company on the evening of Dec. 1, and also the exterior view of one of the principal car houses of the company, showing the artistic arrangement of lamps. The train of cars was made

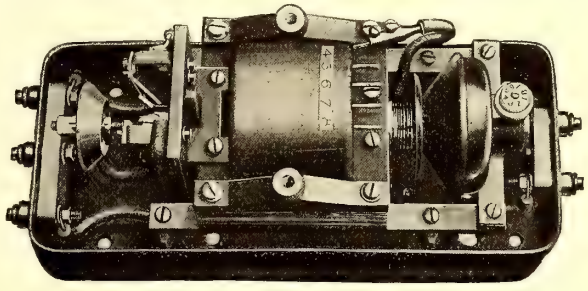


Illuminated Floats in Three-Car Train

up of three cars, a motor car at each end and a trail car between them. Each motor car was equipped with 575 10-cp lamps arranged in circuits of five lamps each, and the trail car had 750 lamps of the same size.

AN OVERLOAD INVERSE TIME-LIMIT RELAY

From the standpoint of uninterrupted service the ideal protection against overload on a heavily loaded power or lighting circuit is one that opens the circuit only after the overload has continued long enough to approach more or less nearly to the danger point. A new relay having several novel features and offering this protection has been designed by the Westinghouse Electric & Manufacturing Company and is known as the Type B. This relay with the cover removed is shown in an accompanying cut. The stationary parts consist of a current coil mounted in a laminated iron shell and a needle valve in the metal framework of the bellows. The moving part consists of a brass rod on which are mounted an iron core inside the coil, a contact cone below, and the bellows above the coil. The relay is inclosed in a dustproof case. The current settings are for 4, 5, 6, 7 and 8 amp. The number of turns de-



Overload Inverse Time-Limit Relay

creases in proportion as the current rating increases, so that the ampere-turns are the same for any current setting. The size of wire is larger for the larger current capacities, making the loss in watts at full load due to resistance approximately the same for any capacity. This is 7 watts in case of the 4-amp setting and 11 watts with the 8-amp setting. This watt loss is exceptionally low for an instrument of this kind.

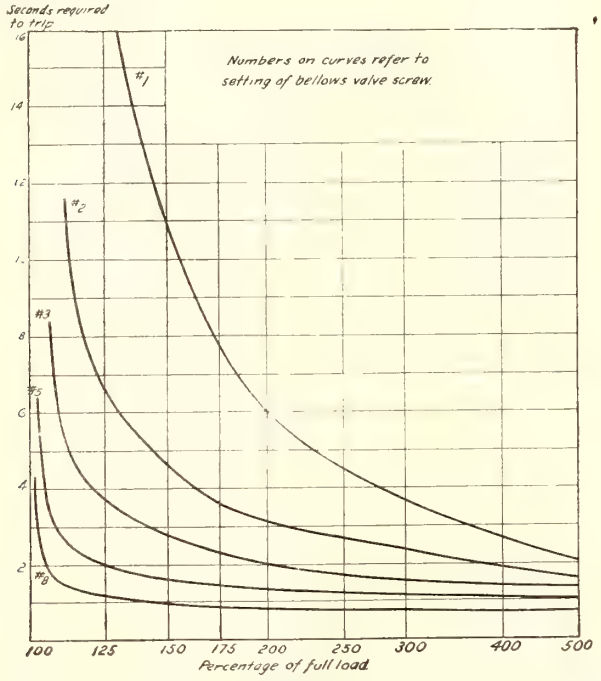
The laminated iron shell around the coil has an ample sectional area and forms a good magnetic circuit with the core. The shell supports the coil firmly and is mounted on the base of the relay. The core is very light, but so constructed magnetically that it exerts an ample force for drawing up the moving parts and making the contact. The bellows leather consists of two thicknesses of light-weight leather treated to render it impervious to air and to make it flexible and durable. The escape valve of the bellows is a needle valve. Each needle is specially ground to allow the right escapement of air. A numbered dial is mounted on the needle so as to indicate accurately the setting of the valve.

This instrument is adjusted at the time of calibration so that the iron core just strikes the iron shell when the moving element is in its highest position, thereby preventing violent vibration of the moving element. It would be impossible to use this method of damping out the violent vibrations if the various current settings were obtained by moving the iron core, but inasmuch as the core is in the same position for all settings of the relay its behavior is very satisfactory.

The weight of the moving element is counterbalanced by a spring, so that only a slight magnetic pull is required to

make it operate. For this reason, and on account of the small weight of the core and the good magnetic circuit, it is possible to have the resistance and inductance of the relay very low. This presents the advantage of having the relay run cool under all conditions as any load heavy enough to heat the relay to 40 deg. C. will open the circuit. Another advantage is the low voltage drop, because these relays are ordinarily used with series transformers, and unless the voltage drop is low the accuracy of the transformer ratio is affected.

This relay is capable of a very wide range of adjustments, as illustrated by the accompanying set of curves. The number on each curve corresponds to a number on the needle valve dial. All the curves except No. 1 are the same for all relays. There is a small variation of No. 1 on different relays. Variations may be made in the time setting without affecting the normal full-load rating, and variations may be made in the normal full-load setting without affecting the time of operation at a given percentage in excess of full load. The curves drawn show the operation on a basis of percentage overload, assuming that the overload begins as soon as the current exceeds the normal rating, which may be anything from 4 amp to 8 amp. Without changing the current setting the time required for operation at 50 per cent overload may be varied from 1 second to 11 seconds. This range may be still further increased by varying the current settings. The scale divisions indicating the horizontal distances are not uniform, but are made on a logarithmic scale because the curve is more compact when drawn in this way. It is thus possible to show clearly the operation of the relay on any load up to 500 per cent of full load.



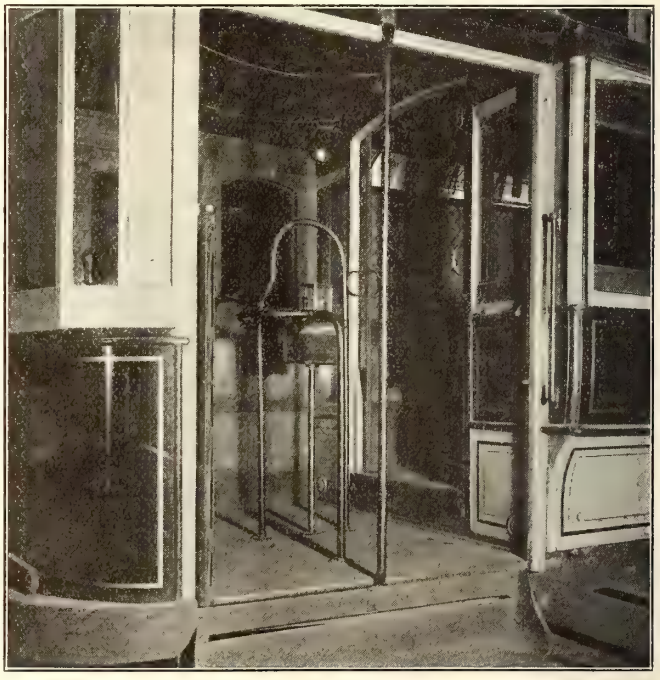
Adjustment Curves of Overload Inverse Time-Limit Relay

In some cases two relays are affected by the same overload. For example, one may be on a main feeder and one on a branch; or one may be at the generator end and the other at the load end of the same feeder. In either case it is essential that if possible only the relay nearer the load end shall operate when the overload occurs. The other relay serves as a protection in case of ground on the line between the generator and the second relay. This selective action may be secured either by adjusting the relay nearer the generator for a longer time element or by setting it for a larger current. By referring to the time-load curves it will be seen that this setting may be easily made because there are wide spaces between the curves and because the relation between time element and percentage overload is absolutely independent of the current setting on which the rated full load is based.

Another point of this relay is its "resetting," or returning to its position of rest. This relay resets in the same time as it takes to operate at 20 per cent to 50 per cent overload, and it begins to reset as soon as the load drops to 60 per cent of the load that would make the relay operative. This time for resetting is so short that if the circuit-breaker is opened the relay resets before the circuit-breaker is closed, but it is not so short as to interfere with the normal operation of the relay.

REBUILDING CARS IN NEW YORK FOR PREPAYMENT SERVICE

The Third Avenue Railroad Company has had in operation for about a month a double-truck car which has been converted for prepayment service by lengthening the platform from 4 ft. to 6 ft. New hoods and knee-braces were required for this purpose, but the old vestibules and dashers have been retained. A special feature of the rebuilt car is the absence of any bulkhead or post between the body doors. The latter are of the double sliding type and when pushed back leave a 36-in. opening which may be used alike by entering or leaving passengers. As shown in the accompanying illustration, the platform dividing rail ends at such a distance from the car body that a space of practically 24 in. is allowed for exit and entrance. The operation of the first car has proved so satisfactory that the company is seriously considering rebuilding over 200 cars for prepayment service on this plan. These cars will be operated in addition to the new pay-as-you-enter cars which have been in service for some months.



Platform Rebuilt for Prepayment Service

Two citizens of Vladivostok have offered to advance to the city two-thirds of the capital necessary to build a system of tramways estimated to cost $695,000.

News of Electric Railways

Reply of Philadelphia Rapid Transit Company to Councils on Fares

The Philadelphia Rapid Transit Company has replied to the City Councils in accordance with the resolution of those bodies adopted on June 17, 1909, asking the company to reconsider and readjust the fare question so that the sale of strip tickets might be restored. The company reviews its present obligations and the obligations which are accumulating, and presents a statement showing that its business has fallen off considerably during the last year. The statemant of the company in full follows:

"Replying to the joint resolution of your honorable bodies passed June 17, 1909, in which you express the hope that this company would reconsider and readjust the fare question, so that the sale of strip tickets might be restored, we beg to lay before you the following facts:

"For the current year, beginning July 1, 1909, the interest, rental and sinking fund charges of the Philadelphia Rapid Transit Company (including the interest on the whole of the $5,000,000 of bonds recently issued with the consent of Councils) will amount to $8,416,056.30. (These charges will be increased beginning in 1912 by sinking fund payments for the benefit of the city, as well as sinking fund payments under the said issue of bonds, the city sinking fund being so arranged as to produce $30,000,000 in the following 45 years.)

"These payments are the binding and legal obligation of the company, and must be met. They are due to over 25,000 different stockholders and bondholders, most of whom are citizens of Philadelphia. In addition, they are an obligation, both of the company and Philadelphia, for they were recognized and confirmed by the contract of July 1, 1907, and all talk about a reduction or readjustment of these charges is mere agitation, which cannot possibly have any practical effect.

"In addition to these fixed charges, the company's taxes for the year ended June 30, 1909, amounted to:

State	$796,611.14
Local	177,597.16
Payment to Philadelphia under contract	499,785.07
Total taxes	$1,473,993.37

"In addition to these direct payments, the company, as part of the fixed charges above mentioned, is paying out each year in interest $1,200,000 upon that portion of its capital which was spent in laying improved pavements in the city at the time the trolley system was installed, so that the company is paying each year out of its receipts for the benefit of the public upward of $2,500.000, or more than one-half a cent for every passenger carried, including those carried on transfers.

"If, therefore, there is no change in the taxes for the coming year, the company will stand obligated to pay out of its receipts from passengers by way of fixed charges, licenses and taxes $9,890,048.67. (As already stated, upward of $2,500,000 of this amount is paid out for the public benefit.)

"The figures for operation for the year 1909 are not yet made up. Taking the year 1908 as a basis, we find that the company's expenses were:

Maintenance of way and buildings	$1,060,424.66
Maintenance of equipment	915,287.31
Transportation	4,822,471.68
Power	1,280,213.44
General expenses (including 6 per cent for accidents)	1,716,110.78
Total	$9,794,507.87

"As is known, the increase in the wages of motormen and conductors will add approximately $280,000 to the expenses during the coming year, so that the company must take in during the year ending June 30, 1910:

For taxes, licenses and fixed charges	$9,890,040.67
For operation (based on expenses of 1908)	9,794,507.87
Add increase in wages	280,000.00
Or a total of	$19,964,557.54

"To estimate the receipts, there are two factors to be determined, viz., the number of passengers carried, and the average amount received per passenger. The record of former years shows the number of passengers carried to have been: Year ended June 30, 1906, 448,576,785; June 30, 1907, 492,137,038; June 30, 1908, 512,869,023; June 30, 1909, 464,364,636.

"An estimate of the number of passengers to be carried during the current year at 500,000,000 seems to be fair.

"Now as to the rate per passenger. For the nine months ending April 1, 1909, which included a period when the new transfer order was in effect, and before strip tickets were withdrawn from sale, the average fare per passenger was 3.90. If strip tickets were restored, as requested by Councils, and if the estimate of 500,000,000 should prove correct, the receipts of the company for the current year would be: 500,000,000 passengers carried at 3.90 per passenger, $19,500,000, or nearly $500,000 less than the absolute requirements of the company.

"On the other hand, the average fare now being received per passenger is about 4.18. (This is less than estimated, due to the greater use of exchanges and transfers). Again, assuming that the company will carry 500,000,000 passengers, and applying the present average per passenger, we get estimated receipts for the current year of 500,000,000 passengers carried at 4.18 per passenger, $20,900,000, or a surplus of about $900,000. If this estimate proves correct, it will leave about 3 per cent on the $30,000,000 cash capital of the company.

"All of these figures for the current year, except the fixed charges, are necessarily estimates, and the results are subject to change if the taxes or expenses should be increased or reduced, or the number of passengers should vary. The actual figures, however, for the past years, on which these estimates are based, have been given, and we submit conclusively to every fair-minded person that the company is not in a position to restore strip tickets."

Question Box of the A. S. & I. R. Engineering Association

The American Street & Interurban Railway Engineering Association, through its secretary-treasurer, John W. Corning, is sending to member companies and associate members for consideration and replies a set of questions submitted by the membership, which, with the answers received, will constitute the question box for the 1909 convention. It is requested that replies be forwarded to Mr. Corning at 552 Harrison Avenue, Boston, Mass., as early as possible. The questions follow:

POWER HOUSES

1. What experience has been had in the use of hot-water meters in power plants?
2. What have been the actual results of purchasing coal under contracts which specify a standard quality and price, with a sliding scale of prices covering variations in quality?
3. Give an exact definition and basis on which power station load factors are worked out, especially in combined railway and lighting stations.

TRACKS

4. How does the cost of steel ties in concrete compare with that of wooden ties laid in concrete, and what life is expected for steel ties?
5. Does the gage line of both rails on straight track wear equally, and, if not, what causes one rail to wear more than the other?
6. Does such unequal wear occur on high-speed lines only?
7. On what foundation is the track? What kind of ballast? What rail section?
8. Are both rails bonded, and if only one is bonded, which rail wears most?
9. What kind of trucks?
10. What is the most satisfactory manner of testing for defective bonds in pavement?
11. What is the average cost of creosote block pavement, laid in concrete foundation?
12. What is the average life of creosote block pavement?
13. Do physical and chemical tests show any difference between rolled manganese steel rails and cast manganese steel rails? Give details and recommendations.
14. Is it practical and advisable to adopt a standard set of track maintenance rules for city and also for interurban lines, including both streets and private right of way?
15. Have electrically brazed or soldered bonds placed on outside of rail head in paved streets, or in streets graded to top of rail, proved satisfactory? Give some figures.
16. What is the life of cast weld joints on new rail laid with good foundation in paved street?
17. How close should ties be spaced in track laid with 6 inches of crushed stone underneath the ties and 4 inches of concrete between the ties; ties 8 x 6 x 8 inches?
18. What is the best method of getting good fitting combination joint plates, whether from the manufacturers of special work, or if made in home shop?
19. What is the life of one of the best mechanical joints put on new rail laid with good foundation in paved street?
20. What is the life of electric welded joints put on new rail laid with good foundation?
21. How long should concrete be allowed to set, under and between rails, before allowing cars to run over same?
22. Is the use of soapy water in place of oil in general use as a lubricant for drills used in boring holes for copper rail bonding to improve conductivity of contact?

CAR-HOUSE CONSTRUCTION

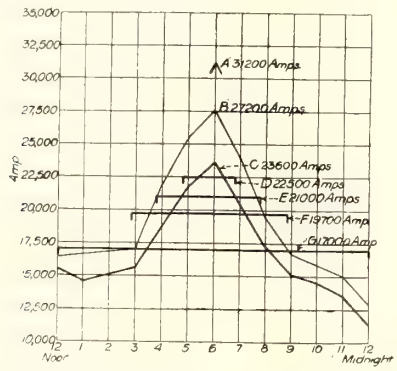
23. What percentage of the length of a car storage house should be of open pit construction?
24. What is the opinion of the association as regards the necessity of aisle sprinklers when the ceiling sprinklers are not more than 18 feet above the top of the rail?

LINES—OVERHEAD AND UNDERGROUND

25. Given a net work of street railway lines fed from several 600-volt direct current stations and substations: *a*. Would you install trunk

line feeders to tie the stations together, so that they may help each other out in case of trouble? *b.* Or would you extend and connect the ends of certain feeders so that, in addition to feeding a section, they may serve as tie lines? *c.* What proportion of station or substation capacity would you provide in the capacity of such trunk lines or tie lines?

26. Given a net work of street railway lines fed from several 600-volt direct-current stations: If the system load curves are similar to accompanying diagram, and if the morning and afternoon peaks are approximately the same, assuming underground distribution, by using paper-insulated copper cables, would you calculate your feeders on the basis of the loads, as per values A, B or C in accompanying diagram, or would you use say the 2-hour or 4-hour value D and E and allow the overload capacity of the feeder cables to take care of the system through the peak period?



A—Momentary Max. Observed.
B—Aver. Max. Heaviest Month.
C—Aver. Max. Heaviest 3 Months.
D—2 Hour Average of C.
E—4 Hour Average of C.
F—6 Hour Average of C.
G—12 Hour Average of C.

27. Can the life of cedar poles be prolonged by treatment? If so, to what extent and by what method?
28. What is the best method of testing underground power cables? Interval between inspections and interval between tests?
29. Is the use of galvanized Siemens-Martin steel strand for overhead supports found as satisfactory, both from a lineman's point of view as regards ease of manipulation and from a general manager's point of view as regards reduced maintenance charges, as the use of ordinary galvanized steel cable?
30. Is the San Francisco practice of putting out fires on wooden poles and crossarms of 13,000-volt alternating-current lines by portable extinguishers while the conductors are kept in service in general use?
31. *a.* Is the leading of the feed-in tap from the underground feeder cable up through the inside of the iron side pole in successful, satisfactory use anywhere in this country? If so, where? *b.* In case this is done, what is the B & S size of the conductor, and what is the preferred insulation of that part of the feed-in tap that passes up the interior of the pole—giving all layers outside of the conductor? *c.* In this particular case is the conductor stranded or solid? *d.* In this same case is a cut-out installed in each feed-in tap, and if so, where is it located?

CAR BODIES

32. Is it better practice to use electric markers in connection with storage batteries on interurban cars than to use regular oil markers?
33. What is the most satisfactory position of the truck centers in relation to the "Over All" length of car?
34. Are the ventilating devices on cars more efficient with or without the monitor or upper decks?
35. What is altogether the most satisfactory disinfectant to be regularly used on the interior of closed city cars? Interurban cars?
36. In your particular locality, approximately, what actual saving in cost for power can be effected on one car for one year, or for 100 miles run, by reducing the dead weight of an average city car by 100 lb.
37. What is the best method of car washing with special reference to the preservation of outside varnish?
38. What is the cost of changing double-end, single-truck cars to single-end, pay-as-you-enter type?
39. What is the average life of a closed passenger car, an open car, and a service car?
40. What percentage of the original cost each year should be deducted for depreciation?
41. What value is placed on car after it has outlived its usefulness?

CAR EQUIPMENT

42. Which is preferable on strapwound armatures, one or two part coils?
43. From experience of the past year with vacuum process of coil impregnation, is such treatment considered more or less valuable than it was a year ago?
44. For motors of 50 hp or under, are commutating fields desirable?
45. Does it pay to furnish the depot repairmen small tools, such as hammers, monkey-wrenches, plyers, screwdrivers, etc.?
46. What results have been obtained from the use of automatic slack adjusters, and what has been the saving of labor by use of same?
47. Why does the insulation on the long field leads of the General Electric 80 motors catch fire inside of motor shell, and what can be done to prevent it?
48. What is the average life of a car body?
49. What is the average life of equipment?
50. Which is the best policy: viz., to continue using an expensive tin base babbitt metal as used with grease lubrication after your motors are converted to oil lubrication, or to use a cheap lead base metal?
51. Do you use either ball-bearing or rolling center plates or side bearings; and if so, what effect have you noted on wheel flange wear, power consumption and saving in center plate lubrication?
52. Have you ever tried the use of a recording meter under the car for car-mileage records?
53. How many motors should one armature winder take care of—average conditions on a road having say 25—4 motor equipments and 75 double motors, city and suburban traffic?
54. What should determine the minimum diameter of a railway motor commutator, that is, when should it be scrapped on account of being too small?
55. What has been your experience with motor field and armature coils wound with asbestos-covered wire? Do you think impregnation of such coils is necessary in addition to being wound with asbestos wire?
56. Is not the use of asbestos-covered wire for motor and car wiring sufficiently important to justify the manufacturers of asbestos wire to so perfect their product as to enable it to stand the necessary insulation test required of wire used for such purposes?
57. What are the advantages, if any, of asbestos wire-wound field and armature coils over those wound with cotton-covered wire? Do you think there is anything harmful in such construction due to liability of overloading of motors?
58. What have been the results of using babbitt-lined journal brasses on heavy high-speed interurban equipment?
59. What is the best brake shoe for steel wheels?
60. What is the best method of boring armature bearings true, or any other treatment of them to increase life?
61. What is considered good mileage for cast-iron brake shoes?
62. What is considered good mileage for trolley wheels?
63. How much of the wear on the truck brake rigging and the resulting brake trouble and the wear on the wheel flanges when in contact with the shoes is due to the lost end motion of the axle in its M. C. B. bearings?
64. Will a car ride better if the excessive end motion of the axle in its M. C. B. bearings is eliminated?
65. What is the best method of preventing rapid wear on the bolts and other moving parts of the truck brake rigging?
66. What methods should be used to prevent excessive wear on the ends of M. C. B. journal bearings and the resulting excessive side motion of the truck frame with reference to the axles and wheels?
67. What is a quicker (and fairly reliable) method of periodically calibrating car circuit-breakers by car equipment inspectors than the use of water rheostat and an ammeter?
68. Has the intelligent use of a spring balance, in opposition to the calibrating spring, been passed on by the association, and if so, what was the decision? (This practice was pronounced impracticable by the manufacturing company, but has been found of much value by the interrogator for approximate calibration, detection of faults in adjustment, incorrect springs, etc.)

WHEELS AND AXLES

69. Limit gages and average mileage between turning steel wheels on city service?
70. In using steel wheels, what mileage should be had between turnings, what wear from service, and how much turned off?
71. What is considered good mileage for solid steel wheels, steel-tired wheels and cast-iron wheels, allowing three turnings for steel?

PURCHASING AGENTS

72. Should there not be a separate section in the convention for the deliberations and decisions of the purchasing agents' division of the American Street & Interurban Railway Association?
73. Should the storekeeper be under the supervision of, and responsible to, the purchasing agent or the engineer?
74. To avoid the heavy loss by dead stock in storeroom, how often should the purchasing agent and engineer fix arbitrary standards of material?
75. How long should the agreement last?

Cleveland Traction Situation

An ordinance was introduced and passed to its second reading in the City Council of Cleveland, July 12, giving Herman J. Schmidt an extension from the proposed Payne Avenue road on Wade Park Avenue, East Sixty-fifth Street, East Sixty-sixth Street and West Sixty-fifth Street.

As an indication that promises made at the tent meetings by Mayor Tom L. Johnson will be carried out, the Cleveland Traction Company has been incorporated with a capital stock of $10,000 by H. Schmidt, A. F. May, O. F. Leisey, T. G. Fitzsimmons and J. Lawrence. Mr. Schmidt expects to transfer his grants to this company.

Harry Decker, a west side dry goods merchant, has resigned as a member of the committee of 100. Mr. Decker says that he is as much in favor of defeating the Schmidt franchise as ever, but that he has not the time to devote to the work of the organization. He is one of the merchants named in the Mayor's famous circular, but he states that his business has not suffered as a result of the effort of the Mayor to misrepresent him in public.

At a meeting of the local branch of the Amalgamated Association of Street & Electric Railway Employees held on July 16 it was decided to oppose the Schmidt franchise. Members were instructed to bring every influence to bear against the adoption of the grant by the people. This organization had much to do with the defeat of the security franchise granted to the Cleveland Electric Railway when the property of that company was leased to the Municipal Traction Company.

F. W. Walz, a Councilman who deserted the Mayor as an ally some time ago, held a second tent meeting at Superior Street and Eighty-sixth Street on the evening of July 17. Mr. Walz was not interrupted in making his address, but questioners persisted in having him explain various matters to which he referred. A. L. Behner, vice-president of the International Organization of Street Railway Employees, secured the consent of the chairman of the meeting to reply to an attack the Mayor made upon him. He said the Mayor had called him a dynamiter, and defied the Mayor to prove the statement.

Mayor Johnson has had hundreds of small billboards erected between the sidewalks and the curbs along the streets on which the proposed 3-cent lines are to be built, and upon them are pasted posters advising people to vote for the Schmidt grant and instructing them how to cast their votes at the election. As special permits must be obtained for putting billboards on the streets, the department of public safety decided to allow any persons who wish to do so to erect such boards for a limited time.

The report of the receiver of the Municipal Traction

Company for June, made public through the Federal Court on July 17, follows:

Gross earnings	$561,587
Operating expenses:	
Maintenance	$107,330
Transportation	174,257
General	38,970
Total	$320,557
Net earnings	241,030
Neutral street railway, rental	936
Taxes	24,644
Interest rental	38,589
Dividend rental	73,378
Total	$137,548
Surplus	103,482

Transit Affairs in New York

The Appellate Division of the Supreme Court has overruled the Public Service Commission in its refusal to approve the franchise granted by the Board of Estimate to the South Shore Traction Company to operate cars over the Queensboro Bridge, and has ordered the commission to grant the application of the company and pay it $50 in costs. The opinion was written by Justice Ingraham, Justices Laughlin, Clarke, and Houghton assenting. The latter, however, wrote a separate opinion, in which he differed with his colleagues on several of their findings with regard to the powers of the commission. The commission refused to grant the franchise purely on its terms, admitting the necessity for the immediate operation of cars across the bridge. In its decision on the matter the commission declared that under the franchise the company was given the right for 50 years to one of the most important thoroughfares between Jamaica and Long Island City, and that future extensions were not sufficiently provided for.

In its decision the court holds:

"Necessity or convenience for the public service was the single question the commission was authorized to determine, and upon the determination of that question depended the permission of approval.

"The Public Service Commission had no right to arbitrarily reject an application because of the action of the local authorities in granting or refusing their consent.

"If a railroad over the proposed route was required by the public, was necessary or convenient for the public service, then it was the duty of the commission to grant the application, and as I understand from the return that they have determined that the proposed railroad was required, the denial of the application was error."

It is announced that the commission will carry the case at once to the Court of Appeals.

The Public Service Commission has modified the plan of construction for the Broadway-Lexington Avenue subway, acceding to the wishes of property owners in Lexington Avenue, so as to make the subway structure a double instead of a single deck tunnel. The original plan adopted by the commission contemplated four tracks on one level, but the property owners have objected to this plan on account of the narrowness of the avenue and the interference with abutting property which would result. On the receipt of these objections the commission instructed its engineers to devise a better plan, if possible, and the result is the development of the double deck form of construction from Houston Street to 103d Street, and from 113th Street to the Harlem River, the lower tracks varying from 25 ft. to 70 ft. below the upper tracks. The modified plan has been approved both by the commission and the Board of Estimate and Apportionment.

Enlargement of the Chambers Street station of the Brooklyn loop section of the subway to accommodate six instead of four tracks, at a cost of $875,000, as recommended by the Public Service Commission has been approved by the Board of Estimate and Apportionment. It is understood that this will also involve the taking of additional property estimated to cost about $1,000,000. The board has also granted the request of the commission for leave to advertise for bids for the construction of the Lexington Avenue and the Brooklyn subways.

The Public Service Commission has made public a provisional list of stations for the Broadway-Lexington Avenue subway, on which the Bradley-Gaffney-Steers Company is a bidder according to the route which the commission has approved. The list as now given out is tentative only, and the commission is anxious that citizens interested in the matter shall all get the information at the same time. The permanent list of stations will not be definitely determined until several engineering problems have been settled. As now laid out the new line starts with a terminal at Battery Park. The commission apparently has decided that express trains in the new subway shall be operated primarily for the benefit of the residents of Harlem and the Bronx. Express trains will stop at Canal Street and Murray Street and Warren Street and at the terminal at the Battery. There will be no express stop between Canal Street and Eighty-sixth Street, and the only other one in Manhattan will be at 125th Street. In the Bronx the express stops will be more frequent.

Advertising Campaign in Philadelphia

The Philadelphia Rapid Transit Company has begun the publication in the daily papers of Philadelphia of a series of transit talks designed to acquaint the public better with the problems which beset the management of a large corporation such as the Philadelphia Rapid Transit Company, in the hope that the advertisements may prove mutually helpful to the company and its patrons. The first talk was entitled "Why Street Car Operation Is Especially Difficult and Costly." It occupied approximately 38 square inches of space. The announcement of the company follows:

Next to the streets, there is no more important factor in the comfort and well-being of city dwellers than the street car.

You realize this when trolley transportation is interrupted for even a few hours.

The Philadelphia Rapid Transit Company also realizes this fact, and the consequent responsibility resting upon it to give satisfactory service to the public.

But the transit company and the 1,350,000 people who ride on its cars every day come in contact so often that some friction and misunderstanding seem to be unavoidable.

We believe, however, that this misunderstanding can be lessened by increasing the public's knowledge of the company's affairs. We are convinced that a better understanding can be brought about by informing you of our efforts, difficulties, accomplishments—and failures.

Acting on this belief, it is our intention to publish in the newspapers regular bulletins that will deal with all aspects of the company's affairs and service, its relation with the public and the city.

Look for these "trolley facts." They will be interesting, as well as informing.

Every citizen of Philadelphia, under the contract between the city and the company, is a future part owner of the street car system—another reason why you ought to know more about it.

If there is anything you want especially to hear about, write to the Publicity Bureau, 228 Land Title Building, and if the subject is of general interest, it will be taken up in its turn.

The first talk of the company follows:

Philadelphia has come to be known as the City of Homes, because it is the best city in the country to live in. But it presents more difficulties for the transportation company than any other city on earth.

The streets are narrow and the blocks are short, with the result that about every 400 ft. there is a grade crossing.

It costs more to install a crossing and keep it in repair than it costs for the 400 ft. of straight track between crossings. It is more wearing on the electrical equipment and the car trucks to go over a crossing than it is to run a quarter of a mile on the straight track.

Then there are the additional chances of accident at crossings—chances not encountered on straight track. In this city a car must be started and brought to a stop nearly every 450 ft.; it cannot run its full speed more than half that distance.

These are the reasons why trolley service costs more and is necessarily slower here than in cities where there are broad avenues of travel and few intersecting streets.

But even under the hampering circumstances described, our cars make an average speed of 8½ miles an hour—not bad when you consider the frequent crossings and the fact that the cars share the tracks with hundreds of vehicles whose drivers seem to think that they have as much right as anybody to the use of the rails.

Much has been done toward bettering the service by the traffic regulations of the police department. Much more could be done if drivers and teamsters would clear the track *before* the motorman is obliged to slacken speed and wear out the gong behind some obstinate driver.

Railway Office Robbed.—The office of the Los Angeles-Pacific Company, Los Angeles, Cal., was entered by burglars on July 4, and the safe rifled of $3,700 in cash. According to the latest reports the robbers have not yet been apprehended.

Outing of the New England Street Railway Club.—The August outing of the New England Street Railway Club will be a ladies' day, and will be held on Aug. 12, at Canobie Lake Park, Salem, N. H. The program will be announced later.

Hearing on Application of the Boston, Lowell & Lawrence Electric Railroad.—Another hearing on the petition of the Boston, Lowell & Lawrence Electric Railroad, Boston, Mass., for a certificate of exigency, was held before the Massachusetts Railroad Commissioners on July 9. Prominent business men and public officials were present to favor the building of the new line. The hearing will be continued on Sept. 20.

Plan for Report on Subways in Pittsburgh.—At a conference on July 13 between Mayor Magee, of Pittsburgh; Morris Einstein, chairman of the corporation committee of the City Council, and Dr. H. B. Burns, chairman of the sub-committee on subways of the City Council, plans were discussed for employing an expert to study the subject of underground railways in Pittsburgh and report to the Council in the fall.

Circular on Taxes and Other Requirements.—The secretary of the American Street & Interurban Railway Asso

ciation has issued Bulletin No. 107 giving information in regard to taxes and other city and municipal requirements of city lines. The bulletin contains a number of tables showing the basis of the tax requirements, as well as the free transportation for municipal employees, removal of snow and ice, etc., required of the different companies. The bulletin is sent only to member companies of the association.

New York Tunnel of the Pennsylvania Railroad Ready for Equipment.—The twin tunnels of the Pennsylvania Railroad under the Hudson River between Hackensack N. J., and Seventh Avenue and Thirty-third Street, New York, where the immense terminal of the company is being built, have been completed, and the work of track laying, placing the third rail and installing the signal system will now be pushed. The first excavation was begun on May 12, 1905. The north tunnel was joined on Sept. 12, 1906, and the south tunnel on Oct. 9, 1906. The tunnels under Bergen Hill, New Jersey, were connected on May 7, 1908, and on April 11, 1908, respectively.

Progress in Detroit Investigation.—The fifth meeting of the committee of fifty which is investigating the street railway situation in Detroit was held in the common council chamber in Detroit on June 7. Reports of progress and the results accomplished were received from the committee on franchises. This committee has examined all the franchises under which the Detroit United Railways and its constituents operate and all the amendments to grants for street railways made by the city from the ordinance dated Nov. 24, 1862, to the present time, and it has reviewed the history of every street railway that has owned or operated a line in Detroit. This review has been published as part of the record of the meeting on June 7.

Columbus Terminal Ordinance Signed.—Mayor Bond, of Columbus, has signed the ordinance granting the Ohio Electric Railway, Columbus, Ohio, permission to erect its proposed union station. The measure provides that an interurban station to cost $175,000 shall be erected at Third Street and Town Street by Jan. 1, 1913; that what is known as the loop be abandoned; that 7 tickets be sold for 25 cents within the city and that the franchise of the company to operate in Columbus be extended for eight years. The new terminal for the present will probably be only two stories high, but it will be so constructed as to permit of the addition of floors as the business demands. The first floor will be used for the ticket offices and as a waiting room. The second floor will be fitted up for the use of the office force by the company in Columbus.

Colorado State Convention.—The Colorado Electric Light, Power & Railway Association, which usually holds its conventions in September, has arranged this year to hold its meetings as opportunity may offer at Denver during Thursday, Oct. 7, Friday, Oct. 8 and Saturday, Oct. 9, of the week of the convention of the American Street & Interurban Railway Association, the officers of the association deciding that this is better than to ask members to convene during some other week, especially as it is expected that there will be a full attendance of members of the Colorado Electric Light, Power & Railway Association at the national convention. The program of the meeting of the Colorado Electric Light, Power & Railway Association has not yet been fully arranged. J. F. Dostal, of the Denver Gas & Electric Company, is president of the association, and J. C. Lawler, of the Colorado Springs Electric Company, is secretary and treasurer.

Public Utility Matters in Abeyance in Maryland.—Consideration by the cabinet of Governor Crowthers of Maryland of the question of creating a public service commission has been postponed until S. Davies Warfield, chairman of the executive committee of the Consolidated Gas, Electric Light & Power Company, Baltimore, Md., submits to the cabinet his plan for bringing natural gas into Baltimore from Virginia. The first meeting of the cabinet of the Governor to consider this matter was called for June 17. Mr. Warfield then said that his company desired to enter into an agreement with the City of Baltimore by which the city would become a partner in the company, and be represented on the board of directors, but that under these circumstances he felt the company should not be subject to the orders of a commission. He has not said when he expects formally to outline his plans to the Governor.

Electrical Engineering at the Massachusetts Institute of Technology.—Late last month announcement was made of the appointment at the Massachusetts Institute of Technology of Dr. Harold Pender as professor of theoretical and applied electricity. Dr. Pender is a graduate of Johns Hopkins University and took the degree of Ph.D. at that university in 1901. Later he joined the engineering department of the Westinghouse Electric & Manufacturing Company and is recognized as notable in his work in mathematical and experimental physics. His teaching at the Institute of Technology will consist of a course for third-year undergraduate students and courses for graduate students in the more advanced theories of electric current flow and the electric transmission of power, in addition to the direction of experimental research by advanced students. The advanced lectures on the organization and administration of public service companies, on the design of power stations and systems, and on electrical measurements heretofore carried on by Professor Jackson, Professor Shaad and Professor Laws will be continued by the same professors. As indicating the trend of electrical engineering study at the present time, it is notable that 40 per cent of the students just graduated from the electrical engineering course at the Massachusetts Institute of Technology already bore degrees of Bachelor of Arts or Bachelor of Science, conferred, as a rule, in classical or literary courses.

Active Construction Begun on Cambridge Subway.—Active construction work upon the new subway to be built in Cambridge, Mass., by the Boston (Mass.) Elevated Railway has been begun by Contractor Hugh Nawn at the intersection of Bay Street and Massachusetts Avenue, near the Harvard Square district. A shaft has been excavated to facilitate removing the material from underneath Massachusetts Avenue, and a system of narrow-gage car tracks has been built on a lot at the south to enable the material raised from the tunnel section of the subway to be hauled away from the route and dumped into wagons for transfer away from the city. It is expected that the method of removing the material from beneath the avenue at this section of the work will eliminate very largely the inconvenience which has sometimes attended subway construction in trunk thoroughfares. G. A. Kimball, chief engineer, is in charge of the subway work. The Railroad Commission has approved the plans of the company for stations at Harvard, Central and Kendall Squares. At present the question is before the Supreme Court of Massachusetts of allowing the Boston Transit Commission to construct the Boston end of the Cambridge subway under Boston Common, citizens having appealed to this tribunal in favor of the Scollay Square terminus. The Transit Commission and the Boston Elevated Railway are convinced that the Park Street terminus, or its equivalent, will meet the needs of the greater number of patrons, and full preparations were being made to construct it when an injunction was demanded by the complainants. It is not expected that there will be any considerable delay in reaching the decision.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—The special committee of the Legislature which has had under consideration the question of recommending for passage a public utilities measure has adopted a bill to create a board of telephone, lighting and water commissioners. The measure is designed to deal exclusively with telephone, lighting and water companies, and provides that there shall be three commissioners at salaries of $3,000 each, the same as that paid to the railroad commissioners. Before the close of the present session of the Assembly the Governor is to nominate one commissioner to hold office until July 1, 1911; one commissioner to hold office until July 1, 1913, and one commissioner to hold office until July 1, 1915. Sixty days after the organization of the General Assembly of 1911 and biennially thereafter the Governor is to nominate one commissioner to hold office for a term of six years from July 1. The commissioners are authorized to employ such clerks, accountants, engineers, inspectors, experts and others as may be necessary to conduct the work of the commission properly. Reports of the operation of companies subject to the jurisdiction are to be made to the commission for the year ended June 30 on blanks specially prepared by the commission and furnished to the companies. The act will become effective on its passage. The Connecticut Railway & Light Company, operated under lease by the Connecticut Company, has been granted a charter amendment to permit it to extend its lines in Bridgeport and Stratford. The New York, New Haven & Hartford Railroad has been given the right to extend its Middletown-Middlefield electric line to Durham if the Meriden, Middletown & Guilford Street Railway, incorporated two years ago, does not build within the next two years. The Senate has reversed the action of the House and rejected the bill which provides for two 5-cent fares between Hartford and Manchester on the line of the Connecticut Company, instead of three. This session has been prolific of attempts to reduce fares on electric railways. In all upward of 20 measures seeking reductions have been introduced, but not one has been favorably acted upon in committee. Of this number, however, three or four have passed the House.

Financial and Corporate

New York Stock and Money Market

July 23, 1909.

The market last week was sluggish, but preserved a strong undertone, based very largely on the ease in money, the excellent outlook for crops and the continued revival in business. Speculative interest centered largely in Steel common, and on Saturday the market showed a decided upward tendency. The movement was concentrated, however, and for a time there was a reaction due to profit taking, but the list recovered rapidly. Naturally the traction stocks followed the trend of the market and slight advances were recorded for nearly all their securities.

Quotations for money were raised, but are still low for this period of the year. Rates to-day were: Call, 1½ to 2 per cent; time, 2 per cent for 60 days; 2¼ to 2½ per cent for 90 days; 3¼ per cent for five months, and 3¼ to 3½ per cent for six months.

Other Markets

In Philadelphia an effort was made to force Philadelphia Rapid Transit to higher levels, but at 28½ on Friday considerable was offered. On Tuesday, however, the stock recovered to 29½ on better demand.

In Chicago, Kansas City Railway & Light common and preferred advanced slightly. The elevated stocks were weak, however, Metropolitan West Side common and preferred falling off fractions.

On Tuesday, on light transactions, Massachusetts Electric Companies preferred advanced to 75, its highest price in three years. Boston Suburban Electric common recorded a slight gain. Boston Elevated moved upward more than half a point.

In Baltimore, United Railways securities were quite active and strong. The first mortgage bonds were in demand at 87¾ and 88, the funding 5s from 85 to 86, and the incomes from 57¾ to 58¼. Maryland Electric first mortgage 5s were quoted at 95 to 95¼.

Quotations of various traction securities as compared with last week follow:

	July 13.	July 20.
American Railways Company	45	a45¾
Aurora, Elgin & Chicago Railroad (common)	39⅛	a40¼
Aurora, Elgin & Chicago Railroad (preferred)	a87	a86½
Boston Elevated Railway	129	a130
Boston & Suburban Electric Companies	*15½	*16
Boston & Suburban Electric Companies (preferred)	*71	*71
Boston & Worcester Electric Companies (common)	10	10
Boston & Worcester Electric Companies (preferred)	a56	a56
Brooklyn Rapid Transit Company	77¾	78½
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	86	85⅜
Capital Traction Company, Washington	a138	a137½
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*2½	*2½
Chicago & Oak Park Elevated Railroad (preferred)	*10	*10
Chicago Railways, ptcptg, ctf. 1	a112¾	a114
Chicago Railways, ptcptg, ctf. 2	a39½	a38¾
Chicago Railways, ptcptg, ctf. 3	a26¼	a26½
Chicago Railways, ptcptg, ctf. 4s	a10½	a10½
Cleveland Electric Railway	*78	*78
Consolidated Traction Company of New Jersey	a76½	a77
Consolidated Traction of N. J. 5 per cent bonds	a106½	a106
Detroit United Railway	a63½	63
General Electric Company	164	168
Georgia Railway & Electric Company (common)	a92¾	a93
Georgia Railway & Electric Company (preferred)	89	a87
Interborough-Metropolitan Company (common)	15½	15¾
Interborough-Metropolitan Company (preferred)	47¾	48
Interborough-Metropolitan Company (4½s)	80⅛	80½
Kansas City Railway & Light Company (common)	a50	50
Kansas City Railway & Light Company (preferred)	84¾	84½
Manhattan Railway	a146	146
Massachusetts Electric Companies (common)	13½	a14
Massachusetts Electric Companies (preferred)	71¼	a75
Metropolitan West Side, Chicago (common)	a16½	16½
Metropolitan West Side, Chicago (preferred)	a48	48
Metropolitan Street Railway	a20	a20
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	82	84
Northwestern Elevated Railroad (common)	a22	a22
Northwestern Elevated Railroad (preferred)	a69	a71
Philadelphia Company, Pittsburg (common)	a42	a42
Philadelphia Company, Pittsburg (preferred)	43	a43
Philadelphia Rapid Transit Company	28⅝	29¼
Philadelphia Traction Company	91	a91
Public Service Corporation, 5 per cent col. notes	a100½	a100½
Public Service Corporation, ctfs	a89	a89
Seattle Electric Company (common)	*102	*105¼
Seattle Electric Company (preferred)	103½	*103
South Side Elevated Railroad, Chicago	a55	a56
Toledo Railways & Light Company	a9½	a10
Third Avenue Railroad, New York	17	18½
Twin City Rapid Transit, Minneapolis (common)	103½	106
Union Traction Company, Philadelphia	53	53½
United Railways & Electric Company, Baltimore	12	a12½
United Railways Inv. Co., San Francisco (common)	a38	37
United Railways Inv. Co., San Francisco (preferred)	a55½	53¾
Washington Railway & Electric Company (common)	a42½	a46
Washington Railway & Electric Company (preferred)	a96⅞	a93
West End Street Railway, Boston (common)	92½	93
West End Street Railway, Boston (preferred)	104½	a104½
Westinghouse Electric & Manufacturing Company	a84¼	85½
Westinghouse Elec. & Mfg. Company (1st pref.)	a124½	a124½

aAsked. *Last sale.

First Annual Report of the Chicago Railways Company

The first annual report of the Chicago Railways Company for the year ended Jan. 31, 1909, has been made public. The income statement shows the results from the operation of the property for the joint account of the company and the City of Chicago under the terms of the ordinance of Feb. 11, 1907.

This income statement follows:

Income from:	
Passengers	$10,773,914.50
Chartered cars	4,619.00
Mail	31,812.60
Advertising	44,333.34
Rent of land and buildings	14,632.77
Rent of equipment	33,973.50
Sale of power	17,925.30
Interest on deposits	41,711.13
Miscellaneous income	74,149.02
Gross income	$11,037,071.16
Expenses:	
Maintenance of way and structures	$544,763.11
Maintenance equipment	844,711.68
Renewals	171,201.44
Operation power plants	1,000,148.87
Operation cars	3,618,693.64
General expenses	1,119,638.69
Expense account investment real estate	54,837.22
Taxes	371,955.16
Total expenses	$7,725,949.81
Balance	$3,311,121.35
Deduct interest at 5 per cent on valuation	1,739,684.39
Net income	$1,571,436.96
Division of net income:	
City of Chicago, 55 per cent	$864,290.33
Chicago Railways Company, 45 per cent	707,146.63

The traffic statistics for the year ended Jan. 31, 1909, follow:

Car mileage:		
Passenger cars, miles		43,857,066
Mail cars, miles		164,388
Total		44,021,454
Passengers carried:		Per cent of total.
Revenue	217,400,335	58.18
Free	2,947,287	00.79
Transfer	153,295,766	41.03
Total	373,643,388	100.00
Percentage of revenue and free passengers using transfers		69.57
Percentage of operating expenses to gross income		65.06
Percentage of renewals to gross income		1.57
Percentage of taxes to gross income		3.37
Total		70.00
Percentage of interest on plant value to gross income		15.76
Percentage of net divisible income to gross income		14.24
Total		100.00

The income statement of the company for the year ended Jan. 31, 1909 (non-partnership account), follows:

Items of income:		
The company's proportion of income from joint operation	$707,146.63	
Interest allowance on valuation of property	1,739,684.39	
Interest on bank balances	99,872.75	
Interest on treasury securities	38,933.03	
Interest on bonds and collateral notes not issued	153,664.78	
Gross income from all sources		$2,739,301.58
Deductions:		
Interest accrued on—		
First mortgage bonds	$400,000.00	
Consolidated mortgage bonds	1,213,015.58	
Collateral and funding notes	414,613.26	
Underlying securities	29,986.54	
Miscellaneous items	1,571.98	
Sinking fund reserve accrued	250,000.00	
Corporate expenses and adjustments	124,139.64	
Total deductions		2,433,327.00
*Net income available for dividends		$305,974.58

*NOTE.—From this amount a payment was made to the depositaries, who disbursed from same an equivalent to 4 per cent to the holders of Participation Certificates, Series 1, Chicago Railways Company.

Decision Against Metropolitan Securities Company Affirmed

The judgment of the United States Circuit Court, awarding William W. Ladd, receiver of the New York City Railway, plaintiff in a suit against the Metropolitan Securities Company, $5,271,582.54, has been affirmed in a decision rendered by the United States Circuit Court of

Appeals. The amount awarded Mr. Ladd is the balance of $8,000,000 that the Metropolitan Securities Company agreed to advance to the New York City Railway to enable the latter to carry out its agreement with the Metropolitan Street Railway, whereby it was to furnish money for improvements. The principal point of contention at the trial last fall was whether the money to be advanced by the Metropolitan Securities Company was a loan or a purchase of the $8,000,000 in improvement notes, issued by the Metropolitan Street Railway. The Court of Appeals, among other things, says:

"But whatever would be an accurate description of the strict legal nature of the obligation between the Metropolitan Securities Company and the New York City Railway, one thing seems absolutely clear, and that is, it was not a contract of loan. Nothing in the case indicates that the Metropolitan Securities Company was loaning the money to the New York City Railway. No promise to repay was executed, no evidence of the loan was delivered, no time for the repayment was fixed, no rate of interest was agreed upon, and none of the ordinary indications of a loan, particularly a loan of such magnitude as $8,000,000, exists. But much weightier than the fact that all ordinary evidences of a loan are wanting is the fact shown by all the evidence and all the circumstances of the case, that nobody imagined at the time that the transaction was a loan or had any analogy to a loan. The Metropolitan Street Railway had furnished the securities upon which the money was to be raised.

"They were in the shape of negotiable securities. They had been transferred for value before maturity to innocent purchasers in good faith, and no defense could be interposed to them. The money had been raised and deposited with the Metropolitan Securities Company, subject to the call of the New York City Railway. It was just as though that amount had been deposited in a bank subject to the checks of the New York City Railway. It was intended to be expended in permanent betterments of the property of the street railway, to provide for which the railway had parted with its securities for a like amount. The suggestion made now that this was a loan, that the New York City Railway supposed or that any of the parties concerned imagined that the New York City Railway, after it expended that $8,000,000, was at some future time to repay it in cash to the Metropolitan Securities Company, seems to us absolutely untenable."

Report of the Vienna Tramway System

The report of the Vienna municipal tramways for 1908 has just been made public and shows an increase in passenger receipts on the electric lines of 9.7 per cent. Part of this was due to the crowds attracted to Vienna during the Imperial jubilee, part to extensions of the system. The gross receipts from passengers last year amounted to Kr. 33,868,992 ($6,773,800). The day of lightest traffic was Aug. 9; of heaviest traffic Nov 1. The average single fare paid was 14.38 heller (2.876 cents).

The system comprises 458.169 km (286.36 miles) of track, of which about 90 per cent is electric, the rest steam, and possesses 1056 motor cars, 998 trail cars, 153 snow plows and 64 work cars. Of the snow plows 122 are operated by horses, 8 by electric motors and 23 are attached to motor cars. In addition the system includes three automobile 'bus lines, one of which is a trackless trolley line with 4 cars. These cars are equipped with two 20-hp motors each and accommodate 14 seated and 10 standing passengers each. The street is equipped with four overhead wires so that the line is practically a double-track road. There are also 14 gasoline automobiles and two storage battery automobiles. The trackless trolley line was in operation only during the last two and a half months of 1908.

In the electric service there were 91 serious and 10 fatal accidents, 29 of these serious casualties, and 1 fatal accident occurred to persons boarding or leaving cars in motion.

Some statistics follow:

	1908.	1907.
Average length of route in km	198.3	187.9
Car kilometers, in thousands	69,098	62,430
Passengers carried, in thousands	238,050	216,901
Receipts in thousands of kroner	33,868	30,885
Average per km. of track per day:		
(*a*) car kilometers	997	911
(*b*) passengers carried	3,435	3,163
(*c*) receipts in kroner	488.73	450.44
Average per car kilometer:		
(*a*) passengers carried	3.4	3.5
(*b*) receipts in kroner	0.49	0.495
Average cash fare in kroner	0.1438	0.1410

The Copenhagen Tramways

The tramway system of Copenhagen, Denmark, is supplied by three tramway companies which in the order of their size are the Copenhagen Tramway Company, the Fredericksborg Tramway Company and the Suburban Tramway Company. The latter is largely an excursion line. The gross receipts for 1908 in American currency were:

Name of Company.	Receipts.	Per Cent Increase Over 1907.
Copenhagen Tramway Company	$1,720,654	3.4
Fredericksborg Tramway Company	319,059	3.5
Suburban Tramway Company	82,077	3.0

Statistics of last year's operation follow:

Tramways.	Copenhagen.	Fredericksborg.	Suburban Comp.
Length of line, km	59	12.2	6.28
Length of electric line, km	56.5	11.0	6.28
Population served	471,661	92,500	.....
Population per km	8,188	8,409	.....
Passengers per km	1,187,879	1,098,173	.....
Passengers (electric)	1,208,355	1,044,005	328,253
No. of tons per km. (El. lines)	[1]84,585	73,080	22,978
Rides per inhabitant per year	149	143.7	.....
Rides (electric lines)	144.7	124	.....
Motor car km., per km	222,547	178,481	95,007
Trailer km., per km	92,370	38,564	33,610
Horse car km., per km	159,621	238,860	.....
Load factor of traffic	0.85	.....	0.16
Capital stock, per km	$44,603	.....	$62,832
Gross receipts per km	29,164	26,155	13,670
Passenger receipts (electric) per km	29,475	24,304	11,422
Passenger receipts (horse) per km	14,900	[2]41,036	.....
Pas. receipts per train or motor c. km	.13	13.0	12
Gross receipts per calc. car kh	[3]11	12.5	11.2
Gross receipts per inhab. per year	3.63	3.47	.....
Pass. receipts per inhab. per year	3.5	2.6	.....
Receipts per passenger	2.4	2.36	4
Total exp. per km. (electric)	20,700	17,870	7,062
Total exp. per km. (horse)	19,350	41,367	.....
Watt-consumption per tr. km	673	679	453.6
Franchise charges per km	1,800	1,304	147
Exp. in per cent of receipts	20.4	22	54

[1] Passengers estimated at 70 Kg. each, [2] including omnibuses. [3] In obtaining this figure one-half of the trailer mileage is added to the motor car milage.

Interborough Rapid Transit Report for Year

The Interborough Rapid Transit Company has issued a statement of income for the year ended May 31, 1909, as follows:

Gross earnings	$25,594,439
Operating expenses	10,799,650
Net earnings	$14,794,789
Other income	1,404,769
Gross income	$16,199,558
Rentals of Subway and Manhattan Railway	8,021,281
Taxes	1,786,520
Total rental and taxes	$9,807,801
Balance	6,391,757
Interest charges, Interurban Rapid Transit Company	1,996,370
Balance	$4,395,387
Discount, etc	19,185
Surplus for dividends	$4,376,202

Report of Chicago Railways Company for May

The Chicago (Ill.) Railways Company has reported its earnings for May, 1909. A comparative statement of the earnings follows:

May.	1909.	1908.
Gross earnings	$1,055,160	$902,482
Expenses:		
Maintenance way and structures	55,180	41,015
Maintenance equipment	59,501	67,678
Operation power plants	110,832	78,073
Operation cars	325,010	290,220
General expenses	124,619	103,960
Expense investment real estate	3,446	2,798
Taxes (estimated)	31,156	16,608
Total	$709,744	$600,352
Balance (actual)	345,416	302,129
Balance based 70 per cent operating	316,548	270,744
Deduct interest 5 per cent on valuation	176,437	137,625
Net income	$140,110	$133,118
City of Chicago, 55 per cent	77,060	73,215
Chicago Railways Company, 45 per cent	63,049	59,903

Carlisle & Mount Holly Railway, Carlisle, Pa.—The property of the Carlisle & Mount Holly Railway has been sold to the Cumberland Railway, recently organized. The officers of the Cumberland Railway are: John Graham, Newville, Pa., president; Walter Stuart, Carlisle, Pa., secretary and treasurer; W. F. Pascoe, Carlisle, Pa., general manager.

Dallas (Tex.) Electric Corporation.—Stone & Webster, Boston, Mass., offer, subject to previous sale, 6 per cent cumulative stock and common stock of the Dallas Electric

Corporation, consisting of 10 shares of first preferred stock and four shares of common stock at $925. A circular gives the gross earnings of the company for the year ended May 31, 1909, as $1,230,639 and the balance as $68,843, and estimates the earnings of the company for the year ending Dec. 31, 1909, to be $1,303,303 and the balance for the same period to be $117,664.

Eastern Pennsylvania Railway, Pottsville, Pa.—Julius Christensen, Philadelphia, Pa., offers at 93 and interest to yield 5½ per cent the unsold portion of a block of $100,000 of first mortgage 5 per cent gold bonds of the Eastern Pennsylvania Railway, dated 1906 and due July, 1936, but subject to call at 110 and interest. The bonds are of the par value of $500 and $1,000, and interest is payable in New York in January and July. They are part of an authorized issue of $6,000,000, of which $3,002,500 are outstanding. The Central Trust Company, New York, is trustee of the mortgage under which the bonds are secured.

Illinois Traction System, Champaign, Ill.—William B. McKinley and his associates in the Illinois Traction System are understood to have concluded negotiations for the purchase of the property of the Des Moines Electric Company as a nucleus for a system of interurban electric railways to extend from Des Moines.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—Charles L. Henry, president and receiver of the Indianapolis & Cincinnati Traction Company, has requested the court to extend the receiver's certificates so they will not become due until Aug. 1, 1910. Mr. Henry says that he proposes to extend the road from Connersville to Hamilton, Ohio, so as to secure an entrance to Cincinnati.

Iowa Light & Traction Company, Boone, Ia.—E. E. Hughes, Boone, Ia., J. H. McBride, Philadelphia, Pa., and Andrew Stevenson, Chicago, Ill., have purchased from the estate of L. W. Reynolds, the property of the Boone Electric Company and the Boone Suburban Railway, which includes all the public utilities in Boone, and after Sept. 1, 1909, will operate the properties under the name of the Iowa Light & Traction Company under a new franchise from the city for 25 years. It is proposed thoroughly to rehabilitate the different systems and to extend the Boone Suburban Railway from its present terminus on the Des Moines River to Ogden, 3½ miles distant. The officers of the Iowa Light & Traction Company follow: Henry S. Osborne, chairman of the board of directors, Chicago, Ill.; Andrew Stevenson, president and general manager, 153 La Salle Street, Chicago, Ill.; E. E. Hughes, vice-president and treasurer, Boone, Ia.; J. H. McBride, second vice-president. Philadelphia, Pa., and J. F. Hardin, secretary, Eldora, Ia.

Public Service Investment Company, Boston, Mass.—An initial quarterly dividend of 1½ per cent has been declared on the preferred stock of the Public Service Investment Company, payable on Aug. 2, 1909, to stock of record on July 19, 1909.

Second Avenue Railroad, New York, N. Y.—Judge Lacombe of the United States Circuit Court has signed an order extending the time for all parties to take testimony in the foreclosure proceedings instituted by the Guaranty Trust Company against the Second Avenue Railroad until Oct. 9, 1909. Under this order the complainant has until Aug. 9 and the defendant until Sept. 9 for the taking of testimony, and from that date until Oct. 9 the complainant is allowed to take testimony in rebuttal.

Virginia Railway & Power Company, Richmond, Va.—The distribution of the securities of the new Virginia Railway & Power Company, common and preferred stock and bonds, is expected to be made by the Equitable Trust Company, of New York, on July 25. Registrar and transfer agents have been appointed as follows: For Philadelphia, Guarantee Trust & Safe Deposit Company, registrar, Trust Company of North America, transfer agent; for New York, Equitable Trust Company, registrar, D. J. Gallagher, transfer agent; for Baltimore, Baltimore Trust & Guarantee Company, registrar, Fidelity Trust Company, transfer agent; for Richmond, Virginia Trust Company, registrar, Bank of Richmond, transfer agent.

Winchester & Washington Railway, Winchester, Va.—At the annual meeting of the Winchester & Washington Railway on July 6 the following officers were elected: Lewis F. Cooper, Winchester, president, to succeed the late Scott H. Hansbrough; Charles Mullikin, Boyce, vice-president; Shirley Carter, secretary-treasurer, and the following directors: Lewis F. Cooper, C. Mullikin, E. V. Weems, W. H. Baker, A. Moore, Harry Warden, S. L. Hoover, R. H. Chew and R. Cray Williams. A dividend of 3 per cent was declared for the six months.

Traffic and Transportation

Rules for City Car Inspectors in Cincinnati

The following rules have been adopted by the Board of Public Service of Cincinnati for the guidance of the chief car inspector and his five assistants appointed in accordance with the provisions of an ordinance passed recently by the Council of Cincinnati as noted on page 1100 of the ELECTRIC RAILWAY JOURNAL of June 12, 1909:

"1. All inspectors will be required while on duty to wear the official badge, bearing the words 'Street Car Inspector' and showing the city seal; the badge of the chief inspector is to bear the additional word 'Chief.' Inspectors will, when necessity arises, exhibit their badges as their authority for acting in their line of duty. No inspector will be allowed to ride on the front end of any car or converse with the motorman while the car is in motion and all must studiously avoid any arguments with motormen, conductors, or other employees of any street car company with which they have dealings.

"2. Inspectors shall make daily reports to the chief inspector on forms provided for the same, and the chief inspector shall make reports to the Board of Public Service at least once a week, and at any other time as ordered or as necessity may require.

"3. It shall be the duty of inspectors to inspect all street cars operated in Cincinnati as frequently as possible, by examining the condition of the safety brakes, service brakes, wheels, gears, sand boxes, fenders and all other equipment, and noting the condition of the cleanliness and sanitation.

"4. By ordinance of Council the chief inspector and inspectors have the right to enter any barn belonging to any company operating street cars in Cincinnati, for the purpose of making inspections. Inspectors must not hold any car at the end of the line after schedule time is up to leave unless found defective.

"5. Regular inspections shall be made in the barn before the cars are run out, and at the further end of routes, except in cases of companies having lay-over terminals in the city, and in such cases inspection may be made in or at such terminals.

"6. Inspectors shall forbid the use of cars which are found by them to be in an unsafe condition, and any cars so found will be reported to the barn foreman or man in charge of the barn at once, such report being made in writing on a form prepared for that purpose as provided for in Rule No. 8. When cars so reported are repaired and put into a safe condition they will be re-inspected as promptly as possible by the inspector, and if found to be in good condition, written release will be given by the inspector, allowing the car to be put back into service, but in all cases inspectors shall so arrange as to re-inspect cars within 12 hours after they are notified that they are ready for such re-inspection.

"7. While all regular inspections must be made as provided for in Rule 5, inspectors have the authority to stop any street car at any point on the streets of Cincinnati, in case they have good and sufficient reason to believe that such car has need of immediate inspection. Inspectors are specifically directed, however, to refrain from stopping cars while in operation on the streets except in cases of emergency, it being necessary to bear in mind that the safety and convenience of the traveling public are to be considered, and traffic is not to be delayed except in extreme cases. Cars on the street must not be turned into the barn unless absolutely necessary by reason of unsafe condition, and all such cars will be treated in the same way, in so far as reports and inspection are concerned, as those inspected in the barn under Rule No. 6.

"8. Blank forms will be provided upon which inspectors shall report every car found to be in unsafe condition, which form shall provide space for indicating the place where the inspection is made, the line on which the car is operated, the car number, the number of the conductor and motorman, and the direction in which the car is going (if the car is in operation on the streets), together with all details as to the condition discovered.

"9. If, in case of an emergency inspection on the streets, a car is found unsafe and is turned in, the inspector must accompany the car to the barn and see that his order is complied with and make proper report to the barn foreman.

"10. Inspectors will give no orders to any employee of any company except when emergency inspection shows that safety requires the car to be turned in, when the motorman and conductor will be so instructed.

"11. Inspectors will not make known the result of their inspection except to barn foreman or other officials of any traction company authorized to receive such report, as

provided in Rule No. 6, to the motorman or conductor in charge of car turned in from emergency inspection, and to the chief inspector, in their daily reports. Under no circumstances shall inspectors give any information or make any statement whatsoever to any other persons regarding conditions of cars inspected.

"12. Inspectors must not forbid cars to be run out of barns nor order cars turned in upon any statement or complaint whatsoever, whether it be made by an employee of any company or any other person. In every case inspectors must make their own examinations.

"13. Inspectors shall not have anything to say concerning the ordinary running or operation of cars, and will refrain from assisting in relieving blockades, settling disputes between passengers and employees, or taking part in any affairs of a similar nature.

"14. Inspectors will arrange so as to go over the tracks of every street railway operating in Cincinnati as frequently as possible, paying especial attention to all tracks on grade; and they shall report all unsafe conditions that may be found, including such report in their daily report to the chief inspector, and giving the exact location and conditions as found.

"15. In fair weather, when tracks on grades do not require the attention of inspectors, they shall endeavor, as far as possible, without interfering with the inspection of cars, to watch the schedule of the various lines as to the headway and number of cars operated so as to be able to furnish the chief inspector with such information as will make it possible for him to at all times give the Board of Public Service all information with reference to car schedules."

Arbitrators Decide in Favor of Pittsburgh Railways Company

In the settlement of the differences between the employees of the Pittsburgh Railways Company and the company recently only one subject was left over for final adjustment. This was the question of whether a motorman discharged for drinking while in uniform should be reinstated, the company's rule covering this point making discharge the punishment on the first offense. D. B. Oliver and W. J. Brennan acted as arbitrators, and they sustained the company in declaring rigid enforcement of the rule "necessary for the good of the service," but expressed the opinion that in the case under review discharge was too drastic a punishment, this being the first offence. The decision of the arbitrators follows:

"In pursuance of our appointment as arbitrators in the dispute between the Pittsburgh Railways Company and its employees, we met and considered the questions involved and the subjects submitted to arbitration and agreement. The question at issue is the summary discharge of James Ashford, a motorman in the company's service. The company claims Ashford violated one of its rules by entering a tavern and taking a drink of liquor while wearing the company's uniform. Ashford admits the truth of the charge.

"After considering the matters submitted to arbitration and agreement, we came to the conclusion that we could agree without the selection of a third arbitrator, as the matters in controversy were not of such character as required the taking of testimony, as the facts and questions involved were not disputed by either side of the parties to the controversy.

"Owing to the weighty responsibility lying on the company in case of accidents involving loss of life or limb, or damage to property, the interest of the general public, the company and its operating force require that the company shall have a free hand in the matter of hiring and discharging its employees. Under existing conditions we regard this as imperative; at the same time due discretion is to be used by the company in exercising these powers so as to induce and promote faithful and efficient service on the part of its employees, and just and generous treatment of them by the company; they must be exercised in good conscience and no snap judgment must be taken, and care must be had that they do not at any time become the means of carrying out the dislikes that sometimes arise in the minds of the sub-bosses.

"In Ashford's case we find that he was, in the language of the rule, 'sober and temperate,' that he had been an acceptable employee of the company for 12 years; that on the occasion in question he had finished his run and had worked some over-time and was on his way home; that it took place in a saloon on a street on which there is no car line, to which he was followed by the inspector who reported him. The rule, dated April 20, 1907, is as follows:

"'For the betterment of the service and the safety of the public, it will from this date be the policy of this company not to retain in its employ men who use intoxicating liquors or cigarettes or are in the habit of gambling. While it is the privilege of each individual to eat, drink and smoke what he pleases, it becomes the duty of this management to have in the service only men of sober and temperate habits, physically and mentally able to perform the duties to which they may be assigned. For employees discharged for violation of any of the provisions of this rule there is no appeal.'

"Another rule found in a book issued to the employees relates to drinking intoxicating liquors and makes discharge the penalty for infraction. It says:

"'Entering, while in uniform or while on duty any place where the same is sold or dispensed, except in case of necessity.'

"The main object of this rule is to provide that the men shall be 'sober and temperate;' that is its primary consideration, all else is secondary. The rule is good and necessary, but a method of its enforcement which, for a first violation of one of its provisions summarily compels the loss to the company of the services of a capable employee and to that employee his means of support for himself and family, cannot be regarded as a just and generous enforcement or of a kind to win faithful and efficient service on the part of its employees.

"In view, therefore, of these conditions, our finding is that James Ashford be reinstated in the company's employment and that he be allowed 20 days' pay for the time he was off duty."

Finding of Massachusetts Commission in Methuen Fare Case

On June 25 the Massachusetts Railroad Commission gave a hearing on the petition of the Selectmen of Methuen for a reduction of the fare from 10 cents to 5 cents on the Lawrence-High Dracut line of the Boston & Northern Street Railway between the Broadway and Essex Street transfer station in Lawrence and the Methuen-Dracut town line, as mentioned on page 54 of the Electric Railway Journal for July 3, 1909. The opinion of the commission, rendered on July 9, follows:

"The application, briefly stated, requests the board to recommend to the Boston & Northern Street Railway Company an extension of its fare zone in the town of Methuen to the Dracut line. The present fare limit is at a point known as 'Private Lands,' where the line of the company leaves the highway and for something over a mile runs over private lands to the Dracut line. The existing fare zone is one of three covering the route from Lowell to Lawrence, and the established fare between these cities is 15 cents, with transfer privileges.

"Any readjustment of the fares in Methuen as petitioned for would have an important if not a controlling effect upon the through fare from Lowell to Lawrence, and might have a serious effect upon existing privileges of free transfer. The sole question before the board is the reasonableness of the rate. Having in view the present fares of the company, and the free transfer privileges, it does not appear that the fare complained of is unreasonable or excessive, and we do not therefore recommend the extension of the fare limit.

"During the hearing it appeared that conductors of cars over this route are accustomed to make collection of fares before reaching the zones for which the fare is payable, resulting, in some instances, in overcharge for patrons not intending to make the through trip between Lowell and Lawrence. The attention of the company is specifically directed to this condition, and the board recommends that clear and specific instructions be given by the management with respect to the established fare zones and points of collection."

Letter to Springfield (Ill.) Consolidated Railway Employees on Conduct

C. S. Goodwill, superintendent of transportation of the Springfield (Ill.) Consolidated Railway, recently addressed the following letter to the employees of the company:

"This letter is addressed to you, and I hope will appeal to you in what it contains. Your hearty co-operation cannot help but get good results for yourself and the company for which you are working.

"Remember that a company is judged by the public through the appearance and gentlemanly conduct of its employees. Be neat and clean at all times. Don't forget to blacken your shoes once in a while. Be courteous in answering questions. Don't carry on unnecessary conversation with passengers.

"Motormen should not talk to passengers while cars are in motion. Motormen should ring their gong at all cross-streets and when passing vehicles in the street. Your at-

tention is especially called to the ringing of gongs. In the future this will be watched closely, and I hope it will not be necessary to cause any one any inconvenience for not obeying this rule.

"Motormen should not run with vestibule gates open at any time.

"When carrying large loads, motormen, help your conductor all you can.

"Don't 'yell' at the crews on passing cars. Don't run by another car that is standing still, or running, at a reckless rate of speed.

"Conductors now have open cars to work, on most lines, and should be careful about people getting on or off while the cars are in motion. Don't be afraid to 'yell' at them 'Wait until the car stops.' Let them know that you are alive; it may save you writing out an accident report.

"Your attention is called to the careful operation of your car at all times. It is not necessary to run like mad from one end of the line to the other and abuse the car equipment. Take your time feeding the power by your controller.

"Don't be taking in all the sights through the city while your car is in motion.

"Don't forget to make your safety stops or slow-downs. Be careful at railroads. Look back before starting your car at railroads to see that no one is getting on or off.

"If you should have an accident, don't forget to make a full report at once, and be sure to get plenty of witnesses. All serious accidents report to the inspector, or direct to the office by telephone. Look—and be sure at railroad crossings. Don't take any chances.

"When you have read this, sign your name and give it to the inspector in charge."

Tacoma Company Experimenting with New Safety Car Gates.—The Tacoma Railway & Power Company, Tacoma, Wash., is experimenting with a new safety car gate with a view of adopting it for use on all its cars.

Bonuses for Employees in Washington, D. C.—Through a typographical error in the ELECTRIC RAILWAY JOURNAL of July 17, 1909, it was stated that the Capital Traction Company, Washington, D. C., distributed $1,600 in bonuses to 226 of its motormen and conductors for efficient service during the year. The amount distributed by the company was $16,000.

Extension of Pay-as-You-Enter System in Columbus, Ohio.—The Columbus Railway & Light Company has extended the use of pay-as-you-enter cars to its Main Street line. Cars of this type were first placed in operation on the Oak Street line of the company, and it is said that not a single serious accident has been reported on this line during the four months that the pay-as-you-enter cars have been in service.

Additional Transfer Points in Philadelphia.—Twenty-eight additional transfer points have been established by the Philadelphia Rapid Transit Company for the convenience of the residents of South Philadelphia. The company has also decided to inaugurate a double-loop system between Arch Street and Catharine Street and Second Street and Eighteenth Street. The purpose of this loop is to enable patrons to reach the central section of the city from points downtown, and vice versa, for one fare.

New Trolley Express Service Between Boston and Worcester.—A two-car express passenger service was inaugurated by the Boston & Worcester Street Railway, Boston, Mass., between Boston and Worcester on July 12. The express cars leave Worcester at 8:05 a. m. and 9:05 a. m. and arrive at Park Square, Boston, at 9:50 a. m. and 10:50 a. m., respectively, and leave Park Square at 4 p. m. and 5 p. m., and arrive at the City Hall, Worcester, at 5:45 p. m. and 6:45 p. m., respectively. Only two stops are made between Boston and Worcester.

Traffic Records Broken in Portland, Ore.—B. S. Josselyn, president of the Portland Railway, Light & Power Company, Portland, Ore., has compiled a record of passenger business handled by the company during the Rose Festival week. During the six days of the festival the various divisions of the service carried the unprecedented total of 1,751,745 passengers, an average of 291,957 for each day. During the celebration last year the company carried 1,564,145, the increase this year over last being 187,600, or 12 per cent. Not an accident or a mishap of consequence occurred during the week.

Employees' Benefit Association of the Fort Wayne & Wabash Valley Traction Company.—The report of Chas. W. Guild, treasurer of the Fort Wayne & Wabash Valley Traction Company Employees' Mutual Benefit Association, which is composed of employees of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., shows that the association has paid out $2,712.19 since Oct. 1, 1907, of which amount $2,100 was distributed in death claims. The secretary of the association reports that the association has a total membership of 673. This is 90 per cent of the entire number of men employed by the company.

Warning Signs in Chicago.—The Chicago (Ill.) City Railway has posted signs in all of its cars which call attention to the dangers of crossing tracks in front of moving cars and of getting caught between cars running in opposite directions. The text of the poster is: "Be careful. Take no chances when crossing tracks. To be run down by or caught between cars means serious injury. Vigilance is the price of safety." The posting of these signs is part of a general campaign by the company to warn people of the dangers of getting caught between cars operating over the reconstructed lines in Chicago which have a standard distance between track centers of 9 ft. 8½ in.

Trolley Trips in the Hudson-Mohawk Valleys.—This is the title of a very interesting folder issued by the Schenectady (N. Y.) Railway, describing the many historic places along its lines in the Hudson and the Mohawk Valleys. The Schenectady Railway operates three separate lines: from Saratoga Springs to Schenectady, from Schenectady to Albany, and from Schenectady to Troy. The folder opens with a paragraph on the early history of transportation between Schenectady and Albany, and illustrates, in colors, the first steam locomotive to operate between the two cities on Sept. 24, 1831. It also contains an illustrated description of the encounters between the Indians and the early settlers in the region traversed by the Schenectady Railway. There are two maps, which show the lines of the Schenectady Railway and its connections, and one of Lake George. The publication is concluded with the rates of fare and a list of connections made with other transportation lines in the territory served by the company. The covers are printed in colors and are illustrated with scenes in the principal streets in Saratoga, Schenectady, Troy and a picture of the State Capitol at Albany.

Interchange Order in Indiana.—Mention was made on page 93 of the ELECTRIC RAILWAY JOURNAL of July 10, 1909, of the order issued by the Indiana Railroad Commission directing that on or before Aug. 15, 1909, the Evansville, Suburban & Newburg Railway and the Evansville Terminal Railway establish a connection and interchange freight after that date. The order of the commission follows: "It is now ordered that the said respondents on and after Aug. 15, 1909, shall interchange with each other all business in carload lots moving from one line to another, from one point to another point in this State. It is further ordered, that on or before Aug. 15, 1909, the said respondents, Evansville, Suburban & Newburg Railway and Evansville Terminal Railway, shall construct on the north side of their said railroads at the point of intersection near Newburg, Ind., a track of railway to be used by said companies as a transfer track between their said lines, the cost of constructing and maintaining said track to be borne equally by said respondents. It is further ordered that a copy of this order duly certified shall be forwarded by the secretary to the general managers or superintendents of said companies by registered mail."

Awards for Suggestions in Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company has awarded cash prizes to motormen and conductors who have submitted suggestions of value to the management. Ten men received $10 each and 56 men received $2 each. The prizes of $10 each were awarded for suggestions covering a variety of subjects. One first-prize winner suggested a change in route to avoid two crossings, another made a suggestion for the use of the back of transfers, another suggested means for the co-operation of employees in accident work, another suggested improvements in witness blanks, another suggested means for preventing boarding and alighting accidents. The company has issued the first of a series of cards commenting on the suggestions received. This card says: "A considerable number of letters submitted by conductors and motormen in connection with our recent 'suggestion' contest touched upon the fact that some few motormen still persist in the needlessly dangerous practice of starting their cars upon receipt of but one bell. The regulations covering the matter of signals are very clearly set forth. Failure to observe them can be attributed only to indifference. If your signal bell does not work properly report the matter at once. Motormen are herewith cautioned against putting their cars in motion until they first shall have received the full signal of two bells."

Personal Mention

Mr. Walter S. Heaton has been appointed claim agent of the Los Angeles-Pacific Company, Los Angeles, Cal. Mr. Heaton was formerly general Western agent of the Ohmer Fare Register Company.

Mr. Francis A. Stratton, president of the Northern Westchester Lighting Company and the Peekskill Lighting & Railroad Company, Peekskill, N. Y., has been elected president of the Westchester Lighting Company.

Mr. J. Brodie Smith, vice-president and general manager of the Manchester Traction, Light & Power Company, Manchester, N. H., was married on July 14 to Miss Charlotte Dodd Stewartson by the Rev. Thomas Chalmers. Miss Stewartson is a graduate of the medical department of Tufts College, class of 1900, and is a member of the Massachusetts and New Hampshire Medical Societies and since 1902 has practised in Manchester. Mr. Smith, besides being vice-president and general manager of the Manchester Traction, Light & Power Company, is treasurer of the Brodie Electric Company and is a trustee of the Manchester Savings Bank. He is also an associate member of the American Institute of Electrical Engineers.

Mr. W. A. Gibbs, whose resignation as district manager of the Ohio Electric Railway, with headquarters at Springfield, Ohio, was announced in the Electric Railway Journal of July 17, 1909, has become associated with an organization which is interested in the purchase and development of public utility properties. Mr. Gibbs and his associates have already purchased a street railway and electric lighting plant in Cambridge, Ohio, and as soon as he severs his connection with the Ohio Electric Railway Mr. Gibbs will devote his attention to the improvement and extension of the properties at Cambridge. After the rehabilitation of these utilities has been accomplished, Mr. Gibbs will assist his associates in managing other railway and light companies which they control.

Mr. H. C. Patterson, whose appointment as mechanical and electrical engineer of the Illinois Traction System, Peoria, Ill., to succeed Mr. H. C. Hoagland, was noted in the Electric Railway Journal of July 10, 1909, has had an experience of more than 30 years, covering the mechanical, electrical and hydraulic branches of engineering, being especially wide along the lines of cost of construction and maintenance of public utility properties. Previous to 1880 Mr. Patterson was engaged in construction and design of engines, boilers, tools etc. In 1880 he became connected with the engineering department of the New York Edison Company and assisted in the construction of the first station in New York. In 1882 Mr. Patterson was sent to Europe by the Edison interests to assist in constructing the first lighting stations there. From 1883 to 1886 he was connected with the sales department of the Brush Electric Company, Cleveland, Ohio. In 1885 he entered the employ of the Thomson-Houston Company, Boston, organized the engineering department and subsequently was appointed chief engineer of the company. When the Thomson-Houston Company was succeeded by the General Electric Company Mr. Patterson continued with the General Electric Company, for which he designed and constructed more than 75 railway and lighting plants. During this time he also acted as an independent consulting engineer, in which capacity he selected for the West End Street Railway, Boston, the location of its plant and was more or less closely identified with its construction. For many years Mr. Patterson was a member of the committee which managed local light and power companies in which the General Electric Company was financially interested. About 1895 Mr. Patterson was appointed receiver of the Consolidated Lighting Company, Dover, N. H., and for a year managed the railway, lighting and gas interests there. Between 1896 and 1902 Mr. Patterson was manager of the municipal lighting and water plant of Austin, Tex. Since 1902 he has engaged as an independent consulting engineer, with offices in Boston. As electrical and mechanical engineer of the Illinois Traction System Mr. Patterson will design, construct and supervise the operation of stations on the system. He is at present at work on a 20,000-hp plant for Venice, Ill., and another for Wichita, Kan.



H. C. Patterson

Mr. F. L. Richards has been appointed trainmaster of the Illinois Traction System, with headquarters at Springfield, Ill. This is Mr. Richards' first experience in electric railway work. He has, however, had more than 20 years' experience in steam railroading. He entered railroad work in 1882 with the Erie Railroad as a telegraph operator and subsequently became a train dispatcher. In 1888 Mr. Richards became chief dispatcher for the Buffalo, Rochester & Pittsburg Railroad, and in 1890 he entered the employ of the Chicago, Milwaukee & St. Paul Railway, with which he served as dispatcher, chief dispatcher and trainmaster of various divisions. In 1903 he was appointed assistant superintendent of the Chicago, Rock Island & Pacific Railroad between Albert Lea and Minneapolis and the terminals. In 1904 Mr. Richards entered the employ of the Chicago & Alton Railroad, and remained with it until June, 1909, when he resigned to become connected with the Illinois Traction System. During his connection with the Chicago & Alton Railroad Mr. Richards acted as passenger trainmaster, trainmaster and assistant superintendent.

NEW PUBLICATIONS

Poor's Manual for 1909. New York: Poor's Railroad Manual Company; 2362 pages. Price, $10.

This publication is now in its 42d year and its value is generally recognized. The data in the present volume are divided into three main groups: the steam railroad section, the street railway section and the industrial section, the latter including manufacturing, water, gas, electric light and other companies. In addition there are lists giving data of annual meetings, addresses of transfer agencies, dividend tables, etc. In the street railway section the roads are grouped by States except in the case of the roads controlled by Stone & Webster, which are published together, and of some holding companies which appear in the industrial section.

Grounded Electric Transmission and Electrolytic Corrosion. By J. Stanley Richmond, Consulting Engineer. Toronto, 1909: The *Canadian Engineer.* Paper, 70 pages. Price, 50 cents.

This is a reprint from the *Canadian Engineer* of a series of articles by an engineer who has made a specialty of studying the effects of electrolytic action on buried pipes and means for preventing such action. The author briefly outlines the history of the use of the earth as a return conductor in the development of various applications of electricity and gives a short bibliography of the subject. He then discusses methods of measurement for the detection of stray current, track drops, voltage contour lines, rail bonding and transverse stray transmission. The author's general conclusions on the prevention of electrolytic action are interesting and are reprinted below:

"Do everything possible to prevent assisting earthed conductors to collect stray transmission. Do everything possible to collect all stray transmission in earthed conductors at a lower voltage than the voltage of contiguous rails. Do everything possible to keep each and every portion of the return in a first-class condition—a bad return system costs considerable money every year in the form of wasted power. In any centralized system of electric traction, such as that of a city, plenty of insulated return copper is a good investment for the traction company.

"Electrolytic corrosion of pipes due to grounded transmission mediums can be made a negligible factor by:

"(1) Good condition of bonding.

"(2) Special long bonding at all special track work.

"(3) Insulation of generators from ground in power house—this includes the connections between the generators and the switchboard.

"(4) Insulation of all auxiliary return copper between switchboard and equi-voltage points—this includes pipe drainage copper.

"(5) Removal of all bond connections between rails and other earthed conductors, such as pipes, cable sheaths, etc.; the only connections permissible being those to pipe drainage and insulated return cables.

"(6) Treatment of bad local conditions at outlying dangerous points.

"Don't bond cable sheaths to the track rails. Run an insulated 'stray transmission cable' in a duct by itself. To this cable should be bonded at each manhole all the cable sheaths, the connection between the bonded sheaths and the insulated 'stray transmission cable' to be by means of insulated jumpers. To drain the 'stray transmission cable' it should be connected to the low voltage side of the generators in the power house, but not to the pipe drainage cable."

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Monterey & Del Monte Heights Railway, Monterey, Cal.—Incorporated to construct a street railway from Monterey to Seaside, a distance of 5 miles. Capital stock, $100,000. Officers: H. R. O'Bryan, president; Geo. W. Phelps, vice-president; A. G. Metz, secretary and treasurer, and F. M. Fairchild, 1707½ Oak Street, San Francisco, general manager. [E. R. J., July 3, '09.]

***Detroit, Lansing & Grand Rapids Railway, Lansing, Mich.**—Incorporated to build an electric railway to connect the cities named in the title. Capital stock, $25,000. Incorporators: Oliver H. Lau and Henry M. Wallace, Detroit.

***Cedar Point (Ohio) Railway.**—Incorporated to build an electric railway along the lake shore to connect the Cedar Point resort with the Lake Shore Electric Railway at Sandusky. Capital stock, $10,000. Incorporators: W. C. Phelps and others.

***Northwestern Traction Company, Columbus, Ohio.**—Chartered to build an electric railway from Newark via Fallsburg, West Carlisle, Cooperdale and Wakatomika to Coshocton and New Philadelphia. Capital stock, $25,000. Incorporators: G. W. Oxley, E. S. Crawford, T. S. Sharpless, S. H. Miller and J. M. Magruder.

***Interstate Interurban Railway, Waynesburg, Pa.**—Chartered to build electric railways in West Virginia and Pennsylvania. Capital stock, $8,400. Incorporators: W. J. Sheldon, McKeesport, Pa.; J. C. Sheldon, Buffalo, N. Y.; T. H. Shannon, R. B. Blair and R. B. Chaleroi, Waynesburg.

Marshall (Tex.) Traction Company.—Incorporated to build an electric railway within the corporate limits of Marshall. Capital stock, $25,000. Incorporators: Marvin Turney, F. H. Prendergast, John Copeland and others. [E. R. J., Jan. 16, '09.]

***Helper Western Electric Railway, Helper, Utah.**—Incorporated in Utah to build an electric railway from the Denver & Rio Grande Railroad at a point 2 miles southeast of Helper, through Carbon County. Capital stock, $15,000. Incorporators: J. F. Williamson, Salt Lake City, president; C. L. Crandall, vice-president; H. B. Tyrrall, Provo, secretary and treasurer; G. W. Higgins, Clinton, Ind., and J. A. Thorne, Springfield, Ill.

***Clark County Railway, Vancouver, Wash.**—Incorporated to build electric railways in Clark County. Headquarters, Vancouver. Capital stock, $150,000. Incorporators: Bert Yates, J. W. Sifton and O. C. Spencer. Directors: Jas. G. Kidwell, Walla Walla; J. H. Murphy, A. Welch, C. E. Moulton and O. C. Spencer.

FRANCHISES

***Escondido, Cal.**—G. W. Pursell, San Diego, has applied to the City Council for a franchise for an electric railway to be built from San Diego to Escondido.

Ocean View, Cal.—The Board of Trustees has granted to the Southern Pacific Railroad a franchise for the construction of an electric railway, that company being the only bidder. The franchise provides that the company may enter and leave the city via Shattuck Avenue and California Street.

***Yuma, Col.**—Messrs. Karr, Kester & Speese have applied to the City Council for a 25-year franchise over the streets of Yuma for an electric railway to be operated in connection with the Colorado River Railroad, which they propose to build.

Galesburg, Ill.—S. F. Atwood, secretary of the Peoria & Galesburg Railway, has applied to the City Council for a 35-year franchise to operate a street railway in Galesburg. [E. R. J., May 15, '09.]

Hampton, Ill.—A 20-year franchise has been granted to the Tri-City & Northeastern Interurban Railway, Port Byron, by the Town Board. J. W. Simonson, Port Byron, president. [E. R. J., June 19, '09.]

Paxton, Ill.—The Chicago, Kankakee & Champaign Electric Railway has been granted a 50-year franchise by the Board of Trustees to construct an electric railway through Paxton. [E. R. J., July 10, '09.]

Chanute, Kan.—The City Council has granted the Chanute Electric Railway a year's extension of its franchise, until July 10, 1910, in which to begin work on its railway. [E. R. J., July 18, '08.]

Worcester, Mass.—The Board of Aldermen has granted to the Worcester Consolidated Street Railway a franchise to lay tracks in Hamilton Street from the terminus of the present route to Lake Park.

Butte, Mont.—The Board of County Commissioners has granted to the Butte Electric Railway a franchise to build an electric railway in the McQueen addition. The new railway will connect with its Garden Street tracks and will extend northerly for 1 mile. J. R. Wharton, manager.

Missoula, Mont.—A 50-year franchise has been granted to the Missoula Street Railway by the County Commissioners to build an electric railway within a radius of 4 miles outside the city limits from the south end of the Higgins Avenue bridge. W. A. Clark, Butte, is interested. [E. R. J., March 13, '09.]

Bryan, Ohio.—Application to the City Council has been made by the Fort Wayne & Toledo Electric Railway, Harlan, Ind., for a franchise. The company proposes to build an electric railway from Fort Wayne, Ind., to Bryan, Ohio, 55 miles. R. T. Bastress, Harlan, general manager. [E. R. J., March 27, '09.]

New Albany, Ohio.—The Columbus, New Albany & Johnstown Traction Company has applied to the City Council for a franchise to build a street railway through Main Street, New Albany.

Plymouth, Wis.—A franchise has been granted to the Milwaukee & Fox River Valley Railway to build a street railway in Plymouth. [E. R. J., May 16, '08.]

TRACK AND ROADWAY

Edmonton (Alta) Radial Railway.—A company represented by R. Brutinelle is said to be negotiating with the City Council for the purchase of the interurban franchise of the street railway. If an agreement is effected, the company will build as far as the White Star coal mines, 7 miles distant, during the summer. Among other things the company agrees to purchase the charter now owned by Edmonton, which was purchased last year from the Strathcona Radial Tramway Company and which grants to the company the right to construct radial lines within a radius of 80 miles from the center of Strathcona.

Suburban Railway, Phoenix, Ariz.—C. B. King advises that this company has secured franchises for its proposed street and suburban railway and has not as yet done anything toward construction. [E. R. J., July 3, '09.]

Fort Smith, Subiaco & Eastern Railroad, Paris, Ark.—This company has filed a certificate to extend its proposed electric railway from Subiaco to Scranton, 8 miles. The present railway is from Paris to a point near Subiaco, a distance of 7 miles. The company has changed its name to the Subiaco Traction Company. [E. R. J., July 18, '08.]

Grand Junction Electric Railway, Colorado Springs, Col.—It is officially announced that work will be started soon on the interurban railway between Grand Junction and Palisades, a distance of 17 miles. It will be extended to Fruita. The railway is expected to be completed next April. E. A. Sunderlin, general manager. [E. R. J., Dec. 5, '08.]

Denver (Col.) Interurban Railroad.—It is stated that this company will extend its railway from Louisville to Lafayette and from there to Longmont, building 12 miles of double track, one track to be used for freight and the other for passenger service.

Chicago, Kankakee & Champaign Electric Railway, Champaign, Ill.—It is stated that this company has secured the principal franchises along the route and most of the right-of-way. It is probable that a new company will be incorporated to take over the holdings and rights of the Chicago, Kankakee & Champaign Electric Railway so as to secure funds for carrying out the plans of the old company and to provide for future extensions. Upton Schaub, vice-president. [E. R. J., July 10, '09.]

Iowa Railroad, Chicago, Ill.—The ELECTRIC RAILWAY JOURNAL is officially advised that this company, which proposes to build an electric railway between Waterloo and Des Moines, has purchased from the estate of L. W. Reynolds all of the public utilities in Boone, Ia., and vicinity heretofore controlled by that estate. These consist of the Boone Electric Railway & Light Company, the Boone Suburban Railway and the Central Heating plant. The Iowa Railroad will begin operating these properties on Sept. 1, under the name of the Iowa Light & Traction Company. The entire systems will be rehabilitated, and it is probable that the Boone Suburban Railway will be extended from its present terminus on the Des Moines River to Ogden, a distance of 3½ miles. The City Council of Boone has granted 25-year franchises covering all the utilities which the Iowa Light & Traction Company will operate. The officers of the new company are as follows: Henry S. Osborne, Chicago, chairman of board; Andrew Stevenson, 153 La Salle Street, Chicago, president and general manager; E. E. Hughes, Boone, Ia., vice-president and treasurer; J.

H. McBride, Philadelphia, Pa., second vice-president; J. F. Hardin, Eldora, Ia., secretary. The Iowa Railroad is also negotiating for the purchase of the public utilities in Marshalltown, Ia., and the properties of the Tama & Toledo Electric Railway & Light Company. These systems will be operated under one management if satisfactory terms are reached. [E. R. J., Jan. 9, '09.]

*Cornell, Ill.—H. W. Knight is said to be promoting a plan to build an electric railway which is to extend from Peoria and Bloomington to Eureka, then to El Paso, Gridley, Flanagan, Cornell, Blackstone, Ransom, Seneca and Chicago.

East St. Louis, Caseyville & Eastern Railway, East St. Louis, Ill.—Grading has been started by this company on its proposed railway from East Lansdowne to Caseyville. F. G. Harding and Joseph Harding are interested. [E. R. J., Jan. 16, '09.]

Manhattan City & Interurban Railway, Manhattan, Kan.—It is announced that this company, which has only been in operation since June 1, will make extensions to its electric railway in Manhattan. It is the intention to establish a park on College Heights and extend the line to this point, a distance of about 1 mile. Jos. T. West, Manhattan, secretary and general manager.

Kentucky Electric Railway, Providence, Ky.—It is stated that this company has made surveys for its proposed electric railway from Providence to Dawson Springs, 20 miles, which will eventually extend east to Madisonville. J. T. Edwards, president. [E. R. J., July 3, '09.]

*Cumberland, Md.—It is stated that the Marion Railroad has sold all its rights, titles, interests and franchises to Clement L. Shaver, Fairmont, W. Va. A new company to be known as the Fairmont & Northern Traction Company will be incorporated and the holdings of Mr. Shaver will be turned over to the new company, which will construct an electric railway from Fairmont to Fairview and Blacksville.

*Detroit, Lansing & Grand Rapids Railway, Lansing, Mich.—It is stated that this company, which is to build an electric railway from Detroit to Grand Rapids via Lansing, has let the contract for building the railway to the St. Johns Construction Company, Chicago, Ill. Oliver H. Lau, Detroit, interested.

*Manistee, Mich.—It is stated that the R. G. Peters Lumber Company will electrify the railway from its timber land on Lake Mitchell to Manistee, about 7 miles distant.

Missouri River, Carrollton & Northwestern Railroad, Carrollton, Mo.—This company advises that it is now making its preliminary survey for its proposed electric railway from Carrollton to the boat line on the Missouri River and to Northwest Carroll. Herndon Ely, president. [E. R. J., July 10, '09.]

North Missouri Central Railway, Mexico, Mo.—This company has been organized for the purpose of building an electric railway from Columbia to Jefferson City and Mexico, 63 miles. It will connect with the Missouri Pacific Railway at Jefferson City and the Chicago & Alton Railroad at Mexico. The contract for the building of this proposed railway has been let to the Franklin Construction Company, St. Louis, Mo. Officers: O. F. Spaete, St. Louis, president; H. C. Hoagland, Decatur, Ill., vice-president and general manager; A. J. Estes, Columbia, secretary and treasurer. Directors: F. W. Niedermeyer, C. B. Rollins, T. S. Gordon, L. F. Conley, L. B. Bass, E. C. Clinkscales, all of Columbia, and G. T. Odell, Chicago, Ill., and V. H. Roberts, St. Louis. [E. R. J., July 10, '09.]

Brooklyn (N. Y.) Rapid Transit Company.—Application has been made to the Public Service Commission of the First District by the Brooklyn Rapid Transit Company for permission to substitute for the cable power of its Montague Street line the overhead trolley system. W. S. Menden, chief engineer of the company, told the commission that by means of the change the Montague Street cars, instead of stopping at Court Street, would run through Fulton Street to Fulton ferry, and that transfers would be given to the lines on Sands Street. As the necessary consents have been obtained, it is understood that the commission will grant the application. [E. R. J., July 17, '09.]

New York, Westchester & Boston Railway, New York, N. Y.—It is stated that the grading of this railway, which is to be a double-track electric system, connecting New York and Portchester, a distance of 65 miles, has started in New Rochelle. The expense of this project will be $21,000,000 for road and equipment. The railway will be controlled by interests which obtained possession of the New York, Westchester & Boston Railway and the New York & Portchester Railway franchises. The contract for the work on the railway between the Bronx and Portchester has been let to the Ferguson Contracting Company, New York and Pittsburgh.

Putnam & Westchester Traction Company, Peekskill, N. Y.—This company advises that its railway now extends from Peekskill to Oregon, which previously extended only to Varian's Mills. The new extension is about 1½ miles long.

*Minot, N. D.—It is reported that H. F. Bartling is interested in a plan to construct an electric railway from Minot to the Canadian boundary.

*Cleveland, Ohio.—It is reported that Charles Phelps is securing the rights of way for an electric railway to extend between Cedar Point and Rye Beach, near Huron, which will connect with the main line of the Lake Shore Electric Railway.

Hocking-Sunday Creek Traction Company, Nelsonville, Ohio.—C. W. Juniper, secretary of the Nelsonville, Athens & Gloucester Traction Company, writes that this company has been recently sold and transferred its rights of franchises, etc., over to the Hocking-Sunday Creek Traction Company, which proposes to construct a gasoline motor system over the same route of the old company. It is probable that construction work will be started within a few days. The proposed railway will connect Nelsonville, Gloucester and Athens. Capital stock authorized, $300,000. Officers: E. B. Young, president; Charles A. Vorhes, vice-president; Charles Tutt, Nelsonville, general manager; Warren H. Badger, chief engineer, all of Nelsonville. [E. R. J., June 26, '09.]

Ohio Central Electric Railway, Uhrichsville, Ohio.—Carl C. Conkle, president, advises that the engineering preliminaries have been completed and that the company is now ready to begin grading the proposed electric railway. Construction work is scheduled to begin Aug. 1. The proposed line will connect Wheeling, W. Va., Bridgeport, Cadiz, Uhrichsville and Dennison, a distance of 52 miles. It is proposed to install the overhead trolley system. Capital stock authorized and issued, $500,000; bonds authorized, $1,250,000. Offices, Uhrichsville and 1306 Machesney Building, Pittsburgh, Pa. Officers: Carl C. Conkle, Pittsburg, Pa., president; Wylie N. Taylor, Wellsburg, W. Va., vice-president; C. U. Patterson, Uhrichsville, secretary; H. L. Thompson, Uhrichsville, treasurer; A. Evans Townsend, Cadiz, general manager. [E. R. J., June 19, '09.]

Berlin & Waterloo Street Railway, Berlin, Ont.—The ratepayers have approved a by-law to raise $19,000 for double tracking a section of the street railway track between Berlin and Waterloo. [E. R. J., June 26, '09.]

Windsor, Essex & Lake Shore Rapid Railway, Windsor, Ont.—It is reported that this company will extend its railway to Chatham and London from its present eastern terminus at Leamington. Spur lines will also be constructed on this new route.

Pittsburgh, Monongahela & Washington Railways Company, Pittsburgh, Pa.—Surveys are being made by this company, under the direction of J. A. Morrow, for a route for the proposed electric railway from Monongahela to Washington, 32 miles. At a recent stockholders' meeting the name of the company was changed from Monongahela & Carrol Street Railway to Pittsburgh, Monongahela & Washington Railways Company. About 1700 ft. of track has been laid in Monongahela. The contractors are Phil & Miller, Pittsburgh. J. W. Bridge, general manager.

Holmesburg, Tacony & Frankford Electric Railway, Tacony, Philadelphia, Pa.—This company has placed orders for 2400 ft. of Lorain 95-lb. girder rails, ties, joints, etc., for reconstruction work.

San Angelo, Tex.—J. J. Lanin advises that no company has yet been organized to build the proposed railway from San Angelo to Carlsbad and Sterling City. An organization will be effected at once. It is the intention of the promoters to begin construction work on Aug. 15. The officers of the preliminary organization are: W. H. Shaffer, president; A. H. Shaffer, vice-president; J. J. Lanin, New Hampton, Ia., manager, to whom all communications should be addressed. [E. R. J., July 10, '09.]

Ogden (Utah) Rapid Transit Company.—This company has opened its electric railway for traffic up through Ogden Canyon as far as Perry. A half-hour schedule will be maintained on the line during the summer. Work is still progressing on the extension, which has already reached the Hermitage.

Utah Light & Railway Company, Salt Lake City, Utah.—W. H. Bancroft, president of this company, has approved of the plans for the proposed Ninth Avenue and Eighth West Street extensions of the street railway, which have been prepared by Chief Engineer L. L. Dagron. The Ninth Avenue extension will be a continuation of the line north

on B Street from Sixth Avenue to Ninth Avenue, and thence east to K Street. Standard 65-lb. steel rails and the 80-lb. high T-rails will be used. The estimated cost of the improvements is $56,000.

Everett & Cherry Valley Traction Company, Everett, Wash.—It is stated that construction work is to be started at once on an electric railway from Monroe up the Snoqualmie Valley. The contract is said to have been let to Coughren, Winter, Smith & Company, Seattle, for grading and bridge work on the first 30 miles. J. T. McChesney, president. [E. R. J., Dec. 5, '08.]

Kennewick, Wash.—C. A. Lundy, Kennewick, writes that the proposed electric railway in Kennewick will extend from the wharf on Columbia River through Kennewick, connecting with the Northern Pacific Railroad, the North Coast & Spokane Railroad and the Portland & Seattle Railroad, and then into the wheat country a distance of 20 miles. The main business will be freight. The company has not as yet incorporated and is not connected with any other system. The proposed railway will be standard gage and equipped with overhead trolley and a 3-phase system. Power will be purchased from the Yakima Valley Power Company. [E. R. J., July 3, '09.]

SHOPS AND BUILDINGS

Louisville & Eastern Railroad, Louisville, Ky.—This company will soon award contracts for the erection of three frame depot buildings and 40 shelter houses. Henry Glover, Louisville, receiver.

Maryland Electric Railways, Baltimore, Md.—This company has awarded to J. Henry Miller, 110 Dover Street, Baltimore, the contract for the building of a car house and terminal station at Druid Hill and Fulton Avenue. Plans for the new structure, which will be 191 ft. x 472 ft., were made by Baldwin & Pennington, 330 N. Charles Street. The building will cost about $250,000. It will be two stories high, of fireproof construction, with red pressed brick outside walls. [E. R. J., June 12, '09.]

Ohio Electric Railway, Cincinnati, Ohio.—The Columbus City Council has passed a franchise measure which requires this company to construct a union station at Third and Rich Streets, Columbus. The building will cost, it is estimated, $175,000. [E. R. J., June 12, '09.]

Ohio Central Electric Railway, Uhrichsville, Ohio.—This company, which proposes to build an electric railway between Wheeling, W. Va., and Uhrichsville, announces that it will erect its repair shops at Cadiz.

POWER HOUSES AND SUBSTATIONS

Denver City Tramway, Denver, Col.—This company has just placed in commission a new fireproof rotary converter substation to maintain the voltage in the northeastern part of Denver. There are two 500-kw General Electric rotary converters supplied by two banks of transformers. The primary voltage is 11,000, protected by aluminum cell arresters.

Illinois Traction System, Peoria, Ill.—It is stated that this company has purchased the property of the Des Moines (Ia.) Electric Company and that it plans to build an interurban system radiating from Des Moines, with the power system of the property just taken over as a nucleus.

Louisville & Eastern Railroad, Louisville, Ky.—This company expects to award contracts soon for the building of two brick substations.

Binghamton (N. Y.) Railway.—Construction is now under way on the addition to the power station of the Binghamton Railway. The improvements to be made will cost, it is estimated, $50,000, and will include the installation of a new turbine, new boilers and a new condensing plant. Foundations for the turbine are now being laid and it is expected the new plant will be in operation by Oct. 1.

Ohio Central Electric Railway, Urichsville, Ohio.—This company expects to build a power plant at Cadiz to furnish power for the operation of its proposed electric railway in Wheeling, W. Va., and Uhrichsville.

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio.—This company has placed a contract with the General Electric Company for a portable sub-station.

Hanover & McSherrystown Street Railway, Hanover, Pa.—This company announces that it has placed contracts with the General Electric Company for a 300-kw motor generator set, consisting of a 325-kw, 220-volt, 60-cycle, two-phase a.c. motor and a 300-kw, 600-volt, d.c. interpole generator; and for a switchboard with 6 panels to control both the a.c. and d.c. current.

Union Traction Company, Philadelphia, Pa.—This company has awarded to George W. Beard & Company, Reading, the contract to build its substations at Mount Penn, Mohnton, Robesonia and Sanatoga, which will cost about $30,000.

Manufactures & Supplies

ROLLING STOCK

Chicago & Oak Park Elevated Railroad, Chicago, Ill., is planning to purchase 20 cars.

Peoria (Ill.) Railway, it is reported, is in the market for 10 cars of the pay-as-you-enter type.

Connecticut Valley Street Railway, Greenfield, Mass., is in the market for two double-truck closed cars.

Durham (N. C.) Traction Company has just ordered two sets of Brill E-39 double trucks for replacement.

Edmonton (Alberta) Radial Railway expects to place an order for six additional cars in the course of a week.

Illinois Traction System, Peoria, Ill., has ordered two sleeping cars from the American Car & Foundry Company.

Union Street Railway, New Bedford, Mass., expects to buy 15 open double-truck cars and 12 double-truck closed cars.

Easton (Pa.) Transit Company will purchase two (and probably four) second-hand, 20-ft. closed car bodies without trucks or equipment.

Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., expect to purchase one new express car complete within a week.

Milford & Uxbridge Street Railway, Milford, Mass., has just received a 2400-gal., single-truck sprinkler car from The J. G. Brill Company.

Columbus, Delaware & Marion Railway, Columbus, Ohio, has ordered one freight and express car from the Jewett Car Company, Newark, Ohio.

Exeter, Hampton & Amesbury Street Railway, Hampton, N. H., has purchased a second-hand, 10-bench open car from the Public Service Railway, of Newark, N. J.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., contemplate buying one or two single-truck closed cars for city service, either new or second-hand.

Pittsburgh (Pa.) Railways has purchased 20 interurbans from the G. C. Kuhlman Car Company. Mention of the contemplated purchase of these cars was made in the ELECTRIC RAILWAY JOURNAL of June 19, 1909.

Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., has placed an order with the Curtis Motor Truck Company, Decatur, Ill., for six sets of interurban trucks and 20 single trucks for city cars. The car bodies to be mounted on these trucks are being built by the Cincinnati Car Company.

Michigan United Railways, Lansing, Mich., has ordered two combination baggage and express cars from the St. Louis Car Company, St. Louis. The car bodies will weigh 23,800 lbs. and the distance between bolster will be 35 ft. The bodies will be 48 ft. long; length over vestibules, 50 ft.; width over sills, 8 ft. 8 in. The bodies and underframes will be of wood and the interior trim of yellow pine. With the exception of Peckham No. 14-A trucks, and Ohio Brass Company's couplers, the St. Louis Car Company will furnish all the remaining special equipment.

Sapulpa (Okla.) Interurban Railway, mentioned in the ELECTRIC RAILWAY JOURNAL of June 5, 1909, as having purchased four cars from the St. Louis Car Company, has drawn up the following specifications:

Seating capacity 38	Interior trim.....white oak
Weight (car body only)	Underframe ..... wood
23,000 lb.	Air brakes.... Westinghouse
Bolster centers, length	Couplers .....St. Louis
22 ft. 6 in.	Curtain fixtures
Length of body.....34 ft.	Curtain Supply Company
Length over vestibule, 46 ft.	Curtain material..Hartshorn
Width over sills..8 ft. 8 in.	Heating system, Consolidated
Sill to trolley base..9 ft. 3 in.	Roofs.....steam coach type
Height top of rail to sills	Seats ..... St. Louis
30 in.	Trucks.. St. Louis No. 23-A
Body ..... wood	

TRADE NOTES

Sterling Varnish Company, Pittsburgh, Pa., has removed its main offices from 325 Water Street to 908 Fulton Building, Pittsburgh.

General Fire Extinguisher Company, Providence, R. I., has removed its St. Louis office from the Lincoln Trust Building to 1621 Pierce Building.

Westinghouse Electric & Manufacturing Company, Pittsburg, Pa., has removed the sales office formerly located at Tucson, Ariz., to 173 San Francisco Street, El Paso, Tex., where it will be continued as a branch of the Los Angeles office.

Liberty Manufacturing Company, Pittsburgh, Pa., announces that Glen M. Porter has succeeded W. M. Owen as manager of its New York office at 90 West Street. Mr. Porter will give the New York district his entire attention, assisted by C. S. Roosa.

Crocker-Wheeler Company, Ampere, N. J., announces that at the last directors' meeting the following were elected officers of the company: President, Dr. S. S. Wheeler; vice-president, Gano S. Dunn; second vice-president, A. L. Doremus; chief engineer, Gano S. Dunn; secretary, Rodman Gilder; treasurer, W. L. Brownell; assistant treasurer, G. W. Bower.

H. G. Nicholls, Toronto, Ont., who has for several years been assistant general manager of the Canadian General Electric Company and the Canada Foundry Company, has resigned to go into business for himself. He has organized a company under the name of Factory Products, Limited, with offices in the Confederation Life Building, Toronto, for the purpose of acting as Canadian selling agents for representative manufacturers.

M. L. Newman & Company, New York, N. Y., have opened an office at 26 Broad Street for the practice of industrial engineering in a consulting capacity. M. L. Newman, the senior member of the firm, is perhaps best known by his long experience in the employ of the Government at the Brooklyn Navy Yard. Alfonse Kaufman, who recently severed his connection as manager of the Alaska Chemical Company, has become actively engaged with the new firm.

Warren Bicknell Company, Cleveland, Ohio, was organized recently in the interest of the Cleveland Construction Company, the charter of which does not give it authority to operate railroads. No definite plans have been made for the operation of any railroad, but the company will be fully organized and prepared to act in an operating capacity. After a new road has been completed, it is sometime necessary to operate it for a time, and the Warren Bicknell Company will be prepared to relieve the construction company in such cases.

Forsyth Steel Tie Company, Pittsburgh, Pa., has purchased the plant and business of the Pittsburgh Pole & Forge Company and will continue to manufacture all of the devices formerly made by that company, including trolley poles, span wire poles, rail benders and miscellaneous railroad equipment. It has also acquired the rights to manufacture the Forsyth steel tie, Forsyth fastening device for steel ties and Improved brake-shoe keys, brake levers, tie plates, etc. The company's offices are in the Curry Building, Fourth Avenue and Ross Street, Pittsburgh, Pa.

W. T. Van Dorn Company, Chicago, Ill., reports a number of contracts for couplers received during the past few months. Among them may be mentioned the following: For the Seattle Electric Company, 140 couplers; Hudson & Manhattan Railroad, 184 couplers; United Railways & Electric Company, Baltimore, 160 couplers; Pittsburgh Railways Company, 200 couplers; Philadelphia Rapid Transit Company, 80 couplers; Interborough Rapid Transit Company, Elevated Division, 200 couplers; Interborough Rapid Transit Company, Subway Division, 500 couplers; Aurora, Elgin & Chicago Railway, 20 couplers; Denver City Tramway, 20 couplers. Mr. Van Dorn has been working on some important improvements in couplers of the M. C. B. type and on some heavy couplers of his standard type and an announcement of the results secured may be expected at an early date.

Cooper Heater Company, Dayton, Ohio, which for the last year and a half has been operating under a receiver, has been successfully reorganized. The announcement was made this week that some of Dayton's leading business men are now interested in the company and that they will give it strong financial backing. Since the organization of the company, three years ago, it has been under the management of W. L. Blackwell, who retains his interest under the new corporation. The company has also been fortunate in obtaining the services of W. E. Hinmon as traveling representative. Mr. Hinmon was for three years superintendent of operation of the Dayton & Western Traction Company, and for seven years was connected with the Ohmer Fare Register Company as sales agent. He has many friends in the electric railway world, who wish him every success in his new departure. The Cooper Heater Company manufactures hot water heaters for city and interurban cars, and has succeeded in placing them on 50 important electric railway lines throughout the country. The chief claims made for the heater by its manufacturers are its economy in fuel and the small amount of floor space it occupies. It is interesting to learn that the company has brought out a number of valuable improvements on its heater and that they are to be introduced the coming season.

ADVERTISING LITERATURE

Electric Storage Battery Company, Philadelphia, Pa., sketches the development of "Exide" and "Hycap-Exide" storage batteries in a small illustrated booklet just published.

Scully Steel & Iron Company, Chicago, Ill., has just issued its July stock list of iron-working machines, tools and appliances for immediate delivery to electric railway companies.

Buda Foundry & Manufacturing Company, Chicago, Ill., is distributing a calendar 9 in. x 15 in. for the last half of 1909, illustrated with a city view on which a Buda handcar is shown floating in space.

Wickes Brothers, Saginaw, Mich., show in their July stock list a large variety of steam boilers, engines, heating apparatus, electrical machinery, feed-water heaters, condensers and contractors' material.

Arthur S. Partridge, St. Louis, Mo., in Schedule No. 30, dated July 15, 1909, lists for sale a number of street and interurban railway cars, controllers, motors and power house equipment of all sizes and types.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued Bulletin No. 89, listing all kinds of new and second-hand rails, cars, locomotives and miscellaneous steam and electric railway equipment and supplies.

Pettingill-Andrews Company, Boston, Mass., has issued the July number of *Juice*. It contains notes on regenerative flame lamps, Pittsburgh transformers, concrete conduits, woven-wire dynamo brushes, luxometers, lighting reflectors and Tungsten miniature and candelabra lamps.

Packard Electric Company, Warren, Ohio, has issued a folder describing the features of its tungsten sign lamp transformers. The folder also contains the specifications for these transformers, giving their kilowatt capacity, efficiency, net weights, shipping weights and price.

Allis-Chalmers Company, Milwaukee, Wis., has issued Bulletin No. 1519, dated July, which has for its subject Tomlinson barometric condensers, Type A N. The front cover contains an interior view of the Thirty-ninth Street pumping station, Chicago, Ill., showing the Tomlinson Type A N condensers and pumps, which were installed by the Allis-Chalmers Company.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued a booklet describing the application of its line of small motors to office, store and shop services. The numerous illustrations scattered through the pages suggest many time and labor saving uses for these efficient little power devices; among these are the motor-driven adding machine, mailing machine, eraser, graphophone, envelope sealer, vacuum cleaner, etc.—applications selected at random from the large number of uses where the electric motor provides the ideal power.

General Electric Company, Schenectady, N. Y., has issued the following bulletins: No. 4674, illustrating and describing polyphase induction motors and controlling apparatus; No. 4672, with the title "Electric Drive for Large Printing Presses"; No. 4679, which describes a new line of commutating pole constant speed motors, made for both slow and moderate speed in sizes from 20 hp to 350 hp; No. 4673, which is a reprint from the Electric Railway Journal of Jan. 16, 1909, of an article by J. R. Hewitt, describing the 1200-volt direct-current installation of the Pittsburg, Harmony, Butler & Newcastle Railway; No. 4678, which describes type MS-8 hood switches for railway service.

Pennsylvania Metal Culvert Company, Warren, Pa., has issued a pamphlet devoted to its product. The use of its culverts by steam railroads, electric railways, State highway departments, etc., is shown. Accompanying the pamphlet is a print recording the result of a comparative corrosion test of samples of steel, charcoal iron and American ingot iron which had been immersed in 25 per cent sulphuric acid for 1½ hours. This showed the original thickness of metals before the test and the thickness after the test, the result showing the percentage of loss of the steel to be 88.7, the percentage of loss of the charcoal iron to be 69.6, and the percentage of loss of the American ingot iron to be only 1.14.

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Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

Securities for Working Capital in Massachusetts

An act has been passed by the Legislature of Massachusetts and approved by the Governor, which is designed to enable street railway companies of that State to issue securities to provide funds for working capital. It is provided in the act that a street railway company may increase its capital stock for this purpose to an amount not exceeding 5 per cent of the par value of its capital stock then outstanding, "or may issue bonds, secured by mortgage or otherwise, to an amount beyond the amounts fixed and limited by its agreement of association or by the provisions of any general or special law, and not more than the Board of Railroad Commissioners shall determine will be properly required for such purpose and as said board shall approve as being consistent with the interest of the public and of the stockholders of such company and as not unreasonably reducing the security of any bond previously issued." Heretofore, the street railways of the State have not been able, in the absence of an explicit provision in the law, to issue securities for this purpose. As the margin of profit in the business does not provide sufficient revenue to meet the needs for working capital, companies have been compelled to borrow money. This floating debt, added to other liabilities of the properties, has constituted a serious menace in times of financial distress. The largest companies in Massachusetts have in working capital amounts varying from 5 to 10 per cent of their capital stock. The current liabilities of the street railway companies of the State for the last fiscal year reached a total of $16,810,000. It is evident from the necessities which led to the authorization of issue of securities for this purpose that some of the companies will petition the board under the act at an early date.

Cash Tickets and Traffic Stimulation

Recent observation of the traffic conditions on a large system where cash tickets are used in connection with pay-as-you-enter cars indicates that such tickets have a much greater value in the stimulation of riding than is generally realized. Operating men appreciate that anything which makes travel more convenient to the public tends to produce growth of business, but often think that the selling of tickets at a flat rate of 5 cents each is a needless complication, since the public pays the same either in cash or pasteboard for a given ride. In the case in mind the use of the tickets is undoubtedly greatly increased by the fact that a slight reduction in fare is obtained by purchasing a strip of them, but it is also plain that the convenience of the ticket itself, combined with the fact that it has been paid for by the patron in advance, tends to encourage riding, and particularly short-haul travel. It is a singular characteristic of human nature to regard a strip of purchased tickets much more prodigally than the same value in coin, even where no reduction is made in the price per ride. This characteristic may be based upon the convenience which the ticket affords for paying fare, but is none the less real.

Aside from the encouragement to ride which a strip of unused tickets offers in the pocket of the prospective patron, the arrangement saves the company time in all types of cars, since it eliminates the problem of making change, so far as the tickets are used, and thus releases a certain portion of the conductor's time for other duties, such as watching the entrance and exit of passengers, collection of cash

fares and accurate handling of transfers. With proper precautions there is little to fear from ticket counterfeiters, and the reduction of delays where passengers pay at the vestibule is not to be overlooked. The main point, however, is the incentive to ride which the ticket book provides. Where 6 or 7-cent fares prevail, the ticket book offers an easy way out of one of the most difficult phases of the fare problem.

Aiding the Claim Department

There is no question that many an accident case is lost by the claim department through the failure to present complete technical evidence, an inexcusable condition when the services and data of the company's engineering staff are so easily available. In fact, it would be well for the claim department to have at least a working knowledge of what the engineering department can supply if necessary. The claim department also should have in its own files dimensioned plans and photographs of all rolling stock. One company carries this practice so far as to make plaster casts of rails and switches at places where derailments have occurred. This renders it possible to determine the exact cause of the accident and is further valuable in the study of truck and wheel behavior. The claim department is justly entitled to a great deal of this kind of information, but as it may require considerable time to gather such data the expense should be charged directly against the damages and accidents account. If this is done the heads of the engineering and shop forces will have no just cause for refusing to co-operate with their legal fellow-workers.

Economy in Car Fittings

Among the annoyances which beset the managements of some city railways is the tendency of a certain element of the public to mutilate the seats, scratch the woodwork and even carry off the smaller brass trimmings. About two years ago, for example, one large city system distributed on half a dozen lines several hundred specimens of its latest type of car. If one should bring together to-day a representative car from each route, the contrast would be so great that no one ignorant of the conditions would believe that all had been placed in service at the same time and maintained according to the same standards. Naturally the query arises as to how far such deterioration can be prevented by using cheaper and plainer fittings without making the cars unattractive when they are operated on the lines which enjoy a more refined and considerate patronage. On some of the lines of the same company the rattan cross seats were so badly cut up and soiled within a few days after their installation that it has been decided to adopt a hardwood slat seat, which is considerably cheaper and more easily cleaned. Slat benches are not the most esthetic objects in the world, but they are certainly more agreeable than rattan or plush seats which perforce have served as foot-mats. Ornate carvings have been almost abolished in city cars, but the use of brass and bronze for trimmings still survives. It seems a pity to discontinue the use of attractive fittings, but in cases where this is necessary it is possible to make them of gilded steel or iron. In this case the first cost of the fittings has been materially lowered and thieving has been made unprofitable.

Another Referendum for Cleveland

The people of Cleveland will vote on Aug. 3 on the Schmidt franchise, either accepting or rejecting the ordinance designed to create a street railway in opposition to the system of the Cleveland Railway Company. The voters thus have an opportunity of taking a step, by rejecting the Schmidt grant, that will be an effective cry for cessation of the political turmoil from which they have suffered for years. By their votes at the referendum of last fall the people showed their weariness of the contest, their disgust at the service given during the low-fare experiment of Mayor Johnson, and their desire that the traction issue should be settled and withdrawn from politics; yet the city is aroused again, and a certain element is excited over promises of a system at a rate of fare which is not adequate to provide proper street railway facilities in a city like Cleveland and could not be permanently successful.

Warren Bicknell, receiver of the Municipal Traction Company and the property of the Cleveland Railway, has stated that 3-cent fare would not be profitable on the entire system operated by the receiver, and that a charge of one cent for a transfer, yielding additional revenue, would not have made operation profitable. In making the computation upon which this conclusion was based Mr. Bicknell multiplied the number of pay passengers each month by three to show what revenue would have been received from transportation of these passengers at 3 cents each, and added the miscellaneous receipts of every character. He found that in no month since the appointment of the receivers would the receipts obtained from 3-cent fare have been adequate to pay the maintenance charges, operating expenses, taxes and bond interest, except in the month of June, and the deficit shown each month would be increased by $73,378 if any interest was to be paid on the capital investment.

The figures on which this conclusion was based were made public. The largest traffic in any month during the term of the receivers was in June, when 12,443,486 pay passengers were carried, the gross revenue from whom, at 3 cents each, would have been $373,304. Total expenses and charges in that month were as follows: Maintenance (as provided in lease), $107,330; operating (actual), $174,257; general (actual), $38,970; taxes (actual), $24,644; interest, bond (actual), $38,580; Neutral Street Railway rental (actual), $937. With allowance for interest on the capital investment in the month, there would have been, according to the figures of Mr. Bicknell, a deficit of $65,516. If one cent had been charged for each transfer issued without refund on presentation of the transfer, the result in June, after allowance for interest on the capital investment, as shown by the table, would have been a deficit of $22,336.

A summary which accompanies the figures presents the following array of deficits resulting from the application of the low fare unit to the actual traffic: Total deficit, exclusive of interest on capital, for seven months, $73,353; total deficit for seven months, $586,999; total deficit if one cent for transfer had been charged, with no refund, for seven months, $317,624.

After the referendum vote of last fall it was generally

understood that the people of Cleveland had concluded that as between low fare and poor service on the one hand or adequate fare and good service on the other, they preferred good service. It will be extraordinary if the enticing promise of a low rate of fare should lead the residents of that city to approve the Schmidt franchise.

Purchasing Coal by Thermal Specification

We have had several times occasion to mention the increasing frequency of the practice on the part of large consumers, such as great railway companies, of purchasing coal supply on a specification based rigidly on the thermal value of the coal—that is, its actual equivalent in b.t.u. Such is the practice of various departments of the United States Government and other large consumers, and of the big railway companies following the practice may be mentioned: The Interborough Rapid Transit Company, Third Avenue Railroad and Cleveland Railway Company. Of the particular specification used in some of these cases there is direct information in the present issue, but the main question of policy is greater than any details of the requirements. It deals with the wisdom of purchasing fuel upon this basis rather than in the customary way, either without specification of thermal value or by sample or by specification implicitly, although not directly in thermal value. Now it quite goes without saying that the value of coal as fuel depends directly upon its b.t.u. equivalent. Incidentally, the quantities of ash and sulphur contained in the coal act as adverse constituents so far as combustion is concerned. In comparatively early times coal was ordinarily bought merely by weight with specification of the trade designation, which implied roughly a certain grade of fuel. The inadvisability of purchasing large quantities of coal in any such loose way requires no comment, the main question not being whether specifications should be applied to the coal, but what specification. Perhaps the next forward step was a little closer definition of the coal as regards source and character or purchasing on the basis of equality with a certain submitted lot. These steps bring exactness and quality of material bought a little nearer. And a still further improvement in specification has been the purchase of coal on the requirement that its thermal equivalent shall be not less than a certain number of b.t.u.

Now the present b.t.u. specification is a direct outcome of the plan last mentioned. As to the reasonableness of so purchasing coal there can be no dispute since in this way only is it possible for the purchaser to pay for exactly what he gets. B.t.u. specifications as a matter of policy demand first, that the determinations of b.t.u. values shall be reasonably easy and prices so that the criterion can be quickly and fairly applied, and, second, that such specifications cannot be so burdensome to the dealer as to compel him in self-defense to allow a certain margin in price and cover adverse contingencies. As regards the first count we think that it is possible to sample the coal fairly and with sufficient precision and to determine the thermal value without serious difficulty. The method of sampling, for example, adopted by the Third Avenue Railroad Company, as published in our columns, seems entirely fair, consisting as it does of taking a small quantity of coal automatically from the weighing hopper as the coal is being unloaded from the lighter and accumulating it until 200 lb. has been thus gathered. This quantity is mixed, crushed and quartered in the ordinary routine of sampling and held for addition of similar samples until the lot has been completely dealt with so far as sampling is concerned. This is at least a fair and uniform method.

With respect to the analysis the determining of the b.t.u. equivalent coal is a simple problem of calorimetry, which long experience has shown can be carried out with a very satisfactory degree of precision. The so-called bomb method generally in use is probably as fair as any, as the determinations of ash, sulphur and moisture involve no material difficulties. One must grant then that the determination of thermal equivalent necessary to a fair application of the b.t.u. specification is entirely practicable and not difficult.

This admitted, let us consider the effect of such specification on the price of coal. Either the dealer has quoted a fair price, sufficiently protecting him, with the intention of supplying coal of the grade specified, or he has not. If his price is made with the intention of supplying an inferior article he is an expensive person to deal with at any price and the sooner he is put off the list of bidders the better. If he is dealing squarely in making the contract he should neither lose nor gain by the b.t.u. specification, since, while in occasional lots his price may be cut, it will always be automatically raised on certain other lots of superior quality. The b.t.u. specification then merely requires him to exercise reasonable care in meeting its requirements, and it gives him the advantage which some of the older methods did not, of escaping the unpleasant contingency of having coal thrown back on his hands or accepting a lower price only after annoying litigation.

The coal dealer, at present, has always to assume, if he undertakes to supply coal of a particular grade, that the customer will test that requirement from time to time. Now if his coal falls below grade there are just three things that the customer can do—turn the coal back on the dealer's hands, cancel the contract and try somebody else, or accept the coal at a reduced figure, involving an irritating amount of discussion. None of these things tends to make the business go smoothly and prosperously. On the other hand, if the coal is purchased on b.t.u. specification coal below grade has its price automatically adjusted and coal above grade yields a bonus, as it properly should.

The net result of purchase on the b.t.u. basis, then, is that the customer gets just what he pays for and the coal dealer gets pay for just what he furnishes. If the ordinary contract is squarely taken on the basis of furnishing the article required and getting properly paid for it, then we cannot see that the dealer has anything of which to complain in the b.t.u. specification. The only dealers whom it would hit hard are those who have been counting on furnishing an article below the grade which it is supposed to represent, and these deserve no sympathy and on general principles should be eliminated by a process of natural selection. Hence we are disposed to go squarely on record as believing in the more general application of the b.t.u. specification as being really the only one which provides fair payment for the article furnished without laying for either party a burden worth considering.

WATERBURY EXTENSIONS OF THE CONNECTICUT COMPANY

The Connecticut Company, operating the greater part of Connecticut's electric railway mileage, added last year two important extensions to its Waterbury division. One of these is a line to North Woodbury and the other a line to Thomaston. Both roads are of suburban character, but use the same rolling stock as employed in the Waterbury city service.

WATERBURY TO NORTH WOODBURY LINE

The Waterbury to North Woodbury line, which was completed on Oct. 20, 1908, runs in a westerly direction from Waterbury. It passes through a territory still of great natural beauty and wildness despite the fact that some portions of it were settled over 200 years ago. Woodbury with a prosperous population of 4500 is about 6 miles from the nearest steam railroad. Middlebury, the largest community along the line, has only 1000 inhabitants, while Southbury's 1500 residents must first go by carriage to Woodbury before they can get electric railway transportation to Waterbury.



Waterbury Extensions—Steel Girder Bridge Over Highway

The construction of this line, of course, has greatly stimulated travel between these towns and Waterbury. People in the latter town have already taken up the commuters' life, but aside from this the Connecticut Company is developing Quassapaug Park, which with its famous lake, a mile square, should be very welcome to Waterbury's 60,000 people. The park is located directly on the line, 1¾ miles west of Middlebury and 7¾ miles from Waterbury, from whence it can be reached by a 15-cent fare. The hotel at the lake has been greatly improved and furnished with pool and billiard parlors. Among the attractions will be boating, fishing, roller-skating and swings. In anticipation of heavy traffic a loop has been built in front of the park.

During the winter months the schedule is hourly and is handled by two cars taken from the Waterbury city system. These cars are operated with four 40-hp motors and have no difficulty in making time. The seating capacity is about 44, made up of 18 sets of rattan cross-seats and short longitudinal corner seats. As there is no question that the future traffic, especially in summer, will be much heavier than at present, the turnouts were set for 15 minutes' service. It is quite likely that double headers will be operated as far as the Quassapaug Lake loop. The fare for the 13.2 miles from North Woodbury is 25 cents, including transfer to the Waterbury lines. The pretty brown and white shelter stations, of which two are shown in the accompanying views, form an attractive feature of the passenger service. Express-package service is given on this line by the Connecticut Trolley Express Company.

At the time this line was started the Waterbury system was owned by the Connecticut Railway & Lighting Company. That part of the work from the center of Waterbury to the town line was called the Middlebury extension and the balance the Waterbury & Pompera Valley Railway Company. The entire length of the line is 13.2 miles. The first section, 2 1/3 miles long, was built by C. W. Blakeslee & Sons, New Haven, Conn., and the remainder by Wellington & McCarthy, Boston, Mass. Wm. G. Smith, C. E., Waterbury, Conn., laid out the line and designed the bridges.

The line is on private right of way, but along the highway from the Waterbury town line through Middlebury to the lake, then across country to Woodbury and over the main street of that town to North Woodbury, one-half mile farther. Franchise rights have been obtained also for a 2-mile extension to Hotchkissville. There are no steam crossings on the entire route and only two main highway intersections. The maximum grade on the line is 8 per cent on one stretch of 400 ft. and a 4 per cent to 5 per cent grade extends for 1 mile west of Quassapaug Park. The shortest radius of curvature is 170 ft.

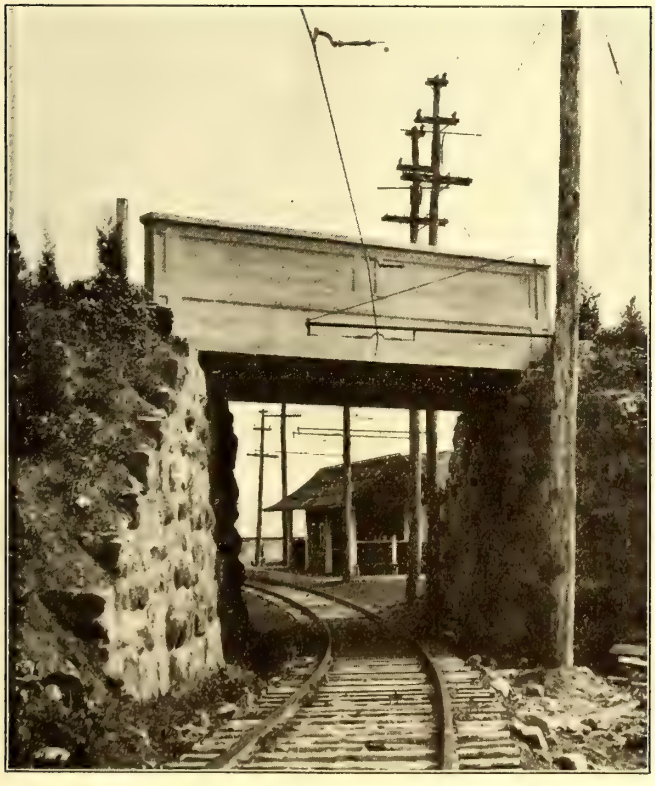
The natural difficulties encountered along different parts of the route were decidedly opposite in character, calling for rock cuts at the western end and mattresses over peat swamps near Waterbury and just beyond Quassapaug Park. The Waterbury morass, which is over 800 ft. long and 32 ft. deep, has a brush mattress 18 in. to 2 ft. thick extending about 2 ft. on each side of the toe of the slope; a similar mattress has been placed over the other swamp, which is 1200 ft. long and 43 ft. deep. So far these brush foundations have shown no signs of settling.



Waterbury Extensions—Shelter Station at Entrance to Quassapaug Lake

There are three plate girder bridges over highways as follows: A 29-ft. span at the Waterbury-Middlebury town line; a 40-ft. span over the main highway between Waterbury and Middlebury about 1¼ miles west of the 29-ft. span bridge, and a 50-ft. span over the main highway between Middlebury and Woodbury. All of these bridges have cement rubble abutments. The ties are placed directly on the girders. At the undercrossing near the Middlebury station there has been erected a 13-ft. span paneled bridge of reinforced concrete slabs. The floor of this undercrossing is 18 in. thick and is reinforced with 1-in. twisted bars placed 5 in. centers. The panel railings are of concrete reinforced with ½-in. twisted rods placed 2 ft. centers. The railings were bush-hammered to simulate the appearance of finished stone. The second undercrossing, which is located at Abbotts Four Corners, 1¼ miles west from the Waterbury-Middlebury town line, is of entirely different type. It consists of a 36-ft. non-reinforced concrete arch. The wing walls and parapets of this bridge are made of rubble which gives a pleasing rustic appearance to the structure.

The track construction between Waterbury and Woodbury substation is of 80-lb. A.S.C.E. rail and beyond that point a 60-lb. A.S.C.E. rail is used, all connected with six-bolt angle joints and bonded with two No. 0000 concealed bonds. Throughout the entire route the 8-ft. ties are spaced 24 in. centers and laid in gravel ballast. All curves are



Waterbury Extensions—Reinforced Concrete Slab Bridge, 22-ft. Span, with Middlebury Station in Background

spiraled and protected by guard rails. Sheffield iron cattle guards are in place at all crossings.

The overhead line is carried by chestnut poles with tops at least 22 in. in circumference. Between Waterbury and the substation there is an 11,000-volt transmission line of No. 4 solid copper wire on Crown No. 2 porcelain insulators disposed in an equilateral triangle 40 in. on a side, the top insulator being carried by a pin on a short cross-arm. The poles here are 40 ft. long, but where there is no transmission line 35-ft. poles are used. The trolley is No. 0000 grooved wire with flexible bracket suspension and is fed every 1000 ft., the construction being the Connecticut Company's standard for new lines.

Hydro-electric power is transmitted at 33,000 volts from Bulls Bridge, on the Housatonic River, 30 miles to Waterbury, where it is converted to direct current for local feeding and also is stepped down to 11,000 volts for transmission to the Woodbury line substation. The latter is located



Waterbury Extensions—Non-Reinforced Concrete Arch Bridge of 36-ft. Span at Abbott's Four Corners

about 1 mile west of Lake Quassapaug and is of brick, with concrete floor and reinforced concrete roof, and two 300-kw GE rotary converters, each with reactive coil and bank of step-down transformers so interconnected that they can be used in any reasonable combination in case of trouble.

EXTENSION TO THOMASTON, CONN.

The 7½-mile Thomaston extension from Waterbury was opened on Aug. 3, 1908, with an hourly service. This road was originally projected by the Thomaston Tramway Company, but the lines are now operated from Waterbury by the Connecticut Company. The Thomaston line runs up the Naugatuck Valley, through Waterville to Thomaston and Reynolds Bridge. Thomaston has a population of about 3500 and the contiguous territory about 3500. The cars and track construction standards are similar to those of the North Woodbury extension except that 80-lb. A.S.C.E. rail is used throughout. The maximum grade is 3 per cent and the shortest curve 200 ft. Turnouts are placed every 7000 ft. to make a 15-minute headway possible when needed. The principal structures consist of a 50-ft. span concrete skew arch without reinforcement, two 110-ft. deck spans (which were previously in steam service) over the Naugatuck River, with a 75-ft. through girder bridge with 60-ft. trestle approach over the Naugatuck Railroad and a retaining wall along the Naugatuck River, portions of which are in 20 ft. of water. The 4300 cu. yd. of rubble masonry were laid in 50 days, one derrick handling the stock from the ledge across the highway, while a traveling derrick was employed in direct construction.

In connection with this line 1500 ft. of country road, flooded in times of freshets, were converted into a 60-ft. graveled highway above flood level, and in Thomaston a crooked and narrow street 1600 ft. long was made into a 50-ft. wide boulevard paved with macadam.

The overhead construction is the same as that in use on the Woodbury line, except that there is no transmission.

The feeding is done directly from the Waterbury substation at the southerly end of the line, a 120-kw booster compensating for line losses on the upper end.

The construction was done under the direction of the



Waterbury Extensions—View Along the Thomaston Line

engineering department of the New York, New Haven & Hartford Railroad, E. H. McHenry, vice-president; Edward Gagel, chief engineer; C. R. Harte, in charge of trolley construction. Wm. G. Smith, C.E., of Waterbury, located the



Waterbury Extensions—Bridge Over the Naugatuck River

lines and had immediate charge of the work in the field. The contractors for the entire construction were F. T. Ley & Company, Springfield, Mass.

REDUCTION OF CORRUGATION BY WELDING

Electric railway companies in Europe seem to have been more troubled by corrugation of rails than those in this country and have given a great deal of attention to the subject. In a paper recently read by A. Busse, of Berlin, on rail corrugation, it is stated that the electric railway companies in Bremen, Berlin and Hamburg have recently been trying the experiment of welding strips of soft iron to the rail surface to overcome the trouble. The welding is accomplished by means of an electric arc. It is said that the results so far have proved satisfactory and that noisy riding due to the corrugations has disappeared, but the plan has been followed too short a time to determine whether the relief will be permanent.

The Cardiff Corporation Tramways is considering a plan to build a trackless trolley system between Cardiff and Llandaff, Wales.

THIRD AVENUE RAILROAD COMPANY'S SPECIFICATIONS FOR ANTHRACITE COAL

The Third Avenue Railroad Company, New York, has been buying bituminous coal on heat value specifications since July 1, 1908, and it has recently begun the purchase of anthracite coal under a similar set of specifications. The specifications for bituminous coal of this company are the same in all important details as those of the Interborough Rapid Transit Company, of New York, which were printed in abstract in the Street Railway Journal of Feb. 22, 1908, page 284. Many clauses of the anthracite specifications follow closely the practice used in purchasing and testing bituminous coal. The following are the principal provisions:

DELIVERIES

Anthracite coal is to be delivered in self-trimming lighters of from 350-tons to 700-tons capacity at or near the Kingsbridge power house on the Harlem River. Some anthracite coal is purchased for use in the car houses and shops, and this coal is delivered from the contractors' dock in trucks.

GENERAL REQUIREMENTS

The coal covered by the specifications is fresh-mined anthracite, size No. 1 buckwheat. The dry sample of the coal must approximate the standard of 12,150 b.t.u. and show the following constituents on analysis: Carbon, 77.5 per cent; volatile matter, 5 per cent; ash, 17.5 per cent, and sulphur, 1.0 per cent.

Volatile tests are made by using one gram of coal in a platinum crucible held over a Bunsen burner until all flame ceases. When this condition is reached and before any cooling takes place the same is heated over a blast lamp for one and one-half minutes.

METHOD OF SAMPLING COAL FOR ANALYSIS

A small quantity of sample coal is taken automatically from each alternating weighing hopper just before the hopper is dumped while the lighter is being unloaded. These quantities are thrown into a receptacle provided for the purpose until about 200 lb. have accumulated. The bulk of coal thus gathered is crushed and quartered successively to about 10 lb. and placed in a box. The receptacles are then filled again, when the same operation of crushing and quartering is continued until the lighter has been unloaded. The contents of the box are then crushed and quartered to about 2 lb., which, after being pulverized in a mill, is taken for chemical analysis. All samples are dried for one hour at a temperature of from 105 deg. to 110 deg. Fahr.

ANALYSIS AND STANDARD

The analysis of the dry sample taken from the average sample is made by the railroad company's chemist under the supervision of the railway company's engineer. Should the contractor question the results of the test (a copy of which is mailed to him when requested), the railway will within three days after a copy of the test has been mailed to him forward a sufficient quantity of the average sample from each weighing hopper to any New York laboratory mutually agreed upon. The results obtained from this second analysis are final and binding on both parties. In case the questioned values obtained in the railway's analysis are found by the second analysis to be 2 per cent or less in error the cost of investigation is borne by the contractor, but if the disputed values are found to be more than 2 per cent in error the cost is borne by the railway. Should no question regarding the first

analysis be raised by the contractor within three days the average sample of coal will be destroyed at the end of seven days from the date of discharge of coal from the lighter. Any penalties for coal below standard are made according to the table of "reductions" given later and are based as obtained on the second analysis.

All analyses are made in accordance with the standards adopted by the American Chemical Society. The heat value is determined by the Atwater-Mahler bomb calorimeter, which is standardized against cane sugar or naphthalene.

When the lighter is unloaded about 5 lb. of coal is taken from each of the receptacles, to be used for moisture determination. This sample is held and a second analysis made as in the case of the other tests except that the expense must be borne by the contractor should the value questioned be found to vary 10 per cent or less. When coal is delivered in trucks a small quantity is taken from each truck for analysis.

Where the analysis gives amounts for any and all elements in excess of the standard quantities mentioned a reduction in the price per ton will be made in accordance with the accompanying tables of volatile matter, ash and sulphur as well as a reduction for an excess in moisture, plus or minus the amounts above or below the standard b.t.u. values, in addition to any other reductions which may be made.

REDUCTIONS FOR EXCESS OF ASH

For Anthracite Coal in Any Lighter Which Is Found by Test to Contain Per Pound of Dry Coal

Over 18.0 per cent and less than 18.5 per cent	2 cents per ton
18.5 per cent and over and less than 19.0 per cent	4 cents per ton
19.0 per cent and over and less than 19.5 per cent	6 cents per ton
19.5 per cent and over and less than 20.0 per cent	8 cents per ton
20.0 per cent and over and less than 20.5 per cent	10 cents per ton
20.5 per cent and over and less than 21.0 per cent	12 cents per ton
21.0 per cent and over and less than 21.5 per cent	14 cents per ton
21.5 per cent and over and less than 22.0 per cent	16 cents per ton
22.0 per cent and over and less than 22.5 per cent	18 cents per ton
22.5 per cent and over and less than 23.0 per cent	20 cents per ton
23.0 per cent and over and less than 23.5 per cent	23 cents per ton
23.5 per cent and over and less than 24.0 per cent	26 cents per ton
24.0 per cent and over and less than 24.5 per cent	29 cents per ton
24.5 per cent and over and less than 25.0 per cent	32 cents per ton
25.0 per cent and over and less than 25.5 per cent	35 cents per ton
25.5 per cent and over	40 cents per ton

REDUCTIONS FOR EXCESS OF VOLATILE MATTER

For Anthracite Coal in Any Lighter Which Is Found by Test to Contain Per Pound of Dry Coal

Over 5.0 per cent and less than 5.5 per cent	2 cents per ton
5.5 per cent and over and less than 6.0 per cent	4 cents per ton
6.0 per cent and over and less than 6.5 per cent	6 cents per ton
6.5 per cent and over and less than 7.0 per cent	8 cents per ton
7.0 per cent and over and less than 7.5 per cent	10 cents per ton
7.5 per cent and over and less than 8.0 per cent	12 cents per ton
8.0 per cent and over and less than 8.5 per cent	14 cents per ton
8.5 per cent and over and less than 9.0 per cent	16 cents per ton
9.5 per cent and over	18 cents per ton

REDUCTIONS FOR EXCESS OF SULPHUR

For Anthracite Coal in Any Lighter Which Is Found by Test to Contain Per Pound of Dry Coal

Over 1.00 per cent and less than 1.25 per cent	6 cents per ton
1.25 per cent and over and less than 1.50 per cent	10 cents per ton
1.50 per cent and over and less than 1.75 per cent	14 cents per ton
1.75 per cent and over and less than 2.00 per cent	18 cents per ton
2.00 per cent and over	20 cents per ton

If any lighter is rejected by the engineer of the railway on account of excessive coal dust a reduction of 25 cents per ton is made from the price as determined by the b.t.u. value and analysis in accordance with the table of values for the coal taken from that lighter in addition to any other penalties.

Should coal be delivered on other than self-trimming lighters a further reduction of 7 cents per ton is made from the price determined by the b.t.u. value and analysis.

WEIGHTS, TOWING AND DEMURRAGE

The contractor's bill of lading is checked by the scales of the railway company. From the latter's weights are subtracted the amount due to all moisture in excess of 3 per cent. If the railway's weights are less by 1 per cent or more than those on the bill of lading they are substituted for the bill-of-lading weights and all reductions are made therefrom.

No charges are allowed for extra towing or for demurrage unless charges for the latter are presented within one week of the date during which such demurrage occurred. Demurrage is paid only when the lighter ordered by the railway's engineer had been held at the dock for more than five full working days, a working day being taken to mean between the hours of 6 a. m. and 6 p. m., exclusive of Sundays and legal holidays. The price for demurrage is $5 a day for lighters of not less than 700 tons.

The contractors are required to remove within 12 hours of notification any lighter containing coal which has been rejected on account of an excessive amount of dust; otherwise the railway company is at liberty to have it removed and charge any costs of towing, etc., incidental thereto against the account of the contractor.

PRICE AND PAYMENT

The contract calls for a delivery price on the standard coal. In addition to the penalties for excess of ash, volatile matter and sulphur, an extended table of penalties is included for values above and below the standard heat unit contents of the coal. The standard is 12,101 to 12,150 b.t.u. A penalty of 1 cent for each 50 units below the standard is exacted, and a premium of 1 cent for each 50 units above the standard is allowed. The maximum premium is 26 cents for coal of 13,400 b.t.u. or over, and the maximum penalty is 45 cents per ton for coal of 9900 b.t.u. or less.

HEAT VALUE SPECIFICATIONS FOR COAL

The practice of purchasing coal on a sliding scale of prices based on the heating value and proximate analysis is making headway among large consumers of fuel, and a number of large electric railway companies have adopted this method with satisfactory results during the past two or three years. Among these may be mentioned the Interborough Rapid Transit Company, the Cleveland Railway Company and the Third Avenue Railroad, New York. The anthracite coal specifications of the latter company are printed in abstract above. The specifications of the Interborough Rapid Transit Company for bituminous coal, under which it has been purchasing fuel for several years, have also been employed by the Third Avenue Railroad, as mentioned above, and were printed in abstract in the STREET RAILWAY JOURNAL of Feb. 22, 1908, p. 284. Various departments of the United States Government will purchase during 1909 upward of 611,000 tons of both anthracite and bituminous coal on the b.t.u. basis. It is interesting to compare the requirements of these large consumers as outlined in the specifications used by them.

Heat value specifications for coal are drawn up on the theory that the consumer should pay for the actual heat units in the coal delivered by the dealer, with proper allowances both as to premiums and penalties for variations in the ash, sulphur and moisture content above or below a standard fixed in the contract. For coal high in heat units penalties and premiums for variations of ash and sulphur are not usually necessary, as the high-grade coals are mined in thick seams, and there is little difference between samples taken from two parts of the same seam. The cheaper coals, however, such as slack bituminous and No. 1 or No. 2 buckwheat anthracite, may come from any mine or district, and usually show considerable variations in their analyses. It is these cheap coals which are the most economical to use in the efficient furnaces of large power stations.

If the percentage of sulphur is kept down to a reasonable maximum of, say, 1.5 per cent in bituminous coal and 1 per cent in anthracite, and the percentage of ash is constant, the number of heat units per pound of dry coal is a direct measure of the value of different samples of coal as fuel. An excess of sulphur over the reasonable maximum above named may cause the formation of objectionable clinker on the grate, which impairs the draft and increases the labor of handling the furnaces; hence it is fair to impose penalties for excess percentages at an increasing rate, but as the consumer gains little or nothing in efficiency of the fuel with low sulphur content no premium is usually allowed. The United States Government specifications exact no penalties for excess sulphur and provide no premiums, but a maximum limit is set for each class of coal, which if exceeded may be cause for rejection of the shipment. For anthracite this limit is 1 per cent and for bituminous from 1.5 to 3 per cent. Both the Interborough Company and the Cleveland Railway Company exact penalties on an increasing scale. The penalties of the Cleveland Railway Company, which uses Ohio bituminous slack with a normal sulphur content of 3.5 per cent, begin at 2 cents per ton for sulphur between 4 and 4.4 per cent and range as high as 30 cents per ton for sulphur between 10 and 10.4 per cent. The penalties for sulphur, ash and less than standard heat units are designed to put the price paid for coal 10 per cent below the general standard at a point where only the freight charges are realized on the coal delivered. The Interborough Company's specifications provide for penalties on bituminous coal carrying more than 1.5 per cent of sulphur, the initial deduction being 6 cents per ton for sulphur between 1.50 and 1.75 per cent, and running up to 20 cents per ton for sulphur over 2.5 per cent. For anthracite coal the Third Avenue Railroad exacts sulphur penalties beginning with 1 per cent and running up to 20 cents per ton for sulphur in excess of 2 per cent.

The percentage of ash in coal directly affects the heating value and its behavior in the furnace. The coals which run low in ash have high heat values and create less resistance to the free and uniform passage of air through the grate. There is also a saving in the cost of cleaning fires and disposing of the ashes. So important does the Government consider the percentage of ash in both bituminous and anthracite coal that it provides premiums for coal containing less than the standard fixed, as well as penalties for exceeding the standard. The anthracite specifications provide definite fixed standards of quality for each size of coal based on the ash percentage in "dry coal" instead of on the number of heat units.

The Government standard for No. 1 and No. 2 buckwheat is 18 per cent ash, and an excess of 21 per cent is cause for rejection. The penalties accrue from 19 per cent upward at an increasing rate, beginning at 4 cents per ton for ash between 19.01 and 19.50 per cent and rising to 48 cents for ash between 21.50 and 22 per cent. The premiums, however, accrue at a constant rate of 2 cents per 0.50 per cent, beginning at 4 cents for ash between 16.51 and 17 per cent. The maximum premium is 12 cents per ton. In the Third Avenue Railroad specifications for No. 1 buckwheat the standard ash is fixed at 17.5 per cent, and penalties accrue above 18 per cent. Between 18 and 23 per cent the penalty is 2 cents per ton for each 0.50 per cent excess, and above 23 per cent the penalty is 3 cents for each 0.50 per cent. No premium is allowed for smaller percentages of ash than standard. The percentage of ash in bituminous coal varies widely in different sizes from different mines or fields. It is not an approximate index of the heating value as in anthracite, and a standard must be fixed for each proposal. In the Government specifications the percentage of ash is used, together with the heat unit content, in comparing competitive bids on the same proposal, and both premiums and penalties are provided for variations in the coal as delivered above and below the standard fixed in the bids. A premium of 1 cent per ton for each whole per cent less ash is paid and an increase of 2 per cent above the standard is allowed without penalty. Above 2 per cent, however, a rising scale of penalties is exacted, beginning at 2 cents per ton for an excess between 2 and 3 per cent and increasing to 18 cents for an excess between 6 and 7 per cent. In comparing two bids on different standards of coal the bids are reduced to cents per 1,000,000 b.t.u. corrected for ash. Thus a coal containing 14,400 b.t.u. and 8.5 per cent ash is bid on at $4.95 a ton, and another coal containing 14,150 b.t.u. and 14 per cent ash is bid on at $4.60. Each per cent of difference in ash is valued at 2 cents per ton, increasing the cost of the second coal 11 cents to $4.71. The two coals can now be compared on the basis of cost of 1,000,000 heating units by the formula $\frac{1{,}000{,}000 \times \text{price per ton}}{2240 \times \text{b.t.u.}}$. The first coal would cost $0.1534 per 1,000,000 b.t.u., while the second would cost $0.1451. The second coal, in spite of its lower b.t.u. content and higher percentage of ash, would be the cheapest, provided, of course, the furnace in which it was to be fired was suitable.

In the Interborough Company's specifications the standard ash for good steam caking run-of-mine bituminous coal is 9 per cent, and the penalty attached for exceeding this limit is 2 cents per ton for each 0.50 per cent. No premium for ash percentage lower than this standard is allowed. In Cleveland the specifications provide for Ohio slack with a standard of 15 per cent ash. The penalties are 3 cents per ton for each 1 per cent excess over the standard, and no premiums are allowed.

The Government specifications have been drawn to cover bids on a wide range of bituminous coals, while the railway specifications which are included in the comparison are intended to cover one grade of coal only. The difference in penalties and premiums on ash percentage is explained on this ground. The operating conditions in a railway power station are fairly constant from week to week, and it is desirable to burn coal of uniform quality best adapted to the furnaces in use. The penalties are intended to act as a preventive measure against shipment of coal below the fixed standard of quality, and there is little or no gain in efficiency by using coal of better quality. Hence a premium is perhaps unwarranted.

The moisture in coal as received is beyond the control of the miner, the shipper or the consumer. It affects the weight of the coal, and its presence in excessive quantities also materially affects the steaming quality of the coal, as a considerable part of the heat energy is consumed in evaporating the water which goes up the stack as waste steam intermingled with the gases of combustion. Where it is practicable to weigh coal as delivered, the presence of moisture can be allowed for equitably by determining the heat units per pound of wet coal as a basis of payment. This is the plan adopted by the Government, and it works no hardship on the consumer or the dealer, as the price paid per ton is correspondingly low if the coal is wet and high if the coal is dry. The Cleveland Railway Company, which

is close to the coal fields, makes no provision for excess moisture in its specifications, but uses mine weights and determines the heating value of the coal as delivered from samples taken on the cars. In exceptional cases this might work a hardship on the dealer, but it provides an incentive for delivering fresh, dry coal, which is what is desired from the railway company's standpoint. The Third Avenue Railroad Company deducts from the railway scale weights an amount due to all moisture in excess of 4 per cent with bituminous coal and 3 per cent with anthracite coal, but uses a dry sample for determining the heating value and percentages of ash and sulphur.



Ohio Electric Railway—Toledo Freight and Passenger Stations

The penalties and premiums for variations from the standard heating value of coal show wide differences in the three specifications under consideration. This is the most important element entering into the purchase of coal on the basis of analysis, and must be determined according to the conditions of each source of supply and consumption. The Government specifications, which are drawn on broad lines, provide for a proportionate increase or decrease in the contract price of bituminous coal. If the heating value runs 1 per cent above the standard fixed in the contract, the price, after adjustment for ash, is increased 1 per cent, and vice versa. The heating value is not considered in the purchase of anthracite.

The specifications of the Interborough Company include a table of penalties and premiums based on a fixed value of 1 cent per ton for each 50 b.t.u. above or below the standard of 14,250 for bituminous and 12,150 for anthracite. The maximum premium on both bituminous and anthracite is 26 cents and the maximum penalty is 45 cents.

The Cleveland Railway Company has calculated its table of bonuses and penalties for variations in heating value in connection with the penalties for excess of ash and sulphur so as to incite the dealer to supply coal ranging from the standard of 12,500 b.t.u. up to 13,125 b.t.u., between which range the best profit is yielded, and to prevent delivery of coal more than 10 per cent below standard, on which there is no profit. The maximum premium is 35 cents per ton for coal of 13,975 b.t.u. and above, and the maximum penalty 80 cents per ton on coal below 10,100 b.t.u. One feature of the New York companies' specifications which is not included in the others under review is the limit set on percentage of volatile matter in both bituminous and anthracite coal. Volatile matter may be all combustible, but usually contains some inert gases. Generally speaking, the coal which contains the highest percentage of fixed carbon can be burned most efficiently, and therefore the limiting of the percentage of volatile matter is important, particularly in a city like New York, where there are stringent regulations against smoke production.

THE TOLEDO ENTRANCE AND TERMINAL OF THE OHIO ELECTRIC RAILWAY

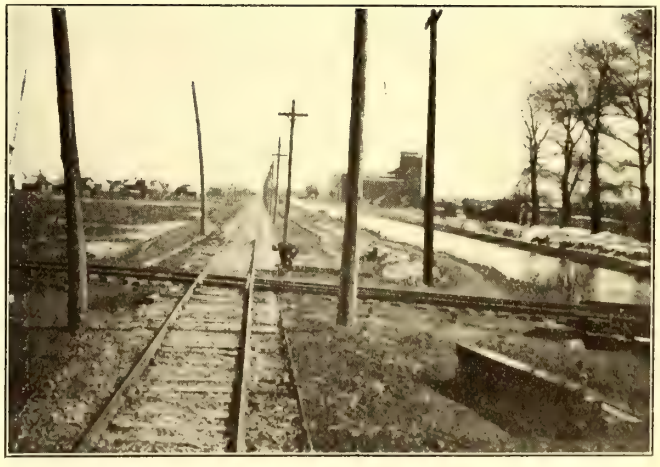
The Ohio Electric Railway early last fall put in service the two new lines which connect up all its lines in Ohio, constituting about 600 miles of lines in that State. The one new line was from Bellefontaine to Lima, and the other from Lima to Toledo. The entrance of the latter line in Toledo is rather unusual in traction construction and location, in that a private right-of-way was secured to within a few blocks of the commercial center of the city. The line lands passengers and freight nearer the heart of the



Ohio Electric Railway—The "Lima Limited" at the Toledo Terminal

city than any steam road, without occupying a foot of city street.

The company has erected a passenger station and a freight station on the terminal property, and has recently established a limited service between Toledo and Lima which, connecting at the latter point with limited service to Fort Wayne, Springfield, Columbus, Zanesville, Dayton, Indianapolis and Cincinnati, offers inducements for many long-haul trips entirely over one electric line. The limiteds between Lima and Toledo make the run of 72½ miles in 2

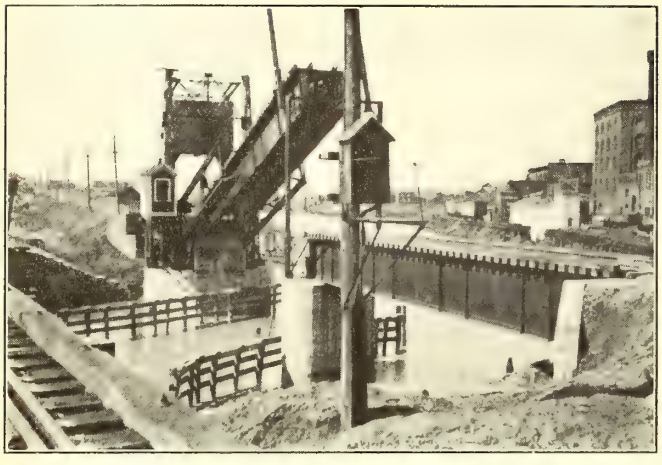


Ohio Electric Railway—Right-of-Way Along Canal at Toledo

hours and 15 minutes, the same time as the fastest train on the competing steam road. The whole line is laid with 70-lb. T-rail, with Continuous joints, and is ballasted with clean broken stone. There is no curvature over 3 deg., and practically no street tracks in any of the towns along the line. The maintenance charges should be comparatively low, and even faster running time is entirely possible later.

The right-of-way for the tracks approaching the new terminal was purchased about 10 years ago by the Wabash

Railroad interests, but the project which they had in mind was never completed. Therefore the Ohio Electric Railway was able to purchase a portion of this right-of-way leading out of the city. Ample room is provided for double tracking whenever traffic demands. No track is laid in the streets except at highway crossings, and only four streets are crossed at grade within the city. This freedom from crossings is brought about largely by the right-of-way being parallel to that of the Miami & Erie Canal, across which very few streets have been opened. The most severe grade in the Toledo entrance is a dip of 2½ per cent through a subway. The terminal buildings comprise a freight house and a passenger station. The passenger station includes waiting rooms, baggage room, ticket office and employees' room. The two buildings are separated by a driveway.



Ohio Electric Railway—Lift Bridge at Toledo, Entrance Open

An interesting feature of the private right-of-way entrance to Toledo is the bascule bridge across Swan Creek. This bridge was erected by the Strauss Bascule Bridge Company, and comprises three deck-plate girders, two approach spans of 64 ft. and one channel span of 73 ft. 6 in.



Ohio Electric Railway—Lift Bridge at Toledo, Entrance Closed

The latter has each of its two cross-frames extended to a rigid connection with a lifting truss on either side. These lifting trusses are mounted on trunnions resting on the pivot pier, and are counterweighted with a block of reinforced concrete carried on the steel frame. This weight supporting the frame is pin-connected to the lifting trusses at the end and is held by a link at the top, the arrangement being the parallel-link motion characteristic of the Strauss bascule bridge. The operation of the bridge is effected by racks on the lifting trusses and pinions and gearing on the pivot pier. The usual locks, brakes, signals and operator's house are provided, together with a reserve hand gear. This design is said to permit the use of an ordinary deck-plate girder span of the shortest possible length for a given opening. Lifting trusses can be added at any time when provision must be made for future navigation. Additional spans also may be added on either side of the first span without disturbing the earlier work.

This new line furnishes for Toledo a high-speed suburban as well as long-distance interurban line which has few equals in any city of its size in the country.

MODIFIED MERIT SYSTEM IN LITTLE ROCK

A modified system of awarding merits and demerits has been established on the railway lines of the Little Rock Railway & Electric Company, Little Rock. During the time in which it has been in operation, since April 1, 1909, it has proved very satisfactory, and, according to D. A. Hegarty, general manager, has been followed by marked increase in the efficiency of the force. The novel feature of the system lies in the fact that the merits and demerits are awarded by a jury in which the employees are represented.

The schedule of merits and demerits does not differ greatly from that on other roads. There are only seven faults for which there is immediate discharge, namely: disobedience of rules governing railroad crossings, disloyalty to the company, false statements, intoxication, dishonesty, gambling and gross ungentlemanly conduct. A schedule of the demerits and merits shows that the former vary from 1 to 100 and the latter from 1 to 50. Originally these merits and demerits were assessed by a board of inquiry, consisting of the general manager, the superintendent of the railway department, the superintendent of transportation and the claim agent. On April 1, however, the company decided to add to this committee two motormen and two conductors, who are chosen by the men at large. This jury has charge of all of the cases except those relating to the appropriation of fares, and assesses all merits and demerits to motormen and conductors after a consideration of the evidence.

The jury meets every Friday morning, and the employees on the jury are paid for their time while engaged in jury work at the same rate as if they were operating a car. When any case for the award of merits or demerits arrives, the employee affected is notified in writing of the fact, with the reason, and is given opportunity to appear before the committee to explain his side of the case, if he desires. After the marks are awarded, a notice is posted on the bulletin board announcing the marks given, the charge, the date and the decision, but the name of the man and the car number are omitted, although the man himself is notified personally by mail. When an employee's demerits have reached the number of 90, he is called in by the superintendent and cautioned and advised; when they amount to 100, he is subject to dismissal from the service. Employees are permitted to examine their record at any time. Five merits are awarded all railway employees who pass a month without demerits.

To encourage interest in making a good report a prize of $25 is awarded every six months to each conductor and each motorman having the best record.

MEETING OF COMMITTEE ON POWER DISTRIBUTION

A meeting of the committee on power distribution of the American Street & Interurban Railway Engineering Association was held July 23 at the headquarters of the association, 29 West Thirty-ninth Street, New York. Those present were James Heywood, Philadelphia Rapid Transit Company (chairman); W. J. Harvie, Utica & Mohawk Valley Railway; G. W. Palmer, Boston & Northern Street Railway Company, and E. J. Dunne, Public Service Railway Company, Newark, N. J. The two other members of the committee, S. L. Foster, United Railways of San Francisco, and W. G. Matthews, Denver City Tramway Company, were unable to be present, but both have greatly assisted the committee by sending discussions on the subjects being considered this year. These communications will be embodied, in part, in the final report. The meeting last week was called by Chairman Heywood so that the committee could finally consider and prepare the recommendations to be presented at the Denver Convention.

The work carried on by the committee this year has been a continuation of that conducted by the previous committee on the same subject, and in its report the committee will follow the outline of topics adopted in last year's report, but some additions have been made to that list.

The first subject considered in the report this year will be that of underground and overhead feeder cables for both high-tension and low-tension current and the best methods of protecting them from lightning. The committee will go quite extensively into the requirements of design of high-tension transmission towers. In this portion of the report the committee will also discuss the possibility of rehabilitating paper-insulated low-tension cables, and will describe a furnace in which the metal in these cables can be economically recovered if the cables have to be scrapped. In connection with the discussion of lightning protection the committee has secured some valuable data from member companies in the Far Western States. This section of the report will be accompanied by five appendices: Appendix A is an outline specification for high-tension, three-conductor, paper-insulated, lead-sheathed underground cable. Appendix B is a specification for rubber compound insulation. The specification to be included in Appendix B covers only the physical and chemical properties of the rubber compound to be used for insulation, and does not refer to the thickness of insulation on wires or to specifications for braiding. Appendix C will consist of a discussion by S. L. Foster of San Francisco, who is a member of the committee, on some features of moderately high-tension transmission in California. Appendix D is a specification for low-tension underground feeder cables. Appendix E is a discussion on the general subject of lightning protection by J. V. E. Titus.

The second portion of the report will be devoted to the subject of working conductors, and will include a discussion of the merits of different sections and sizes of trolley wire. The committee has had under consideration a number of specifications for trolley wire, but in the limited time at its disposal was unable to prepare a satisfactory specification to be submitted for adoption by the association, and it will only report progress in this direction.

Following the discussion on trolley wire, the report will take up the most desirable forms of overhead line material. In this connection Appendix F will be submitted, in which will be given the results of a series of tests of overhead line materials supplied by different manufacturers which have recently been conducted under the auspices of the committee. Samples of various forms of overhead line material were obtained from seven manufacturers, and these were subjected to mechanical tests both at normal temperatures and when heated to 150 deg. Fahr., and to electrical tests, both dry and either saturated or under precipitation of moisture. The second section of the report will be concluded with an extended discussion of the different methods of preserving wooden poles from decay and of reclaiming both wooden and iron poles.

The third section of the report relates to the improvements in catenary construction developed since the report of last year was prepared. In its treatment of this topic the committee will give a comparison of the relative costs of bridge and pole catenary construction with that of the ordinary type. The committee will present some general recommendations as to good practice in the details of catenary construction.

Under the heading "Return System," the report will discuss the most desirable type of bonds to use with T and girder rails, the proper method of testing bonds and other problems in connection with the laying and maintenance of return circuit cables. The report will conclude with a carefully prepared discussion of duct, conduit and manhole construction, accompanied by drawings of two-way and four-way manholes of a type approved by the committee and also by a complete outline specification covering the purchase and laying of tile conduit, which will be designated as Appendix G.

SPECIFICATIONS FOR HEAT TREATED AXLES

At the meeting of the committee on equipment of the American Street & Interurban Engineering Association held in Cleveland on July 19 and 20 the preparation of tentative specifications for heat-treated axles was assigned to J. S. Doyle, superintendent of car equipment of the Interborough Rapid Transit Company, New York, who is a member of the committee. In order to obtain the views of steel manufacturers, Mr. Doyle called a meeting at the office of the association, 29 West Thirty-ninth Street, New York, on the morning of July 22. Besides Mr. Doyle, who acted as chairman, those present at the meeting were: George William Sargent, Carpenter Steel Company; F. W. Weston, Standard Steel Company; A. A. Stevenson, Standard Steel Works; W. A. Bostwick, Carnegie Steel Company; E. A. C. Acker, Bethlehem Steel Company; H. L. Waterman, Cambria Steel Company, and Norman Litchfield, Interborough Rapid Transit Company. Mr. Barba, of the Midvale Steel Company, to whom an invitation had been extended, was unable to be present.

Mr. Doyle explained that the object of the conference was to agree, if possible, upon the principal requirements of a specification for heat-treated axles to be used on electric motor trucks carrying motors of 100 hp and over. This would include the types EC-1 and ED of the standards already adopted by the American Street & Interurban Railway Engineering Association. He called attention to the fact that axle failures have been experienced by a number of electric railway companies during the past few years, and he expressed the belief that the time was opportune for bringing to the attention of the railway companies in general the desirability of using treated steel for axles of heavy motor trucks.

The representatives of the steel manufacturers agreed that the following requirements could be met in the manufacture of treated axles without undue difficulty:

1. All axles for this class of service should be forged

of open-hearth steel made either by the acid or basic process.

2. Maximum limit of phosphorus, 0.04 per cent for basic steel and 0.05 per cent for acid steel.

3. Maximum limit of sulphur, 0.06 per cent.

4. Maximum limit of manganese, 0.80 per cent.

5. Discard from the top ingot sufficient to insure freedom from piping and undue segregation.

6. Tensile strength, 80,000 lb. per square inch.

7. Yield point, as measured by the drop of the beam, 45,000 lb. per square inch.

8. Elongation in 2 in., 22 per cent.

9. Reduction of area, 40 per cent.

10. All steel axles should be allowed to cool after forging, then reheated to the proper temperature, quenched in some medium, again allowed to cool, and then reheated to the proper temperature for annealing.

At the request of Mr. Doyle, the representatives of the steel manufacturers present at the meeting expressed a willingness to prepare for the committee brief statements of their views on the value of heat treatment of steel to be used in axles, to be incorporated in its report.

MEETING OF THE COMMITTEE OF EQUIPMENT

A meeting of the committee on equipment of the American Street & Interurban Railway Engineering Association was held at the Hollenden Hotel, Cleveland, Ohio, on July 19 and 20. The members of the committee who were present were: L. L. Smith, master mechanic of the Chicago & Milwaukee Railway Company, chairman; M. V. Ayres, of the Boston & Worcester Street Railway Company, and L. W. Jacques, of the Fort Wayne & Wabash Valley Traction Company. Others in attendance were: Paul Winsor, of Boston, president of the association; W. H. Evans, of Buffalo; A. A. Stevenson, vice-president of the Standard Steel Works, and M. R. Hanna, representing the General Electric Company.

The first subject considered was the subject of standard wheels. Mr. Stevenson stated that in spite of the large number of sections in use, his company had been able to confine all recent orders, some several hundred in number, to within a dozen different sections. This was done by showing the customers how their needs could be supplied by wheels that are of standard size at less money than it would cost to make the wheels of special dimensions.

The shape of the flange was also discussed exhaustively, both by the members of the committee and the visitors. It was suggested that there should be more metal in the flange than in the standard adopted two years ago, because of the wear from the guard rails. It was also suggested that the cone of the standard type of the wheel tread might be increased from the present standard of 1 in 25 to 1 in 20. Several of those present maintained that many roads change the taper on the first turning or grinding of the wheels to 1 in 20, so there is no good reason for not using that taper originally. It was finally decided, however, not to make any change this year. The discussion brought out the fact that the average number of turnings of rolled-steel wheels is three. Some wheels have been known to run 150,000 miles on one turning, but the average is 45,000 miles. An interesting claim made during the discussion on wheels was that thick rims increase the weight of the wheel to such an extent that the cost of hauling the wheels is about equal to the cost of the wheels. The belief was expressed by one engineer that light wheels with one life will be more economical than the heavy ones that will stand turning several times. The following suggestions as to wheels were brought up:

Diameter.	Thickness of Rim.	Diameter of Hub.
33 in.	2½ in.	5½ in.
34 in.	3 in.	6 in.
35 in.	3 in.	6 in.
36 in.	2½ in.	6 in.
37 in.	3 in.	6 in.

Flanges:
1 3-16 x 3-4 with 2 1-2 in. tread.
1 3-16 x 7-8 with 3 in. or 3 1-2 in. tread.

Chairman L. L. Smith read a communication from W. H. McAloney, member of the committee and superintendent of rolling stock of the Denver City Tramway Company, on the subject of "Economical Maintenance." The writer touched upon almost every important phase of electric railway operation, and recommended a number of features he believed will prove of benefit. This communication will be made a part of the report of the committee.

L. W. Jacques read a paper, compiled principally from the data sheets received, on "Rolled-steel vs. Steel-tired Wheels." The experience of many roads was given, and some amusing stories were related.

RAIL GRINDER OF ALBANY & HUDSON RAILROAD

The accompanying illustration shows a rail grinder which was recently devised by the Albany & Hudson Railroad Company for grinding down the wing rails of frogs to permit smoother passage of the car wheels. The grinder also will be used to improve the condition of the rail joints on the local lines in Hudson, N. Y. All of the wing rails on the frogs located on the main line between Albany and Hudson have been ground down with this machine at a cost of 28 cents per frog. The emery grinder is driven at a speed of 1900 r.p.m. by a 500-volt, 7½-hp motor, which is unnecessarily large for the work.

It will be noticed that this device is carried on an ordinary track section car. The motor frame is mounted on a



Grinding the Wing Rails of Frogs on the Albany & Hudson Railroad

movable wooden base, which can be shifted from one side of the car to the other to reach the work on either rail. The hinged frame which is suspended from the top of the fixed frame carries a shaft and double pulley at each end. The frame carrying the emery wheel is hinged at the bottom of the upright swinging frame and is held in a horizontal position by a spring suspended from the stationary frame. The pressure against the rail is supplied by the operator. As the belt centers are constant, the emery wheel has a movement of from 2½ ft. to 3 ft. along the top of the rail. The framework is of the folding type, and can be prepared for removal to another location in from one to two minutes. The entire machine is moved and operated by three laborers.

Acknowledgments are due to R. H. Smith, general manager of the company, for the data in this article.

AMERICAN ASSOCIATION MEMBERSHIP CIRCULARS

The American Street & Interurban Railway Association is continuing its vigorous campaign to procure new members. It recently sent circulars and application blanks for associate membership to the managers of all the tramway companies in Europe and foreign countries, and has already received two applications. It is hoped that a large number of the foreign tramway officers will take advantage of the invitation extended to them to become members.

The secretary's office has also sent out to all street railway companies in the United States circulars pointing out the advantages of membership in the association, and enclosing application blanks. The application blank for active membership has attached a table headed "A Case of Non-Support," and is directed primarily to railway companies in the Western States. The table gives the number of member companies and non-member companies in each of 16 States west of the Mississippi River, and shows a total of 67 member companies and 128 non-member companies. Below the table is printed the following urgent appeal: "You need your convention as much as it needs you. Reverse these totals and insure its success."

The application blank for associate membership states briefly what privileges are accorded to members and the cost of membership. The privileges may be summarized as follows: Privileges of the annual conventions; attendance at meetings of the Engineering and Transportation & Traffic associations and participation in their discussions; receipt of all papers and committee reports of the Engineering Association 30 days in advance of the convention; one cloth-bound copy of the proceedings of the Engineering and Transportation & Traffic associations, 900 pages; privilege of wearing associate membership emblem.

Another circular which has been sent out with the application blanks is headed "Cost vs. Return." This gives in parallel columns the cost of company membership and the benefits to be derived from membership. Each association is considered separately, and the scope of its work is outlined. The titles of this year's committees, with the number of their members, are also given.

The field of the American Association covers matters of general welfare, public policy, etc. Its committees include those on insurance, six members; welfare of employees, 4; compensation for carrying U. S. Mail, 5; municipal ownership and public relations, 13; Interstate Commerce Commission affairs, 5; a total of 38.

The Accountants' Association considers accounting questions, standardization of accounts, reports, etc. Its committees include one on shop accounting (jointly with the Engineering Association committee), 3 members; collection of blanks and forms, 1; international standard form of report, 3; standard classification of construction and equipment accounts and form of report, 5; interline accounts, 3; a total of 15.

The Engineering Association considers engineering questions, covering the construction and maintenance of electric railway equipment and apparatus, standardization, etc. Its committees include those on standards, 9 members; equipment, 6; way matters, 6; power generation, 6; power distribution, 6; shop accounts (jointly with the Accountants' Association), 3; a total of 36.

The Claim Agents' Association concerns itself principally with the organization of the details of the work of reducing the "damages" account. This year it has only two committees, one on employment of 3 members and one on ways and means, 4 members; a total of 7.

The Transportation & Traffic Association deals with general operating methods and details. The committees are those on interurban rules, 6 members; city rules, 6; passenger traffic, 6; express and freight traffic, 6; training of transportation employees, 6; transfers and transfer information, 6; a total of 30.

The total number of committees is 24, and the total membership 132. Other benefits to be derived by company membership in the association include participation of officers in all convention meetings and discussions; cloth-bound copies of proceedings, 1650 pages; monthly statistical bulletins; clearing house for electric railway information; opportunity of viewing the convention exhibits.

The number of member companies in the association is the best indication of the claim that value is received for the membership dues. At the time this circular was prepared there were 300 member companies, having total capital liabilities of $2,148,272,441; gross income, $290,784,299; single-track mileage, 19,586; cars owned, 60,505.

The association is also endeavoring to interest as many of its members as possible in the coming Denver convention, and has prepared a small card giving a few reasons why the attendance this year should be as large as in previous years. Some of these reasons are: That Denver is 1500 miles from San Francisco and but 2000 miles from New York; it takes 48 hours from San Francisco to Denver and only 47 hours from New York to Denver; 20 per cent of the active members of the association are located west of the Mississippi River; 20 per cent of the companies represented at the 1908 convention held at Atlantic City, N. J., came from west of the Mississippi River. The only convention of the association ever held west of the Mississippi River was in Kansas City in 1900.

PROGRAM FOR CONVENTION OF ACCOUNTANTS' ASSOCIATION

President Robert N. Wallis of the American Street & Interurban Railway Accountants' Association has announced the tentative program for the convention to be held at Denver during the week beginning Oct. 4.

Papers will be read by the following: W. B. Brockway, "Relation of the Accountant to Electric Railway Organization;" E. S. Pattee, Twin City Rapid Transit Company, "Storeroom Accounting and Inventory;" N. E. Stubbs, United Railways & Electric Company, of Baltimore, "Timekeeping and Payrolls;" S. C. Rogers, treasurer, Mahoning & Shenango Railway & Light Company, "Interurban Statistics;" W. M. Steuart, United States Census Bureau, "The Census and Electric Railway Statistics."

Reports will be presented to the association by the committee on interline accounts, the classification committee, and from the joint committee of the Accountants' and Engineering associations, each of which will undoubtedly provoke a great deal of discussion.

ROUTING OF SPECIAL CONVENTION TRAINS TO DENVER

It has been announced that the special train to the convention at Denver leaving New York over the New York Central & Hudson River Railroad will run via the Lake Shore from Buffalo to Chicago, and over the Chicago, Rock Island & Pacific Railroad from Chicago through to Denver. The other special train from New York, over the Pennsylvania Railroad, will run from Chicago to Denver via the Chicago, Burlington & Quincy Railroad.

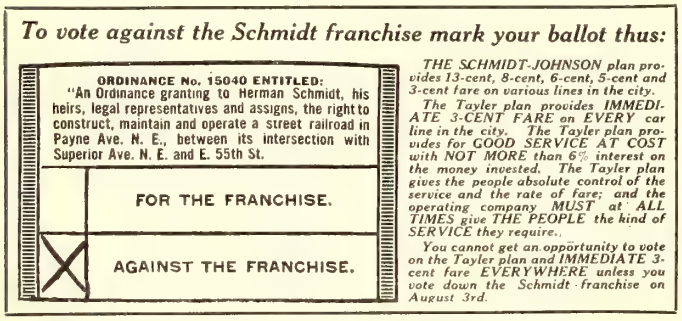
CAMPAIGN OF THE CITIZENS' COMMITTEE OF CLEVELAND

The citizens' committee of one hundred of Cleveland is conducting a strenuous campaign against the Schmidt franchise, the measure by means of which Mayor Johnson and his associates hope to be in a position to build another road to compete with the system of the Cleveland Railway. A referendum on the Schmidt ordinance will be held on Aug. 3. Tent meetings are being held and literature circulated by the citizens' committee and by the Johnson supporters.

A series of circulars has been issued by the citizens' committee. No. 1 says in part regarding the Schmidt franchise:

The franchise given to Herman Schmidt and his assigns provides that the rate of fare for each passenger over six years of age, from the intersection of Payne Avenue and Superior Avenue to East Fifty-fifth Street (Willson Avenue), shall be 3 cents. There is no provision that a passenger shall be carried upon any extension of said line for the 3 cents.

It in express terms releases Schmidt and his assigns



Circular Issued by Citizens' Committee Showing Method of Voting Against Franchise

from paying for the repaving of 16 ft. of the street, as required by the general ordinances of the city.

It does not give the city any control over the service or management of the property.

It does not limit the profits from operation to 6 per cent, or any other sum.

It does not limit the capitalization of the company to the physical value of the property, or to any sum.

Acting under the laws governing original grants, the City Council advertised for bids on 14 routes, requiring deposits of cash amounting to $255,000. Of the 14 original routes thus advertised one was granted to Herman Schmidt and assigns, that being the Payne Avenue route described. The deposit required on this grant was but $18,000.

From this original Payne Avenue grant it is proposed to give Schmidt and his assigns the right to build extensions, thus evading the law governing the granting of original routes to the lowest responsible bidder and defeating its purposes.

The Schmidt-Johnson plan means continual street railway warfare, with disordered service and many different rates of fare, varying from 3 cents to 13 cents, or more.

The citizens' committee of 100 urges the defeat of the Schmidt franchise on Aug. 3, and of any other franchise the City Council may grant which aims to renew the disastrous street railway war, and they demand a referendum election on Judge Tayler's plan for street railway settlement, which insures immediate 3-cent fare on all lines and the best terms ever given to the people in any city in the world.

In circular No. 2, discussing "Three-cent Fare or Thirteen-cent Fare," the citizens' committee said:

As long as he can prevent it, Mr. Johnson will not permit the people to vote on any franchise unless it is granted to his friends or associates; he will not put the whole question squarely before the people by submitting the Tayler plan to a referendum, because Mr. Johnson proposes to obstruct any settlement of the street railway question just as long as the people allow him to do so, unless he can again secure control of the properties for himself and his friends.

No. 3 in the series was entitled "Valuation," and showed the details of the valuation placed upon the properties of the Cleveland Electric Railway and the Forest City Railway by Mayor Johnson and F. H. Goff, as follows:

Description	Per mile Cleve. Electric property	Per mile Forest City property
Tracks	$16,926.50	$29,292.23
Pavement	7,665.92	8,293.12
Cars	11,735.25	30,325.01
Land	5,053.34	1,036.89
Buildings, except power and battery houses	3,754.95	2,247.00
Overhead construction and return circuits	4,914.78	9,862.14
Power stations and buildings therefor	9,875.24	11,038.75
Storage batteries and buildings therefor	1,291.15	4,007.61
Shops, shop stores, tools, rails, ties and track	1,902.33	2,652.71
Miscellaneous, rolling stock and equipment	689.38	342.70
Miscellaneous: Accounts receivable, office furniture, etc.		2,942.79
Overhead charges: Organization, construction interest, salaries of general officers, etc.	3,160.49	4,731.03
Items not covered by physical value schedules	31,846.76	13,283.24
Cost per mile	$98,816.09	$120,055.22

The committee said in this circular that Mayor Johnson had declared that the Forest City property would be built and equipped for $50,000 per mile, whereas, when the sale took place, he claimed that the real cost was $120,000 per mile.

In circular No. 4, dealing with "Service," the committee states that the object of the Schmidt-Payne Avenue franchise is to force a return to the holding company plan, while "the Tayler plan means immediate 3-cent fare over every car route in Cleveland, with good service at cost, and always under the control of the people." It adds:

As a matter of fact and figures, on Aug. 8, 1908, investigations made by the *Press* and the *News* showed there were lying idle during the rush hours in the various barns of the company 230 cars, or 25 per cent of all the company owned, although August is the busiest month in the year. While men, women and children were being packed in cars like cattle, 25 per cent of the equipment was lying idle!

No. 5 in the series, discussing transfers, states: "About 30 per cent of Cleveland car riders now use transfers. If the railway system is divided between two companies, many people will have to pay two fares who now ride on free transfers."

The American Railway Association has appointed the following committee on electrical working, which will investigate and report on the progress made in the electrification of steam railroads: George Gibbs, chief engineer of electric traction, Long Island Railroad, chairman; L. C. Fritch, consulting engineer, Illinois Central, J. F. Deems, superintendent of motive power, New York Central lines; J. D. Isaacs, consulting engineer, Union & Southern Pacific system; W. J. Harahan, assistant to the president, Erie Railroad; C. S. Sims, second vice-president, Delaware & Hudson, and E. H. McHenry, vice-president, New York, New Haven & Hartford.

SPECIFICATIONS FOR HARD-DRAWN COPPER WIRE

At the annual meeting of the American Society for Testing Materials, held in Atlantic City, N. J., June 29 to July 3, 1909, Committee W presented proposed standard specifications for hard-drawn copper wire, including round wire, grooved trolley wire and cable or standard wire. These specifications were received without discussion and ordered submitted to letter ballot for adoption by the society. The result of this ballot has not yet been announced. The committee which prepared the specifications consisted of the following:

J. A. Capp, General Electric Company, chairman; W. H. Bassett, American Brass Company; J. F. Finley, American Steel & Wire Company; H. J. Horn, John A. Roebling's Sons Company; C. C. Baldwin, Standard Underground Cable Company; O. A. Havill, Viele, Blackwell & Buck; F. W. Wallace, Waclark Wire Company; C. Crosland, Western Electric Company; T. D. Lynch, Westinghouse Electric & Manufacturing Company; C. D. Gray, J. G. White & Company.

The text of the specifications as presented and the explanatory notes of the committee are reprinted in full below:

PROPOSED STANDARD SPECIFICATIONS FOR HARD-DRAWN COPPER WIRE

1. The material shall be copper of such quality and purity that, when drawn hard, it shall have the properties and characteristics herein required.

2. These specifications cover hard-drawn round wire, grooved trolley wire and hard-drawn cable or strand, as hereinafter described.

3. The wire, in all shapes, must be free from all surface imperfections not consistent with the best commercial practice.

4. (*a*) Package sizes for round wire and for cable shall be agreed upon in the placing of individual orders; standard packages of grooved trolley wire shall be shipments upon reels holding about 2500 lb. each.

(*b*) The wire shall be protected against damage in ordinary handling and shipping.

5. For the purpose of calculating weights, cross-sections, etc., the specific gravity of copper shall be taken as 8.90.

6. All testing and inspection shall be made at the place of manufacture. The manufacturer shall afford the inspector representing the purchaser all reasonable facilities to enable him to satisfy himself that the material conforms to the requirements of these specifications.

HARD-DRAWN ROUND WIRE

7. (*a*) Size shall be expressed as the diameter of the wire in decimal fractions of an inch, using not more than three places of decimals; i.e., in mils.

(*b*) Wire is expected to be accurate in diameter; permissible variations from nominal diameter shall be:

For wire 0.100 in. in diameter and larger, 1 per cent over or under.

For wire less than 0.100 in. in diameter, 1 mil over or under.

(*c*) Each coil is to be gaged at three places, one near each end, and one approximately at the middle; the coil may be rejected if, two points being within the accepted limits, the third point is off gage more than 2 per cent in the case of wire 0.064 in. in diameter and larger, or more than 3 per cent in the case of wire less than 0.064 in. in diameter.

8. The wire shall be so drawn that its tensile strength and elongation shall be at least equal to the values stated in the following table. Tensile tests shall be made upon fair samples, and the elongation shall be determined as the permanent increase in length, due to the breaking of the wire in tension, measured between bench marks placed upon the wire originally 10 in. apart. The fracture shall be between the bench marks, and not closer than 1 in. to either mark. If, upon testing a sample from any coil of wire, the results are found to be below the values stated in the table, tests upon two additional samples shall be made, and the average of the three tests shall determine acceptance or rejection of the coil.

Diameter, inches	Area, circular mils	Tensile strength, lbs. per sq. in.	Elongation in 10 in. per cent
0.460	211,600	49,000	2.7
0.410	168,100	51,000	2.6
0.365	133,200	53,000	2.4
0.325	105,600	54,500	2.3
0.289	83,520	56,000	2.1
0.258	66,560	57,500	2.0
0.229	52,440	58,500	1.9
0.204	41,620	59,500	1.8
0.182	33,120	60,500	1.7
0.162	26,240	61,500	1.6
0.144	20,740	62,500	1.5
0.128	16,380	63,400	1.4
0.114	12,996	64,200	1.3
0.102	10,404	64,800	1.2
0.091	8,281	65,400	1.1
0.081	6,561	65,700	1.0
0.072	5,184	66,000	0.9
0.064	4,096	66,200	0.9
0.057	3,249	66,400	0.8
0.051	2,601	66,600	0.8
0.045	2,025	66,800	0.7
0.040	1,600	67,000	0.7

For wire whose nominal diameter is between listed sizes, the requirements shall be those of the next larger size included in the table.

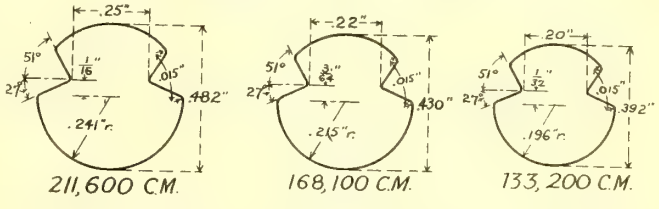
9. Electric conductivity shall be determined upon fair samples by resistance measurements at a temperature of 20 deg. C. (68 deg. F.). The wire shall not exceed the following limits:

For diameters 0.460 in. to 0.325 in., 900.77 lb. per mile-ohm at 20 deg. C.

For diameters 0.324 in. to 0.040 in., 910.15 lb. per mile-ohm at 20 deg. C.

GROOVED TROLLEY WIRE

10. Standard sections shall be those known as the



American Standard Sections for Grooved Trolley Wire

"American Standard" grooved trolley wire sections, the shape and dimensions of which are shown in the accompanying drawing.

11. (*a*) Size shall be expressed as the area of cross-section in circular mils, the standard sizes being as follows:

211,600 circular mils, weighing 3386 lb. per mile.

168,100 circular mils, weighing 2690 lb. per mile.

133,200 circular mils, weighing 2132 lb. per mile.

(*b*) Grooved trolley wire may vary 4 per cent over or under in weight per unit length from standard, as determined from the nominal cross-section.

12. The physical tests shall be made in the same manner as those upon round wire. The tensile strength of grooved wire shall be at least 95 per cent of that required for round wire of the same sectional area; the elongation shall be the same as that required for round wire of the same sectional area.

13. The requirements for electric conductivity shall be the same as those for round wire of the same sectional area.

HARD-DRAWN COPPER WIRE CABLE OR STRAND

14. For the purposes of these specifications, standard cable shall be that made up of hard-drawn wire laid concentrically about a hard-drawn wire center. Cable laid up about a hemp center or about a soft wire core is to be subject to special specifications to be agreed upon in individual cases.

15. The wire entering into the construction of stranded

cable shall, before stranding, meet all the requirements of round wire, hereinbefore stated.

16. The tensile strength of standard cable shall be at least 90 per cent of the total strength required of the wires forming the cable.

17. Brazes, made in accordance with the best commercial practice, will be permitted in wire entering into cable; but no two brazes in wire in the cable may be closer together than 50 ft.

18. The pitch of standard cable shall be not less than 12, nor more than 16, diameters of the cable. The cable shall be laid left-handed or right-handed, as shall be agreed upon in the placing of individual orders.

EXPLANATORY NOTES ON PROPOSED SPECIFICATIONS FOR HARD-DRAWN COPPER WIRE

5. The specific gravity of copper has been commonly accepted as 8.9, and this value is retained in the proposed specifications. The maximum variation from this figure in a large number of samples of wire has not been sufficient to lead one to anticipate any serious error from its use as a flat value in calculations.

7. (*a*) The use of arbitrary gage numbers to express dimensions cannot be too strongly condemned. There are many such gages in existence, and confusion is to be expected unless the particular gage to be used is specified. Many of the gages have their dimensions stated in absurd figures, such as 0.090742 in., when it is not especially easy to measure dimensions in the fourth decimal placed by workshop tools. Definite diameters in measurable units are evidently preferable.

8. Many other physical tests than those provided in these specifications are included in existing specifications. The reasons for the omission of some of the more common are given as follows:

Twist Tests.—The wire is sometimes required to permit twisting through a stated number of revolutions before breaking. The results are so easily influenced by temperature, speed of rotation, method of gripping and other variables not easily defined or controlled, that the test is at least of doubtful value. It is the opinion of the committee that it is impractical to so define the conditions of the test that a twist test can be made definite and reliable; hence there is no warrant for its inclusion in specifications.

Wrap Tests.—Wire is sometimes required to permit tight wrapping about a wire of its own diameter, unwrapping and again rewrapping. It is obvious that the making of a test of this kind with wire that is already hard-drawn is exceedingly difficult. Every one who has tried to break off a piece of tough wire by bending it back and forth between the fingers knows how hard it is to confine the bend to one place, because of the hardening action of the previous bends. Hard wire which has been wrapped around a wire of small diameter is hardened still more and it is almost impossible to straighten the wire, let alone recoil it in the opposite direction. In the opinion of the committee it is inadvisable to include a test which at best is so indefinite as a wrap test. Furthermore, it is the opinion of the committee that wire which will meet the physical tests included in the proposed specifications will meet any properly made twist or wrap test that would reasonably be required.

Elastic Limit.—During the tension test on wire there is seldom to be observed any definite drop of the beam or increase in the rate of elongation, corresponding to the yield point commonly observed in testing steel. The only way in which the elastic limit of hard wire may be determined is by the actual plotting of the elastic curve from extensometer readings. Even such tests are difficult of interpretation, because the wire when available for tests is usually curved, due to its having been put up in a coil. There are little sets observable before the true elastic limit has been reached, owing to the fact that one side of the wire, having been stretched in coiling, is really a little harder than the other side, and the pull is, therefore, not even. Considering the difficulty of making the test and the uncertainty of the results obtained, it is the opinion of the committee that it would be inadvisable to include an elastic-limit test in the proposed specifications. It is evident that if the designing engineer requires a knowledge of the location of the elastic limit for purposes of calculation in designing, such data can be obtained by special tests on representative sizes of wire, which will fix the relation of the elastic limit to the ultimate strength for all wire which is properly made.

Elongation.—Elongation tests on wire are required in different specifications to be measured in lengths varying from 8 to 60 in. The elongation has variously been measured as the permanent increase in the length of the wire, measured between bench marks placed on the wire before fracture; as the elongation measured between the jaws of the testing machine, which are adjusted to grip the wire with a certain definite free length, and in various other ways. Perhaps the most commonly used length is 10 in., and it is a good length, because measurements may be immediately transposed into percentages without laborious calculation. Measurement of elongation in any other way than as the permanent increase in length between bench marks, in the manner customary in the measurement of steel elongation of specimens, is open to criticism. If measurements are made between the jaws of the testing machine there is included a certain amount of elongation which has taken place within the jaws, because the wire in stretching will have been reduced in diameter and, therefore, have stretched to a greater or less extent within the jaws themselves. If the measurement is made between bench marks on the wire just prior to breakage, there is included in the elongation a certain amount of elastic deformation.

9. Electric conductivity is usually expressed as a percentage on the Matthiesen basis, reference being made to determinations of the electrical resistivity of supposedly pure copper by Matthiesen about 1865. Since that time the methods of refining copper have greatly improved, so that to-day it is not uncommon to find copper of over 100 per cent conductivity on the Matthiesen basis. Furthermore, what the electrical engineer requires is that the wire shall not exceed a certain maximum electrical resistance. It seems obvious that it is less laborious to express quantities in direct definite terms rather than by reference to something else which requires interpretation before the results are ready for use in calculation. Resistivity is commonly expressed in a number of different ways, all being equivalent to the resistance of some unit of cross-section, this unit being expressed either in linear dimensions or as a combination of weight and dimensions. For convenience we give a table of equivalents of the values for electrical resistance included in the proposed specifications. The values are equivalent respectively to 97 per cent and 96 per cent conductivity on the Matthiesen basis.

900.77 lb. per mile-ohm is equal to:
- 0.15776 ohms per meter-gram,
- 1.7726 microhms per centimeter cube,
- 0.69789 microhms per inch-cube,
- 10.663 ohms per mil-foot.

910.15 lb. per mile-ohm is equal to:
- 0.15941 ohms per meter-gram,
- 1.7911 microhms per centimeter-cube,
- 0.70517 microhms per inch-cube,
- 10.774 ohms per mil-foot.

10. It is obvious that the simplest designation of irregular shapes of similar outline is by sectional area, and the most commonly used unit among electrical engineers is the circular mil. Therefore, while the sizes of grooved trolley wire regularly used are generally known by B & S gage number, corresponding to their sectional area, it has been deemed advisable by the committee to list these sizes, in specifications, by their sectional area expressed in circular mils. The three sizes which are most extensively used commercially are the only ones listed; a fourth size is but little used, and the use is growing less.

11. The only way in which gage variations are easily determinable in irregular shapes is by recourse to weights of standard lengths, and this has been the method adopted in the specifications.

14. So many variations in the construction of cable are possible that it has been deemed inadvisable to complicate the specifications by including requirements for any other than the one type most commonly used.

16. Physical testing of cable is at best a difficult matter, and the measurement of elongation in cable which has been subjected to a tensile test is uncertain, since it includes both the elastic deformation of the cable as a spring,

the actual elongation of the wires, and perhaps even some elastic deformation of the wires as such. It is therefore thought inadvisable to include a requirement covering an elongation test.

17. The permitting of brazes in wire entering into the construction of copper cable was discussed at considerable length, and it is finally the opinion of the committee that, provided no two brazes are closer together than 50 ft., the cable has fully 90 per cent of the theoretical strength obtained by adding together the required strengths of the constituent wires. This is due, in such long lengths, to the frictional gripping of the wires in the cable. The construction of long lengths of cable without brazes is costly, and it has been thought best, therefore, to permit their use, provided they are sufficiently widely spaced as not to be detrimental to the strength of the cable.

CIRCULAR OF MANUFACTURERS' ASSOCIATION ABOUT DENVER

George Keegan, secretary of the Manufacturers' Association, has sent out this week a circular containing a letter addressed to prospective exhibitors by Kenneth D. Hequembourg, vice-president of the exhibit committee, which contains the exhibit arrangements at the Denver convention. The text of the letter follows:

The American Street & Interurban Railway Manufacturers' Association will hold its twenty-eighth annual Railway Appliance Exposition at Denver, Colo., in the new auditorium and adjacent temporary buildings, on Oct. 4 to 8, inclusive. The plans of the exhibit committee were approved by the executive committee on July 7, and your committee is prepared to give details regarding exhibit space and general layout as well as information and regulations of the association.

The auditorium is situated in the central part of Denver, a few blocks from the leading hotels. The Annex buildings are temporarily constructed of heavy canvas, with plank flooring laid over the sidewalk and street, similar to the construction of building No. 3, or annex, on the Steel Pier at Atlantic City. These buildings will be light and contain perhaps the best exhibit space in the whole layout.

The United States Weather Bureau gives us a record of temperature and precipitation for the corresponding period in 1907 and 1908, which bears out Denver's guarantee of good weather in October. A schedule, showing temperature, etc., is given herewith:

WEATHER REPORT, OCTOBER, 1907.

Date.	Temperature, (degrees Fahrenheit) maximum.	minimum.	Precipitations in inches and tooths.	Percentage of sunshine.
1	70	38	0	90
2	67	39	0	37
3	53	38	T.	23
4	67	36	0	87
5	81	39	0	100
6	80	46	.08	78
7	62	45	.04	59
8	73	45	0	77
9	71	42	0	72
10	76	42	0	92

WEATHER REPORT, OCTOBER, 1908.

Date.	Temperature, (degrees Fahrenheit) maximum.	minimum.	Precipitations in inches and tooths.	Percentage of sunshine.
1	79	42	0	86
2	78	56	0	69
3	62	43	.03	60
4	59	41	0	60
5	63	40	0	95
6	64	38	0	75
7	66	36	0	100
8	74	37	0	100
9	77	42	0	78
10	63	42	0	91

The main and only entrance to the exposition will be through the annex, near the registration offices at Fourteenth Street and Curtis Street. Wide aisles lead delegates through the annex and into the center of the auditorium proper on the Champa Street side, through which the delegates will proceed to reach the Convention Hall. The balcony is reached by stairways leading off the main floor of the Convention Hall. It may be found desirable to extend the annex toward Thirteenth Street, thus securing more space on the main floor, in which case the car exhibits would be located at the extreme end of the new part of the annex, so that spaces 146 to 166 would be available for other exhibits. Heavy weights are permissible in all booths from 1 to 384, inclusive, as shown on the inclosed schedule.

Your committee regrets to advise that it is at this time impossible to give information regarding special freight rates, but that this matter is being attended to and will be taken up in a later bulletin.

In conformance with the ruling of the executive committee all applications for space received on or before July 31 will be considered as having been received on that date, and all such will have equal preference as to location. Applications received after that date will be assigned as they are received chronologically. Applicants may state their preference, giving first, second and third choice. The exhibit committee will do all in their power to satisfy each exhibitor in this intricate proposition in conformity with the conditions and general appearance of the exposition. Any objection made to the ruling of this committee will be received and a hearing may be obtained.

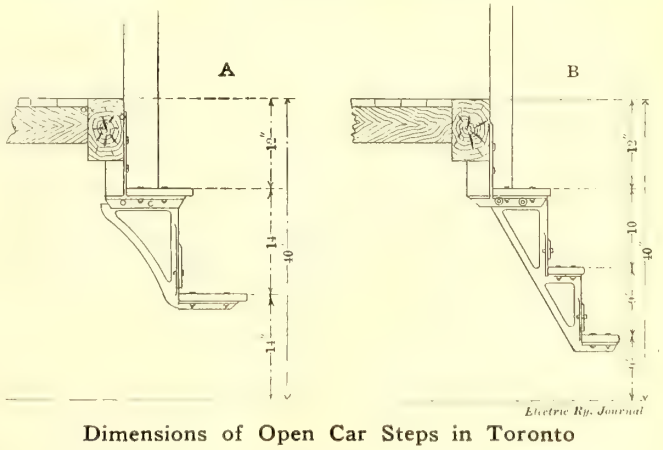
Kindly fill out and mail application blank for space so that the committee can give it their prompt attention, mailing to the nearest of the following: L. M. Cargo, Westinghouse Company, Denver; S. P. McGough, the Lorain Steel Company, Chicago; K. D. Hequembourg, Walker-Bennett Manufacturing Company, New York; George Keegan, New York; whose addresses will be found on the page to the left of the circular, of whom any general inquiries may be made.

If you are not a member write to Charles C. Castle, Hildreth Varnish Company, New York City, who is chairman of the membership committee, or to George Keegan, secretary of the association.

The circular contains information regarding special lighting and electric signs, shipping instructions, weights allowed, freight rates, arrangements for electric power, plan of exhibit space, etc. The exhibit committee is also sending out applications for exhibit space.

STEPS ON OPEN CARS IN TORONTO

An account was published last week of the recent decision of the Toronto Railway & Municipal Board in regard to the height of the steps on open cars in Toronto. The decision calls for two side-steps on open double-truck cars, height from rail level as follows: First, 14 in. to 16 in.; second, 14 in.; third, 12 in. As stated in the article, the Toronto Railway Company, at the request of the board, also tried



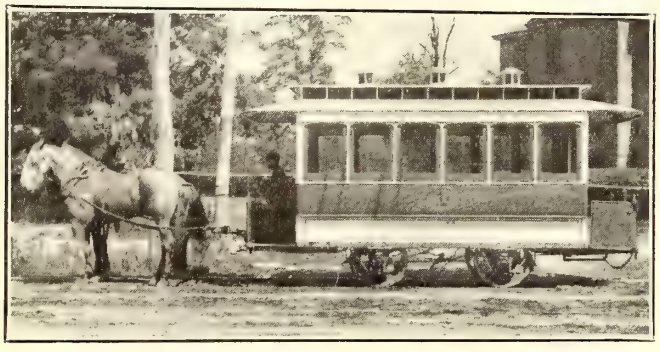
Dimensions of Open Car Steps in Toronto

a system of three steps, but these steps projected so far beyond the side of the car that it was found impossible to operate the cars satisfactorily in the streets.

The two diagrams herewith show the two methods, "A" being that now adopted as standard and "B" being the plan with the extra step. As stated last week, the decision of the board relates to future cars only, and not to the present rolling stock.

BALTIMORE COMPANY CELEBRATES ITS FIFTIETH ANNIVERSARY

On July 26 the United Railways & Electric Company, Baltimore, Md., celebrated the fiftieth anniversary of the establishment of street railway service in Baltimore. The first line in Baltimore was about 2 miles long. It extended from the foot of Broadway to North Street, and over it for some time was operated a lone horse car in entire charge of a driver. From this beginning the system has



First Horse Car in Baltimore

grown until to-day the lines of the United Railways & Electric Company, which controls all the city lines proper, comprising more than 400 miles of track, over which 750 cars are operated by an army of employees directly and indirectly connected with the actual work of running a car, and numbering 4500 men and women.

To make the anniversary especially significant to its employees, the company planned a special celebration for them, and gave the employees and their families an outing at Bay Shore Park and Gwynn Oak Park on Monday. Tickets entitling the holders to free transportation to the park were distributed by the management, besides which coupons were given the families of the employees, entitling them to all the privileges of the grounds, including the attractions. As a mark of identification, the company also gave each employee a small silk pennant bearing the words "1859—United Railways—1909." The employees were apprised of the celebration planned in their behalf by the fol-



First Electric Car in Baltimore

lowing letter, addressed to them by William A. House, president of the company:

Monday, July 26, marks the fiftieth anniversary of the inauguration of street-car service in this city.

On July 26, 1859, a small car was placed in operation from the foot of Broadway to Baltimore and North Streets. It was regarded as a great curiosity, an innovation, and the wiseacres of that day were sure it could never displace the slow and lumbering omnibus. However, to-day this primitive horse-car line has grown into a system operating about 400 miles of track, with a generating capacity of nearly 50,000 hp and employing 4500 persons.

Our railway system may be likened to a huge industrial machine—a harmoniously adjusted unit—of which each individual employee forms a component part and has a certain function to perform.

This growth, success and superior service are due largely to the loyalty, efficiency and harmonious team work of the company's employees.

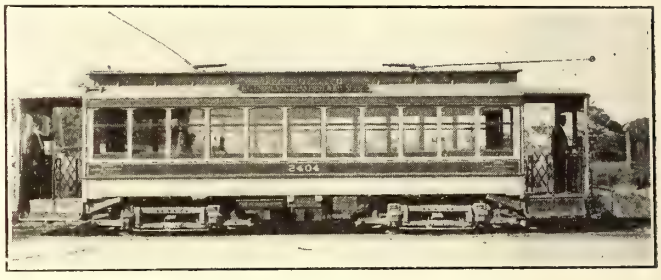
In appreciation of this fact it has occurred that it might be a fitting celebration of the fiftieth anniversary for the company to extend to its employees and their families an invitation to use Gwynn Oak and Bay Shore Parks on that day for a general company outing and picnic.

On behalf of the company, therefore, a cordial invitation is extended to you and your families for a day's outing at either Gwynn Oak or Bay Shore on Monday, July 26, and to enjoy the attractions of those resorts.

To discharge our obligation to the traveling public, you realize, of course, that there can be no interruption in the operations of the system on that day, and that while some of you will be unable, personally, to take advantage of this invitation, except possibly for a few hours, it is hoped that your families will find it convenient to enjoy these attractions as the company's guests.

It is the earnest wish of the company that the day may prove to be one of unalloyed pleasure to you and yours, and that the fiftieth milestone in our progress may be a banner day in the history of our company.

On Monday the offices and buildings of the company were decorated, and each car carried a number of flags and a pennant descriptive of the occasion. Both Mr. House and his wife, and T. A. Cross, general manager of the company,



Modern Electric Car Used in Baltimore

and his wife visited the different parks during the day. Schedules were so adjusted that all trainmen were given an opportunity to attend the festivities at one or the other of the two parks during the day, and both parks were crowded to their capacity.

Through the courtesy of Mr. House the Electric Railway Journal is able to present the following review of railway progress in Baltimore from the day the first street car was placed in operation, on July 12, 1859, as an experiment:

The car which had been operated as an experiment on July 12 was placed in operation to carry passengers on July 26, 1859. On Aug. 24, 1859, the City Passenger Railway began operating a road, which subsequently became the Green & Pennsylvania line. These cars started from Baltimore Street and Sharp Street and ran up Pennsylvania Avenue to the Boundary. On Sept. 12, 1859, cars were placed in operation on the line extending out Baltimore Street to Franklin Square. On Nov. 18, 1859, the White Line of the City Passenger Railway was extended out Madison Street to Boundry Avenue. On Dec. 11, 1861, the Red Line was diverted from Baltimore Street east to Gay and carried out Gay Street to the Blue Line (the present St. Paul Street service), and put into operation as far north as Boundry Avenue on Dec. 4, 1862. In the early 80's the City Passenger Railway assumed control of the Harford Avenue and the Orleans Street line, and in 1888 it gained control of the Central Line.

The Citizens' Passenger Railway and the Catonsville & Ellicott Mills Railway entered the field at an early date in competition with the City Passenger Railway. The Towsontown Railroad, incorporated on March 9, 1858, completed its line to Govanstown on May 27, 1863, and shortly thereafter reached Towson. On June 25, 1868, the Citizens' Passenger Railway obtained a grant to build from Druid Hill Park to Patterson Park. In 1872 the City Council passed an ordinance granting the Park Railway the privilege of building a line from German Street and South Street to the northern city limits. This franchise was acquired by the Baltimore, Peabody Heights & Waverly Passenger Railway, incorporated in 1872, and in 1874 this company purchased the Peabody Heights Railway. In 1870 the Baltimore & Hall Springs Passenger Railway constructed a line from the City Hall to Harford, where connections were made with the line for Homestead and Hall Springs. The People's Passenger Railway was incorporated in 1876. It built a line from Druid Hill and Boundary Avenue to Port McHenry, and the first car was run on Aug. 9, 1879. The Baltimore, Calverton & Powhatan Railway was incorporated in 1870 to build a line to Baltimore, Wetheredsville, Franklintown and Powhatan. Up to 1880 there were the City Passenger, operating about six lines; the Citizens' Passenger Railway, operating a Druid Hill Park-Patterson Park service; the People's Passenger Railway, covering the city from Druid Hill Avenue and the boundary to Fort McHenry; the Baltimore, Peabody Heights & Waverly Passenger Railway from South and German Street via Bolton Street to Waverly; the York Road to Towsontown; the Catonsville, and lines to Powhatan and Hall Springs.

In 1870 the Citizens' Passenger Railway attempted to substitute steam for horses as a motive power, and placed in operation on Sept. 28, 1876, a queer-looking steam-dummy train, but the experiment was discontinued after 60 days. The next step in rapid transit in Baltimore was the use of the Daft system on the Baltimore Union Passenger Railway in 1885. This line ran from the outskirts of the city to the village of Hampton, a distance of about 2 miles. Two locomotives were built for this service, and one of the trains is shown in the accompanying illustration. Service was opened on this line on Aug. 10, 1885, but the experiment was discontinued after a short trial. Six years after the opening of the Baltimore Union Passenger Railway, the Baltimore Traction Company opened a cable line on Druid Hill Avenue. This service was started on May 23, 1891, and continued for five years. The road was then electrified. From 1891 to Oct. 4, 1893, 20 rapid transit lines were opened in Baltimore. Cable was still favored as motor power in Baltimore as late as 1893, for on Aug. 20 of that year the City Passenger Railway opened its Madison Avenue cable line. This afterward proved to be the last cable line in Baltimore. The period of reconstruction and conversion of the railways in Baltimore from cable and horse-power to electricity extended from 1895 to 1899. During this time there developed among the companies a tendency toward consolidation, and in June, 1897, the Baltimore Consolidated Railway was formed, and subsequently effected the consolidation of a number of lines. A little earlier than this, however, the Baltimore Traction Company absorbed the Citizens' Passenger Railway, the People's Railway, the North Baltimore Railway, the Pimlico & Pikesville Railway and a number of other lines. The Baltimore Traction Company and the City & Interurban Railway, the Lake Roland Elevated were subsequently consolidated as the Baltimore Consolidated Railway, which acquired the Ellicott City branch of the Columbia & Maryland Electric Railway by purchase in 1898. Finally, on March 4, 1899, the United Railways & Electric Company took over all the street railways in Baltimore.

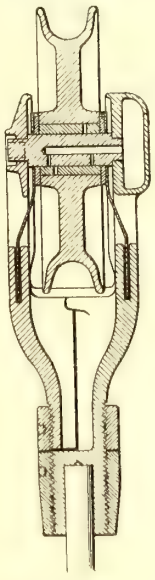
A summary of the notable events in the history of street railroading in Baltimore follows:

Plans for first horse-car line formed	1854
City authorized laying of tracks	March 28, 1859
First car ran from foot of Broadway to Baltimore and North Streets	July 26, 1859
Second (Green) line opened	Aug. 24, 1859
Red line opened on Baltimore Street	Sept. 12, 1859
First all-night cars (ran one week only)	Dec. 17, 1860
Catonsville line opened	July 23, 1862
Blue line opened to North Avenue	Dec. 4, 1862
Govanstown line opened	May 27, 1863
First Sunday cars operated	April 28, 1867
Line connecting Druid Hill and Patterson parks opened	June 25, 1868
Hall's Spring and Powhatan lines opened	1870
First "Jim-Crow" cars	May 2, 1870
"Jim-Crow" cars abandoned	Nov. 11, 1871
First rapid transit (steam cars)	Sept. 28, 1876
Fort McHenry line opened	Aug. 9, 1879
First electric cars (at Hampden)	Aug. 10, 1885
First cable cars (Druid Hill Avenue)	May 23, 1891
Baltimore Consolidated Railway formed	June, 1897
All of the lines consolidated in the United Railways & Electric Company	March 4, 1899

One of the most pleasing features of the celebration to the company was the spirit with which the newspapers entered into the plans of the company to make the affair a success. All the papers told about the celebration, and on Sunday, July 25, the Baltimore *Sun*, Baltimore *News* and Baltimore *American* published in their magazine sections long descriptive articles reviewing the history of the company, illuminated them with striking photographs showing the contrasts between the facilities afforded for transportation in Baltimore now and a few years ago.

A SELF-LUBRICATING HARP AND TROLLEY WHEEL

The Pacific Electric Railway Company, Los Angeles, Cal., has recently installed a number of self-lubricating trolley harps and wheels devised by Joseph M. Smith, Worcester, Mass. As shown in the accompanying section, one side of the harp is fitted with a head for an oil well. When this chamber is filled, the oil enters the passage in the journal pin, and after going through ducts in the pin, passes through perforations in the bushing in the bore of the trolley wheel. In this way the trolley wheel is constantly lubricated as long as it is kept in motion.



Self-Lubricating Trolley Wheel

The trolley wheel washers are held in place by spring plates. The latter fit into vertical recesses at the bottom of the harp, but are readily removable. The springs extend to the interior of the harp through transverse openings, as shown. It will be noted that the harp members are detachably connected by cutting one side with a rectangular seat, the other member being shaped to correspond. Both pieces are tapered at the lower end to receive the nut which fastens them to the trolley pole. This type of harp and wheel is being made and sold by the Worcester Railway Supply Company, Worcester, Mass.

A NEW CAR CURTAIN FIXTURE

The accompanying engravings illustrate the mechanism of a new and improved form of curtain fixture for steam and electric railway cars which is made by the Planet Company, Chicago, Ill. The construction is simple and durable, consisting of a brass tube, one small spring, one operating lever made of brass, two brass heads, two round steel rods, to which small steel clips are fastened, and a brass cover plate, part of which forms the pinch handle. This construction employs no small wheels, cams or rings. The fixture is free from dust pockets and cannot accumulate dust or dirt, which makes it sanitary and easy to keep clean.

Fig. 1 is a sectional view of the fixture with cover plate of handle removed. It shows the position of the operating lever, the spring and the round rods when assembled. Passing through the inside of the lever is a square hole and riveted to the spring are two small washers with square holes in them. One end of the rods is squared, and as shown in the illustration these rods pass through the washers, through the torsion spring and into the square hole in the operating lever, the ends of the rods almost meeting in the center of the lever. The square hole in the lever being a trifle larger than the square ends of the rods gives each rod enough independent action to insure griping in both grooves should they vary any in width. The tube is slotted in both ends and the guide heads are fastened to the rods so as they can be pushed in or drawn out three-quarters of an inch for adjustment should the distance between the top and bottom of the grooves vary. The assembling of the fixture is a simple operation and the curtains can be attached easily.

Fig. 2 is a view of the end of the fixture in holding position. The principle of locking is simple and effective, the grip of friction being on the sides of the grooves instead of an outward pressure against the posts. On each end of the fixture there is a small S-shaped casting which with the guide gives four points of contact in each groove, locking the fixture so securely that it cannot creep. It is immaterial whether the grooves be rough or smooth, varnished or unvarnished. The fixture requires the same size grooves as all other fixtures, ⅜ in. wide by ⅜ in. to ½ in. deep. The clips and guide heads are shaped so that they will not wear, scratch or cut the grooves. This locking arrangement will work well in steel cars where brass slots or grooves are used and fastened on with screws driven in through the bottom of the groove into the post. There is nothing to rattle and the end of the fixture cannot catch on the screw slots, as there is ⅛-in. clearance. The pinch handle is in the opposite position from other styles and places the operating lever in a more convenient position for passengers to grasp. It is not necessary to pinch in and then push up or pull down. To release the tension all that is necessary is to take hold of the pinch handle, give it the slightest pressure and it is free to run up or be drawn down. Fig. 3 is a view of the non-holding position of the fixture.

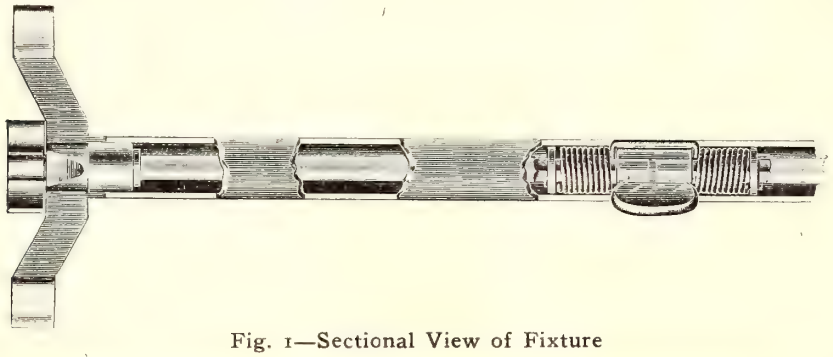


Fig. 1—Sectional View of Fixture

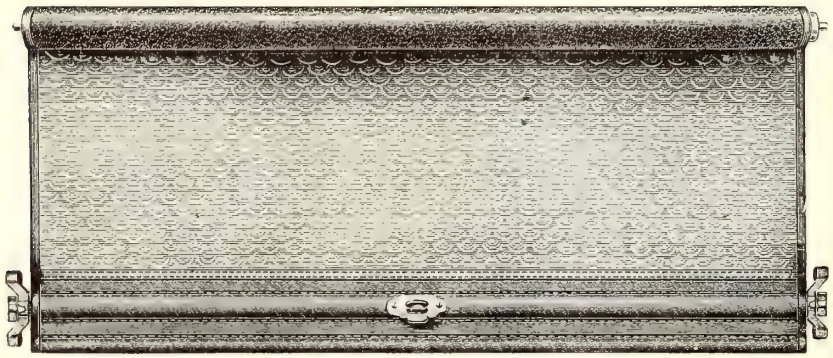


Fig. 4—Fixture Attached to Curtain



Fig. 2—Holding Position



Fig. 3—Non-Holding Position

Fig. 4 shows the fixture attached to a curtain. Only a slight portion of the guide heads can be seen when placed in the window frame. As the heads do not move in or out in operation the curtains can be made full width to entirely shut out the light. This feature, together with the fact that the curtain cannot creep, makes this fixture very desirable for sleeping cars.

The few parts and the minimum amount of workmanship required in its manufacture make the fixture quite inexpensive as compared with other fixtures. The parts are made of solid metal to render the device durable and are constructed to withstand the roughest kind of usage. The spring is made of music wire and it is claimed will wear indefinitely. The tension is controlled by one lever and one spring insures the releasing of both sides at the same instant, allowing the curtains to roll and unroll evenly at all times. This eliminates crooked or furrowed curtains.

The Planet Company has named this device the Eclipse curtain fixture.

News of Electric Railways

Cleveland Traction Situation

Warren Bicknell, receiver of the Municipal Traction Company, has presented a tabulation of the earnings of the company which shows that the operation of the system at a 3-cent fare would have resulted in a deficit for the seven months the property has been under his charge. The results which would have followed the operation of the system at a 3-cent fare, as arrived at by Mr. Bicknell, are shown in the accompanying table:

	December, 1908.	January, 1909.	February, 1909.	March, 1909.	April, 1909.	May, 1909.	June, 1909.
Number passengers carried	12,301,335	11,673,783	10,189,222	11,454,473	11,435,401	12,132,689	12,443,186
Pay passengers, at 3 cents	$369,040	$350,213	$305,677	$343,634	$343,062	$363,980	$373,305
Other earnings (actual):							
Chartered cars	674	726	743	1,008	1,038	1,414	2,261
Touring cars	....	....	....	....	....	86	540
Freight and express	2,792	2,095	2,095	2,372	3,357	4,377	3,640
Mail	1,003	1,405	1,158	1,155	1,156	1,150	1,157
Passes	....	....	....	....	....	2,184	3,542
Newspapers	1,333	1,133	1,333	1,333	1,333	1,333	1,333
Advertising	3,764	3,682	4,025	3,729	3,313	3,254	3,277
Rent of land and buildings	14	33	38	33	33	33	33
Rent of tracks	20	20	20	20	20	20	20
Miscellaneous	2,352	2,096	3,211	2,874	3,062	2,789	3,532
Total earnings	$380,992	$361,603	$318,294	$356,158	$356,374	$380,456	$392,589
Expenses:							
Maintenance (as provided in lease)	$99,580	$98,429	$88,668	$98,174	$96,010	$106,257	$107,330
Operating (actual)	180,270	179,548	164,485	176,386	169,903	175,972	174,257
General (actual)	39,211	34,109	34,895	34,469	37,808	37,250	38,070
Taxes (actual)	23,544	22,847	23,564	24,103	24,114	24,401	24,644
Interest, bond (actual)	40,293	38,552	39,516	39,516	38,803	38,589	38,580
Neutral Street Railway rental (actual)	891	1,008	937	936	937	937	936
Total expenses	$383,790	$374,493	$352,065	$373,584	$367,655	$383,496	$384,727
Deficit (exclusive interest on capital investment)	$2,798	$12,389	$33,770	$17,426	$11,290	$3,039	*$7,862
Interest on capital investment	73,378	73,378	73,378	73,378	73,378	73,378	73,378
Deficit with interest charged	$76,176	$86,267	$107,148	$90,804	$84,668	$76,417	$65,515
Transfer passengers:							
Number carried on transfers	3,846,250	3,859,273	3,224,535	3,682,078	3,741,649	4,265,749	4,317,991
Revenue derived if charged 1 cent—no refund	$38,462	$38,592	$32,245	$36,820	$37,416	$42,657	$43,179
Deficit, with 1 cent transfer—no refund	$37,713	$47,675	$74,903	$53,983	$47,252	$33,760	$22,336

Total deficit, exclusive of interest on capital, for seven months $73,353
Total deficit for seven months $586,999
Total deficit if 1 cent for transfer were charged, with no refund, for seven months $317,624

* Surplus.

These figures cover the operation of the entire system, both in the city and the suburbs. Every month, with one exception, shows a deficit, exclusive of the interest charges. With interest added, the deficit increases for the seven months to $586,999. The deficit, with a charge of 1 cent for transfer, not rebated, would have amounted to $317,624. These figures show that the system can not be operated at a 3-cent fare with 1 cent for transfers and pay the operating expenses, fixed charges and dividends on the stock. The average fare received from the 3-cent lines, with the charge for transfers, brings the receipts up, so that they yield more than the flat rate used in the tabulation. The average is 3.62 cents, while the average rate from all lines for June, 1909, was 4.37 cents.

Mayor Johnson says it is proposed to charge 3 cents only within the city limits. He charges that a surplus of almost $1,000,000 has been accumulated by the receivers and that a portion of this has been set aside to defray claims for accidents that are not properly a charge, and for repairs which are still to be made. Mr. Bicknell states that $800,000 has been deposited in the local banks to be used in paying claims against the Municipal Traction Company and for other necessary purposes, but that all of this money could be used to advantage within a short time for rehabilitation work.

Robert E. McKisson, a former Mayor of Cleveland, has entered the referendum campaign of his own accord and independently of the committee of 100. He is urging the defeat of the Schmidt grant. Mr. McKisson favors a low fare during the morning and evening rush hours, with a higher rate for the remainder of the day. He argues with many others that the conditions imposed by the extension ordinances granted to Mr. Schmidt are not applicable to the original franchises and that the Mayor and the administration speakers are making promises which they know it will be impossible to fulfill under the terms of the new grants. It is probable that Mr. McKisson will be a candidate for mayor before the Republican city convention. He says, however, that he is taking an active part in the campaign because he feels that the administration plan should be defeated.

After several conferences of the representatives of organized labor a circular has been prepared, denouncing the Schmidt franchise and advising members of the various unions to vote and work against it.

At one of the tent meetings, John A. Cline, prosecuting attorney, asserted that under the extension ordinance prepared for Herman Schmidt the right is given to charge any fare the owners of the franchise see fit to exact, but that the clause making this possible is so drawn as to eliminate suspicion.

Mayor Johnson has had small billboards erected at all points of vantage in and about the Public Square on which he has placed a poster containing his latest argument that the people will do away with all opportunity for competition if the Schmidt franchise is defeated. The first posters put on the billboards stated that the question was between 3-cent and 5-cent fares and that a vote for the Schmidt grant will be a vote for 3-cent fare. While the Tayler plan does provide for an initial fare of 5 cents it contains the new principle of a sliding fare, depending upon the ability of the company to give good service and pay 6 per cent on the investment.

Proposed Franchise for Des Moines

The City Council of Des Moines, Ia., on May 24, 1909, passed a resolution authorizing the corporation counsel to prepare and submit to the City Council a new ordinance to govern the relations between the city of Des Moines and the Des Moines City Railway. Previous to the passage of this resolution the question had arisen of the authority of the Des Moines City Railway under the franchise which it now holds, and it was decided by the city that an expedient way to settle the differences between the city and the company would be to draw a new ordinance as a basis for negotiations for a new agreement between the company and the city. The city and the company seem to be particularly at odds regarding the right of the company to operate interurban cars over its tracks and the rights of the Interurban Railway Company. In preparing the ordinance, William H. Baily, corporation counsel of Des Moines, followed the ordinance governing the right of the Chicago City Railway to operate in Chicago. The report of the corporation counsel on the proposed ordinance reviews the resolution authorizing the new grant and the conditions which led the Council to decide to have a new ordinance drawn. It also contains statements by the company showing its financial condition and earning capacity, on which are based some of the provisions of the ordinance. The ordinance provides in brief as follows:

The franchise of the Des Moines City Railway is to be extended for a period of 25 years from April 1, 1910. The company may permit other street and interurban railways to use its tracks, subject to regulations imposed by the

City Council. The compensation for the use of such city lines by the interurban railway is to be fixed by mutual agreement between the companies, if possible. In the event of their failure to agree to terms, the same are to be fixed by a board of three arbitrators, who shall be members of the railroad commission. If the members of the railroad commission, for any reason, refuse to act, however, one arbitrator is to be selected by the city company, one by the interurban railway seeking entrance to the city and the third by the City Council. Pending such arbitration, however, the interurban railway is to have the right to use the tracks designated by the City Council, provided the company execute a bond adequate to cover any loss that may be sustained by the city company. Failure by the interurban railway to pay its rental forfeits its right to operate in the city. In case of any controversy as to the compensation, the fixing of the amount due is to be submitted to arbitration as previously mentioned. Interurban cars operating in the city over the Des Moines City Railway are to be subject to the conditions governing the operation of that company's cars. The company is given the right to haul freight, subject to conditions to be imposed by the City Council. It is to proceed at once to reconstruct portions of its track and roadbed, and otherwise improve its property in compliance with specifications provided for such work as set forth in detail in the ordinance.

In laying or relaying rails in streets, the distance between center lines of track is not to be less than 9 ft. 8½ in. The exact location of tracks in the streets is to be subject to the approval of the superintendent of the department of street and public improvements. The new track is to be laid with girder rail weighing not less than 129 lb. per yd., which must conform to specifications for grooved rail made by the city engineer and approved by the City Council. The company is to grade, pave, keep in repair, sweep, sprinkle and clean free from snow 8 ft. of all streets and public ways occupied by it with a single-track line and 16 ft. with a double-track line. All cars hereafter put into service are to be equipped with double trucks and seat 40 or 50 passengers, and nine months after the approval of the ordinance by the voters every passenger car is to be equipped with hand brakes and power brakes of a type approved by the board of supervising engineers.

Nine months after the approval of the ordinance by the voters every passenger car is to be vestibuled. The city is to have the right, subject to certain limitations, to require the company to make such extensions as it may deem necessary. All work of rehabilitation is to be carried out subject to the approval of the board of supervising engineers, which is to consist of an engineer to represent the city, an engineer to represent the company and an engineer selected by the representatives of the city and the company. The engineer selected by the city and the company is to be ex-officio chairman of the board, and during the period of immediate rehabilitation is to act as chief engineer of the work contemplated in the ordinance. He is to be paid at a rate to be agreed upon by the city and the company, and he is to receive such additional compensation for his services during the period of rehabilitation as the city and the company may deem commensurate with the work involved. Each of the other two members of the board is to be paid for his services at the rate of $100 a day and his traveling and living expenses while away from home, it being understood that his total compensation for service shall not be less than $2,500 nor more than $5,000 per year. The salaries and expenses of the board of supervising engineers during the period of rehabilitation are to be added to the cost of such rehabilitation, and thereafter are to be paid out of the gross receipts of the company as operating expenses.

The rate of cash fare is to be 5 cents for each passenger 12 years of age or over and 3 cents for each passenger under 12 years of age. Children under 7 years of age, accompanied by their parents or a guardian, are to ride free. The company is to sell six tickets, through its conductors, for 25 cents. Transfers are to be good upon any line of the Des Moines City Railway other than the one on which they are issued or on any other street railway or interurban railway operated in Des Moines. Transfers are to be accepted for passage where lines cross or come within the distance of 200 ft. of the line on which the passenger has taken passage. A transfer is to be issued on a transfer, but passengers who transfer are to be required to travel in the same general direction. No passes are to be issued except to employees of the company, policemen, firemen, or officers of the health department of Des Moines in full uniform or wearing their official badges. The company is to be permitted to set aside as a separate fund to defray personal injury claims such percentage of its gross receipts as the board of supervising engineers deem sufficient to protect the company against all such claims. This provision will also protect the city, should it exercise its option to purchase the property at the expiration of the franchise grant.

Immediately upon the acceptance of the ordinance by the company a commission is to be appointed to appraise the property. The company is to appoint a commissioner as a member of the appraisal commission, the city is to appoint a commissioner to represent it, and the third member is to be selected by the city and the company. Within 25 days after accepting the ordinance, the company is to file with the Superintendent of the Department of Accounts and Finances of the city an inventory of all its holdings. The city reserves to itself the right upon April 1 or Oct. 1 of each year after the acceptance of the ordinance to purchase the property upon six months' notice at the appraised value and a sum equal to the cost of improvements made after the appraisal. If the city does not exercise its right to purchase the property during the expiration of the franchise grant, it is to have the right to designate parties who may purchase the property after the expiration of the grant at the figure at which the city could take over the property. Of the net receipts of the company, 45 per cent are to be retained by the company and 55 per cent are to be paid to the city. The city reserves the right to use a sum not exceeding its share of the net receipts of the company for the previous year to reduce the rate of fare. In the event of such a reduction, the company is to deduct and retain as its share of the net receipts each year an amount equal to what would have been its share of the net receipts had the passengers carried during the year paid the fare originally prescribed in the ordinance. Subject to the action of the City Council, the city is to deposit its share of the net receipts to create a fund to be reserved to purchase the railway system at the expiration of the franchise.

More Transit Talks in Philadelphia

The Philadelphia (Pa.) Rapid Transit Company has published No. 3 and No. 4 of its transit talks, entitled respectively, "Transfers" and "When Seventh Street Was 'Out of Town'—and Since." Talk No. 3 was dated July 20, 1909. It follows:

Unlimited transfers will bankrupt any traction company.

It costs as much to carry a transfer passenger as it costs to carry a passenger for the cash portion of his trip—sometimes more.

Overextension of the transfer privilege was directly responsible for the bankruptcy of one of the most important systems in New York City, where the giving of unlimited transfers reduced the revenue per passenger to a fraction over 3 cents. The Philadelphia Rapid Transit Company's revenue was in the same way reduced almost as low a few years ago.

In the end the public at large does not benefit by cutting down the revenue of public service corporations to a point below which good service can be given.

Last year we issued 83,448,925 transfers, nearly 7,000,000 a month. That is to say, every month the company carried 7,000,000 people part, and perhaps the larger part, of a trolley trip without charge. The company gives transfers in 382 directions from 175 points. Hardly any city in the country has more liberal transfer facilities.

Nothing short of a universal transfer system would satisfy everybody.

We make transfer arrangements which are aimed to meet the requirements of the general trend of travel, but there are still complainants who find that they cannot go from one point to another for one fare. There are doubtless a large number of such cases, but it does not follow that the transfer rights given are unduly restricted.

It seems reasonable to ask that the transfer problem be considered as a part of our problem as a whole, which is to get a revenue that will pay for the cost of transportation. It is not the individual problem of particular riders or sections.

When considered in this way it will be found that the Philadelphia Rapid Transit Company gives as many transfers, over as wide a territory, and accommodates as many people by these transfers, as does any transportation company in a large city.

Talk No. 4 was dated July 24, 1909. It follows:

Watson in his delightful "Annals" records an incident that reveals how far we have progressed since his book was written.

He tells of a prosperous Second Street storekeeper about the beginning of the last century, when every tradesman lived over his shop, who erected a dwelling house at Seventh Street and Spruce Street. The house was much admired, but everybody predicted that the man would fail in business because it was believed that no one could succeed who lived so far from his work!

How enormous has been the growth of Philadelphia since Seventh Street was regarded as "out of town"!

In those days we grew house by house; now it is square by square. What would be the amazement of Watson could he behold the man or woman who daily travels 15 miles to and from his or her place of employment!

The city of Philadelphia increases at the rate of between 6000 or 7000 dwellings every year. That means more than 21 miles of houses, if placed side by side.

Since Watson's day 1000 miles of paved streets have been constructed, and 335,000 buildings of all descriptions! And Philadelphia is still growing!

What power since the old annalist's time has been added to the world's forces to make such marvelous growth possible? *Electricity*, tamed and harnessed into man's most useful servant.

This force, converting the old-time street cars, drawn by horses, into the 160-hp trolley car of to-day, has worked the transformation of the city.

Under the management of the Philadelphia Rapid Transit Company more than 500 miles of electric lines now link together every portion of

Philadelphia in close relationship and bring the suburbs into speedy touch with the city's business heart.

This is only what traction companies should do. But their part in the development of the modern city is rarely acknowledged, and their rewards are scant in comparison to the vast additions they make to the city's wealth and wellbeing.

Ohio Electric Railway Moves Several Departments to Springfield.—Because Springfield, Ohio, is almost the geographical center of the system, the auditor, the general passenger agent and the general freight agent of the Ohio Electric Railway will move from the Traction Building in Cincinnati to Springfield on Aug. 1, 1909. The auditor of receipts moved to Springfield in January, 1909.

Car License Suit Decided Against North Jersey Street Railway.—Justice Swayze in the Supreme Court at Trenton, N. J., on July 20, 1909, in the suit brought by Jersey City against the North Jersey Street Railway, now merged in the Public Service Railway, held that the company is liable for unpaid license fees since 1867 of $10 for each car operated within the city. The amount of the obligation will be fixed by the Court if counsel cannot agree thereon. An appeal will be taken to the Court of Errors and Appeals.

Consideration of Tunnel Franchise at Camden Postponed.—The City Council of Camden, N. J., met on July 22 to consider the terms of the proposed franchise grant to the Camden Tunnel Railway, which proposes to build a tunnel between Camden and Philadelphia. The company conferred recently with E. G. C. Bleakley, counsel of Camden, regarding a proposed ordinance, and terms were agreed to subject to the approval of the Council, as announced in the ELECTRIC RAILWAY JOURNAL of July 10, 1909, page 88. Only eight members of the Council were present on July 22, and action on the franchise was deferred until Sept. 8, 1909. W. A. Stern, of Stern & Silverman, Philadelphia, who is interested in the company, is quoted as stating that the consent of the Council of Camden to the construction of the line is not necessarily essential on account of a special enabling act for tunnels passed by the Legislature.

Proposal for a New Franchise in Norwood, Ohio.—Upon the request of the Village Council of Norwood, Ohio, that the Cincinnati (Ohio) Traction Company lay new heavy rails on Montgomery Road when that thoroughfare is improved by the village and the county jointly, W. Kesley Schoepf, president of the company, stated that the franchise of the company has only five years to run and that the rails in use are good for a longer period than that, but that if the Council will extend the franchise to 25 years the company will lay 90-lb. T-rail in a 6-in. concrete bed and extend the line so as to serve the west end of the village. The proposal means an expenditure of more than $80,000.

City Rules Submitted for Comment.—The American Street & Interurban Railway Transportation & Traffic Association has sent to the general managers of member and non-member companies tentative changes in the form and arrangement of city rules, agreed upon by the city rules committee of the association which the association desires managers to study carefully and send the committee their suggestions and criticisms, or come to the Denver convention during the week of Oct. 4 prepared to discuss the rules as they have been drafted. Suggestions and criticisms should be addressed to B. V. Swenson, secretary of the association, 29 West Thirty-ninth Street, New York, N. Y.

Plan for a Report on Subways in Pittsburgh.—In the ELECTRIC RAILWAY JOURNAL of July 24, 1909, page 155, mention was made of a plan of the sub-committee on subways of the City Council of Pittsburgh to secure a report on subways in that city. W. A. Magee, Mayor of Pittsburgh, in reply to an inquiry regarding the matter, said: "The expert which we intend to employ for the subway has not yet been selected and it has not been determined what the nature of the work shall be; that is to say, whether he will examine the whole subject and make a formal report, or whether he will merely be employed to sit with the committee and informally advise it as it proceeds with its work on the ordinances now pending before it."

Properties in Ohio Inspected.—Thomas D. Cuyler, a director of the Pennsylvania Railroad, and at one time a large stockholder in the International Traction Company, Buffalo; J. J. Turner, second vice-president of the Pennsylvania Lines West of Pittsburgh; A. M. Shoyer, general superintendent of the Pennsylvania Lines West of Pittsburgh; Arthur Newbold, representing the Drexel interests of Philadelphia; W. L. Lloyd, president of the Commercial Trust Company, Philadelphia; Thomas Hamilton, superintendent of the Cleveland & Pittsburgh division of the Pennsylvania Railroad, and W. Caryl Ely, Buffalo, were members of a party that inspected the property of the East Liverpool Traction & Light Company, East Liverpool, Ohio, on July 19.

Suit to Restore Strip Tickets in Philadelphia Dismissed.—Common Pleas Court No. 2 at Philadelphia has dismissed the bills filed by Rudolph Blankenburg, representing the committee of 15 and the city, requesting injunctions to compel the Philadelphia (Pa.) Rapid Transit Company to restore the sale of the strip tickets at the rate of six for 25 cents. The judges decided that, there being no duty on the part of the company to sell the tickets, the discontinuance of their sale was a mere change in a detail of management and did not require the consent of Councils under the company's contract with the city. Judge Wiltbank, the third member of the court, concurred with his associates, but filed a dissenting decision in the city's action, expressing the view that the interpretation of "rates of fare" in the company's contract with the city meant 5 cents, 8 cents and six-for-a-quarter tickets, the fares at the time the contract was signed. Judges Sulzberger and Barratt in their decision in the city's suit followed the recent ruling of the Supreme Court in dismissing the suit brought directly in that tribunal by City Solicitor Gendell. They held that the only rate of fare contemplated by the agreement was the straight 5 cents for a single ride and that the withdrawal of the strip tickets was not a change in violation of the contract. In the Blankenburg case it was decided that the plaintiff, as an individual, had no standing in view of the city asserting a similar claim.

Kansas City Ordinance Recommended for Passage.—Eight of the 10 members of the West Twelfth Street traffic way commission of Kansas City, Mo., which has under consideration a new franchise to govern the relations between the Metropolitan Street Railway and the city, have signed the modified ordinance mentioned in the ELECTRIC RAILWAY JOURNAL of July 17, 1909, page 120, and recommended its passage to the City Council. Mayor Crittenden in presenting the ordinance outlined the conditions that led the committee to consider the matter and recommend a proposed ordinance. The Mayor said that he visited Chicago personally many months ago to study street railway conditions there and in particular the terms under which the Chicago City Railway and the Chicago Railways operate and the effect of the operating agreement on the service rendered. He afterward communicated with the traffic way commission regarding the matter, and as a result a delegation from that body went to Chicago to study transit conditions there. The Mayor said his governing idea is to supplant the present grants of the Metropolitan Street Railway with a blanket franchise that will conserve the interests of the company and the city and remove clauses admitting of various dubious interpretations and which are a menace to the city and the company. A long statement reviewing the conditions of the grant accompanied the ordinance as part of the full report of the commission to the Council.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—Representatives Chandler and Whiton, of the special committee of the Senate and House which has been considering public utility matters, have presented a minority report and urge the adoption of a measure which generally is considered more radical than the one which was adversely reported by the judiciary committee earlier in the session. The minority bill provides for a commission of five members with salaries of $4,000 each, and abolishes the Railroad Commission, vesting the powers of that body with the new commission. Members of the commission are to be nominated by the Governor and appointed by the General Assembly, and one member must be a lawyer and another a capable and experienced civil engineer. The bill further requires gas, electric, water and electric railway companies to report to the State; provides for the supervision of issues of stocks and bonds by public service corporations; for the supervision of service and rates of these companies and invests the commission with the power to order repairs. Conditions in the Assembly regarding public utilities legislation are peculiar, and it is regarded as likely that the provisions of the minority bill will cause a deadlock which will result in indefinite postponement of the question or its reference to the next General Assembly. The Senate is conservative, while the House is considered one of the most radical in the history of the State. The Republican party was not pledged to public utility legislation, but Governor Lilley was committed to the idea and urged the adoption of a measure to create a commission. Frank B. Weeks, the present Governor, was elected Lieutenant-Governor, and came into the Governor's chair through the death of Mr. Lilley. He has not publicly expressed his views on the question. The Hartford *Courant* ventures the prediction that the attempt to bring the railroads under the act will result in the defeat of the measure advanced by the minority.

Financial and Corporate

New York Stock and Money Market

July 27, 1909.

The stock market during the past week can easily be described as dull but strong. Trading has been limited but prices have as a general thing been well supported. During the week Union Pacific made a new high record—reaching to-day 199⅞—and United States Steel common continued to be an active issue on the list. After the close of the market to-day announcement was made that the dividend on Steel common had been advanced to a 3 per cent basis. This action had been pretty well discounted and has been represented in the recent rise in the price of the stock. Traction shares have been less active, those of Manhattan showing recessions on the week's business.

The money market continues to be easy. Cash is apparently plentiful and the demand for investment securities and bonds continues to be urgent. Loans were quoted to-day: Call, 1¾ to 2 per cent; 90 days, 2¼ to 2¾ per cent.

Other Markets

There has been little activity in traction shares in the Philadelphia market during the past week, although Rapid Transit and Union Traction continued to be sold in limited quantities. Prices are practically unchanged. Electric Storage Battery continues to advance, and to-day touched 60 on transactions amounting to almost 4000 shares.

In the Boston market, tractions in small lots only are being dealt in. Massachusetts Electric preferred and Boston Elevated are more active than any of the others

There has not been much doing in traction securities in Chicago during the past week. Chicago Railways, Series 1 and 2, have been traded in to a limited amount at advancing prices and Subway stock has been fairly active.

Trading in Baltimore continues to be mostly confined to United Railways bonds, which are still fairly active at prices that show small change. A few shares of United Railways stock have been sold about 12½.

Quotations of various traction securities as compared with last week follow:

	July 20.	July 27.
American Railways Company	a45¾	a45¾
Aurora, Elgin & Chicago Railroad (common)	a40¼	a41½
Aurora, Elgin & Chicago Railroad (preferred)	a86½	86½
Boston Elevated Railway	a130	130½
Boston & Suburban Electric Companies	*16	17½
Boston & Suburban Electric Companies (preferred)	*71	*72
Boston & Worcester Electric Companies (common)	10	a13
Boston & Worcester Electric Companies (preferred)	a56	a56
Brooklyn Rapid Transit Company	78½	78
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	85⅜	85¾
Capital Traction Company, Washington	a137½	a139
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*2½	*2
Chicago & Oak Park Elevated Railroad (preferred)	*10	*10
Chicago Railways, ptcptg, ctf. 1	a114	a119½
Chicago Railways, ptcptg, ctf. 2	a38¾	a39
Chicago Railways, ptcptg, ctf. 3	a26½	a26½
Chicago Railways, ptcptg, ctf. 4s	a10½	a10½
Cleveland Electric Railway	*78	*78
Consolidated Traction Company of New Jersey	a77	a77
Consolidated Traction of N. J., 5 per cent bonds	a106	a106
Detroit United Railway	63	a67¾
General Electric Company	168	167⅞
Georgia Railway & Electric Company (common)	a93	a92
Georgia Railway & Electric Company (preferred)	a87	85
Interborough-Metropolitan Company (common)	15¾	14½
Interborough-Metropolitan Company (preferred)	48	45½
Interborough-Metropolitan Company (4½s)	80½	79⅜
Kansas City Railway & Light Company (common)	50	a49
Kansas City Railway & Light Company (preferred)	84½	a84½
Manhattan Railway	146	a146
Massachusetts Electric Companies (common)	a14	a13
Massachusetts Electric Companies (preferred)	a75	73½
Metropolitan West Side, Chicago (common)	16½	a15¾
Metropolitan West Side, Chicago (preferred)	48	47
Metropolitan Street Railway	a20	a20
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	84	a83¾
Northwestern Elevated Railroad (common)	a22	20½
Northwestern Elevated Railroad (preferred)	a71	a71
Philadelphia Company, Pittsburg (common)	a42	41¾
Philadelphia Company, Pittsburg (preferred)	a43	42½
Philadelphia Rapid Transit Company	29¼	29¼
Philadelphia Traction Company	a91	a90⅞
Public Service Corporation, 5 per cent col. notes	a100½	a100¼
Public Service Corporation, ctfs.	a89	a89
Seattle Electric Company (common)	*105¼	*105
Seattle Electric Company (preferred)	*103	104¼
South Side Elevated Railroad, Chicago	a56	a56
Toledo Railways & Light Company	a10	a10
Third Avenue Railroad, New York	18½	20
Twin City Rapid Transit, Minneapolis (common)	106	103¾
Union Traction Company, Philadelphia	53½	53½
United Railways & Electric Company, Baltimore	a12½	a12½
United Railways Inv. Co., San Francisco (common)	37	a38
United Railways Inv. Co., San Francisco (preferred)	53¾	53⅜
Washington Railway & Electric Company (common)	a46	a48
Washington Railway & Electric Company (preferred)	a93	a93¾
West End Street Railway, Boston (common)	93	94
West End Street Railway, Boston (preferred)	a104½	*106
Westinghouse Electric & Manufacturing Company	85½	85
Westinghouse Elec. & Mfg. Company (1st pref.)	a124½	a124½

aAsked. *Last sale.

Westinghouse Report for the Year

The Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has made public its report for the year ended March 31, 1909. A comparison of the results for the years ended March 31, 1909, and 1907, and the six years ended March 31, 1906, follows:

	Year ending March 31, 1909.	Year ending March 31, 1907.	Six years ending March 31, 1906.
Gross earnings	$20,606,592	$33,026,240	$114,618,537
Operating expenses	a19,955,808	28,846,665	97,726,008
Net earnings	$650,784	$4,179,575	$16,892,529
Other income:			
Interest and discount	362,384	190,463	1,074,718
Interest and dividend on stocks and bonds owned	782,316	503,041	1,679,332
Miscellaneous royalties, etc.	170,775	562,831	910,540
Total income	$1,966,259	$5,435,910	$20,557,119
Deductions from income:			
Interest on bonds and debentures	$1,056,808	$827,888	$911,662
Interest on collateral notes	496,515	764,465	2,955,105
Miscellaneous interest	647,448		
Tax on capital, premium on debentures retired, etc.	.....	46,250	728,257
Property and plant depreciation written off	513,316	b900,637	b1,864,105
Miscellaneous	170,854	128,707	.....
Total deductions	$2,884,942	$2,667,946	$6,459,129
Balance	def.918,683	sur.2,767,964	sur.14,097,990
Other profit and loss credits:			
Profit and loss surplus March 31.	x11,972,997	y12,562,507	z3,570,015
Profit on bonds purchased and retired through sinking fund.	105,479	.....	.....
Premium on stock issued	.....	.....	4,415,230
Miscellaneous	z7 994	84,205	.....
Gross surplus	$11,187,787	$15,414,676	$22,083,235
Profit and loss charge:			
Various profit and loss charges	c2,207,452	319,970	620,524
Dividend on preferred stock	.....	(10%)399,870	
Dividend on assenting stock (also $1,100 non-assenting)	.....	(10%)2,099,685	9,922,069
Total surplus March 31	$8.980,335	$12,595,152	$11,540,642

a Includes factory costs, embracing all expenditures for patterns, dies, new small tools and other betterments, and extensions. Also inventory adjustments and all selling, administration, general and development expenses.

b Includes accounts and bills receivable, etc., written off.

c Includes compensation and expenses of receivers and attorneys, expenses in connection with adjustment of debt, depreciation of patents, proportion of discount on bond issues of previous years written off, reserve for possible losses on accounts receivable and inactive machines and parts, and other items appertaining to prior years or of an extraordinary nature.

x 1908. *y* 1906. *z* 1900.

The balance sheets as of March 31, 1909, March 31, 1907, and March 31, 1906, show assets and liabilities, respectively, of $84,885,471, $72,270,855 and $69,061,995.

Under date of July 21, 1909, George Westinghouse, president of the company, wrote in substance:

"The affairs of the company were taken out of the hands of the receivers Dec. 5, 1908. The present board was elected Nov. 30, 1908, the officers were appointed Dec. 7, 1908, and an executive committee elected Jan. 5, 1909; but the board was not permanently organized until the election of Robert Mather as chairman on Jan. 19, 1909.

"The intervening time has been required to complete the adjustments resulting from the receivership and the readjustment of the debt of the company, and to determine the reductions to be made with reference to the company's business in America.

"There was a decrease in the surplus account during the year of $2,992,662, as follows:

Loss from operations of the business after providing for all interest charges and making fair allowances for depreciation	$918,683
Expenses incurred in connection with the adjustment of the debt existing Oct. 23, 1907	460,490
Compensation and expenses of receivers and their attorneys	265,883
Charged off to reduce the book value of assets, such as discount and expenses incurred in connection with bond issues of previous years; depreciation of patents, depreciation of various stocks and bonds, provision for possible losses on inactive finished parts and machines on hand at the close of the year, and other minor items of similar nature	1,347,606

"The loss during the fiscal year of $918,683, after providing for interest on the debt and all expenses, is chiefly accounted for by a small volume of business, the utilization of high-priced material, by sales at reduced prices and by very considerable extra expenses incurred in completing the departmentalizing of the manufacturing operations of the company and in the rearranging of the machinery, which work was carried on without interruption by the re-

ceivers. These important changes in manufacturing methods have reduced greatly the amount of material, raw, in process and finished, required to be kept in stock for a given amount of output (the amount of material in stock, work in progress, goods on consignment and apparatus with customers on March 31, 1909, was $9,961,182, as compared with $17,740,178 on Oct. 23, 1907), and has also increased the space available for manufacturing operations.

"The company received from stockholders, merchandise and other creditors subscriptions to capital stock at par amounting to $12,778,825; to 5 per cent convertible bonds at par amounting to $3,586,000, and to 4, 5, 6 and 15-year notes $1,392,150, making a total of new capital raised at par by the sale of stock and securities of $17,756,975.

"Your officials estimate that the plants have an annual output capacity of $50,000,000, and that the cash capital provided as above is ample for conducting a business of that magnitude.

"Under the provisions of the convertible bond indenture the company is required to provide a sinking fund of $500,000 annually and to invest the same in its convertible bonds. Since the termination of the receivership the company has turned into the sinking fund $1,500,000, covering the requirements up to the end of the present calendar year. This sum was invested in convertible bonds, yielding a profit of $105,479.

"While there has been a decided improvement in the business of the company since the beginning of the year, it has not yet nearly reached normal proportions, although the outlook and inquiries indicate that in the near future the full capacity of your various works will be required to meet the demand."

Readjustment Plan of Interstate Railways

The committee which was appointed to consider the matter of readjusting the affairs of the Interstate Railways Company, Philadelphia, Pa., reported to the directors of the company under date of June 30, 1909. John A. Rigg, president of the company, has since addressed a letter to the holders of the collateral trust 4 per cent gold bonds of the company, enclosing the statement to the directors outlining the plan, and has asked them to assent to the proposal "as the best possible plan for the readjustment of the affairs of the company."

The plan is in the form of a letter addressed to the company by a committee of which George H. Earle, Jr., is chairman. While the power of foreclosure is given to the committee, the belief is expressed that "a satisfactory adjustment of the financial affairs of the company is possible without foreclosure * * * and that such foreclosure should only be considered as a last resort."

The plan proposes that the bondholders deposit their bonds with the Real Estate Trust Company, as trustee, which is authorized to borrow the funds required for betterments and coupon interest during a period of five years. In this way, foreclosure, with its large expenses, probable disintegration of the property, and usual dilution of the value of securities upon reorganization is to be avoided. The depositing bondholder may elect to take 6 per cent scrip or cash for his coupons. Arrangements have been made with a syndicate to buy the scrip. The amount which the trustee is authorized to borrow is such sum in excess of the earnings each year as is required for the payment of the interest and betterments, which betterments are not to exceed $500,000 in any one year, nor $1,500,000 in the five years.

Accompanying the plan is a letter from John A. Rigg, president of the company, containing an estimate of the net earnings during the five years, 1910-1914, and the charges against the same during those years for interest, betterments, etc. This estimate shows a deficit of $150,000 in 1910 and of $50,000 in 1911, and a surplus of $50,000 in 1912. At the end of the third year the betterments to the extent of $1,500,000 will, as the company's president estimates, all have been made and paid. Then the fourth and fifth years, 1913 and 1914, show a surplus of $650,000 and $750,000, respectively. The trustee will thus be enabled to return their bonds to the owners at the end of five years, freed from any charge thereon, with all the coupons fully paid and the betterments to the extent of $1,500,000 made and paid for.

The United Power & Transportation Company guarantees the return to the bondholders of the money borrowed upon their bonds, and pledges for such repayment, in the event of failure of the plan and consequent foreclosure, stocks of the value, it is said, of $1,500,000 now on deposit with the Real Estate Title Insurance & Trust Company under the "tripartite agreement," which stocks would be released by such foreclosure. The Interstate Railways Company also guarantees the payment of all loans and expenses.

The total of bonds outstanding against the Interstate Railways Company is nearly $11,000,000. Counsel for the estate of Robert N. Carson has already applied to the court for permission to deposit the bonds of the company held by the estate under the above plan. These bonds are said to have a face value of $4,000,000.

Changing the Method of Basing Copper Quotations

Heretofore quotations on the price of copper metal have been based on prices arbitrarily fixed by the quotation committee of the Metal Exchange in New York. The committee met each day and fixed a price in cents per pound which was sent out as the official quotation on copper for that day, but the price was not based on actual transactions and, as a matter of fact, the actual price at which the metal could be bought in the market often varied from a fraction of a cent above or below the "official" quotation. The board of managers of the New York Metal Exchange has now adopted recommendations whereby, hereafter, quotations sent out by the exchange will not be estimates prepared by the quotation committee, but will be based on actual transactions in copper on the floor of the exchange.

Under the old plan the prices per pound were fixed on three grades of copper, known respectively as "lake," "electrolytic" and "casting," although "casting" copper of late years has played but little part in the American markets. Furthermore, the distinction between lake and electrolytic coppers has been gradually eliminated, and the electrolytic metal has been sold indiscriminately in place of the so-called "lake" copper, which is the metal supposed to come from the Lake Superior district. Under the new rules adopted by the Metal Exchange, the quotation will be based only on one recognized grade, namely, "standard" copper, which will be divided into classes A, B, C and D, and the minimum quantity of standard copper to be dealt in shall be 25 tons of 2240 lb. each. The sellers have the option of delivering each lot of 25 tons in four classes, the classifications being based upon the percentage of assay and subject to a rebate or premium on the contract price accordingly. It is not known what changes, if any, the new rules will make in the method of basing estimates and contracts for copper wire and other products, but it is believed they will put the copper market on a more logical and definite basis.

The board of managers of the exchange also made changes in the rules applying to tin, lead and spelter. A minimum contract on pig tin hereafter will be for 5 tons instead of 10. Pig lead and spelter dealings will be for "delivery New York" and "delivery East St. Louis." The quotations on lead will be on what is known as "good merchantable brands," and in spelter on "prime virgin spelter."

Albany & Hudson Railroad, Hudson, N. Y.—Judge Fitts in the Supreme Court at Albany on July 21, 1909, appointed General Manager Raymond H. Smith as receiver of the Albany & Hudson Railroad on application by Parker, Hatch & Sheehan, attorneys for the Trust Company of America, New York, trustee under the first mortgage, on the ground that the road is unable to earn fixed charges. Myron T. Herrick, C. L. Rossiter and R. A. C. Smith have been asked by the holders of a large amount of the securities to act as a committee on behalf of the bondholders and stockholders for the purpose of bringing about a reorganization and have organized for that purpose, with I. W. Day, 100 Broadway, New York, as secretary. It is said that this committee has proposed a plan of reorganization which will eliminate all bonds now outstanding by substituting for the $1,850,000 of bonds $1,850,000 of preferred 5 per cent non-cumulative stock. The preferred stock of $1,000,000 now outstanding is to be exchanged for $1,000,000 of common stock, and for the $750,000 of common stock $375,000 of new common stock will be issued. It is further proposed to issue $1,250,000 of new bonds to carry out a plan for the extension of the road, which, it is expected, will work materially to the benefit of the company.

Des Moines (Iowa) City Railway.—The report that William B. McKinley and his associates in the Illinois Traction System had concluded negotiations for the purchase of the property of the Des Moines (Iowa) Electric Company gave rise to the rumor that Mr. McKinley and his associates were negotiating for the purchase of the Des Moines City Railway, and that arrangements had practically been completed by which the Des Moines City Railway would be taken over. To an inquiry addressed to him at Washington, D. C., Mr. McKinley replied under date of July 26 as follows: "We have not purchased the Des Moines City Railway."

Kingston (N. Y.) Consolidated Railroad.—At the quarterly meeting of the directors of the Kingston Consolidated

Railroad on July 10, 1909, the question of declaring a dividend on the $200,000 preferred stock was postponed until the meeting to be held on Oct. 9, 1909. Four per cent was paid yearly on the preferred shares of the company from its organization in 1901 up to 1908, when 2 per cent was paid in August. No dividends have been declared since then.

Meadville & Cambridge Springs Street Railway, Meadville, Pa.—The property of the Meadville & Cambridge Springs Street Railway has been sold under foreclosure for $5,800 to the Equitable Trust Company, Pittsburgh, representing the bondholders,

Metropolitan Street Railway, New York, N. Y.—The Forty-second Street & Grand Street Ferry Railroad has filed a petition in the United States Circuit Court, asking for an order directing Adrian H. Joline and Douglas Robinson, as receivers of the Metropolitan Street Railway, to elect whether or not they will adopt a lease executed by the petitioner in April, 1893, to the Metropolitan Crosstown Railway, one of the leased lines of the Metropolitan Street Railway. It is also asked that an order be issued, instructing the receivers to pay forthwith taxes and assessments constituting a lien on the property of the petitioner secured by condemnation proceedings; to pay James A. During whatever may be due him for compensation and expenses as attorney for the company in these proceedings, and to instruct the receivers either to pay in full the tax on the special franchise of the petitioner or the amount the receivers may concede to be due by way of tax on this franchise and to further protect the property of the company against the enforcement and collection of the remainder of the tax.

New York, New Haven & Hartford Railroad, New Haven, Conn.—Charles S. Mellen, president of the New York, New Haven & Hartford Railroad, has notified the Massachusetts Railroad Commission that the New York, New Haven & Hartford Railroad is neither directly nor indirectly interested in any electric railways in Massachusetts. The company disposed of its electric railway holdings in accordance with the decree of the Supreme Court of Massachusetts requiring the company to relinquish its rights in these properties on or before July 1, 1909.

Philadelphia Company, Pittsburgh, Pa.—The stockholders of the Philadelphia Company on July 22, 1909, authorized an issue of $5,000,000 of 10-year 5 per cent convertible debentures and an increase of the common stock from $42,000,000 to $47,000,000, to provide for the same.

Sao Paulo Tramway, Light & Power Company, Ltd., Sao Paulo, Brazil.—The pamphlet report of the Sao Paulo Tramway, Light & Power Company, Ltd., for the year ended Dec. 31, 1908, has recently been made public. The income account gives the gross earnings as $2,287,410 and the operating expenses, interest on bonds, taxes, etc., as $1,148,518, leaving a surplus of $1,138,891. This sum, with the balance for the previous year, makes a total of $1,795,790. Three dividends of 2¼ per cent each and one dividend of 2½ per cent were paid, amounting to $836,538. In addition, $300,000 was transferred to the contingent account for renewals, leaving a balance of $695,251 to be carried forward. The assets of the company as given in the balance sheet of Dec. 31, 1908, are $18,497,535 and the liabilities $18,497,535. William Mackenzie, Toronto, Can., president of the company, in reviewing the work for the year said that 4.75 miles of new track had been added to the system and that the Santa Anna Railway, which was acquired last year, has been entirely replaced by an electric line which was opened for traffic on Oct. 8, 1908.

Second Avenue Railroad, New York, N. Y.—J. W. Castles, A. J. Hemphill, Henry S. Redmond and George G. Amer, Jr., have been selected as a committee of the bondholders of the Second Avenue Railroad to submit a plan for the reorganization of the company.

Tarrytown, White Plains & Mamaroneck Railway, White Plains, N. Y.—Justice Keogh has appointed H. R. Barrett, White Plains, as referee to sell the property of the Tarrytown, White Plains & Mamaroneck Railway at foreclosure. The application for the sale was made by the Knickerbocker Trust Company, trustee for the bondholders. The Tarrytown, White Plains & Mamaroneck Railway is in the hands of J. Addison Young, New Rochelle, as receiver.

Virginia Railway & Power Company, Richmond, Va.—Depositors under the plan of the reorganization of the Virginia Passenger & Power Company have been notified to present their certificates of deposit, properly endorsed, at the office of the depositary, the Equitable Trust Company, New York, N. Y., and receive the new securities and cash to which they are entitled.

Traffic and Transportation

Meeting to Consider Modification of Indiana Operating Rules

The work of revising the book of rules adopted sometime ago to govern the operation of interurban railways in Indiana was begun on July 22 in Indianapolis by the committee on rules of the Central Electric Railway Association composed of H. A. Nicholl, general manager of the Indiana Union Traction Company; C. D. Emmons, general manager, Ft. Wayne & Wabash Valley Traction Company; G. K. Jeffries, division superintendent, Terre Haute, Indianapolis & Eastern Traction Company; Fletcher M. Durbin, general manager, Evansville & Southern Indiana Traction Company, and A. A. Anderson, general manager, Indianapolis, Columbus & Southern Traction Company. All the members of the committee were present except Mr. Anderson.

The revision of the rules was advised by both the managers of the interurban railways and the members of the Railroad Commission. The committee organized by electing H. A. Nicholl chairman. As a text for the committee's consideration the Railroad Commission submitted the following recommendation made to it by Samuel Shane, chief inspector of the commission:

"In regard to the recent code of rules and the proposed revision of the same I am firmly impressed that rules 151 and 151 B should be revised so that it be imperative that both the conductor and motorman participate in receiving the order.

"Rule 107 should be amended by adding the words 'Giving no signals to approaching trains.' This, I think, is important, for it is quite clear to me that an accident which occurred at Chestnut Ridge on the line of the Indianapolis & Louisville Traction Company on June 23 was due to the fact that the conductor gave the motorman a signal that everything was O. K., when he had the switch in the wrong position, and a car with a red roof and other red trimming on the siding formed a background so that the motorman of an approaching car was unable to determine to his own satisfaction the position of the semaphore, and accepted the signal.

"In regard to change in certain rules which have been requested by the Indiana Union Traction Company, I think considerable care should be exercised. Rule 162 gives too much leeway to the despatcher. Rules 115, 158 and 155, authorizing trains to meet without orders when they are unable to communicate with the despatcher should have serious consideration before any changes are made. Some slight changes in other rules should also be made, but after they are accepted can be posted by bulletin or pasters. I question the advisability of generally revising these rules, however, as there is a movement on foot to compile a national code, which will undoubtedly be done this fall, and the probability is that the electric railways in Indiana will desire to adopt the national code.

"Before such time, however, I am under the impression that it is within the province and duty of the Railroad Commission to lay down fundamental principles in regard to examining men, inquiring into their past record, keeping a correct record of them, and giving such record to other lines when asked, and to promulgate rules to govern the issuance of orders, find the responsibility of train crews, require both men to participate in receiving train orders, oblige the despatcher personally to know that he has communicated with both trainmen, and prevent one man from signing for another.

"These are a few of the suggestions that I have to make, and after the matter has been duly considered, there will no doubt be others. I am under the impression that, aside from the rules which the commission should require, the matter should be taken up with the managers of every electric railway in the State, and they should be asked for suggestions that will tend to afford a safer system of operation, and I advise that these suggestions and recommendations be laid before the committee, to be considered before completing this work."

The recommendations made by Mr. Shane resulted in a spirited discussion by the members of the committee. As to the change recommended in Rules 151 and 151 B, the committee agreed that both the conductor and the motorman should thoroughly understand the train orders received over the telephone, but it was pointed out that on a number of roads the absence of both conductor and the motorman from the train at the same time to receive train orders would prove hazardous. It was agreed, that no change should be made in this rule at present, but it was suggested that a bulletin be issued instructing con-

ductors and motormen thoroughly to acquaint each other with all train orders received.

Mr. Nicholl explained that the request of the Indiana Union Traction Company for a change in Rule 162 so as to authorize trains to run on schedule time and meet without order when unable to communicate with the despatcher grew out of a condition on that road which made it necessary to violate the rule. He said that during a sleet storm in February the telephone wires of the Indiana Union Traction Company were down, as were all other telephone wires, and that rigid observance of the rule would have tied the entire system up for several days. Other rules in which changes were deemed advisable were considered, and after comparing interesting experiences growing out of the best observance of the present rules that those in attendance found possible, the committee adopted the following changes subject to the approval of the commission:

"1. That Rule 82 C be changed to read 'four bells' instead of 'three bells,' and that the position of present Rule C and D be reversed.

"2. That Rule 134 be amended to read as follows: Conductor must leave the car from the rear platform, and before doing so securely fasten the rear vestibule door on the opposite side from which he leaves to flag the crossing, and not give signal to motorman to proceed until after he is positive no one is attempting to board or leave his car. Before starting the motorman will look back to see that no passengers are getting on or off.

"3. That Rule 162 be amended by adding the following: Except where the train whose rights are to be restricted is blocked by authorized agent or operator, as per Rule 152.

"4. That the American Association rule be adopted in place of Rule 151.

"5. That Rule 107 be amended by adding: 'Giving no signals to approaching trains.'

"6. That the last sentence in Rule 269, which reads as follows, be eliminated: 'When flagging railroad crossings, conductors will keep rear door closed opposite to the side of the car from which they will flag crossings.'"

The Use of Fenders in Seattle

On Dec. 28, 1908, the City Council of Seattle, Wash., passed a resolution calling upon the board of public works to direct the electric railways operating in Seattle to equip their cars with fenders and wheel guards. In accordance with these instructions, A. V. Bouillon, superintendent of public utilities of the board of public works of Seattle, notified the companies under date of Dec. 31, 1908, that neither the fenders nor the wheel guards then used by them were deemed by him sufficiently efficient, and called the attention of the companies to the resolution of the City Council requiring the companies to install proper fenders and wheel guards on all cars before June 1, 1909. The companies so notified were the Seattle Electric Company, the Seattle, Renton & Southern Railway and the Loyal Railway.

Under date of June 10, 1909, Mr. Bouillon reported to the board of public works in detail regarding the effort made by the companies to comply with the order from him. He said that the Seattle Electric Company had adopted fenders and guards of its own make, and in criticism of them said that "they are coarse and rigid structures not built or fitted with due regard to a minimum of injury to persons when struck." He said that up to June 1, 1909, the company had equipped 65 of its cars with these fenders and guards, but that it was engaged in installing them on all the cars with side entrances, the new installation replacing the fenders which were formerly in use. None of the single-end cars, however, had been equipped with new fenders or guards up to this time, so that with the exception of 65 of the side-entrance cars equipped with the new fenders and guards on June 1, all passenger cars operated by the company are still equipped with fenders and guards in use at the time the board's order was issued. Mr. Bouillon said that the company equipped several of its cars during the year with Providence fenders and Worcester fenders for experimental purposes. In regard to the Seattle, Renton & Southern Railway, he said that the fenders in use by that company were imperfect as life-saving appliances for the same general reason stated with reference to the fenders of the cars of the Seattle Electric Company. The cars of the Seattle, Renton & Southern Railway are not equipped with wheel guards. In regard to the Loyal Railway, Mr. Bouillon reported that its cars are not equipped with fenders, but are fitted with automatic wheel guards of the Parmenter type or similar thereto. In regard to these devices, he said that "it is extremely doubtful if the wheel guards will prove to have any appreciable degree of efficiency as life protecting appliances." He concluded his report as follows:

"In general, the fenders on the cars operated in Seattle, with the few exceptions noted of new types recently installed and of the Providence fenders on the cars of the Seattle-Everett Interurban line, have been of primitive design and crudely constructed and readily suggest cheapness, high degree of endurance and economy in upkeep. In my observation of fenders and wheel guards, I have reached the conclusion that these appliances are sadly neglected by the operators, and there is, in my judgment, need for more attention to these appliances with a view to keeping them up in a high state of efficiency. The height at which fenders are carried above the roadbed should receive the closest attention, having in view always carrying them at the lowest practicable elevation above the roadbed.

"Our topographical conditions make it necessary to carry fenders at an elevation above the roadbed varying from 6 in. to 10 in., depending upon the type of the cars and the grades on the line on which it is operated; and while fenders controlled by tripping gear that can be dropped by the motorman would, in my judgment, show a far higher degree of efficiency than the fender without controlling gear, yet the former is dependent upon the human element, and all should be supplemented by automatic life guards and screens to protect a body from coming under the wheels, and there is no apparent reason why a freight car operated on the public streets and places, and that may go wherever a passenger car goes, should not be provided with life-protecting appliances of the same degree of efficiency as those demanded for cars in the passenger service."

As a result of the report of Mr. Bouillon to the board of public works, A. L. Kempster, superintendent of transportation of the Seattle Electric Company, was recently arraigned in court charged with failing to provide proper fenders for the cars of his company, but was subsequently discharged by Police Judge Gordon, who held the case in advisement for several days. Similar action was proposed against the Seattle, Renton & Southern Railway and the Loyal Railway, but these cases are not expected to be brought to trial, as the opinion of the court invalidates the ordinances. In concluding his opinion, Judge Gordon said:

"The testimony of witnesses in this case showed that the fender that would be proper under the city ordinance, under which this prosecution is brought, does not exist. The ordinance specifies a certain sort of fender that would be almost a perfect machine. Such a fender has not been invented. Reasonable care has been taken by the defendant, I believe, to secure good fenders. The accident record of the company does not show that the fenders have been worthless, according to the testimony. In fact, the company's records show a large number of occasions on which the fenders have saved life. The case is dismissed."

Report of Accidents in New York in June

The Public Service Commission of the First District of New York has made public the following comparative summary of accidents occurring during June, 1909, and June, 1908, on the street and electric railways within its jurisdiction:

	June, 1908.	June, 1909.
Car collisions	167	124
Persons and vehicles struck by cars	1,070	928
Boarding	707	614
Alighting	1,252	1,022
Contact electricity	50	34
Other accidents	2,493	2,161
Totals	5,739	4,883
INJURIES.		
Passengers	2,517	2,148
Not passengers	639	527
Employees	634	518
Totals	3,790	3,193
SERIOUS. (Included in above.)		
Killed	42	29
Fractured skulls	16	9
Amputated limbs	10	4
Broken limbs	40	33
Other serious	194	135
Totals	302	210

Riding in Motormen's Vestibules Restricted

The following notice has been issued to motormen on all divisions of the Northern Ohio Traction & Light Company, Akron, Ohio, effective on July 20, 1909:

"Attention is again called to motormen operating cars in allowing passengers, employees deadheading or on duty,

and unauthorized persons to ride in front vestibule or talking in doorway of cars, etc.

"All vestibule permits are hereby cancelled and will not be honored after this date. Employees from any department, official, foreman or subordinate, will not be allowed to ride in motorman's vestibule without special authority or written order from the general manager or general superintendent. Those who are entitled to ride in front vestibule are as follows: President, vice-president, general manager, general superintendent; division superintendents allowed to ride in vestibule only on divisions assigned to them.

"Any violation of the above rule will be cause for suspension or dismissal.

"W. H. Douglas, general superintendent. Approved, Chas. Currie, general manager."

New England Company Calls Public Attention to Its Courtesy Requirements

The Hartford & Springfield Street Railway, Hartford, Conn., in a recent traffic circular addressed the public on the subject of its relations with them and its attitude toward its employees, devoting a page to the following statement:

"It is the desire of the Hartford & Springfield Street Railway to employ only the most experienced and courteous employees, and to provide the public with the very best service possible. The following letter to its conductors, motormen, and operating heads on the subject of courtesy indicates the attitude of this company on a subject of vital interest to its patrons:

"'The possession of a gift should spur one on to the development of that gift. A good disposition is a gift, the possession of which by the company's conductors, motormen and other agents means a courteous attitude toward the public, and is a matter of congratulation both to these agents and to the company itself.

"'To those who have good dispositions and make use of the kindness and courtesy which are the natural offspring of such dispositions in the treatment of the company's patrons, the company extends its sincerest thanks. To those who have not this endowment, and to whom the use of kindliness, courtesy and forbearance in their dealings with their fellow men has not appealed so strongly, a thoughtful consideration of the following points is suggested.

"'First—The principle that underlies courteous treatment of others is simply that of doing unto others as you would they should do unto you.

"'Second—The street railway business is complex, and it is not given to all to understand instinctively its complexities. Your training makes you familiar with all its details, but does not communicate that knowledge to the public. It is, however, desirable and necessary that the public should know, and to know it must ask questions. It is up to you to give all men the courtesy of a clear reply, and to give it without any suggestion of superiority born of a greater knowledge.

"'Third—Words are only one means of expression, and manner is quite as important; therefore, remember that a kindly and gracious manner is not only the sign and mark of a self-respecting man, but it is to your words what oil is to machinery in making them move effectively to their purpose.

"'Fourth—True courtesy is no respecter of persons. It remembers that "a man's a man for a' that," and gives a civil word and helping hand quite as readily to the "seedy" stranger as to the well-dressed patron who habitually patronizes the car.

"'Fifth—Courtesy is not only something which the public have a right to expect of you, but it pays.

"'It pays in the friends it makes for you personally and for the company, because you are its representatives.

"'It pays in minimizing the friction of your life, as well as that between the company and its patrons.

"'It pays in the personal satisfaction resulting in having done the right thing and kindly thing by your neighbor.'"

Safety Guard in Omaha.—The Omaha & Council Bluffs Street Railway, Omaha, Neb., has equipped one of the cars of its Farnam Street line with a Meyer safety guard to test the device with a view to its general adoption.

Interstate Commission Rules Against Special School Rates.—In a decision handed down on July 26, the Interstate Commerce Commission holds that railroads cannot give commutation rates to school children unless the same rates are open to all children within the age limits, thus affirming an Administration ruling made in October, 1909. Following this ruling numerous schools petitioned the commission to cancel the ruling. The commission, however, declined to do so, and granted the petition for a hearing.

Pennsylvania Company Restores Old Wage Scale.—The Lehigh Valley Transit Company, Allentown, Pa., has announced an increase in wages for trainmen, to take effect on Aug. 1. This increase is simply a restoration of the wages which were in effect prior to June, 1908, when the company reduced the wages of the men on account of the financial depression. The new wages will be 19 cents an hour the first year, 20 cents the second year, 21 cents for the third year and 22 cents an hour thereafter. The wage scale in 1908 ranged from 17 cents to 22 cents an hour; 1 cent an hour advance for each year.

Steam Roads to Withdraw Twin Tickets.—It is announced that beginning on Aug. 1 the Hocking Valley Railroad and the Toledo & Ohio Central Railroad will restore their round trip rate of $1.15 between Fostoria and Toledo. When the Toledo, Fostoria & Findlay Electric Railway was completed between Pemberville and Toledo the Hocking Valley Railroad and the Toledo & Ohio Central Railroad authorized a twin ticket rate of 80 cents between Fostoria and Toledo. The Toledo, Fostoria & Findlay Electric Railway met this rate on certain trains, but retained its charge of $1.20 on all others.

Trailers Proposed in Philadelphia.—An official trial was made on July 19 by the Philadelphia (Pa.) Rapid Transit Company with a train consisting of a double-truck car equipped with four 40-hp motors, and a single-truck trail car equipped with one 40-hp motor. Both cars were fitted with air brakes under the control of the motorman of the first car. By placing one motor on the trailer, jolting was avoided in starting and the air brakes on the trail car eliminated jolting in stopping. The motor on the trail car is also useful for operating into the barn when the train is broken up. It is intended to use such trains for rush-hour traffic, but it has not been decided when they will be placed in operation.

Increase in Wages at Little Rock.—The Little Rock Railway & Electric Company, Little Rock, Ark., has voluntarily granted an increase in wages to its trainmen, effective on Aug. 1. The new rate of wages is as follows: 17 cents an hour for the first year, 18 cents an hour for the second year, 19 cents for the third year, 20 cents for the fourth year, 21 cents for the fifth year and 22½ cents for 10 years and over. The following is the old wage schedule paid by the company: 16 cents an hour for the first six months, 17 cents for the second six months, 17½ cents for the third six months, 18 cents for the fourth six months, 18½ cents for the fifth six months, 19 cents for the sixth six months, 19½ cents for four years, 20 cents for five years and over.

Jay P. Graves Offers Special Prize for Best Apples.—Jay P. Graves, president of the Spokane & Inland Empire Railroad, Spokane, Wash., has offered a $100 silver cup as a special prize for the best 10 boxes of apples, any variety, grown tributary to the electric railway. The apples are to be on exhibition at the National Apple Show and the award will be made by the judges at the show. The Spokane & Inland Empire Railroad is encouraging the fruit-raising industry, especially apples, along its lines, and special demonstration trains of benefit to fruit growers with instructions on pruning and spraying have become an annual feature, as pointed out in the article on the company's "Fruit Special," which was described on page 790 of the Electric Railway Journal of April 24, 1909.

Purpose of the Philadelphia Rapid Transit Company's Hint Cards.—The Philadelphia (Pa.) Rapid Transit Company announces that the hint cards, mention of which was made on page 101 of the Electric Railway Journal for July 24, 1909, will be issued every second week, so as to alternate with its present accident bulletins. The first issue of the hint cards was distributed among the men last week. These cards will deal entirely with accident work, and will be designed with the object in view of briefly directing the attention of the men to certain of the more important features. The cards will be numbered and dated. The company suggests that the men save them as they are received from time to time, with a view to glancing over them occasionally and of thus refreshing their memory, as the cards will be made as interesting and readable as possible.

Folder of the Oregon Electric Railway.—The Oregon Electric Railway, Portland, Ore., has issued its first folder describing the territory served by its lines in the Willamette Valley. On the inside pages there is printed, in colors, a panoramic map 28 in. x 13 in. of the company's system and of other lines with which it connects. The covers are

printed in colors and are decorated with a view of the Willamette Valley and a three-car train of the Oregon Electric Railway. On July 14 the company placed eight new trains in service on its system, two of which were put on the Portland-Salem division and six on the Forest Grove division. The Oregon Electric Railway now operates 10 trains to and from Salem, and nine trains each way to Forest Grove. The new service will include a theater train on each division. This train will leave Portland for Salem at 11 p. m. and for Forest Grove at 11.15 p. m.

Trolley Rides in City and Country.—This is the title of a folder issued by the Detroit (Mich.) United Railway in which the principal points of interest along the different divisions of the company's system are briefly described and directions given for visiting them. The publication also contains a guide for making connections and gives rates of fare and information about special cars, the express and baggage department of the company and fast limited cars. Two maps accompany the text. One shows connections made with electric railways in Toledo, and the other a panoramic view in colors of Detroit and other cities which are connected by the company's interurban lines. The front cover is a harmonious combination of green and white, with a scene from a wooded spot along the company's lines with patrons enjoying water sports. A car surmounts the cover as the insignia of the company.

Excursion Business of the Washington, Baltimore & Annapolis Electric Railway.—The Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md., has succeeded in building up a remarkable list of connections with foreign lines at Washington, Baltimore and Annapolis. On the show window of the company's new office in the Evans Building, Washington, a few doors from the Treasury, the company has listed excursions to Boston, Providence, Philadelphia, New York, Atlantic City, Savannah, Newport News, Baltimore, Annapolis and eight other seaboard cities which involve connections at Baltimore with the steamers of the Merchants' & Miners' Transportation Company, the Baltimore & Philadelphia Steamboat Company, and the Western Maryland Railroad, and at Annapolis with the steamers of the Tolchester Steamboat Company. From Baltimore and Annapolis through tickets are also sold for connections at Washington for Mount Vernon, Marshall Hall, Great Falls of the Potomac, Chesapeake Beach and Colonial Beach. That these connections have proved popular with the people of Washington, Baltimore and Annapolis is witnessed by the fact that on July 4, 1909, more people were carried from Baltimore and Annapolis to Mount Vernon than from Washington, and that the equipment of the company is taxed to its capacity in carrying excursionists for the Chesapeake Bay steamer connections at Annapolis. In a word, these connections furnish a volume of business for long haul over the Washington, Baltimore & Annapolis Electric Railway which otherwise could not be expected.

Traffic Circulars of the United Railway & Electric Company.—The United Railways & Electric Company, Baltimore, through its excursion agent, Benjamin B. Long, has issued a number of very interesting traffic circulars. They are entitled "Trolley Trips In and Around Baltimore," "Gwynn Oak Park," "Seeing Ourselves as Others See Us," "Souvenir of Picturesque Gwynn Oak Park," and "Bay Shore Park." The company has also issued a special illustrated circular regarding its chartered cars for private parties which tells about the advantages of the cars and the arrangements that can be made for chartering them. "Trolley Trips In and Out of Baltimore" contains a list of points of interest in the city, the location of the principal city parks and directions for reaching them, the fares for trips out of the city and the fares for city and suburban lines, a schedule of night cars and other information of value to trolley patrons. The circular on Gwynn Oak Park concerns itself particularly with that resort and contains typical views in the park. "Seeing Ourselves as Others See Us" is a four-page pamphlet containing what has been said about Gwynn Oak Park and Bay Shore Park by men prominent in public life. "Souvenir of Picturesque Gwynn Oak Park" contains the description of the park and its amusements and pictures of scenes in the park. The circular on Bay Shore Park is a reprint of a similar work published by the company in 1908. The park is located on Chesapeake Bay and en route to it are some beautiful scenes and points of historic interest. The fact that this circular has been reissued shows that there has been considerable demand for it and that it has served well the purpose for which it was originally prepared. The company has also issued a special traffic circular on its funeral car, Delores. Interior and exterior views of this car are shown and a plan of the seating arrangement is presented.

Personal Mention

Mr. Frank J. McCormick, for some time a conductor on the Toledo Urban & Interurban Railway, Toledo, Ohio, has been appointed chief train dispatcher of the road, with headquarters at Bowling Green.

Mr. B. J. Jones, manager of the electrical department of the Union Gas & Electric Company, Cincinnati, Ohio, has been appointed to succeed Mr. W. A. Gibbs as district manager of the Ohio Electric Railway, with headquarters at Springfield.

Mr. C. R. McKay, formerly manager and superintendent of the lighting and power departments of the Toledo Railways & Light Company, Toledo, Ohio, has been appointed manager of the Union Light, Heat & Power Company, Covington, Ky.

Mr. J. P. Van Leuven, division superintendent in charge of the Walnut Hills car house of the Cincinnati (Ohio) Traction Company, has been appointed assistant superintendent of the company to succeed Mr. H. G. Gilpin, who has resigned to take charge of the railway and lighting properties of the Schoepf interests at Lima.

Mr. H. Gordon Gilpin, who has been connected with the operating department of the Cincinnati (Ohio) Traction Company for some time as assistant superintendent of the company, has been appointed district manager of the Lima & Toledo Electric Railway, Lima, Ohio, and district manager of the Cincinnati, Milford & Loveland Traction Company, Cincinnati, Ohio, to succeed Mr. F. T. Hepburn. Mr. Gilpin has been associated with Mr. W. Kesley Schoepf, president of the Ohio Electric Railway, for about 10 years, having served under Mr. Schoepf in Washington, D. C. Mr. Gilpin's first position in Cincinnati was with the Millcreek Valley Electric Railway, but after four years' service with that company he was made assistant superintendent of the Cincinnati Traction Company.

Mr. W. H. Thomson, Jr., has been appointed resident engineer and assistant general manager of the San Antonio (Tex.) Traction Company. Mr. Thomson was graduated from Cornell University in 1898 with the degree of mechanical engineer. After leaving college, he entered the service of the United States Navy as assistant engineer, in which capacity he served for eight months. Mr. Thomson then spent about 18 months in the testing department of the General Electric Company and after holding a number of positions of short tenure he went to Corsicana, Tex., and built an electric railway system for the Corsicana Traction Company, and on its completion became general manager of the company and general manager of the Corsicana Gas & Electric Company, continuing in these capacities for three years. Mr. Thomson was then appointed assistant to the general manager of the St. Paul (Minn.) Gas Light Company, but resigned from this position to become general manager of the Union Light, Heat & Power Company, Fargo, N. D. It was from this position that he resigned to become resident engineer and assistant general manager of the San Antonio Traction Company. Mr. Thomson also acts in the same capacities for the San Antonio Gas & Electric Company.

Mr. Harold C. Beatty has been appointed assistant general manager of the Syracuse & South Bay Electric Railroad and assistant to the general manager of the Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y., both of which are controlled by what is known as the Beebe Syndicate. Mr. Beatty will also continue to act as secretary of both companies. Mr. Beatty was graduated from the Law Department of the University of Michigan in 1900 and immediately became associated with Senator George B. Davis, of Detroit, in the promotion of the Detroit, Utica & Romeo Railway. This road, after construction had been commenced, was sold to the Everett-Moore Syndicate, and Senator Davis and Mr. Beatty went to Lexington and organized the Blue Grass Consolidated Traction Company, which had for its purpose the construction of a system of interurban railways radiating out of Lexington. After securing all the franchises for the company and commencing construction on two of the proposed lines, the financial depression of 1903 affected the company and it went into the hands of a receiver in the spring of 1904. In 1905 Mr. Beatty located in Syracuse and has been connected with the Beebe Syndicate since that time. He had charge of the claim department of the Auburn & Syracuse Electric Railroad, the Rochester, Syracuse & Eastern Railroad, the Auburn & Northern Electric Railroad, Syracuse, Lake Shore & Northern Railroad, and the Syracuse & South Bay Electric Railroad, in addition to acting as secretary and assistant secretary of the companies mentioned.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Fort Wayne & Toledo Electric Railway, Harlan, Ind.—Incorporated to build an electric railway from Fort Wayne to Bryan, Ohio, a distance of 55 miles. Headquarters, Fort Wayne. It is said that arrangements have been made to operate cars over the Toledo & Indiana Railway Company's line from Bryan to Toledo and when the new railway is completed there will be a through service from Fort Wayne to Toledo. Capital stock, $100,000. Incorporators: E. A. Tennis, Garden City, Kan.; C. H. Baker, Philadelphia, Pa.; R. L. Bastress and others. [E. R. J., July 24, '09.]

Hornell-Bath Railway, Hornell, N. Y.—Incorporated to construct an electric railway from Hornell to Bath, 24 miles. Capital stock, $250,000. Directors: Charles Adsit, C. H. Armsted and John M. Finch, Hornell, and J. F. Turk, Hammondsport. [E. R. J., Jan. 30, '09.]

Cleveland (Ohio) Traction Company.—Incorporated to build an electric railway in Cleveland. It is stated that Herman J. Schmidt, who has applied for franchise rights in Cleveland, proposes to transfer his grants to this company. Capital stock, $10,000. Incorporators: H. J. Schmidt, Arthur F. May, O. F. Leisey, T. G. Fitzsimmons and James Lawrence. [E. R. J., April 10, '09.]

Umatilla Railway & Electric Power Company, Pendleton, Ore.—Incorporated for the purpose of constructing about 200 miles of electric railway in Umatilla County, one branch of the system to extend south from Pendleton through Pilot Rock, Nye, Alba, Ukiah and into Dale; the other branch to extend northwest from Pendleton to Umatilla. Power is to be developed from Camas Creek. Surveys are now being made for the proposed lines. Capital stock, $100,000. Incorporators: C. J. Smith, Pendleton; Douglas Belts and A. R. Turner. [E. R. J., July 17, '09.]

***Westmoreland Railroad, Houston, Tex.**—Chartered to build a railway other than steam power from Houston to Bellaire, a distance of 7 miles. Capital stock, $40,000. Incorporators: W. W. Baldwin, Max Eggert, A. J. Condit and R. B. Henderson.

FRANCHISES

Auburn, Cal.—An application for a franchise for a narrow-gage electric railway to run from Colfax to Bath, 1 mile east of Forest Hill, has been made by W. S. Fletcher, Pasadena, to the Board of Supervisors in Auburn. The railway will be 16 miles in length. [E. R. J., July 10, '09.]

Fresno, Cal.—The franchise applied for by the Fresno, Hanford & Summit Lake Interurban Railway for an electric railway in Fresno will be sold by the Board of Trustees on Aug. 16 to the highest bidder. [E. R. J., June 26, '09.]

Santa Rosa, Cal.—The City Council has granted a franchise to the Sonoma & Lake County Railroad to construct an electric railway in Santa Rosa. The railway is to connect Cloverdale, Preston and Lakeport. A. E. Dickinson, Ukiah, president. [S. R. J., Nov. 30, '07.]

Wilmington, Cal.—The Board of Trustees has granted to the Pacific Electric Railway a 50-year franchise to construct a railway on certain streets of Wilmington.

Pueblo, Col.—The Kansas-Colorado Railroad has petitioned the City Council asking that its franchise be changed so as to provide for the construction of a steam railroad instead of an electric railway. S. H. Atwater, Canon City, president. [E. R. J., Dec. 19, '09.]

Jackson, Ga.—The City Council has granted a franchise to the Middle Georgia Interurban Railway to build an electric railway into Jackson. W. F. Smith, Flovilla, who is promoting the railway, is now engaged in grading it from Indian Springs to Jackson. The franchise allows the company three years in which to build the railway, which is to be extended from Jackson to Griffin. [E. R. J., March 27, '09.

Aurora, Ill.—The City Council has granted to the Aurora, Elgin & Chicago Railroad a franchise to build an electric railway through Aurora.

Carpenterville, Ill.—The City Council has granted to the Elgin, Woodstock & Lake Geneva Railroad a 50-year franchise to operate a street railway through Carpenterville. The franchise provides that the company must complete the railway within a year and file a bond of $10,000 within 60 days after the passing of the ordinance. J. A. Kirkland, Elgin, is interested . [E. R. J., March 27, '09.]

Chenoa, Ill.—The Joliet & Southern Traction Company has applied to the City Council for a franchise to enter Chenoa. Lee Fisher, electrical and chief engineer.

Galesburg, Ill.—The City Council has granted to S. F. Atwood, secretary of the Peoria & Galesburg Railway, a 25-year franchise to operate a street railway in Galesburg. [E. R. J., July 24, '09.]

Genoa, Ill.—The Board of Trustees has granted to the Woodstock & Sycamore Traction Company a 50-year franchise to build a street railway at Genoa.

Kankakee, Ill.—The City Council has granted a 20-year franchise to the Kankakee Electric Railway to extend its electric railway on certain streets of Kankakee.

Ironwood, Mich.—The Twin City Railway has applied to the City Council for a franchise to extend its railway to Bessemer.

Baker City, Ore.—The City Council has granted to Anthony Mohr a franchise for a street railway in Baker City. [E. R. J., June 19, '09.]

***Jacksonville, Ore.**—A franchise has been granted to the Jackson County Light & Power Company over the roads of the county, the company intending to construct an electric railway traversing the Rogue River Valley.

Wheeling, W. Va.—The Wheeling Rapid Transit Company has applied for a franchise to the Board of Commissioners to operate an electric railway through Ohio County. A. M. Schenk, president. [E. R. J., June 26, '09.]

TRACK AND ROADWAY

Beebe, Ark.—The proposed electric railway from Conway to Beebe via Vilonia, a distance of 36 miles, has been taken up by the business men of these cities. The estimated cost of construction and equipment is approximately $500,000. The railway is to be extended to Des Arc, 62 miles. J. N. Simpson and Senator G. Bush are interested. [E. R. J., July 3, '09.]

Pacific Electric Railway, Los Angeles, Cal.—Work has been started for the extension of this railway from Upland to Claremont and then on to Pomona at a point near Lordsburg, where the Pomona City route will be joined onto the Southern Pacific Railroad tracks of the Covina branch.

Meriden, Middletown & Guilford Railway, Meriden, Conn.—This company, which proposes to build an electric railway from Meriden to Guilford, a distance of 20 miles, has been organized with the following officers: Frances Atwater, Meriden, president; Joseph Merriam, Middletown, vice-president; Eugene F. Hall, Meriden, secretary, and Charles E. Jackson, Middletown, treasurer. Directors: I. E. Palmer, Jos. Merriam, D. Luther Briggs and C. E. Jackson, Middletown; A. H. Auger, F. Atwater, J. H. White and others. [E. R. J., July 10, '09.]

Carmi-Fairfield Traction Company, Burnt Prairie, Ill.—The Electric Railway Journal is officially advised that this company, which is not yet chartered, will construct an electric railway, connecting Carmi, Sumpter, Liberty and Fairfield, a distance of about 25 miles. Construction will be begun on or about Sept. 1. The company will operate 8 passenger cars and 24 freight cars. The power station and shops will be located at Burnt Prairie. Power will be furnished for lighting. Capital stock authorized, $50,000, preliminary. E. S. Lawrence, St. Louis, Mo., chief engineer. [E. R. J., July 17, '09.]

Danville, Kankakee & Crescent Traction Company, Crescent City, Ill.—It is reported that this company will operate gasoline motor cars on its proposed railway, which will connect Jamesburg, Potomac, Rankin, Cissna Park, Crescent City and Kankakee. The company has purchased land in Crescent City for a depot. J. B. Hansbrow and J. P. Sterrenberg, Crescent City, are interested. [E. R. J., May 29, '09.]

Murphysboro Electric Railway, Heat, Light & Power Company, Murphysboro, Ill.—John G. Hardy, secretary and treasurer, announces that this company expects to place, during the next two months, contracts for building one-half mile of track, road bed, etc., and that contracts have been let to extend one-fourth mile of track to Iron Mountain station.

Oil Belt Traction Company, Oblong, Ill.—This company has begun grading on its proposed electric railway from Charleston to Bridgeport. G. E. Groves, Oblong, is interested. [E. R. J., July 10, '09.]

Peoria (Ill.) Railway Terminal Company.—This company announces that it expects to place, during the next six weeks, contracts for laying about 2½ miles of double track.

Yorkville & Morris Railroad, Yorkville, Ill.—Hugh G. Palmer, president and chief engineer, writes that this company, which is about to be reorganized and new officers

elected, will soon resume work on its proposed electric railway connecting Yorkville, Lisbon and Morris, a distance of 22 miles. The railway, which is to be standard gage, will eventually be extended down the Fox River to Ottawa. The company will operate 18 gasoline motor cars. The repair shops are to be located in Yorkville. Capital stock authorized, $500,000; bonds authorized, $500,000. The company desires to communicate with financial interests to sell its bonds. [E. R. J., July 17, '09.]

Pittsburgh & Kansas City Railway, Pittsburgh, Kan.—This company advises that it expects to build immediately an extension a distance of 2¾ miles to Mulberry.

Boston (Mass.) Elevated Railroad.—This company has placed an order with the Pennsylvania Steel Company for 1500 tons of girder rails.

***Clinton, Miss.**—The Business Men's League, of Clinton, is said to be interested in a plan to construct an electric railway connecting Clinton and Jackson. R. H. Henry, chairman.

North Missouri Central Railroad, Mexico, Mo.—At a meeting at Ashland, 15 miles southeast of Columbia, $10,000 was raised as a bonus for the building of this railway from Mexico to Jefferson City, 60 miles. Already $6,000 has been raised and $200,000 must be raised before construction will be started. O. F. Spaete, St. Louis, president. [E. R. J., July 24, '09.]

Springfield (Mo.) Traction Company.—It is stated that this company has contracted for 20,000 lbs. of cement from the Seamon Coal, Cement & Sand Company, to be used in the proposed extensions which will be made during the year.

New York & Long Island Traction Company, Hempstead, N. Y.—It is reported that this company is planning to extend its railway from Hicksville through Woodbury and Coldspring Harbor to Huntington.

Oklahoma City (Okla.) Railway.—This company writes that it expects to construct about 5 miles of city track.

Nipissing Central Railway, North Cobalt, Ont.—The ELECTRIC RAILWAY JOURNAL is officially advised that this company, which is to build a standard gage electric railway to connect Cobalt Port, Cobalt and Haileybury, has completed the road bed and is now ready to lay track and ties. The company will furnish power for lighting. Capital stock authorized, $1,000,000; issued, $250,000. Officers: J. W. Fitzpatrick, North Cobalt, president; P. L. Utley, Escanaba, Mich., vice-president; S. Alfred Jones, Haileybury, secretary; R. B. Stack, treasurer, and Clarence B. Henry, electrical and chief engineer, North Cobalt. [E. R. J., July 17, '09.]

Coos Bay, Oregon & Idaho Railway, Marshfield, Ore.—The ELECTRIC RAILWAY JOURNAL is officially advised that this company, which proposes to build a railway, operated by steam or other motive power, from North Bend and Marshfield, Ore., to Boise, Idaho, is now making surveys. Officers: P. Hennessey, Marshfield, president and general manager; Wm. Grimes, Marshfield, vice-president; J. R. Smith, North Bend, secretary; J. V. Pugh, North Bend, treasurer, and F. A. Haines, Marshfield, chief engineer. [E. R. J., July 10, '09.]

***McKeesport & Portvue Street Railway, McKeesport, Pa.**—It is stated that construction work will be started within a few days on the proposed street railway between McKeesport and Portvue by the Realty Company, McKeesport, which is promoting the project. It is the plan to eventually extend the line to Clairton and Elizabeth. Officers: James F. Woodward, president; Israel A. Simon, secretary and treasurer; Thomas W. White, engineer.

Duquesne & Dravosburg Street Railway, Pittsburgh, Pa.—T. F. Van Kirk, 1210 Ridge Avenue, Coraopolis, secretary, writes that this company will commence construction on its double-track electric railway from Duquesne to Dravosburg via Duquesne Annex within a few weeks. It will be about 3 miles long. Power will be purchased. Capital stock, $50,000. Headquarters, 1351 Frick Annex, Pittsburgh. Officers: Fred W. Scott, 1351 Frick Annex, Pittsburgh, president; J. C. Cato, Aliquippa, vice-president; Adam J. Krill, Aliquippa, treasurer, and Douglas & McKnight, Union Bank Building, Pittsburgh, chief engineers. [E. R. J., July 3, 1909.]

Pittsburgh (Pa.) Railways.—This company will soon begin operating cars over the old Pittsburgh & Castle Shannon Railroad from Mt. Washington Street to Castle Shannon, 7 miles. The company purchased the Pittsburgh & Castle Shannon Railroad some years ago, and has now entirely reconstructed the roadbed and electrified the line.

Chattanooga, Tenn.—Bowdre Brown and associates, who are promoting the proposed electric railway between Chattanooga and its suburbs, announce that they have not yet incorporated and that they have just applied to the City Council for a franchise. A franchise has been secured from the County Court. The railway, which is to be about 50 miles in length, will be standard gage and construction will be started within six months. The company will operate 50 cars and will purchase power from the Chattanooga & Tennessee River Power Company. Officers have not yet been elected. [E. R. J., July 17, '09.]

Russell-Prater Railway, Bessie, Va.—C. M. Crawford, Ironton, Ohio, secretary, advises that this railway, which is to be built in Dickinson County, connecting with the Carolina, Clinchfield & Ohio Railway, will be operated by steam and not by electricity, as stated in a recent issue. [E. R. J., July 17, '09.]

***Big Stone Gap, Va.**—An electric railway 60 miles in length, connecting the agricultural districts of Lee County with the Wise coal fields, is being agitated by capitalists represented by Alexander McD. Allen, Toronto, Ont. The power will be furnished from the Powell River at a point near Jonesville.

Cle Elum-Roslyn Railway & Power Company, Roslyn, Wash.—This company has started the final survey for its interurban electric railway from Roslyn to Cle Elum via Jonesville, a distance of 17 miles. [E. R. J., June 26, '09.]

Lake Washington Electric Railway, Seattle, Wash.—J. R. McLaughlin, 1108 American Bank Building, Seattle, president, advises that this company, which was incorporated June 24, 1909, will commence construction work, within a few months, on its railway in Seattle. The railway will be operated by electricity, which will be purchased. Headquarters, 1108 American Bank Building, Seattle. Capital stock, $50,000. Officers: F. F. Mead, vice-president, and Paul C. Murphy, treasurer, 505 American Bank Building, and E. T. Clark, secretary, 1108 American Bank Building, Seattle. [E. R. J., July 17, '09.]

Spokane (Wash.) Traction Company.—Construction work has been started by this company on the Lincoln Heights extension, which is to run to Twenty-ninth Avenue and Freya Street, a distance of over 3 miles.

Merrill Railway & Lighting Company, Merrill, Wis.—It is stated that this company plans to make a number of improvements to its railway. Several new lines will be built.

SHOPS AND BUILDINGS

Connecticut Company, Bridgeport, Conn.—It is stated that C. W. Blakeslee & Sons, New Haven, who have been awarded the contract by the Connecticut Company for the construction of its proposed car house at Bridgeport, will commence work within a few days. The buildings, which will cost approximately $250,000, will be fireproof structures of reinforced concrete. As previously reported in the issue of Aug. 8, 1908, there will be two large one-story buildings, one for repair shops, etc., north of the railroad station fronting on Congress Street, with a second story on that side for quarters for motormen and conductors. The second building will be built east of the railroad station, and will be used chiefly for storage for open and closed cars in season.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—It is reported that this company has selected a site in Mishawaka on Third Street and Main Street on which to erect an interurban railway station.

Syracuse (N. Y.) Rapid Transit Company.—The new repair shops now being erected by this company on Wolf Street, Syracuse, are expected to be completed by Oct. 1, according to W. J. Harvie, chief engineer. The shops will have a capacity of about 25 cars a month.

Seattle, Renton & Southern Railway, Seattle, Wash.—This company has purchased ground in Renton, on which it shortly will begin the erection of car houses and shops.

POWER HOUSES AND SUBSTATIONS

Peoria (Ill.) Railway Terminal Company.—This company is considering the purchase of two units and three boilers for its power station.

Pittsburgh & Kansas City Railway, Pittsburgh, Kan.—It is announced that this company will soon erect a power station near Franklin, Mo.

Meridian (Miss.) Light & Railway.—This company expects to build an addition to its power house and install a 1500-hp engine and a 1000-kw generator.

Albany & Hudson Railroad, Hudson, N. Y.—It is stated that this company will install a steam turbine at its Stuyvesant Falls power station.

Scioto Valley Traction Company, Columbus, Ohio.—This company has recently purchased a 500-hp boiler, a stoker and shop tools for its power house and shops.

Manufactures & Supplies

ROLLING STOCK

Sabraton Railway, Morgantown, W. Va., expects to purchase one car.

Chicago (Ill.) City Railway is planning to purchase 50 city cars and two funeral cars.

Kansas City Railway & Light Company, Kansas City, Mo., is reported to be in the market for 25 motor and 10 trail cars.

Peoria (Ill.) Railway & Terminal Company is in the market for a combination snow plow, sprinkler and line car.

Maryland Electric Railways, Baltimore, Md., will purchase three cars at an early date.

Southern Pacific Railroad (Electric Division), Oakland, Cal., contemplates purchasing 80 cars, 40 of which will be motor cars and 40 trailers.

Colfax Springs (Ia.) Railway has purchased two trail cars and one 10-ton coal car from the Dorner Railway Equipment Company, Chicago.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has ordered two express cars from the Niles Car & Manufacturing Company, Niles, Ohio.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia., has purchased four 50,000-lb. M. C. B. box cars and two refrigerator cars from the Dorner Railway Equipment Company, Chicago.

Metropolitan Street Railway, New York, N. Y., recently placed an order with the General Electric Company for 250 airbrake equipments to be used on cars being remodeled for pay-as-you-enter service on its lines.

Nashville (Tenn.) Interurban Railway has decided not to buy second-hand equipment, as reported in the Electric Railway Journal of June 19, 1909, and has placed an order for cars with The J. G. Brill Company and for equipment with the General Electric Company.

Lawrence Railway & Light Company, Lawrence, Kans., has just ordered seven open motor cars from the St. Louis Car Company to be mounted on St. Louis No. 9 trucks. These cars are in addition to those mentioned in the Electric Railway Journal of July 10, 1909.

Louisville & Eastern Railway, Louisville, Ky., has completed arrangements for taking possession of the five large interurban cars which were built on its specifications several months ago by the American Car & Foundry Company. This company will also purchase three interurban express cars.

Keokuk Electric Railway & Power Company, Keokuk, Ia., has purchased three second-hand 20-ft. motor cars, mounted on Brill 21-E trucks, from the Dorner Railway Equipment Company, Chicago. Mention of the contemplated purchase of these cars was made in the Electric Railway Journal of April 24, 1909.

Augusta Railway & Electric Company, Augusta, Ga., mentioned in the Electric Railway Journal of April 17, 1909, as being in the market for cars, has placed an order with the St. Louis Car Company for six semi-convertible, single-truck cars, 21 ft. long, for delivery on Oct. 1, 1909. Brill 21-E trucks will be used with these cars.

Louisville (Ky.) Railway has placed an order for 33 city car bodies with the St. Louis Car Company. The trucks have not yet been purchased. These cars are to be equipped with Westinghouse motors and with National Brake & Electric Company's air brakes. Mention of the contemplated purchase of these cars was made in the Electric Railway Journal of June 26, 1909.

Jacksonville (Fla.) Electric Company, mentioned in the Electric Railway Journal of May 1, 1909, as contemplating the purchase of some pay-as-you-enter cars, has ordered five cars from the Cincinnati Car Company. The bodies will be 31 ft. long, mounted on Standard Motor Truck Company's type 0-50 trucks, equipped with GE-81 four-motor equipments and General Electric airbrakes, and will be built under the license of the Pay-as-You-Enter Car Corporation.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has placed an order for 100 city cars and trucks with the St. Louis Car Company. The cars are to be 50 ft. over all, be built of steel below the window rail and are to be of the pay-as-you-enter type and to have steel wheels. They will be heated by Peter Smith Heater Company's No. 1-c heaters, which are especially designed for these cars. Hale & Kilburn seats were specified. The cars will each have a seating capacity of 50. Six of the cars are to be delivered on Nov. 15, and six additional are to be delivered each succeeding week until the order is filled.

TRADE NOTES

Ray D. Lillibridge, New York, N. Y., has removed his office to 100 Broadway, suite 20, 21, 22, and has taken into partnership William L. Rickard. Continuing to devote themselves to technical publicity, Messrs. Lillibridge and Rickard will conduct the business as Ray D. Lillibridge.

Falk Company, Milwaukee, Wis., has filled orders for its hardened centers, steel bound, and special work and solid manganese railroad crossing which were received early in the season from the group of roads controlled by the Huntington Syndicate in Los Angeles, Cal., the Northern Electric Company and the Fresno Traction Company. The Falk Company has recently received orders from the Los Angeles (Cal.) Railway for 14 solid manganese crossings and several layouts. It is building a large extension to its foundry, increasing its pattern storage facilities and otherwise enlarging its plant to better handle its increased business.

John A. Roebling's Sons Company, Trenton, N. J., has an interesting exhibit at the Alaska-Yukon-Pacific Exposition in Seattle, Wash. It includes a model showing a span of catenary construction with a miniature trolley car beneath. The span is 14 ft. 6 in. long, divided into 14 equal spaces. The supporting strand is 3/16 in. in diameter; the trolley hangers are made of galvanized wire and a grooved copper wire of small size represents the trolley wire. The exhibit also contains a display of bare and insulated wires and electrical cables of all kinds, the different processes undergone in the manufacture of wire being shown by samples, beginning with ore and continuing through pig iron, ingots, billets and rods to drawn wire. The samples of wire range from the largest diameter to a diameter of 0.001 in. More than 50 different kinds of wire ropes are also shown. The exhibit is located in Machinery Hall.

ADVERTISING LITERATURE

Eureka Tempered Copper Works, North East, Pa., have issued a very handsomely printed catalog of trolley wheels of various types made of high-grade bronze. A number of complimentary letters from users of these wheels are reprinted.

Goldschmidt Thermit Company, New York, N. Y., is distributing a booklet on the butt welding of wrought iron and steel pipes by the thermit process and a pamphlet entitled "Metals and Alloys Free from Carbon Produced by the Thermit Process."

D & W Fuse Company, Providence, R. I., is mailing its July price-list for Deltabeston magnet wire. The company is manufacturing coils with Deltabeston magnet wire insulated with pure asbestos materials throughout and rendered both heat-proof and moisture-proof by a new process of the company.

Industrial Progress for July, published at Milwaukee, Wis., is devoted largely to articles descriptive of important projects on the Pacific Coast. Among the articles which appear are the following: "High Head Reaction Turbine, 9700 Hp at the Centerville Plant of the California Gas & Electric Corporation," "Industrial Growth on the Pacific Coast," "Our Trade with the Countries Bordering on the Pacific" and "San Anselmo Substation of the Northwestern Pacific Railroad."

Trolley Supply Company, Canton, Ohio, has printed a 60-page catalog, with a complete description and illustrations of the various electric railway supplies which it manufactures. These include the Knutson trolley retriever No. 2, Peerless retriever, Peerless roller bearing trolley base, National roller and ball bearing trolley base No. 2, Ideal trolley catcher, Star headlight, New Climax combination arc and incandescent headlight, plain arc headlight and the semaphore incandescent headlight. Each of the articles and its repair parts are illustrated and accompanied by directions for their operation. The publication also contains a wiring diagram for the combination arc and incandescent and plain arc headlight.

Wonham, Magor & Sanger, New York, N. Y., sole agents of the American Automatic Switch Company, New York, N. Y., have issued catalog "C" descriptive of the American electric switch-throwing machine. There is a short introduction on the value of throwing switches by electricity and a review of the past methods of switch throwing. The description of the machine covers the switch-throwing mechanism, the stuffing box, the relay and fuse boxes and the line contactor. Directions are given for installing the machine and for inspecting it. Its operation is also explained under a separate heading, wiring diagram accompanying the text. The machine as installed in Washington, D. C., was described in the issue of the Electric Railway Journal of April 17, 1909.

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The Electric Train of the Future

New York has been termed the city of troglodytes, but if the predictions of Walter G. Oakman, president of the Hudson Company, come true, the future city will be one of moles. Mr. Oakman believes that the new rapid transit tunnels between New Jersey and New York are simply the precursors of a series of similar tubes, and that the time is soon coming when the rivers and waters around the city will be almost as thickly interlaced with tunnels as the streets of New York are at present with subways and elevated railroads. The prediction does not seem at all unreal, and some of the New York papers in commenting upon it express the belief that these modern methods of transit present an excellent subject for the lyric poet. Certainly, there is enough of the weird and novel about underground travel to appeal to poetic imagination. As yet none in this country seems to have realized the opportunities presented, but not so abroad, where the ambitious electric railway projects in many of the European capitals have inspired varied speculations on the possibilities of the future. Among those which have been put in verse is one in the *Lustige Blätter,* of Berlin. According to this account, the electric train 50 years hence will not only enable one to commence his breakfast in Hamburg and finish it in Berlin, but will also provide the passengers on the train with a gymnasium, Turkish baths, tennis courts, opera recitals and every other luxury of a first-class hotel. Even a crematory will be available for those who wish to use one while in transit. The broomstick train of Holmes has become a classic, and it remains for some successor of his to chronicle the achievements of the high-powered electric car.

Riding in the Motorman's Vestibule

The Northern Ohio Traction & Light Company, by a new rule, has cancelled all permits to ride in the front vestibules of cars, and now restricts this privilege to a very few, comprising the general officials concerned with the operation of the road and, in addition, the division superintendents in the districts for which they are responsible. It is provided in the rule that no other than these shall be permitted to ride in the vestibule except by special authority from the general manager or general superintendent. All precautions that can be taken to prevent motormen from talking to a passenger on a car are in the interest of safe operation of the property, and there should be a clear appreciation of this fact by employees. More than one motorman has paid with his life for non-observance of regulations of this character, and the danger of relaxing from strict compliance ought to be understood by trainmen so well that discipline, for violation of this rule, at least, would not have to be administered. The proportion of accidents occurring where two men were in the motorman's vestibule is large. Success in the operation of interurban electric roads lies in the movement of cars at frequent intervals, with only a short period of space between, affording a service that meets the convenience of the public, in sharp contrast to the poor service offered by the steam lines for short hauls in most districts where electric properties have been able to develop a large traffic. The large number of trains required in electric service means increased responsibility, both of management and employees, and their co-op-

eration in all matters pertaining to safety of operation is needful in order that the necessities of the public for improved transportation facilities may be met.

Improved Service in Cleveland

The statement issued by Mr. Bicknell, receiver of the Municipal Traction Company and the property of the Cleveland Railway Company, showing the increased number of car-miles run as compared with the record while Mayor Johnson and his associates were in control of the property, is evidence of an improvement which is appreciated in that city. Among the changes those in the routing of cars from the peculiar methods followed one year ago are of fully as much importance and value to regular riders, as well as to visitors in the city. Under the scheme of routing adopted during the temporary control of the railway system by Mayor Johnson last year, no car, for instance, was operated directly from the Union depot in Cleveland to the leading hotel. A line now is run directly between these two points, and it receives a paying short-haul traffic, some of which was probably lost under the other arrangement to bus and carriage companies. Other changes of equal or greater importance have been made. After the referendum of last fall the people of Cleveland made an emphatic demand for good service before low fare, and the receivers who were appointed used the equipment at their command, some of which had remained idle in car houses while the experiment was made with inefficient service and a juggled fare that purported to be 3 cents, but was increased for many riders in various ways to a figure above that which the old company had charged previously.

Work of Association Committees

As readers of this paper know, a feature of the work of practically all of the street and interurban railway associations this year is that being done by different committees. Formerly it was the practice to assign to individuals the preparation of papers to be read at the annual conventions, but lately this plan has given place to committee work, and this year all of the committees have been very active, and have been meeting in different cities of the country. If the subject is one on which testimony of manufacturers is desired, they are invited to attend the meeting and offer suggestions, and in other ways every step is taken to secure all the information available. This plan involves a great deal of labor and considerable traveling on the part of the members of the committee, because to secure wide experience they are usually chosen from different sections of the country. Through the permission of the various chairmen, summaries of the work accomplished at these different committee meetings have been published in this paper, so that the member companies have been able to follow in a general way the work being done at the meetings and, if they desire, make suggestions or contribute additional information before the final reports of the committees are prepared. Too much credit cannot be given to the members of the committees for the painstaking work which they have given, often at great personal sacrifice, to the work of the association during the past year, and nothing is more indicative of the virility and value of the association to its members than this committee work.

Proposed New British Coin

The relation between the system of coinage used in a country and the prosperity of its street railways is more intimate than many realize. We have already commented upon the fortunate circumstance, so far as the street railway companies in the United States are concerned, that there is no single coin of a value between 1 and 5 cents, and that the latter coin about corresponds to the fare which the experience of the past has shown is necessary to charge as a universal fare on a city system. The relation between coinage and street railway fares is now attracting considerable attention in Great Britain, owing to the proposal to adopt a new British coin with a value of 1.2 pence, or 2.4 cents. At present there is no coin in England between 3 pence and 1 penny, so that, as a rule, the street railway systems are divided into penny zones, although there are occasional subdivisions of ½ penny, 1½ pence and 2½ pence zones. As street railway enterprises have never prospered greatly in Great Britain, it is plain that if the average fare could be increased by 20 per cent by adding 0.2 pence to each penny fare it would be of considerable assistance. We are somewhat surprised, however, at the proposal to introduce the decimal system, on this very small scale, into the British system of coinage, which does not recognize it elsewhere. If any new coin should be adopted it would seem that one with a value of 1¼ pence would be much more in harmony with those now in use, as it would be a penny plus a farthing, and while its use would still require the zone system of fares, it would increase the average fare 25 per cent above the present rate, or 5 per cent more than that proposed.

The Decisive Defeat in Cleveland

Rejection of the Schmidt franchise by the voters of Cleveland on Aug. 3 is the second decisive defeat which Mayor Johnson has received at their hands. The reasons which influenced the vote against the franchise vary in individual instances, but it is plain that the events that have occurred since the leasing plan went into effect in 1908 have made a lasting change in public sentiment. It would be an astonishing fact if this reversal of opinion had not taken place; the extraordinary part of it is that it was not more overwhelming than the results of the referendum on Tuesday indicate.

Mayor Johnson's record with the street railway situation in Cleveland has been less in fulfillment than in promise, and when he offered to do with the Schmidt franchise something like what he had agreed to perform if given control of all the lines, the recollection of his signal failure of last year was too fresh in the minds of the people to be forgotten. In no one part of the program of attack upon the street railway interests which has been the foundation of Mr. Johnson's policy has the opposition been so united, or so nearly representative of all elements of the city as in the contest just closed. None of the leading daily newspapers has supported the franchise; of the two prominent newspapers that previously gave their support to the street railway policy of the executive of the city, one did not express itself editorially with respect to the measure and the other denounced it as not in the interest of the people of Cleveland. With leading civic bodies and

the labor element arrayed against the scheme to start a new independent line, and the facts made clear by the citizens' committee, the forces opposing the acceptance of the franchise could not be overcome, despite the political resourcefulness of Mayor Johnson.

Prediction concerning the future acts of a character like Mayor Johnson may appear dangerous, because it may not be borne out by subsequent developments, but the consensus of opinion is that the defeat of the Schmidt franchise marks the beginning of the end of any effective war of the city administration of Cleveland upon the street railway system. The most potent factor in the decision registered at the polls on Tuesday was the failure of Mr. Johnson to square his acts with his promises and his repudiation of agreements and refusal to accept peace when it was offered; in the rejection of this franchise he has received what he deserved.

What the effect of this referendum will be upon the contracts which will presumably be made now with the Cleveland Railway Company the future will show; but the people of the city should know, if they have not already learned, that no franchise will yield results in service that can be permanently successful if it does not provide protection for the property rights involved and a fair return on the investment.

No Legal Obligation to Provide Seats

A common experience of railway companies in handling holiday crowds has been their inability to give all passengers a seat. These conditions have almost invariably been accepted without discussion, but not so with a woman named Weeks, in New York State, who recently brought suit against the Auburn & Syracuse Electric Railway Company for injuries alleged to have been sustained by a failure to give her a place on the car to sit down. On Memorial Day she held a ticket entitling her to ride between two cities on the road, and as she boarded a car the crowd entering at the same time was so great that she was unable to get a seat. She was prevented from leaving the car on account of the crowd, was swayed about without any supports for her hands or arms, and was compelled to ride in this manner to her journey's end. Owing to the crowded condition of the car and the jostling and fatigue incident thereto, her health was said to have been very seriously impaired. The defense was that the situation complained of was the ordinary case of a crowded street car, caused by the fact of increased holiday travel, and the large number of passengers who insisted on returning on the first car. The verdict was for the plaintiff, and the company prosecuted a successful appeal. The judgment was reversed on the merits, the court saying that if the failure of the defendant company to furnish more cars so that the plaintiff could have a seat was not negligence, it could not be charged. If the company had provided sufficient cars to furnish her with a seat, the basis upon which the action arose would have had no inception. The action was for negligence, which has been defined as "a violation of the duty to exercise care."

The Onondaga County Judge in his opinion states:

> There was no obligation on the part of the company to transport all the passengers who sought conveyance upon the car in which the plaintiff rode. There can be no possible violation of a duty in the fact that a car built to accommodate 50 passengers would not seat 100. Suppose there were a dozen cars awaiting passengers, and suppose all the people seeking transportation crowded into one car. I take it in such case no claim could be made for negligence in failing to furnish these people with a seat. Other questions might arise, if one received injuries; but I am confining myself strictly to the question of failure to furnish a seat. * * * In the absence of proof of failure of the company to furnish other cars, and in view of the affirmative proof that they did furnish additional cars, upon this ground alone the claim of the plaintiff must be denied. The negligence of the defendant not being shown, no question of contributory negligence arises.

Another interesting feature of the case was the decision that the plaintiff waived any claim she might have had against the company by not declining to give up her ticket and upon the first opportunity to leave the car and hold the company liable for breach of its contract to convey. It has been held in at least four States (Missouri, Tennessee, Arkansas and Minnesota) that she could not refuse to surrender her ticket and ride free. The four cases above mentioned hold that a passenger cannot accept part performance and refuse to pay. By the doctrine of waiver, the plaintiff was held, by taking passage in the car in which it was a physical impossibility for the defendant to give her a seat without committing trespass upon other passengers with equal rights, and remaining upon such car, to be precluded from asserting that she had a right to a seat. As the court well said:

> She paid her fare with a full knowledge of the situation, and accepted it as it was, with its attendant inconveniences, precisely as a first-class passenger might accept a seat in a second-class car. The duty the company then owed to the plaintiff was the duty it owed to a passenger who had contracted to ride standing in one of its cars. Had the plaintiff received injuries occasioned by such carriages interesting questions might be presented.

Negligence, it was remarked, could no more be predicated in such a case upon the fact that a passenger rode standing and became fatigued and faint than from the fact that a passenger who was seated became nauseated by the movement of the car. The maxim, "That to which a person assents is not esteemed in law an injury," applies. The opinion is so logical and convincing that we feel safe in saying that it not only terminated this particular case, but discouraged further litigation of the same sort. We find no record of a further appeal being taken to the higher court from this decision of the intermediate appellate tribunal.

Concerning the Size of Cars

During the last few years the street car has been gradually increasing in dimensions, as our readers well know, until the time has come when it may be worth while to consider whether the limit of useful size has not been reached or even passed. Undoubtedly the cars of a decade ago were many of them too small for comfort and for economy. A long car and a short car alike require two men. The long car unquestionably takes a good deal more power than the short one, but seats more passengers, so that the total cost of operation with reference to capacity is large to a certain point in favor of the long car. Hence the long and heavy car has been introduced to an astonishingly wide extent even on comparatively small roads. Without attempting to pass finally upon the merits of the subject we would like to raise the question as to whether the long car business has not been overdone, especially when we consider that

they are undeniably hard upon the track. This item of increased cost must in a measure compensate for the increased economy with respect to the car crew; to what extent has not yet been sufficiently determined. If upkeep and replacements of track were duly charged in when costs of long and short cars are compared the results might be somewhat different from those now obtained.

Another phase of the matter relates to the character of the service. It is a fact familiar to street railway men that a large amount of riding, particularly in summer, is dependent on pleasure rather than on necessity. If the introduction of long cars with great carrying capacity is associated with even slightly less frequent service the amount of such pleasure riding is liable to be diminished. People who are using cars as a necessary convenience in going to their business use them in a great measure independent of the frequency of the service; at least they are dependent upon the street cars until the service gets thoroughly bad in point of frequency. Where, however, the riding is for pleasure or for convenience rather than from necessity a given hourly capacity obtained by the use of very long cars is certainly less efficacious in securing traffic than the same capacity obtained by a greater number of smaller cars run more frequently. It is very difficult to make quantitative estimates, but it is certainly true that a 10-minute service would get more passengers than a 15 or 20-minute service by an amount often sufficient to pay the extra cost of the more frequent service. Where passengers ride as a matter of choice rather than of necessity small inconveniences count against traffic. Another very practical point in a comparison between long and short cars is that, contrary to a common hypothesis, the former are not necessarily the easier riding cars, providing both are double-truck cars.

The severe requirements of the heavy and fast interurban cars in the matter of track are well known and the general situation is such that we are inclined to think that a good many electric roads might well ask themselves the question: Is this a street railway or a high-speed railroad line? With respect to the long interurban lines there can be little doubt. They are railways pure and simple for all practical purposes, and most of their troubles are owing to insufficient realization of this fact. Only recently we had occasion in these editorial columns to call attention to the necessity of keeping up railway methods and railway discipline as a preventive of accidents. On the other hand, a great many roads, while covering considerable distance and carrying many passengers, are still in their functions street railways. This condition is particularly common in the roads which have a very large and profitable summer business. It is in such cases as these that we are disposed to think the long car, particularly of the semi-enclosed type, has been somewhat overworked. No business save that of selling newspapers depends on so small independent dealings with patrons as the street railway business and none is so sensitive to temporary inconveniences. It therefore seems to us that it would be well to look a little more carefully than is usual into the limitations of the long and heavy car as applied to street railways in general. The interurbans can take care of themselves along an entirely different direction of progress.

The First Two Years Out of School

This is the season of the year when the annual crop of technical graduates is being assimilated by the manufacturing and operating companies. The next two years will be spent in learning the nature of a working day and in building up the tissue which seems necessary to connect the school training with the after business life. The practice of devoting about two years to this process has become general, presumably because it is necessary. The manufacturing companies have developed regular apprentice courses and the public service corporations of all kinds are also rapidly following the same course. Even selling organizations find it necessary to have what may be termed "training departments," to teach the technical end of the business.

In view of these facts it is somewhat surprising that men like Fred W. Taylor, ex-president of the American Society of Mechanical Engineers, and C. B. Going, editor of the *Engineering Magazine,* should believe it possible to prepare a young man to become a profitable employee immediately after graduation. This opinion was expressed before a recent convention of the Society for the Promotion of Engineering Education. Mr. Taylor stated in substance that employers would have nothing to do with recent technical graduates if they could help it. He prefers to have others do the "breaking in." Mr. Going's observation leads him also to conclude that the "schools are headed in the wrong direction" in not preparing young men more directly for the environment in which they are to earn their livelihood. Mr. Taylor advocates a year of practical work immediately after the first year of the college course, while Mr. Going recommends a closer connection between the schools and practice—an endeavor to surround the schools with an industrial atmosphere.

It would appear to be a fair question for investigation by the Education Committee of the American Street & Interurban Railway Association, whether the apprentice courses now being developed by the progressive railway companies of the country are intended to overcome the defects of the school training or whether they form a natural and necessary supplement to it. There is no doubt that if the schools can turn out engineers, designers, shop superintendents, etc., it is desirable that they should do so. It is, however, very difficult to see how this can be accomplished. These men must be developed amid commercial surroundings, and each must seek and find the place in which he can grow best. Obviously the school cannot be transplanted into the shop or power house. If it could, the distractions would prove too great to permit the needed concentration upon the educational routine. Neither can the commercial atmosphere be carried to the schools to a very great extent for the same and other reasons. A school education should be general; practice is specialized. Only enough practical work should be present in the curriculum to serve as illustration for the fundamental principles. As a proof that this contention is correct, attention is called to the fact that among the technical schools which have a reputation for turning out "practical" graduates some of the best are located hundreds of miles from an important industrial center. These schools do not endeavor to prepare for vocations, except in a general way. They leave

that responsibility to the employers who should be and are willing to "shoulder it." The individuals and companies who are building up compact, loyal organizations are those who are carefully selecting their recruits from among the young men who show aptitude and promise of achievement. These young men are then given an opportunity to learn to use their native and acquired ability and by a process of natural selection to rise (or sink) to their proper places.

These remarks are not intended by way of disparagement of Messrs. Taylor and Going. Constructive criticism such as theirs will do much for education and for business. They state the results which are desired from a school training and suggest means for achieving them. As far as the latter apply to the electric railway business it seems that they do not obviate the necessity for the apprentice courses now in such an encouraging state of development under the auspices of the association.

Fire Drills at Large Car Houses

The protection of large car houses from fire is a problem of serious importance, for the value of rolling stock and its earning power under modern conditions of electric railway patronage justify the most thorough precautions against the destruction of this class of property. Operating companies are coming more and more to appreciate the value of the fire drill, and on many roads a good deal of attention has been paid to the organization of fire fighting apparatus and the force charged with its handling. In the case of one large company several of the car houses have been provided with complete equipments of automatic sprinklers, and at irregular times during the past year certain officials have made the rounds of the system and turned in alarms on the spur of the moment, timing the work of the force on duty in coupling up hose, throwing water, and noting the general capability of the men to meet the artificial fire conditions imposed. Often a prominent insurance expert has accompanied the railway officers on their tours of inspection, and many points worth while have been brought out, to be discussed before the men themselves later at the regular meetings of the company's car house foremen and division superintendents.

A year's experience with these drills shows that the most important matter to have in hand, once a car house is equipped with suitable apparatus for fire fighting, is the strict and permanent organization of the force, so that each man shall know the precise duties of his position in the fire line, regardless of whether the foreman, the subforeman or the starter is in command, and also regardless of the presence or absence of different men from the house. While this point is in a sense axiomatic, it is often neglected, but it is so vital in relation to successful fire fighting that too much care cannot be taken to insure it. Foremen should impress upon their subordinates just what each man is expected to do, and provide that when a man is away the duties of his position shall not be neglected if there are men enough on hand to fill all the posts. In this connection it is often worth while, in car houses where the number of men on duty varies considerably at different times of the day and night, to have the entire force report at a central point the moment the alarm bell sounds, so that the foreman can give the proper instructions, dependent upon the circumstances of the case. Such a course will take a few seconds more than where the men go to different stations in the house, but unless the house is large enough to have different call bell signals for different sections, it is the opinion of experts in fire fighting that the formation of a definite, rapid plan of attack by the foreman in charge is worth far more than it costs in time.

In the fighting of a fire the personal equation counts for so much that most of the defects which appeared in the drills referred to depended upon the failure of individuals to understand their duties, to the overlooking of conditions which inspection should have remedied, or to over-excitability when the alarm signal was rung. Such matters as bursting hose and bells out of order or failing to ring with sufficient power are troublesome, but not dependent upon the efficiency with which the men respond to the alarm. It seems clear from the tests that the best way to determine the condition of hose is to actually apply the water, since it is not easy to make sure of its integrity by mere visual inspection. The inspection is valuable, and should be made with special care at the joints and near the points where the fittings are attached, since the tendency is for rotting to occur here first. In some cases the plan of replacing one-eighth of the hose each year is a good one, based on a rough estimate of the average effective life to be expected. Sometimes the municipal authorities object to the use of water for tests, but this ought to be overcome, considering the value of the property at stake and the importance to the abutters of an efficiency on the part of the railway force which shall prevent any fire from spreading.

Among the defects due to insufficient training or to nervousness on the sound of the bell may be mentioned failure to get water when the hose is coupled, poor coupling work, valves left open or only opened part way in the haste of the men to turn on the water, nozzles left alone, hose laid with kinks or sharp bends, failure to close fire doors, and massing of men at the wrong places. Ignorance of the location of the apparatus is not uncommon, and shortage of material is also a frequent cause of trouble. In respect to the latter, it should be the duty of car house employees to put themselves definitely on record when requests for supplies are made, and to keep after the department responsible until the conditions are remedied. It is not enough for a man to file a written request for fire fighting supplies that belong with his installation; he may thus clear himself of responsibility, but only a live interest in the protection of the property will insure its continual protection. Poor team work is especially liable to occur at night, and as the majority of car house fires break out at this time, the greatest care is necessary to maintain the proper organization and intelligent appreciation of duties among car cleaners and other employees less skilled than the men who work on the equipment in the daytime. The plan of timing different car house crews after the alarm is given and stimulating a healthy rivalry in fire fighting efficiency has much to commend it. The time may come when on very large systems one man will be employed to devote most of his attention to the inspection and maintenance of the fire fighting personnel and equipment, keeping systematic records of the performance and conditions in the different houses.

NEW TERMINAL OF THE PUBLIC SERVICE RAILWAY AT HOBOKEN, N. J.

BY MARTIN SCHREIBER, ENGINEER MAINTENANCE OF WAY, PUBLIC SERVICE RAILWAY

The Public Service Railway Company, of New Jersey, has begun the erection of a large terminal in Hoboken adjacent to the new passenger terminal and ferry house of the Delaware, Lackawanna & Western Railroad and directly over the station of the Hudson & Manhattan Railroad which operates the Hudson Tunnels to New York City. This terminal will afford the facilities needed to handle the greatly increased traffic due to the construction of the tunnels and the rapid growth of population.



Hoboken Terminal—Perspective View, Looking Toward River

This improvement is of more than passing interest not only on account of its arrangement and the engineering and architectural features, but also because it is unique in combining so many ways of transportation to the traveling public. Here it will be possible for the traveler to take a ferryboat or tunnel train to New York City or along the New Jersey shore; to board the Delaware, Lackawanna & Western suburban or through passenger trains; to take the elevated cars of the Public Service Railway to Jersey City Heights and West Hoboken, and to board the surface trolleys that form a section of the system of the Public Service Railway, making in all five distinct services which can be reached from under one roof.

OPERATION

The accompanying drawing, Fig. 1, is a map showing the present layout in the neighborhood of the station site. The elevated cars approach along Ferry Street and come to the surface at a point 300 ft. east of Hudson Street, while the surface cars go into the terminal along Ferry Street under the elevated structure and continue around the loop at Ferry Street on the south track. On leaving the terminal the surface cars operate over Hudson Place, while the elevated cars return via the elevated structure along Ferry Street. At present about 70,000 passengers are handled a day via the trolleys coming into the terminal over the following eight lines: Bergen, Union Hill, Summit Avenue, Jackson Avenue, Washington Street, Willow Avenue, Grove Street and Oakland. Altogether 180 cars per hour are operated during the evening and morning rush, but it is proposed to take care of 400 cars per hour. The Delaware, Lackawanna & Western ferries are shown at the right in Fig. 1 and the stairways forming the exit and entrance to the Hudson & Manhattan Railroad tunnels may be seen also.

Fig. 2 shows the general layout of the new station in the immediate neighborhood where any changes in track layout were required. All of the proposed tracks are already installed west of River Street, as shown on the plan. From this plan it is understood that all the surface cars coming into the terminal will return through the terminal

and thence across Hudson Street to private right of way into Washington Street. The elevated structure instead of going to the surface at the station will continue to the second floor of the new terminal and all cars will loop over the street as shown in the track layout of the second floor in Fig. 4.

The general arrangement and operation of the terminal may be readily understood from Figs. 3, 4 and 5. These show the surface plan, the floor for the elevated cars and a section through the proposed terminal extending into the present tunnel station directly underneath. Fig. 3 shown in Fig. 4. After obtaining tickets, these passengers go by the choppers to the waiting-room, which contains the loading tracks bound for what is known as the "hill" section.

It is apparent that the entire layout is designed to keep the loading and unloading tracks separate and to provide a complete pay-as-you-enter system. The tracks shown in Hudson Street on the general plan will be practically abandoned during the regular operation of the new terminal. They are retained only as an emergency outlet from the station. An emergency connection will also be provided

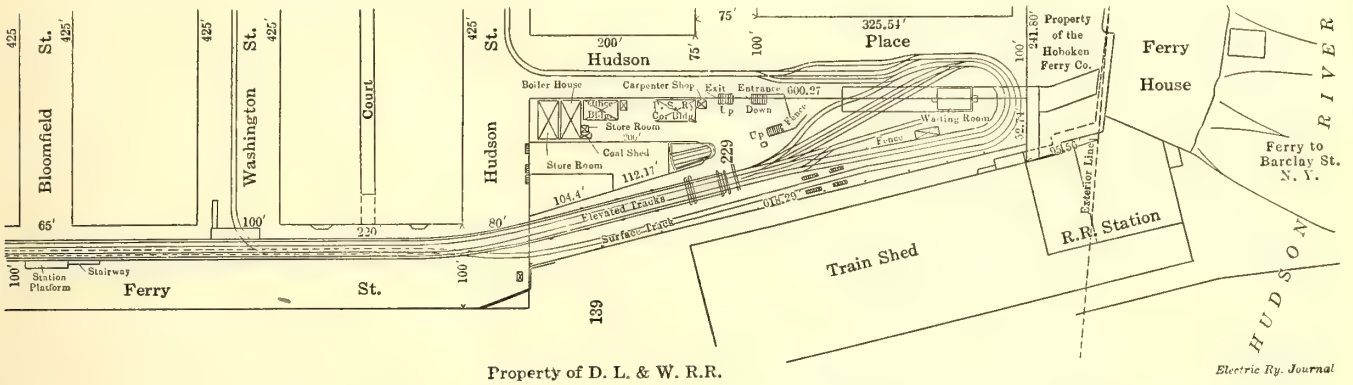


Fig. 1—Hoboken Terminal—Plan of Present Track Layout at Hudson Place, Hoboken, N. J.

shows an isolated 330-ft. loading track on the south side. From this track the passengers coming in during the morning rush on the surface cars may go down the stairways to the tunnel trains, continue on forward to the ferries or to the Delaware, Lackawanna & Western suburban or through trains. Otherwise, they may be transferred to other New Jersey trolley lines by first obtaining tickets and passing by the choppers to the loading tracks on the surface or elevated floors. As shown on the second-floor plan, Fig. 4, passengers coming in on the elevated trains have an isolated unloading track and platform 330 ft. long, from whence they may proceed directly to the upper decks of the Hudson River ferryboats or to the Delaware, Lackawanna & Western trains. They may also go downstairs to buy tickets and go by choppers before boarding the surface cars. from the elevated structure to the surface to afford relief in case of a train blockade on the second floor of the structure.

In abandoning the present terminal to make way for the construction work a temporary loop for the elevated cars will be built in Ferry Street. These cars will load and unload alongside opposite platforms extending from Hudson to Washington Streets, as may be understood from Fig. 2. The operation of surface cars will be confined to stub tracks along Hudson Place and east of Hudson Street.

ENGINEERING FEATURES

The layout presented interesting engineering problems on account of the small space and irregular property available and because it was necessary to conform with the re-

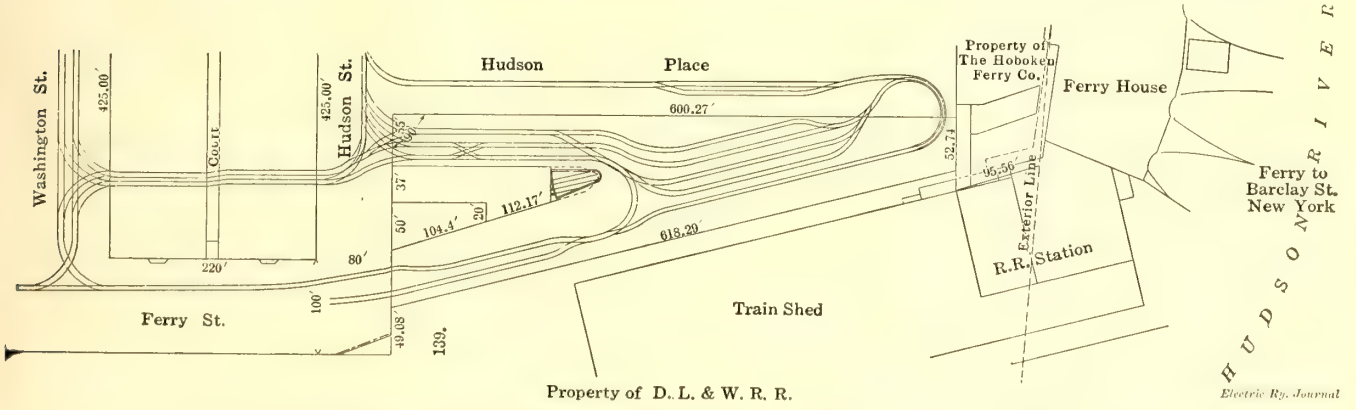


Fig. 2—Hoboken Terminal—New Track Layout at Hudson Place, Hoboken, N. J.

At a still lower level are the tunnel trains bound for New York or to the Pennsylvania Railroad and Erie Railroad station, on the New Jersey shore.

During the evening rush hours the trend of travel is in the opposite direction, originating principally with the Delaware, Lackawanna & Western ferryboats and the tunnel trains. The tunnel passengers come up the stairway to the surface car loading tracks shown in Fig. 3, while those wishing to ride on elevated trains take the escalator in the concourse of the tunnel station and land at the place quirements of the engineers of the Hudson & Manhattan Railroad Company for protecting the tunnel station which forms the support of the proposed structure. In designing the tunnel station the engineers had figured and executed their construction work on the assumption that the Public Service Railway was to erect a surface layout only. This plan was revised, however, in accordance with the preceding description.

The engineers also designed the tunnel station as a kind of floating box. No dependence was placed on the per-

manent foundations to take care of the load, but the bearing power of the soft mud soil was figured at the small value of 1000 lb. to 1500 lb. per square foot and, in addition, the hydrostatic pressure at low tide. This quantity was approximately to balance the dead and live loads of the tunnel station plus superimposed dead and live loads of the station of the Public Service Railway. It was not only necessary to keep the bearing value within the allowable limit, but also to provide proper distribution of loading over the columns of the tunnel station. This condition required an unusual number of columns and made it difficult to arrange the tracks satisfactorily in the limited space and still provide for the large overhang of the new pay-as-you-enter trolley cars with stationary fenders and operating on short radius curves.

It was necessary to place grillage beams under a number of the columns and over the roof of the Hudson & Manhattan tunnel station to give a proper distribution of the load. The underlying columns of the Hudson & Manhattan station at the track level are 12 in. in diameter and of ample strength to take care of the proposed loading, but the columns of the concourse level of the tunnel station are only 7 in. in diameter and are strained up to full loading, especially in the capitals. Five of the concourse columns will be cut out and replaced by new 10-in. cast-iron columns, so that the loads will be safely supported.

The columns outside of the structure of the Hudson & Manhattan Railroad station are to be supported by reinforced concrete footings designed so that the soil bearing will be 1000 lb. per square foot. Moreover, it is necessary to provide for the overhang over Hudson Place for the elevated structure, and at the same time with the smallest obstruction possible on the sidewalk on the north side of Hudson Street in front of property not owned by the Public Service Railway. This accounts for the arrangement of 26-ft. girders forming a V and extending over Hudson Place. These are supported by a single rolled Bethlehem column, which in turn is held up by steel grillage and piles driven to bed rock.

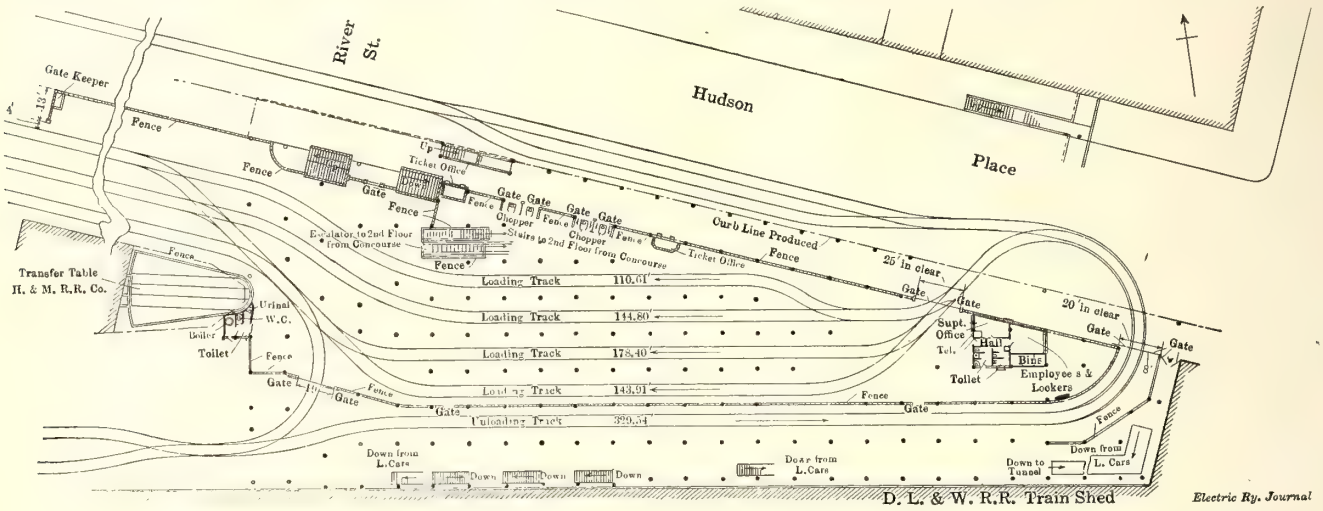


Fig. 3—Hoboken Terminal—Ground Floor Plan

All columns on the first floor are of Bethlehem H-shape, and Bethlehem girders and beams were liberally utilized throughout the design. Outside of the dead load of the structure the steel was designed to support a moving load of trolley cars in trains on all tracks with 5000 lb. on each of eight wheels, axles spaced 4 ft. 6 in., 14 ft. 6 in., 4 ft. 6 in., 20 ft. 6 in., 4 ft. 6 in., etc.

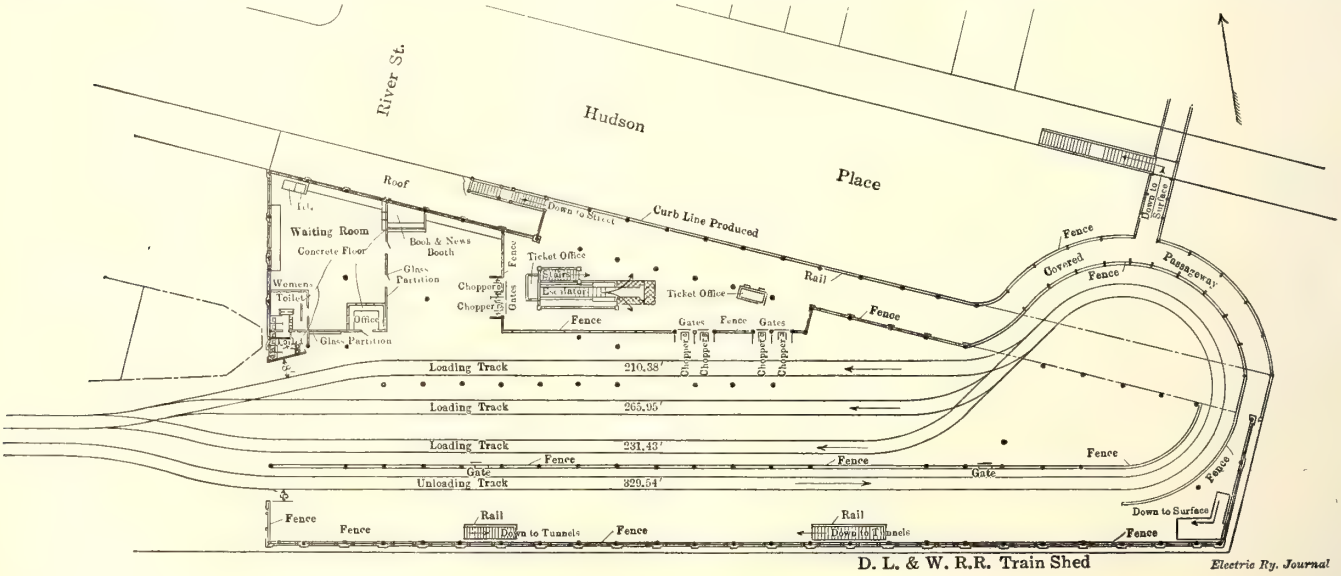


Fig. 4—Hoboken Terminal—Second Floor Plan

DETAILS OF CONSTRUCTION

The station proper is to have a structural steel frame with irregular sides 397 ft. x 373 ft. x 145 ft. x 53 ft.; the area of the first floor will be 43,767 sq. ft. and second floor 46,053 sq. ft. The floors and roof are to be of concrete reinforced with metal fabric and the bottom of the iron work

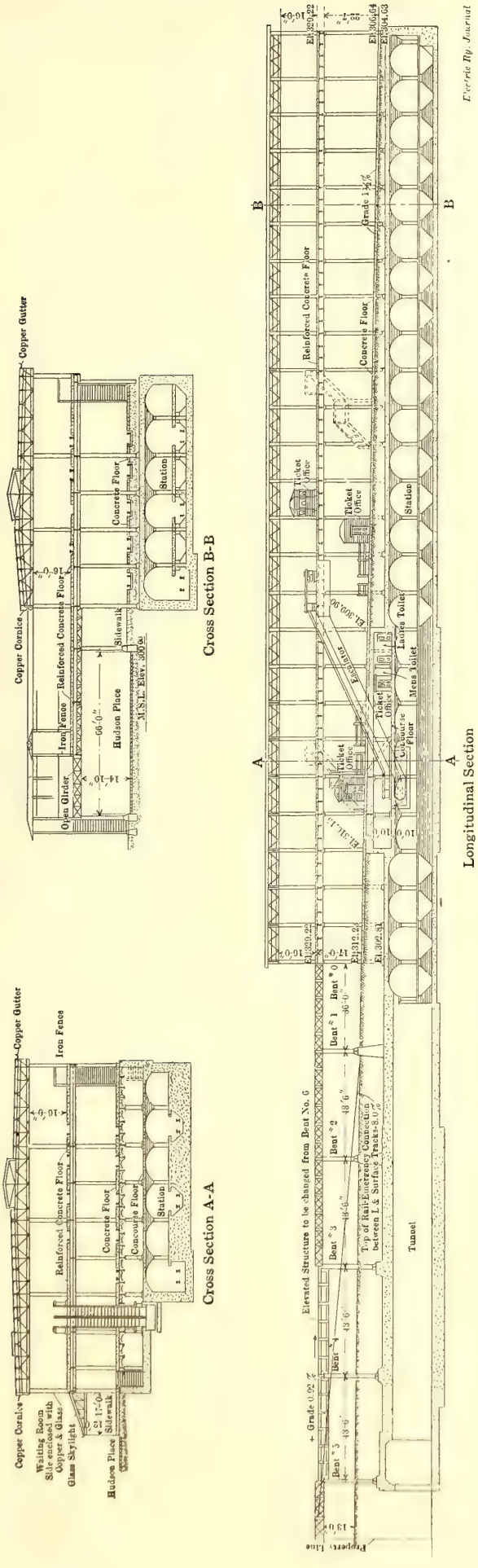


Fig. 5—Hoboken Terminal—Cross and Longitudinal Sections of Terminal Building

of the second floor is to be entirely encased in concrete. Heavy copper ornamental cornices are to extend around the building on the Hudson Street side and at the west and east ends. The lower floor will be open, but will have an ornamental steel fence with folding and sliding gates. There will be provided within the loop track a small employees' building with locker-room, stationmaster's office, toilets and bins. This building will be constructed of tile and plaster and with copper trimmings and metal sash. The heating plant for the second floor and the extra toilets for the trainmen are at the west end of the first floor. The Hudson Street side on the second floor and a portion of the west and east ends are to be inclosed with wire glass and copper. All sash are to be of hollow metal. The copper portion is to be composed of 18-oz. sheet copper except the ornamental work, which will be formed of 20-oz. sheets with a drop press or hammer.

A waiting-room of 2000 sq. ft. floor space is to be built on the second floor on the loading side, as shown in the drawings, and is to be equipped with toilets, retiring-room, news-stand and office. The news-stand is to have steel rolling shutters on the sides and front. The waiting-room is also to be of copper and glass. Each set of choppers provide for four entrances, as shown in Fig. 6.

The stairways are of ornamental cast iron fitted with safety treads and polished oak handrails over ornamental railings. All ticket offices are of a standard design, 10 ft. x 5 ft., inclosed with paneled-oak ground glass and copper bars. They are intended for two men and are fitted with a safe, change drawers and glass slabs.

The escalator operating from the concourse of the tunnel station to the elevated trains is to be a standard Otis type A with a rise of approximately 30 ft. and to be 4 ft. wide. It will be driven by a 500-volt, 35-hp motor geared so that the escalator will have a constant speed of 80 ft. per minute. There are to be provided emergency stops and safety devices to prevent the machine from running backward if current fails. The capacity of the escalator is guaranteed to be between 12,000 and 13,000 people per hour.

The skylights in the main roof and marquise will be constructed of copper, Anti-Pluvius puttiless type, with Mississippi wired maze glass in sheets 18 in. x 72 in. The employees' rooms, offices, toilets, etc., on the ground floor will be heated by an open-tank, hot-water system, in which the hot-water boiler is to be heated by gas.

The waiting-room, toilets and offices and news-stand on the second floor are to be heated from a boiler placed in the trainmen's toilet in the west end of the building on the ground floor. This installation will be of the two-pipe, low-pressure steam gravity-return system.

TRACK AND LINE WORK

All the straight rail on the ground floor is to be of open-hearth Lorain section, 114 lb., No. 393. In preparing the private right of way from Hudson to Washington Street it was necessary to demolish two three-story brick buildings. The buildings had 8-in. party walls and it was found advisable to reinforce the foundations. The walls were cleared of the old plaster, covered with a 1-in. coating of cement and supported by steel framing across one building to the other.

The special work for the complete layout was furnished by the Lorain Steel Company, of Johnstown, Pa. It is of 9-in. standard hardened center construction, except that in the west end of the terminal, including the loops, solid-cast manganese steel will be used. Tongue switches are

employed and the facing-point switches are arranged with lock boxes. The switches will be mechanically operated by the regular gatemen by means of levers and rods. The rail on the second floor of the structure is open-hearth, A. S. C. E., 80-lb. This special work is also hardened center except the portions at the loop, which are solid cast manganese steel having the running and guard rail bolted together with separators. The rails on the second floor are fastened to the steel framing with clips over 1-in. oak shims and will be paved in with wood block. The wood block is supported by reinforced concrete which is finished up flush with the top of the steel beams. This makes a very desirable arrangement on account of it not being necessary to remove any concrete when repairs or renewals are made to the joints. It is only necessary to remove the wood block paving to expose the steel.

The No. 00 trolley wire in the terminal will be fastened with barn hangers to troughing suspended to the iron work and fed so that the current may be conveniently cut out by sectional feeders. All light wiring will be done in open conduit on a 500-volt circuit using clusters of incandescent lamps with neat fixtures, all according to the underwriters' rules. Ample fire protection is also to be included. An auxiliary fire-alarm system will be installed with chemical extinguishers and water and sand pails.

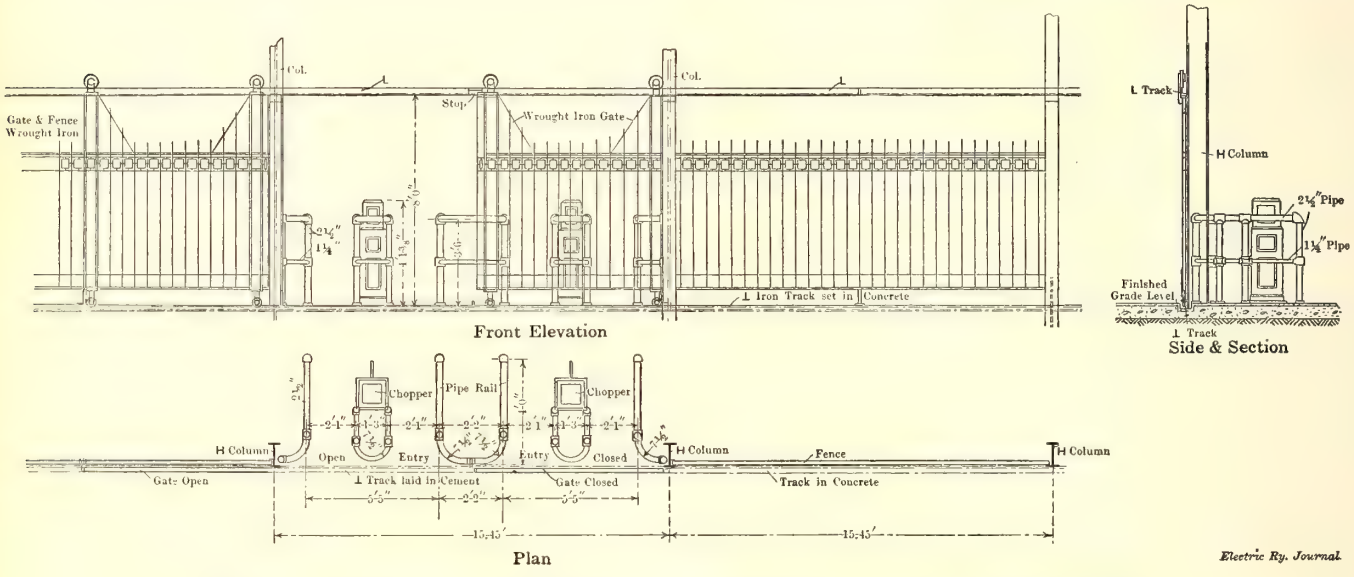


Fig. 6—Hoboken Terminal—Arrangement of Entrance Gates and Ticket Boxes

DESIGN

All the work was designed and will be executed under the supervision of the Public Service Railway Company's own engineers and under the direction of R. E. Danforth, general manager, and Geo. J. Roberts, first vice-president. Kennith Murchison, of New York City, was consulting architect and also laid out the cornices and ornamental work. J. V. Davies, deputy chief engineer, was representative for the Hudson & Manhattan Railroad Company.

All the steel and ornamental iron work was contracted for over six months ago with the Fagan Iron Works, Jersey City, N. J. The general contract, which calls for the remainder of the structure, excluding the track work, has been let to F. D. Hyde, New York.

A concession for an electric railway from Berne to Zollikofen, Switzerland, has been granted to a syndicate, which must complete the line within 18 months. It will be built to 1 meter gage and is estimated to cost $1,300,000.

OHIO ELECTRIC RAILWAY BENEFICIAL ASSOCIATION

The Ohio Electric Railway Beneficial Association was organized in 1907 under the auspices of the railway company whose name appears in the title. The plan of organization of this association is somewhat similar to that of the corresponding association for the benefit of the employees of the Cincinnati Traction Company. Both organizations have been successful from their inception. The older organization, which was formed for the benefit of the Cincinnati Traction Company's employees, has a membership now of over 1800 men and a cash balance in the treasury of above $60,000. The Ohio Electric Railway Beneficial Association started with the substantial sum of $10,000 in its treasury, a donation from the company. It has now a membership of over 1000 and a cash balance in the treasury in excess of $12,000.

Under the constitution of the Ohio Electric Railway Association no officer of the Ohio Electric Railway or subsidiary company is eligible to election to office in the various chapters. The officers of the chapters comprise the grand council, which directs the affairs of the association. The officers of the company, however, are members of the association, participating in its benefits. The present officers of the association are as follows: Grand president, Edward J. Kesler, motorman, Lima city lines; grand vice-president, Edward Hamilton, roadmaster, Newark, Ohio; grand vice-president, Olney Johnson, roadmaster at Medway, Ohio; grand vice-president, Charles Axline, cashier, of Zanesville, Ohio; grand secretary and treasurer, F. L. Boyer, ticket agent, Dayton, Ohio; sergeant-at-arms, G. Hachethorn, motorman, West Alexandria. The original chapters are six in number. They are named for the principal headquarters of the system, Hamilton, Dayton, Columbus, Newark, Zanesville and Lima.

An electric railway 10 miles long has been projected to connect Joinville, the principal trade center of the State of Santa Cathrina, Brazil, and Lake Sogaussu, an ocean harbor affording good anchorage for the largest vessels. All freight to and from Joinville is at present handled by barges from the port of San Francisco, but this is unsatisfactory, owing to the irregular depth of the river up which the barges are towed.

ROLLING STOCK STANDARDIZATION IN BROOKLYN—MANUFACTURE OF SUPPLIES

For the past three years the Brooklyn Rapid Transit Company has been manufacturing car supply parts through its mechanical department. Originally this work was undertaken to obtain the quicker delivery of material necessary to carry out the car standardization program, but it was soon discovered that certain items could be made at home for much less than the company had been accustomed to pay. Previous to 1906 some manufacturing had been done in a desultory way by the different shops, but there were no systematic records for ascertaining the actual costs. The growth of the manufacturing branch consequently involved the adoption of a record system to permit this work to be treated as a separate business, which had to be profitable or cease to exist. The result of this policy during the first fiscal year (June 30, 1907, to June 30, 1908) was a net profit of over $15,000 for home manufacturing.

The methods used by the mechanical department to determine whether the manufacture of a given item would be profitable or not are explained in the following paragraphs. In this case, it will be assumed that the item considered for manufacture is a brake-shoe hanger.

In the first place, the superintendent of equipment sends the form Fig. 1 to the foreman of either the Fifty-second Street surface or East New York elevated shop, requesting him to give the estimated labor and material costs of 100 brake-shoe hangers in accordance with blueprint No. 5104. If the department has not purchased the same item recently, Fig. 2 is sent to the purchasing agent, embodying a request for the manufacturers' price on this design of brake hanger. Should the data supplied by the purchasing agent show a difference in favor of home manufacture, Fig. 3 is filled out for the general storekeeper, to advise him that the article can be made at home for less money, and the recommendation is added that future orders be placed with the mechanical department. Fig. 3 is made out in triplicate, as copies are kept by the general storekeeper, the purchasing agent and the mechanical department.

Whenever the general storekeeper is in need of any of these brake-shoe hangers, he forwards a requisition to the mechanical department on Fig. 4. This form shows the

MECHANICAL DEPARTMENT.

NO. 205. June 20, 1908.

Foreman East. Div. L, Shop.

Dear Sir:—
Please fill in the blank spaces below and return, giving your estimated cost of making the material listed therein, regardless of the cost of making tools, etc.

Yours truly,

(Sgd.) ————————,

Supt. of Equipment.

Amount.	Description.	Est. Cost, Material.	Est. Cost of Labor.	Total.	Remarks.
100	Brake shoe hangers.....	$18.80	$28.70	$47.50	BP No. 5104

(Signed) ————————,

Foreman East. Div. L. Shop.

Fig. 1—Brooklyn Manufacturing—Shop Foreman's Estimate of Cost

MECHANICAL DEPARTMENT.

July 1, 1909.

To the General Storekeeper:—
We believe that the following Standard Material can be manufactured by this Department more cheaply than it can be purchased from Manufacturers, and recommend that you place future orders with this Department.

Description.	Standard		Shop Estimate.			Manufacture Cost.	Purch. Agt's Bid No.	Average Monthly Consumption.	Remarks.
	Class.	Sheet.	Mat'l	Labor.	Total.				
Brake shoe hangers, BP No. 5104..	0	23	$.188	$.287	$.475	$1.00	13/93	40	.....

Original, Duplicate and Triplicate to General Storekeeper who will send Duplicate to Purchasing Agent and Triplicate to Mechanical Department.

(Sgd.) ————————, General Storekeeper.

(Sgd.) ————————, Supt. of Equipment. NO. 205.

Fig. 3—Brooklyn Manufacturing—Notification to the General Storekeeper that Certain Items Can Be Made at a Profit

OFFICE OF SUPERINTENDENT OF EQUIPMENT.

Date, July 1, 1908.

Purchasing Agent:—
We intend manufacturing the following material in our own shops and desire manufacturers' prices.
Will you please enter same below and return to writer?
Duplicate copy herewith for your file.

Quantity.	Description.	Cost, Each	Bid, Number,	Bid, Date.	Remarks.
100	Brake shoe hangers....	$1.00	13/93	8/06	BP No. 5104

(Sgd.) ————————,

Supt. of Equipment.

Fig. 2—Brooklyn Manufacturing—Requisition on Purchasing Agent for Comparative Prices

stock on hand, the estimated quantity to be used in three months and the number of hangers wanted. The part thus called for on the storekeeper's requisition could not be supplied formerly until an authorization had been secured from the general manager in each case. This multiplication of labor is now avoided by the adoption of the blanket authorization form Fig. 5. This is accompanied by the raw material requisition, Fig. 6, which must be approved. Fig. 7 is the formal order on the storeroom for the raw material required on Fig. 6.

TRANSIT DEVELOPMENT COMPANY.

Requisition for Supplies to be Manufactured by the Mechanical Department and delivered to 52d Street Storeroom.

NO. 94. July 5, 1909.

Description	Stock on Hand.	3 Months' Issues.	Quantity Required.
Brake Shoe Hangers, B.P., No. 5104.....	37	118	100

(Sgd.) ————————,

General Storekeeper.

Original to Mechanical Department.
Duplicate and Triplicate to General Storekeeper.

Fig. 4—Brooklyn Manufacturing—Storekeeper's Requisition for Material to Be Manufactured

The superintendent's order on the shop foreman to proceed with a given job is shown in Fig. 8. This order is on the same sheet with Fig. 9, which is a labor and material form returned by the shop foreman on the completion of the work. It will be noted that in this case there was enough material to make 102 instead of 100 hangers, and use of tools, etc. A further addition is made to the cost of all home manufactures by changing this account with the cost of tools bought especially for manufacturing purposes. Thus the account for June 30, 1907, to June 30, 1908, the first year of this department, reads as follows: Total manufacturers' price for articles on 212 authorizations,

Supplies Required at EASTERN DIVISION ELEVATED SHOP.

Do not write on this side. Space is for use of General Storeroom. Articles not standard stock must be entered on Special Form N. S. 169 A (buff color)

Date July 2, 1909.

Quality Required.	Unit.	Description of Article.	Estimated Cost	52nd St.	Gillen	39th St.	Dock	Nostrand	Bldg.	REMARKS	Quantity	Number

REQUIRED ON MANUFACTURED MATERIAL REQUEST, NO. 2904-S.

75 lin. ft. 7/8 x 3 Burden's best iron. $18.80

Required to make 100 brake shoe hangers, B.P., No. 5104.

Approved: Total..... $18.80

....

Ass't Gen'l Manager .....

Head of Department

..... General Manager Request No. 2904 S. Authorization No. 07154

Items must be entered double typewriter spacing
This Requisition must be submitted in *Triplicate.*

Fig. 6—Brooklyn Manufacturing—Detail of Request Accompanying Fig. 5

that the cost was slightly below the original estimate. The figures for labor and material are added at the main office in accordance with data supplied every week by the comptroller. Fig. 10 shows the report sent to the comptroller and general manager as notification that the given requisition has been completed. The manufactured material is turned over to the storekeeper with Fig. 11. On this form the mechanical department takes credit for the entire cost of the articles, and the storekeeper is debited for the same amount.

AUTHORIZATION TO PROCEED WITH WORK.

This form to be made out to cover any work to be done of an extraordinary repair character or for additions or betterments, changes in Equipment, Track, Line, Buildings, etc., and for all new work of any description.

Mechanical
Dept. No. 2904-S. Auth. No. O, 7154. Appropriation No.....

July 1, 1909.

"MISCELLANEOUS"

MANUFACTURE BRAKE SHOE HANGERS, BLUE PRINT NO. 5104.

Mr. J. F. Calderwood,
Vice-Pres. and Gen. Mgr.,
Transit Development Company.

Dear Sir:—

From time to time we will receive from the General Storekeeper Requisitions for brake shoe hangers, BP, No. 5104.

In order that future requisitions for this material may be promptly filled it is proposed to charge against the authorization number assigned this request, the cost of manufacturing such parts from the present date to and including June 30, 1910, simply requisitioning for the necessary material each time an order is received from the general storekeeper for a quantity of these parts.

We now have on hand Gen. Storekeeper's Req. No. 94, dated July 1, 1909, for 100 brake shoe hangers. It is estimated that this quantity, based on previous consumption, will cover his requirements for three months.

These hangers, if purchased from outside manufacturers would cost $1.00 each (P.A. Bid No. 13/93), while we estimate making our own at the Eastern Division Elevated Shop for 47½c. each.

Manftr's cost, $1.00. Date, ...
Pur. Dept. Bid. No. 13/93. Date, 8/06.

This request will be charged to Maintenance.

Signed:

....
....
....
Comptroller. Supt. of Equipment.

Approved
(Sgd.) .....
Vice-Pres't and Gen'l Mgr.
(Sgd.) .....
President.

Recommended:
.....
.....
.....

Fig. 5—Brooklyn Manufacturing—Original Authorization to Manufacture

A record of all items manufactured is kept in a loose-leaf book with the headings shown in Fig. 12. It will be noted that in giving the home and manufacturer's unit costs for a given quantity the home cost is the sum of the labor and material charges plus 15 per cent for superintendence, \$34,630.90; actual cost plus 15 per cent, \$17,962.06; gross profits, \$16,668.84; deduction for one-half the cost of special tools bought during the fiscal year, \$1,503.03; net profits, \$15,165.68. The figures for the nine months from

STOREROOM ORDER. GILLEN PLACE STOREROOM.

Date..July 12, 1909.

Supplies chargeable to one account only to appear on same order.

Book No. 3008 Order No. 50

Quantity	Unit	Description.	Bin No.	Price Amount
75	Ft.	7/8 in. x 3 ins. B. B. Iron 626 Lbs.		18.90

Will not be received if account is not shown.
Spoiled orders must be turned in.

..... Total.....
Foreman.

Account No. 270 M. S. O. No...Request No..Authorization No. 07154

Fig. 7—Brooklyn Manufacturing—Order on Storeroom for Raw Material

July 1, 1908, to March 31, 1909, are as follows: Total manufacturers' cost for articles on 280 authorizations, \$29,484.21; actual cost plus 15 per cent, \$15,538.67; gross profits, \$14,145.54. When the end of the fiscal year is

Autho. No. 07154.
Request No. 2904-S.

REQUEST WORK COMPLETED

To the Comptroller:

Date July 14, 1909.

Autho. No. 07154.

All work covered by Request No. 2904-S has been completed. Final labor and material charges will appear on distribution for week ending March 11, 1909.

Labor and materials other than that furnished by the Company were supplied by

.....
.....

final bill for which was passed by me..... 190..

(Sgd.)—————
Foreman.
East. Div. L. Shop.

Approved:

(Sgd.)—————
Supt. of Equipment.

Labor started: Feb. 18, 1909.
Labor completed: Mar. 10, 1909.

Report on this form must be made in connection with the completion of each Request.

Fig. 10—Brooklyn Manufacturing—Report to Controller on Completion of Manufacturing Authorization

reached there will be subtracted from the gross profits, the other half of the cost of the special tools for the first year plus 50 per cent of the cost of special tools bought during the second year. It is expected that the net profit for this year will exceed that of the preceding year. The charges

against the special tool account are naturally higher now than they will be in the future as it was necessary to buy quite a number of new machines.

The following are some of the items of stock which are now being manufactured by the mechanical department and marked with the B. R. T. monogram, exclusive of work done on special machine-shop orders for other departments which is not included in the manufacturing account:

Trolley parts: Axles, harps, shunts, washers, stands.

Controller Parts: Contact fingers, finger bases, finger sockets, cylinder segments, cylinder tips, contact strips, connectors.

Truck Parts: All special bolts, forged journal box covers, brake-shoe keys, brake-shoe hangers, brake pins.

Motor Parts: Armature bearings, armature commutators, brush holders, brush-holder shunts, brush-holder levers, brush-holder links.

Air-brake Parts: Commutators for armatures, contacts, tips, armature bearings, insulating bushings, contact fingers.

Resistance Parts: Terminals and connectors.

MECHANICAL DEPARTMENT.

Foreman East. Div. L. Shop. July 10, 1909

Dear Sir:

Please proceed to make up and deliver, as soon as possible, to the 52d St. Storeroom, acct. General Storekeeper's Requisition No. 94, dated July 1, 1909,

100 Brake shoe hangers, B. P. No. 5104,

charging all labor employed and material drawn against Autho. No. 07154 (crediting the authorization with any surplus or scrap material), and upon completion of work detach and send to this office the lower portion of this blank properly filled in with information desired.

Yours truly,

(Sgd.)_____
Supt. of Equipment.

E. N. Y. Shop,
July 12, 1909.

Supt. of Equipment.

Dear Sir:

For the information of the Inspector of Manufactured Material, I give below a list of material charged against and credited to Autho. No. 07154, covering the manufacture of

100 Brake shoe hangers, B. P. No. 5104,

completed at East. Div. L. Shop, on July 12, 1909, acct. General Storekeeper, Req. No. 94.

Date.	Book.	Order.	Material.	
2/18/09	3008	50	75 ft. ⅞ in. x 3 ins. Burden's best iron (626 lb.)	$18.90
			Labor	23.35
				$42.25
			Made 102 hangers @ 41 2/5 cts.	$42.22

(Sgd.)_____
Foreman East. Div. L. Shop.

Figs. 8 and 9—Brooklyn Manufacturing—Order to Shop Foreman and Detail of Labor and Material Cost

UNUSED MATERIAL REPORT

Mechanical Dept. Date July 14, 1909.

Material described below drawn from stock, or purchased, for work covered by respective Authorizations given below has been turned into stock at 52d St. Storeroom.

DESCRIPTION { Brake shoe hangers, B. P. No. 5104

CREDIT

Autho.	Account	Quantity	Price	Quantity	Price	Amount
	270	102	41.4c			$42.22
Total Value		102	41.4c			$42.22

ORIGINAL

By (Sgd.)_____
Foreman
Eastern Div. L. Shop

Received and Charged to Stock, Month of July 15, 1909

(Sgd.)_____
General Storekeeper

Statement No.....

TO BE MADE IN QUADRUPLICATE

Original and Duplicate sent to Storekeeper. Triplicate to be retained by Employee making report. Original, when priced, to be forwarded to Comptroller. Quadruplicate to be forwarded to Head of Department.

Fig. 11—Brooklyn Manufacturing—Manufactured Item Turned into Stock

MECHANICAL DEPARTMENT
RECORD OF MANUFACTURED MATERIAL

Authorization Number	Date	Article	Requested Quantity	Requested Unit	Man'f'd Quantity	Man'f'd Unit	Total Actual cost	Total Cost With 15% Added	Manufacturer's Price for Same Quantity	Variation in Total Cost between Manufacturer's Price and Our Cost with 15 Per Cent. Added. Decrease	Variation in Total Cost between Manufacturer's Price and Our Cost with 15 Per Cent. Added. Increase	Mnfr's Unit Price	Our Unit Price	Date Work Started	Date Work Completed	Remarks
07154	July 11, '09	Brake shoe hangers, B. P. No. 5104	100	Ea.	102	Ea.	$42.25	$48.58	$102.00		$53.42	$1.00	47.6c	2/18 '09	3/10 '09	

Fig. 12—Brooklyn Manufacturing—History of a Manufactured Item Kept in Loose-Leaf Record Book

MECHANICAL DEPARTMENT

April 16, 1909

General Storekeeper.

Dear Sir:—

This department will discontinue the manufacture of the following standard material and future requirements should be requisitioned by you on the Purchasing Agent:

Description.	Standard Class.	Standard Sheet.	Last Made G. S. Req.	Last Made Auto. No.
Bulkhead sash catch, BP, No. 5306-F	W	2	107	07349
Bell cord pulleys, complete, No. 16, BP, No. 1480	W	12	71	06848

(Sgd.) ....., Supt. of Equipment.

(Sgd.) ....., General Storekeeper.

Original, Duplicate and Triplicate to General Storekeeper who will send Duplicate to Purchasing Agent; Triplicate to Mechanical Department.

NO. 68.

Fig. 13—Brooklyn Manufacturing—Notification to Storekeeper that Unprofitable Manufacture has been Discontinued

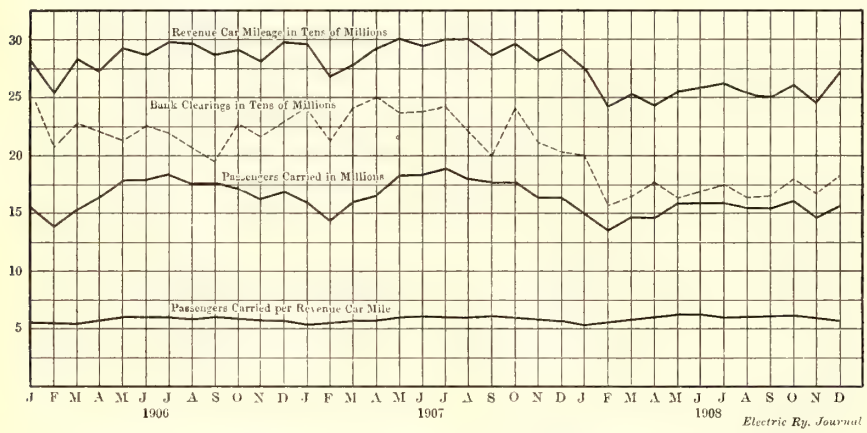
Fig. 13 shows the form used by the mechanical department to notify the general storekeeper that certain items will no longer be manufactured as they can be purchased for less money in the open market than the home cost plus the usual 15 per cent. After the receipt of this form the storekeeper sends his orders through the purchasing agent until such time as it is found profitable to return to manufacturing.

The First National Conservation Congress of the United States will be held in the Auditorium of the Alaska-Yukon-Pacific Exposition, at Seattle, Wash., on Aug. 26, 27, 28, 1909. The Congress will be under the direction of the Washington Conservation Association, an organization comprising several hundred prominent men of the State. It is planned to invite President Taft and members of his cabinet to be present at the meeting.

REPORT ON TRAFFIC CONDITIONS IN PITTSBURGH

Brief mention has been made in previous issues of the Electric Railway Journal regarding the report on traffic conditions of the Pittsburgh Railways Company, made by Stone & Webster, of Boston, at the request of the Pennsylvania State Railroad Commission.

The complete report upon this subject is an extensive study of the difficult traffic conditions which finally led the State Commission to make an investigation. A supplementary report is given on traffic conditions in Ingram Borough, Allegheny County, Pa. The report is illustrated with 250 curves, several of which are reproduced herewith. Stone & Webster were informed by the commission that Mayor Guthrie, acting under a resolution passed by the Common Council of Pittsburgh, complained about the bad sanitary condition of the electric cars, and requested the board to make an investigation of the subject. The commission instructed the engineers, however, to make a more comprehensive investigation, reporting "upon the crowding of cars and the congestion in the business district, particularly at the rush hours during the evening; to investigate also the operating conditions upon the more severe grades and to inform you of all these matters, having due regard for the various factors of economy, safety and practicability." The attention of the engineers was therefore confined largely to the rush hours in the business district, although the entire situation was investigated superficially.



Pittsburgh Report—Comparison of Total Car-Miles, Bank Clearances, Passengers Carried and Passengers Carried Per Revenue Car-Mile

Indicating the difficulties in the way of rapid movement of traffic, resulting from the topographical situation of the business district, it is stated:

The business portion of the city of Pittsburgh is confined to a nearly level area at the top of a peninsula formed by the junction of the Allegheny and Monongahela Rivers. The retail, wholesale, banking, and, in fact, all of the business of the city except manufacturing, which is carried on by a population of nearly 750,000, is transacted in an area of about one-half of a square mile. The entire population of the city lies outside of this district. Extending to Allegheny, across the river from the terminal district, there are four bridges, two of which get most of the travel. To the South Side, across the Monongahela River, there are two bridges, but one takes by far the greater portion of the travel.

The residential parts of the city are on hills or bluffs, or, rather, on a series of terraces. To reach these districts streets have been laid out, which are, of necessity, steep, narrow and crooked, and might in some cases almost be termed corkscrews.

In regard to general operating conditions, the report says in part:

The peninsula type of the city is recognized by students of transportation problems to be the most difficult to serve satisfactorily.

In some ways these natural conditions are exaggerated in Pittsburgh. The business district is very much congested; the various department stores, shops and offices close at more nearly the same period than they do in New York.

The streets in Pittsburgh are narrow and the curves sharp. The grades over which the cars operate are severe, running frequently from 6 to 12 per cent, and in one or two instances 14 per cent. The size and number of the bridges leading out of the city also limit to a degree the operation of the cars.

The tracks of the company are 5 ft. 2½ in. gage. In the city proper a girder rail with a heavy tram head is used. All the teamsters use the broad, smooth tram head to truck on in preference to the rough, cobble-paved streets.

Several of the lines leaving the terminal district run through mill districts before reaching the suburban territory, so that it is not uncommon to find crowded into the same car daintily dressed shoppers and mechanics coming direct from the mills, covered with the day's accumulation of grime and perspiration. Good ventilation under these conditions is difficult to maintain. Light dresses and other clothing are often ruined in the crowded cars. While, of course, one class has just as good a right to ride as the other, the problem of handling them simultaneously and satisfactorily requires of the company special care and necessarily entails the furnishing of more cars than on lines where people of only one class travel. For service in these districts we believe that wood or cane seats are more sanitary than plush or upholstered, and the seats, if properly fashioned, would be fully as comfortable. There is opportunity for improvement in the present method of heating and ventilation.

Delays at steam crossings are frequent, and, in most cases, we believe unnecessary. This is apparently caused by the carelessness or wilfulness of the freight conductors or engineers.

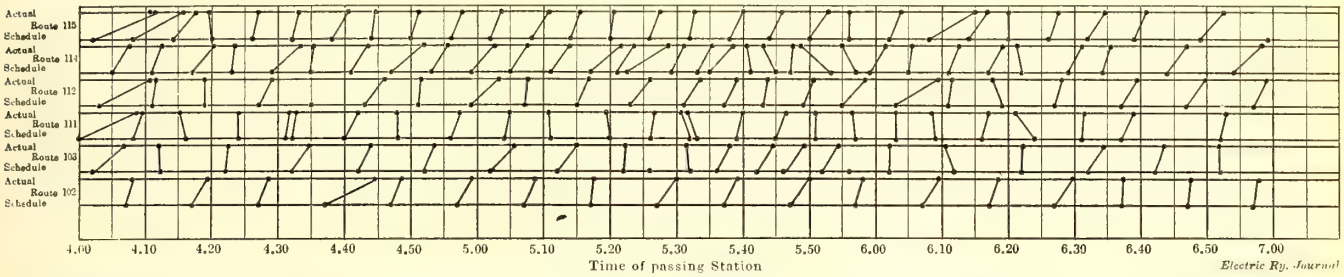
Observations were made to determine the passengers carried per car on each of the nine trunk lines leading from the terminal district of the city. Two observers were placed at certain points on each line and observations were made between the hours of 4 and 7 p. m. on Jan. 7, 8, 9 and 11, providing the following data for each outbound car: Time car should pass according to schedule; time car actually passed; seating capacity of car; passengers seated and passengers standing. These results were plotted for each separate route.

In investigating the subject of operating schedules an examination was made of the company's files to show each change in the rush period between 4 and 7 p. m. since 1905. A detailed study of these tables revealed that on some routes cars had been taken off and on others cars had been added. The net result, however, was reduction of service.

During the two years preceding the observations there had been a decided falling off in the population of the city, estimated at from 10,000 to 75,000 people, so that it would appear that if the company was furnishing adequate service in 1907 some cut would be justified.

In taking up the subject of passengers carried and seats furnished, data as to the number of passengers per hour were obtained from the reports of the company. From these capacity of the cars and the number operated in each hour were obtained from the reports of the company. From this data the number of seats furnished in each hour was figured. Two dates, Dec. 7, 1908, and Jan. 7, 1909, between 4 p. m. and 7 p. m., were selected at random for this computation. In presenting the tables, Stone & Webster say:

No final conclusion should be drawn from the tables because they show average operating conditions for the various hours in which it is entirely possible that violent fluctuations have occurred. The curves must be taken as showing tendencies only; they are not actual, and would only be correct on the assumption that every passenger rode for one hour. As a matter of fact, most of the passengers are carried only short distances, and two, or even three, passengers may have made use of the same seat during the specified hour. The curves give a general idea of the relation between the seats furnished and the passengers carried on the whole system during the 24 hours of the day. They indicate that for the system as a whole the seating capacity, except during a short period of the morning and evening known as the rush hours, is entirely adequate for the present amount of travel. They also bring out very clearly that the outward peak in the evening is greater than the inward peak in the morning; that it is the period from 4 p. m. to 6 p. m. which taxes the company to its utmost capacity.



Pittsburgh Report—Method of Graphically Showing a Comparison of Actual Schedule Times. Readings Taken at Sixth Avenue Bridge, Allegheny Division Loop, on Jan. 7

In commenting on the curves indicating the average density of traffic on each line, and the loading and handling of cars during the rush hours, the report says:

The company can hardly be expected to provide seating capacity for the erratic peaks coming at irregular intervals and of short duration. The long peaks, however, can be handled by additional cars or trippers, but as such short-hour mileage is more expensive to handle, and because of the physical impossibility to get cars in the proper position, it cannot be increased in direct proportion to momentary increases of travel. Again, the excessive use of trippers tends to delay operation of the regular scheduled cars and adds other difficulties. It is common practice in many cities to hold in reserve extra tripper cars at points where they may be fed into the system so as to pick up the excess traffic where it appears. But, owing to the congestion of the business district of Pittsburgh, it is practically impossible to provide such storage at the city end of the lines to handle the outward-bound evening rush.

As far as we can tell without a more detailed study than the scope of this investigation permits, the present operating schedules are sufficient for handling the traffic, provided the regular schedules are properly adhered to and sufficient trippers are run during the rush hours. While trippers are now used on a number of lines, we believe that the congestion during rush hours on certain lines warrants an increase in this form of service.

Trailers are used effectively on a number of the lines to relieve the congestion during the peaks, but as they are slower to load and unload and more difficult to handle safely than trippers, we do not believe that they should be relied upon for further relief. On many lines service could be much better handled with long double-truck cars, in place of the motor cars and trailers now in use.

The company is, of course, buying no more 20-ft. cars, and the type of car it is purchasing is apparently a most satisfactory one. The old short cars should be relegated as fast as finances will permit.

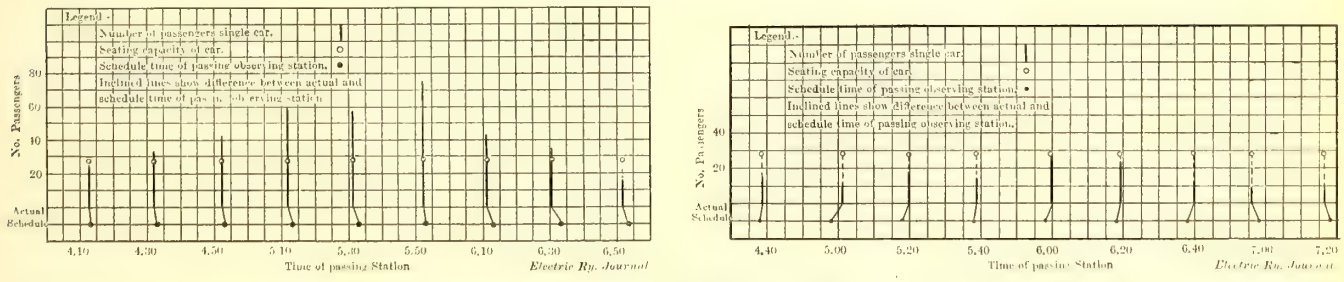
The report states that analysis of car headway and loading shows on various routes another cause of excessive over-crowding of individual cars, in irregularity of operation.

The report adds that the company is not entirely to blame for the delays. Vehicles, traffic and grade-crossings are sources of considerable annoyance. Delays at crossings with steam roads are stated to be serious and should be greatly reduced.

In discussing the subject of heating and ventilation, the report says:

The company uses a large number of electric track brakes. These are so arranged that the motors on the cars act, during the process of stopping, as dynamos, and the current generated by them is used to energize the track brakes. A certain amount of dead resistance is also necessary to prevent too sudden application of these brakes.

The company has arranged this resistance in two sets, one of which is inside the car and is used for heating. No current flows through this resistance except when the brakes are being applied. Ascending long heavy grades there is no heat going into the cars; going down the same grade the cars are overheated. There is apparently no means of regulating the heat. It is either all on the car or all off. A method of partial regulation has been suggested by the engineers of the company, but up to the present time it has not been installed.



Pittsburgh Report—Analysis of Car Headway and Loading, Grafton and Ingram Route, West End Division—First Readings Taken at Noble Avenue and Steubenville Pike, Second at Point Bridge. These Diagrams Show that Overcrowding was Due to Use of Through Cars by Local Traffic in Downtown District

In discussing the subject of grades, brakes and derailing switches, the report says in part:

For the safe operation of cars, a few salient points must be considered.

The braking equipment (1) must be adequate; (2) it must be thoroughly inspected; (3) it must be intelligently used; (4) derailing switches must be properly located, and (5) arranged to stop runaway cars without injury.

The 18 to 20-ft. body single-truck motor cars of the company, weighing about 12 to 13 tons, have ordinary hand-brakes and Westinghouse magnetic brakes. It is this type of car which has been operated over the routes having the severest grades.

One hundred cars have 30-ft. bodies and weigh about 18 tons. These are equipped with ordinary hand-brakes and Westinghouse magnetic brakes.

There are 99 cars having bodies 21 ft. 9 in. long, weighing, approximately, 20 tons, and equipped with hand-brakes and Westinghouse air-brake equipments. There are also about 100 cars of the latter class and 10 Ardmore cars having 30 ft. 8 in. bodies, which weigh, approximately, 21 tons.

More recently there have been installed, approximately, 50 cars with 31-ft. 8-in. bodies, and weighing, approximately, 25 tons.

These two latter classes of cars and the Ardmore cars are equipped with hand-brakes and Westinghouse air brakes.

It seems to be the present policy of the company, for rolling stock additions, to purchase only double-truck cars and to equip them with hand and air brakes, and to buy no more magnetic brakes. We understand also that the company intends to continue the use of the magnetic brake on its single-truck cars, although making no additional purchases except for repairs.

The magnetic brakes now used on the Pittsburgh Railways Company's lines, we are told, were installed some 15 years ago and have been in constant service, and are still in fair operating condition and giving satisfactory results.

Retardation of the car when the magnetic track brake is applied is accomplished by three separate factors:

1. The retarding effect of the motors, which are changed into generators during the braking periods.
2. The drag of the magnetic brakes used on the track.
3. The magnetic shoe drag acting through a system of levers on the brake shoes, pressing them against the wheels.

A series of tests made by the company seems to indicate that about 70 per cent of the total retarding effect when magnetic brakes are used is the action of the motors changed to generators, the remaining 30 per cent being divided about equally between the drag of the magnetic brake shoes on the track and the pressure of the wheel-brake shoes on the wheels. This fact being known by the operating men has brought about a tendency to keep in operation cars upon which the magnetic brake coils are short circuited, so that the last two factors enumerated above are not utilized, the entire braking being brought about by the changing of motors into generators.

It is our belief that double-truck cars, such as are now being operated on the lines of the Pittsburgh Railways Company, can be successfully operated on any of the routes having severe grades, over which single-truck cars are now run. These double-truck cars should be equipped with strong hand brakes, preferably of the geared type, together with either the latest form of magnetic brake or standard air-brake equipment. They should also be equipped with efficient sanding devices, the sand boxes holding a plentiful supply of loose, dry, sharp sand at all times.

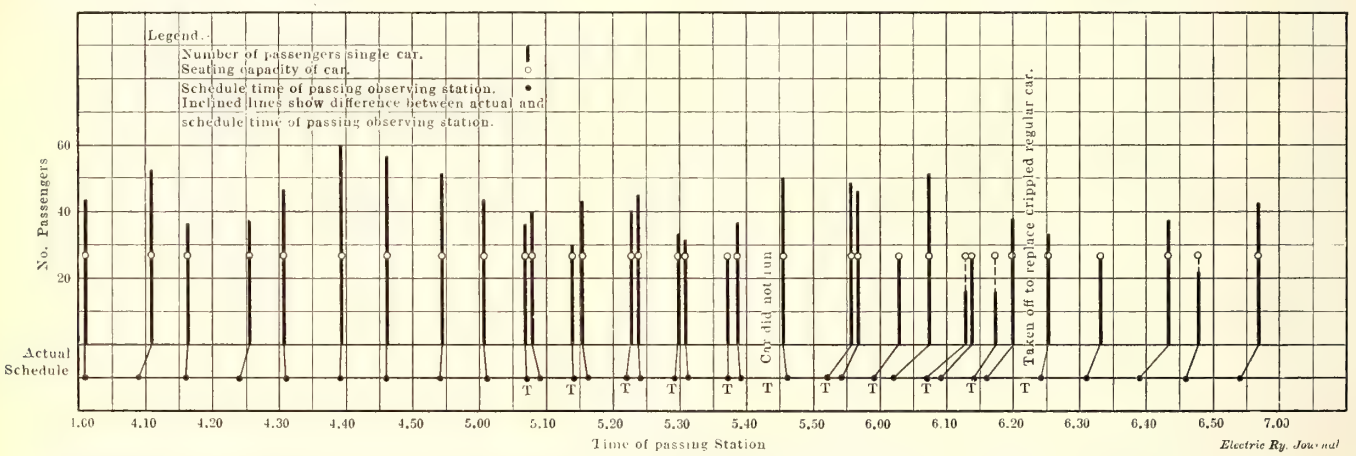
At certain times of the year fallen leaves and frost reduce the coefficient of friction between wheel and track probably as much as 50 per cent from normal conditions. It is necessary, under such conditions, that men should be sent out to clean and sand the tracks on the steep grades. We understand that motormen are directed to descend all grades using only the hand brake at the start. While we believe that this is a wise regulation, we would recommend that the motormen be carefully instructed in what to do when the wheels commence to slip. It is not safe to allow motormen to rely upon their own judgment as to what to do in an emergency.

The company seems to have given considerable attention to the installation of derailing switches, and for the most part we believe these are wisely placed and should be the means of promptly stopping runaway cars.

In its summary and conclusion, the report says in part:

The operating conditions in Pittsburgh and its suburbs are particularly severe, owing, primarily, to the topography of the country, the location of the business district of the city proper between two broad rivers on a comparatively narrow neck of land running to a point at their confluence, and the necessity for transporting to and from this comparatively small area morning and evening the great number of citizens whose business or employment is there situated; and this must be done in a short interval at each end of the day, commonly called the "rush hours."

The "Terminal District," so called, lies between the two rivers and extends from the "Point" to the Pennsylvania Railroad tunnel and Tenth Street at the Union Depot. Sixty street-car routes, with headways varying from one hour to two minutes, are operated into and out of this district and either "dead-ended" or looped therein.



Pittsburgh Report—Analysis of Car Headway and Loading, Elliott and Sheridan Route, West End Division, Readings Taken at Point Bridge Jan. 9. Shows Early Rush Traffic on Saturday Afternoon

The bridge approaches to this district in some instances are inadequate for the great volume of vehicular and street car traffic which must use them, and vexatious delays, disturbing to schedules, are of constant occurrence.

The outlying sections served by the street railways are extremely hilly, necessitating the negotiation by the cars and vehicles of severe grades and curves, and the majority of the streets are narrow, thus causing constant interference between the two classes of traffic. In many places, on bridges and streets where double tracks are maintained, the space between the tracks is too narrow, and in other places clearance on right-hand side of cars in running direction is inadequate and dangerous.

The physical condition of tracks, overhead construction and rolling-stock equipment, as observed, is excellent and well maintained. The tracks are of 5-ft. 2½-in. gage, of mostly heavy tram girder rail, well laid and paved. The combination of the wide gage and the broad tram of the rail is particularly inviting to the drivers of heavy, slow-moving vehicles, as it offers the acme of condition for easy haulage. The overhead construction is substantial and well maintained.

The rolling-stock equipment is, in general, adequate, maintained in good condition and kept clean. It is mixed as to size and equipment, the severe grades and narrow

clearances on many routes requiring the use of a large number of single-truck cars. All cars are supplied with motors of ample capacity, and with suitable hand, air or magnetic brakes, depending on the service to be performed.

Some of the shorter cars are poorly lighted, and, in general, the practice seems to be to overheat, more noticeable at the rush hours, when less heat, or none at all, is needed in average winter weather.

The "pay-as-you-enter" principle has been applied to a number of double-truck cars of the ordinary pattern, and owing to the small size of the entering platform, considerable delay is occasioned during rush hours in loading passengers on the downtown loops.

At crossings of steam railroads at grade, daily operating reports show numerous, and in many instances excessive, delays due to the occupation of these crossings by steam-railroad freights, either in passing or switching operations. These delays disarrange street-car schedules, bunch cars and cause patrons delay and inconvenience, and the company expense and criticism.

We found that motormen on loop routes in the Terminal District were obliged in many cases to throw the switches themselves, where, if electric switches had been used or switchmen stationed during rush hours, the service would have been bettered.

We observe little attempt at police regulation of street traffic, and found no adequate or comprehensive city ordinances on this subject. We secured a copy of an old State law, passed in 1845, which purports to prevent the blocking of street crossings by steam railroads, but which, apparently, is never enforced.

were cut down to meet this condition. Only recently has there been an improvement in business conditions, and to meet this some additional cars and mileage have been restored.

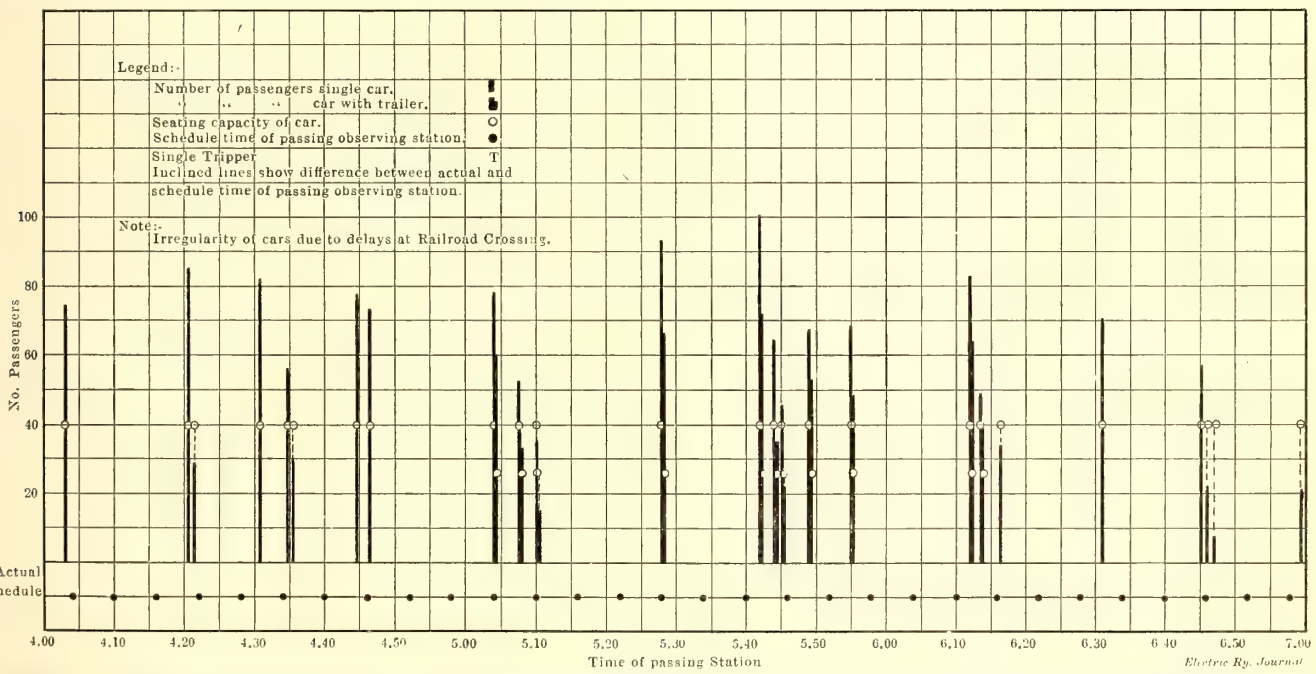
Some three years ago the company spent much time and money in an exhaustive study of traffic conditions, routing of lines, headway of cars, etc., and, as a result, many changes were made which worked a decided improvement in the service and the convenience of its patrons. The system of loops and terminals in the Terminal District then adopted is still in use, and appears to us to be the best obtainable under present conditions.

In general, we believe that co-operation between local municipal and borough officials and the company would result in the removal of some, at least, of the onerous conditions under which the service is now being performed.

The recommendations of Stone & Webster were published in the ELECTRIC RAILWAY JOURNAL for March 20, 1909, page 528.

ADVERTISING THE CLAIM DEPARTMENT

Ellis C. Carpenter, claim adjuster of the Indiana Union Traction Company, Anderson, Ind., is a firm believer in advertising. In the July issue of the *Indiana Union Traction System Magazine,* Mr. Carpenter uses some space in calling the attention of the public to the fact that people who meet with an accident on the company's lines will be



Pittsburgh Report—Analysis of Car Headway and Loading on Liberty Avenue, Homewood Division, Readings Taken Jan. 11, at Corner of Liberty Avenue and Eleventh Street. Shows Bunching, Owing to Bad External Conditions and Railroad Crossing Delays

Car operatives coming under our observation seemed well trained and careful in handling the cars under the severe conditions before noted. Rules and regulations governing the duties of operatives and other employees were examined and found to be adequate and explicit.

Safety or derailing switches were observed at appropriate points on long and severe grades, as were safety signals at junctions and on single-track routes operated in both directions. In some instances, however, no satisfactory provision has been made to receive cars which are derailed by the safety switches. Sanders are employed both day and night on excessive grades to keep tracks in safe condition.

From information obtained we find that Pittsburgh was very seriously affected by the business depression of 1907-8, and many operatives left the city and its suburbs. The travel on the street cars was, in consequence, very appreciably reduced and has remained so. As a logical sequence, the number of cars operated and the mileage furnished

shown the greatest courtesy if they will report such accidents at once to the claim adjuster. The advertisement reads as follows:

"If you should meet with an accident of any kind on or about the cars of the Indiana Union Traction Company, your case will receive prompt and courteous attention, if you will at once write to Ellis C. Carpenter, claim adjuster, Anderson, Ind., and tell him about it. It is the desire of the company to fully investigate all claims, and where the injured person is entitled to a settlement to make it promptly upon a reasonable basis in justice to everyone concerned. A friendly compromise is far better than an expensive and troublesome lawsuit. Should you be a witness to an accident to some one else, if you will write or phone the claim department or the local superintendent, giving your name and address, you will confer a favor upon the injured party as well as the company. Adjustment of claims is based largely upon statements of facts by disinterested parties."

ANOTHER VOLUME OF PUBLIC SERVICE CORRESPONDENCE

Frederick W. Whitridge, receiver of the Third Avenue Railroad, has published Volume II of his correspondence with the Public Service Commission, beginning with an order issued Oct. 9, 1908, and concluding with a letter received from the commission July 9, 1908. The volume contains about 400 pages and is folioed consecutively with the first volume.

The following text is printed on the cover: "For so is the will of God, that with well-doing ye may put to silence the ignorance of foolish men." I Peter, ii:15. The preface follows:

This second volume of correspondence with the Public Service Commission is paged consecutively to the first, and is as dreary as the other. The commission have, to my great regret, forced an issue with me on the subject of the valuation of the properties under my care. It is perhaps not fair to judge the commission about this until they have disclosed the purpose, manner and scope of that valuation. At present they have refused to answer all questions in respect thereto. I am informed, however, that they have had for the last 10 months from 25 to 60 men continually employed on what they call "a valuation." I find nothing in the law to authorize it, or which would make a "valuation" of any legal efficacy if made. The origin of a State valuation of properties was, I believe, the notion that it has some relation through nominal capitalization to the fixing of rates, but that notion is now pretty well exploded. I suppose the commission have the right to educate themselves in any way they please, but a State valuation of these street railroads is legally unwarranted, economically unsound, and practically futile and mischievous, and I am bound to consider that the public money is squandered in making it.

I have added to this correspondence the complaints and answers in two suits brought against me by the commission for the recovery of penalties. The first is identical with six other complaints. The first of these cases came to trial and the complaint was dismissed by the court. Subsequently the commission moved to dismiss six other complaints of the same class, and in the case in respect to the Fort George loop, the commission brought an action to recover $75,000 and recovered a verdict of $1. I should be surprised if the commission had, before bringing these suits, consulted their own counsel, and I had intended to say something about them after they were tried.

On the record made by the commission, however, it appears to me that any just comment would be cruel, and I am only justified in pointing out that I have been subjected to much expense by the commission without warrant or result.

The pages of the volume proper are devoted to the many orders and requests issued by the commission, with the replies by the receiver. Among other points, Mr. Whitridge emphasizes his opposition to any plan to valuate the properties, and on Nov. 5 he wrote to the commission as follows:

I have yours of the 3d, referring to the resolution about the valuation of the properties of the street railways. I thought, so far as these railroads were concerned, that matter was disposed of last June. I respectfully refer you to my letter in reply to your resolution of June 12, and I beg that you will call your chairman's attention to my conversation with him thereafter. Why there should be any valuation of the Third Avenue properties at the present time I do not understand. We are paying no interest, no dividends, no rentals, and are trying to get the property in shape for reorganization, and I thought that the chairman perfectly agreed with me that any kind of a governmental price tag on the property before the reorganization was likely to be most embarrassing, and might result—in view of the enormous losses the bondholders have got to face—in preventing our getting capital, which is absolutely necessary for the company to have. You will understand that personally I care nothing about the matter, but it does seem to me to be perfectly obvious that in the case of the Third Avenue properties any such valuation is now wholly unnecessary, and may be most detrimental.

Subsequently he discovered that part of the force conducting the valuation was occupying part of the building belonging to the company at One Hundred and Thirtieth Street, and requested them to move.

In some cases, when replying to orders of the commission, Mr. Whitridge does not hesitate to criticise the orders if he thinks they deserve such treatment, as in the following reply to certain suggestions made by the commission in regard to the establishment of flagmen at Forty-second Street and Eleventh Avenue:

In reply to these various complaints, investigations and suggestions, I have to say that I am inclined to think your inspector is descended from Captain Bunsby. Second—I think it may be of interest to you to know that Queen Anne is dead. Third—I have the honor to inform you that four flagmen have been stationed at the point your inspector has been inspecting for ten years, two by day and two during the night, and the profound suggestion of your inspector that the expense of a flagman should be divided with others interested, appears to have also dawned on the minds of those who have made the contracts for four flagmen in 1899.

Finally, I venture to suggest that if your honorable body really desires to inspect and ratiocinate about the obvious at the public expense, they should employ inspectors who can inspect.

CIRCULAR OF MANUFACTURERS' ASSOCIATION ON FREIGHT RATES TO DENVER

The exhibit committee of the American Street & Interurban Railway Manufacturers' Association has issued a circular announcing the granting of reduced freight rates on exhibits between Chicago and Denver, the text of which follows:

Your committee is pleased to announce that the Trans-Missouri Traffic Association, which governs freight shipments between Chicago, St. Louis and similar points, and Denver, has acted favorably upon our request for special freight rates. They have granted us the return rate free on all material sent to Denver for exhibit purposes. We are now taking up the question with the Central Traffic Association, which has the matter under advisement.

If any of the roads over which you ship are members of this association, and you can make a request for special rates, through the local railway representative, similar to those granted us by the Trans-Missouri Association, it will materially aid the committee in its work.

The Central Traffic Association covers the lines east of Chicago. As soon as an agreement is reached with this association announcement will be made in a subsequent circular of the rates secured.

The exhibit committee has made arrangements with the Post-American Forwarding Company, Security Building, Chicago, Ill., to consolidate less than carload lot shipments of freight from members of the Manufacturers' Association and forward them as carload freight through to Denver. All small shipments of freight from points east of Chicago are transferred by the railroads at Chicago, and as these transfers will be made at a very busy time of the year, exhibitors who ship in the ordinary way are likely to experience loss, delay and breakage of freight packages. The Post-American Forwarding Company has its own large warehouse at Chicago Heights, on the Elgin, Joliet & Eastern Belt Line, some 30 miles outside of Chicago. Shipments from points east of Chicago forwarded to this company will be transferred at its warehouse without entering the congested freight houses of the railroads in Chicago, and can be consolidated into carloads without

teaming. It is the belief of the committee that this arrangement will prevent any trouble in getting shipments to Denver in time for the opening of the convention, and, in addition, the consolidation into carload lots will result in a saving of from 25 cents to $1 per 100 lb. on the freight rates from Chicago to Denver.

The committee is especially anxious to know if the members of the association care to avail themselves of the plan for consolidation of shipments, and members are requested to advise the committee regarding the approximate weight of their shipments and the character of the freight, so that it will be possible to determine the freight classifications as early as possible.

The committee has also announced that it will hold a meeting at the offices of the Lorain Steel Company, Chicago, Ill., on Aug. 6 at 10 a. m., at which time assignments of exhibit spaces will be made to all members of the association whose applications have been received.

STANDARD CLASSIFICATION OF ACCOUNTS

The American Street & Interurban Railway Accountants' Association has just issued in pamphlet form its standard classifications of operating expenses, operating revenues and expenditures for road and equipment. These are the classifications adopted by the association at its convention last October at Atlantic City and are practically similar to the specifications prescribed by the Interstate Commerce Commission and published by that commission in pamphlet form some months ago. The chief difference in the two classifications is pointed out in the letter of transmittal in the next column.

The pamphlet also contains the report of the committee on standard classification of accounts and form of report, as presented at the Atlantic City Convention; the report of the committee on construction and operating expenses for electric railways of the National Association of Railway Commissioners, presented at the 19th annual convention of that association in Washington, Oct. 7; a statement of the routine to be followed by railway companies in submitting questions on accounting matters for decision; a definition of the three classes into which electric railways are divided for the purpose of accounting, and the three classifications of operating expenses. The latter are for the three groups corresponding to the classes "A," "B" and "C" into which the electric railway companies are divided according to their annual operating revenues. Upon this point the pamphlet says:

Companies of Class A are to keep all the primary accounts provided in this classification, which accounts are numbered consecutively. Companies of Classes B and C are to use as primary accounts such groupings of the primary accounts provided for Class A as are indicated in the schedules below. By reference to these schedules these groupings are clearly shown. For example: In Maintenance of Roadway and Track, companies of Class B are to include all charges covered by the primary accounts numbered from 2 to 12, inclusive, and in Maintenance of Way, companies of Class C are to include all the primary accounts numbered from 2 to 19, inclusive. By this arrangement it is apparent that companies of all three classes can make use of the text descriptive of the accounts.

By use of the same plan, uniform reference numbers of the accounts will be obtained. The primary account numbers of Class A being the basis, those accounts provided for Classes B and C will bear the hyphenated first and last numbers of the combined accounts. For example, for the first 19 accounts under the general account Way and Structures of Class A, Class B will have three accounts; No. 1, Superintendence of Way and Structures; No. 2-12, Maintenance of Roadway and Track, and No. 13-19, Other Maintenance of Way. Class C will have two accounts: No. 1, Superintendence of Way and Structures, and No. 2-19, Maintenance of Way. By this method the numbers clearly indicate the primary accounts of Class A that have been combined for Classes B and C.

The arrangement of the text of the classifications of operating expenses which then follows is very clear, as the titles of the different accounts are set in heavy-faced type, the definitions in a lighter type and the notes in small type following the definitions. The paper used has been especially selected on account of its strength, because of the handling which the pamphlet will undoubtedly receive. A copy is being sent to the accounting officer of each railway member of the association with this letter:

Aug. 3, 1909.

Gentlemen—At the last convention of your association you adopted as standard new classifications of Operating Expenses, Operating Revenues and Expenditures for Road and Equipment. A pamphlet containing the full text of these classifications is being sent herewith.

These classifications are identical with those promulgated by the Interstate Commerce Commission, with the exception of the treatment of discounts and commissions on securities issued for construction purposes or to raise funds for construction. Such discounts and commissions the Interstate Commerce Commission ruled should not be considered as a proper charge against construction. Your association declined to accept this view, and according to the standard classification of your association such discounts and commissions are charged to Expenditures for Road and Equipment, Account 41—Interest.

Since the convention your standing committee on a standard classification of accounts has had a conference with the Interstate Commerce Commission and arrived at a working arrangement for securing uniform interpretations of the instructions contained in the classifications. Those members of this association who operate interstate roads should correspond directly with the Bureau of Statistics and Accounts, Interstate Commerce Commission, Washington, D. C., whenever questions arise as to the proper interpretation to be placed upon the instructions; members of this association who do not operate interstate roads desiring similar information should communicate with W. F. Ham, chairman, committee on a standard classification of accounts, Washington, D. C.

At the conference above referred to a system of numbering accounts was determined upon which is recommended as a desirable way of preventing confusion. The numbers of the accounts to be kept by companies of different classes are fully set forth on page 13 *et seq.* of the pamphlet.

Additional copies of the classifications may be secured at a price of 30 cents per copy by communicating with the office of the association, 29 West Thirty-ninth Street, New York.

Robert N. Wallis, President.

RULING OF INTERSTATE COMMERCE COMMISSION ON REPORTING FOR LAST SIX MONTHS OF 1908

It will be remembered that, by the order of the Interstate Commerce Commission, the classification adopted by the commission became effective Jan. 1, 1909, but with the suggestion that the accounts for the six months ending Dec. 31, 1908, kept under the previous classifications, should, if possible, be recast to harmonize with the new classification. The commission has recognized the difficulty the companies would have in doing this, and has prepared in the form of an annual report to the commission for the year ending June 30, 1909, extra pages similar to corresponding pages in the annual report form for the year ending June 30, 1908, on which returns for operating expenses, operating revenues and expenditures for road and equipment for the six months ending Dec. 31, 1908, may be made.

REPORT ON INTERSTATE ACCOUNTING SYSTEM BY PROF. H. C. ADAMS

"Statistics of Railways in the United States" for the year ended June 30, 1907, prepared by the division of statistics and accounts of the Interstate Commerce Commission, has been issued. It contains a report regarding the new accounting system by Prof. Henry C. Adams, in charge of statistics and accounts.

Referring to the classification of accounts for electric railways which became effective on Jan. 1, 1909, Professor Adams states, in part:

The accounting rules prescribed for electric railways differ in some minor particulars from those prescribed for steam railways. The investigations undertaken by this office, as well as the statements submitted by representatives of this class of carriers, made it evident that the business of urban and interurban transportation covers not only a wide range of varying conditions, but that these conditions differ in many respects from those to which the accounts of steam railways are adjusted. Especially is this true of the organization for purposes of administration. The nature of the problem of a uniform system of accounting for urban and interurban carriers may be further suggested by the fact that the annual operating revenues of electric railways range from a few thousand dollars to over $17,000,000.

The division of electric railways into three classes, according to the gross revenue, is then described. Continuing, Professor Adams says:

Another difficulty in the problem of uniform accounting for urban and interurban electric railways was found in the limited jurisdiction of the Interstate Commerce Commission, but in view of the spirit of co-operation shown by State Railway Commissions, there is good ground for the expectation that this difficulty will not seriously embarrass the realization of the plan.

Discussing the subject of the forms of annual reports which were prepared for electric railways to cover the year ended June 30, 1908, Professor Adams stated that these reports would be rendered "in substantial conformity with present methods of accounting. It was thought wise to obtain such reports in order to enable this office to test the influence of the new accounts prescribed for electric railways, which go into effect on Jan. 1, 1909."

CLASSIFICATION OF ADDITIONS AND BETTERMENTS AND BALANCE SHEET

Taking up the important accounting questions which have not yet been determined, the report discusses the classification of additions and betterments and the proposed balance sheet. It is stated that the interests to be considered with reference to the form of balance sheet are still in course of orderly investigation. The point of difficulty with regard to the classification of additions and betterments pertains, the report says, to the treatment of abandoned property. This subject is discussed as follows:

Shall the value of abandoned property be kept in the capital accounts, or shall it be charged off? If charged off, shall it be charged to operating expenses or to profit and loss? If to operating expenses or to profit and loss, shall it be by a single entry or prorated through a series of months or term of years? If prorated, what principle should govern the determination of the period to be covered by such prorating?

This is the most serious of the technical questions yet raised in the development of a uniform system of accounts, and a point in which the public as well as the carriers have a vital interest. On the part of the public the argument is strong in support of the proposition that the balance sheet statement of "cost of property" should cover only that property actually used in rendering the service of transportation, and that abandoned property should therefore be taken out of the accounts; but the argument of the stockholder also has merit, which is that inasmuch as the property abandoned was abandoned to make way for providing the public with better facilities (for it must be held in mind that the question at issue arises in connection with additions and betterments), and further, inasmuch as the first investment was necessary in order that the second investment might be made, it is scarcely just to require the stockholders to sustain the entire loss. It seemed appropriate to state this question, not for the purpose of discussion, but to call attention to the fact that the work of this division in the development of a system of standard accounts for railways has reached a point where further progress requires a definite expression of policy on the part of the commission. A sense of equity and an appreciation of business conditions, rather than legal or accounting technicalities, would seem to be the element out of which such a policy should be constructed.

Criticisms of the prescribed depreciation fund and of the tentative rules for additions and betterments led Professor Adams to make a statement regarding the line of separation between management and accounting, of which an abstract follows:

LINE OF SEPARATION BETWEEN MANAGEMENT AND ACCOUNTING

1. It must be recognized, first, that the capital assets of a corporation are subject to constant changes as a result of operation and management. Looked at from the point of view of depreciation, it must be recognized that a definite portion of the capital assets of any business concern that makes use of property will disappear as the result of operation. The capital assets may be dissipated by the appearance of a better type of structures or equipment, or by a change in the character of the business or the policy of management. This fact, namely, that capital assets are consumed in operation, must be acknowledged as an industrial law.

Neither the operating officer nor the accountant can arrest the dissipation of capital assets, and any policy of management which aims to undermeasure this fact because the cash box is empty, or to overmeasure it because the cash box is full, results in an incorrect statement of the industrial and financial situation, and for that reason is repugnant to correct accounting. It is true that the accounting orders of the commission do deprive the executives of railways of the right to misstate what in fact has occurred; they do not, however, deprive them of the right of doing whatever they see fit with the money at their disposal.

2. The second fact to be noted is (still holding in mind the depreciation accounts) that it lies within the sphere of accounting to prescribe rules which determine:

(a) The amount of capital assets consumed.

(b) The time when the expense accruing on account of such consumption should be acknowledged, and

(c) The account to which the amount representing such consumed assets should be charged.

The commission has as yet issued no order touching (a), for the orders issued explicitly provide that the rate of depreciation is to be determined by the carrier; but the orders of the commission do aim to cover (b) and (c). They contain nothing relative to the time when a particular form of capital asset that has been retired shall be replaced as a piece of physical property, or as to the form it shall assume when replaced. These orders do say, however, that the expense which accrues on account of the wear of the property shall be acknowledged when the consumption of capital assets takes place, and that the amount of the expense shall be charged to operating expenses.

3. The third fact to be noted is suggested by what has been said above. The task of the operating officer is so to operate as to reduce to a minimum the consumption of capital assets. He must determine when it is wise to spend the money in the cash box, and decide what form the property replaced shall take. Not a sentence in the classifications or rules promulgated by orders of the commission warrants the implication that the commission has failed to recognize that its administrative authority in this matter is confined to supervision over the accounts of the carriers. The depreciation rules submitted are a part of the definition of

"cost of operation"; the proposed additions and betterments classification is a part of the definition of "cost of property"; the accounting rules prescribe the time when an expense is to be taken into the accounts and to what account it shall be charged.

It is true that these accounts do curtail the liberty of the financier to affect arbitrarily public opinion through published statements, a liberty which at times has been exercised to the detriment of the investor and the confusion of the legislator; but it is assumed that this was the intent of Congress when it conferred upon the commission authority to prescribe a uniform system of accounts and to employ special examiners for the investigation of those accounts.

PHYSICAL VALUATION OF RAILWAY PROPERTY

In his conclusion, Professor Adams refers to the subject of physical valuation of railway property, and states:

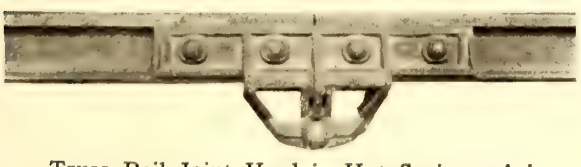
The chief purpose of depreciation accounts is to protect the investor against depletion of his property by understatement of the cost of maintenance, and to protect the public against the perpetuation of unduly high rates by charging improvements to cost of transportation. These accounts, which serve so important a purpose, require for their proper and safe administration complete and accurate information relative to the value of the property to which they apply, and this information can only be secured by a formal appraisal embracing all classes of railway property.

The purpose of a balance sheet is to disclose the financial standing of a corporation. But in the case of railway companies the commission is unable to test the accuracy of the assets reported, and there is no feasible means of providing such a test other than by a detailed inventory of the property which the assets represent. If Congress designed that the commission should do what lies in its power to guarantee the sound financing of railways, the necessity for making an inventory appraisal of railway property cannot longer be delayed.

From whatever point of view this question of valuation be regarded, whether of a reasonable capitalization or a reasonable schedule of rates, of effective administration of depreciation accounts, of the correct interpretation of the balance sheet, or of an intelligent statement of the amount and character of railway stocks and bonds which may be made available for national bank circulation, one is forced to conclude that an authoritative valuation of railway property is the next important step in the development of governmental supervision over railway administration.

HARDIN RAIL JOINT AT HOT SPRINGS

The accompanying engraving shows a base-supported rail joint used by the Hot Springs Street Railway Company. This joint was designed by E. T. Hardin, superintendent, and is said to be giving excellent service. The joint comprises two similar malleable castings weighing 19 lb. each. These castings are bolted through the fishing plates with four ordinary track bolts, and also are fastened together beneath the rail by a 1-in. truss bolt. The shape of the



Truss Rail Joint Used in Hot Springs, Ark.

joint plates is such that the ends of the rails rest for 4½ in. of their length on the trussed portion of the joint, and when the lower truss bolt is drawn up tight the rail ends are held securely against movement in a vertical direction. The stiffness of this joint is said to materially reduce failures of concealed rail bonds, and the square shoulder of the lower portion of the joint prevents creeping of the rail.

ESTIMATE OF COST OF ELECTRIFICATION OF ADIRONDACK RAILROADS

Consideration of the subject of fire prevention on the lines of railroads in the Adirondack forest preserve by the New York Public Service Commmission, Second District, included an inquiry into the cost of electrification. This remedy was rejected on account of the cost of electrification, which was considered quite prohibitive by the commission.

In its opinion, written by Commissioner Sague, the commission states:

OPINION OF THE COMMISSION ON PROPOSED ELECTRIFICATION OF RAILROADS IN THE ADIRONDACKS

The electrification of the lines in the Adirondacks has been frequently proposed as a method of preventing fires, and it has therefore been considered in the treatment of this case. An estimate was submitted by E. B. Katte, chief engineer of electric traction for the New York Central lines, which covers the Mohawk & Malone, Carthage & Adirondack and New York & Ottawa. Mr. Katte's report is submitted below. This report was referred to the General Electric and the Westinghouse Electric companies, and approved by them.

The plan contemplated by Mr. Katte is electrification by the high-tension alternating-current system, with overhead trolley wire carrying 11,000 volts, the system in general being the same as that in use on the New York, New Haven & Hartford between Stamford and New York. It is proposed to locate a central power station at Tupper Lake, with 16 substations, to which the electric power is to be transmitted at 60,000 volts pressure.

The total length of main track for which electrification is proposed is 300 miles, and 38 electric locomotives are considered to be required for the three railroads. The total first cost is estimated at $9,163,000. The total annual cost is summarized as follows:

Cost of electric power	$203,100
Repairs to locomotives	30,910
Repairs to transmission line	141,200
Fixed charges	1,062,270
Total	$1,437,480
Deducting the present annual expense for the operation of steam locomotives	281,010
Net additional cost per year	$1,156,470

If electricity is obtained from water power, the cost of power, item No. 1, will be reduced one-half, or $100,000 per year. The fixed charges due to the great expense of installation will, however, remain the same, and the net annual cost will be over $1,000,000 more than the present cost of operation by steam locomotives. This expense would be entirely prohibitive. The cost of electrification of the Delaware & Hudson lines was not computed, as the estimate for the New York Central was convincing against this method.

It was stated by Mr. Katte that the conditions for electrical operation on the railroad lines in the Adirondacks are nearly as unfavorable as can be found anywhere. The traffic is small compared with the length of the lines, and the train service is limited for the most part to a few heavy trains, whereas successful electrical operation demands a fairly uniform traffic, composed of a large number of small units, such as the conditions which prevail in the suburban railroad lines entering large cities like New York and Chicago.

REPORT OF MR. KATTE

The report of Mr. Katte on the suggested electrification of the Adirondack lines of the New York Central road, as published by the commission, follows:

Approximate estimated cost of electric installation and operation of New York Central lines: Mohawk & Malone Railroad, Remsen to Malone Junction; New York & Ottawa Railway, Tupper Lake to Moira; Carthage & Adirondack Railroad, Carthage to Newton Falls. Estimate presented to the commission Jan 21, 1909, by E. B. Katte, chief engineer of electric traction, New York Central & Hudson River Railroad:

a. General Conditions

Items.	M. & M.	C. & A.	N. Y. & O.
1. Miles of main line	200	46	54
2. Miles sidings	53	15	6
3. Total mileage, single track	253	61	60
4. Passenger trains per day	60	3.7	4
5. Freight trains per day	20	4.6	3
6. Avg. weight, passenger (tons)	166	108	75
7. Avg. weight, freight (tons)	589	438	400
8. Total ton-miles per day (exclusive of locomotive)	767,030	73,010	49,500
9. Total locomotive-miles per year	900,000	91,200	144,000
10. No. of steam locomotives replaced	34	4	4
11. Value of steam locomotives replaced	$436,000	$32,000	$26,000
12. Avg. cost per locomotive-mile, fuel, etc.	$13.85	$9.14	$13.08
13. Avg. cost per locomotive-mile, repairs and maintenance	10.32	6.51	7.09

The above information has been obtained from the operating officials of the several divisions affected, and has been used as a basis for the electrical computations to follow:

b. Electrical Plant Required

Because of the long length of single track and the comparative small number of heavy trains, the 600-volt direct-current system is impracticable, and the following estimates are based upon a single-phase alternating-current system. A central power station is located at Tupper Lake, distributing power to 16 substations located as shown on the sketch map attached. The power station contains three 5000-kw turbo-generators, and each of the substations has a capacity of 3000 kw in static transformers. The transmission line is carried on steel poles, which also support the 11,000-volt trolley wire, with catenary construction.

The locomotives weigh 125 tons, and are designed to meet the present schedules with a trailing load of 600 tons. The plant required is as follows:

Items.	M. & M.	C. & A.	N. Y. & O.
1. Capacity of power stations in kw	12,930	1,230	840
2. No. of capacity in kw		3, 5,000 kw	
3. No. of electric locomotives required	30	4	4
4. Working conductors and transmission lines, 1 trolley circuit, 11,000 v. 2 transmission circuits, 60,000 v. (4 No. 0 wires).			

c. Estimated Cost of Electric Equipment

Items.	M. & M.	C. & A.	N. Y. & O.
1. Power station at $95 per kw	$1,232,000	$117,100	$80,000
2. Transmission lines and trolley	2,860,000	690,000	678,000
3. Substations at $17.50 per kw	630,000	105,000	105,000
4. Locomotives at $50,000	1,500,000	200,000	200,000
5. Engineering and construction at 15 per cent	933,1000	160,900	159,000
Total cost	$7,156,000	1,279,000	$1,222,000
6. Credit for steam locomotives	436,000	32,000	26,000
Total net cost	$6,720,000	$1,247,000	$1,196,000
The total estimated first cost of the electrical installation is			$9,163,000
The additional annual cost of electric operation is estimated at			$1,155,000

In the above table the cost of the power station has been prorated for each of the divisions.

d. Estimated Annual Operating Cost

Items.	M. & M.	C. & A.	N. Y. & O.
1. Cost of electric power	$173,000	$14,800	$15,300
2. Repairs to electric locomotives	23,850	2,740	4,320
3. Repairs to transmission lines	96,000	22,700	22,500
4. Fixed charges at 11 per cent	787,160	140,690	134,420
Total	$1,081,010	$180,930	$176,540
5. Credit cost coal, water and supplies for steam locomotives	$142,500	$8,340	$19,850
6. Credit repairs to steam locomotives	93,000	5,940	11,380
Total credit	$235,500	$14,280	$31,230
Net additional electrical costs	$843,510	$166,650	$145,310

In the above estimate, coal for the power station has been assumed to cost $4.10 per ton, and the cost of current computed at 0.0065 cent per kw-hour. The repairs to electric locomotives have been taken at 3 cents per locomotive-mile. The credit due to elimination of steam locomotive operation is based upon mileage and rates obtained from the several divisions, as given under "General Conditions."

The enormous cost of electric equipment and the heavy increase in annual operating cost are due to the fact that the service proposed is totally unsuited for economical electric operation, long hauls and infrequent heavy units being diametrically opposite to that required for successful electrification.

The order of the commission requires the installation of oil burning upon locomotives operated within the forest preserve between 8 a. m. and 8 p. m. from April 15 to Nov. 1, beginning not later than April 15, 1910. In years of minimum fire risk the oil burning period may be shortened.

THE REFERENDUM IN CLEVELAND

The franchise granting Herman J. Schmidt the right to construct a street railway system in Cleveland in opposition to the Cleveland Railway Company was defeated at the referendum vote on Aug. 3, 1909, by a majority of 3763. A total of 66,004 votes were cast, which was about 32,000 less than the registration. At the referendum vote on Oct. 22, 1908, Mayor Johnson's plan was defeated by a majority of only 605 votes. Only 197 votes were thrown out for improper marking at the election this week. Considering the registration, the vote was a very small one, and the adherents of Mayor Johnson attribute their defeat to this fact. The impression prevails that the citizens were not interested in any plan which did not give evidence of settling the traction situation successfully and permanently. The falling off in the vote was general all over the city, and would seem to indicate that the people have finally lost faith in the Mayor. The vote even fell off heavily in sections of the city which have always supported the Mayor and in what was considered 3-cent territory, but it did not diminish there quite so much as in other places. The Mayor retired early and refused to make a statement after the result was known. Horace Andrews, president of the Cleveland Railway Company, said the company was ready to make a settlement on the Tayler plan, as proposed before the Schmidt franchise was passed. The Tayler ordinance as proposed provided in brief for a fare of 3 cents on all lines, the fare to be raised if the returns were not sufficient to furnish good service and insure a return of 6 per cent on the stock of the company, and an extra charge of 1 cent for universal transfers. The committee of 100 has already begun a movement to force the Council to consider a grant to be based on the Tayler plan. It is expected that the defeat of the franchise will have a serious effect on Tom Johnson's aspirations to be elected Mayor again at the municipal election next November.

The last week of the referendum campaign in Cleveland was characterized by several lively tilts between speakers and visitors at the tent meetings and attacks by the speakers upon each other. Perhaps the most sensational charge was that made by ex-Mayor Robt. E. McKisson that Mayor Johnson should refund the money used in promoting the fare box. Mr. McKisson has been working independently, and entered the campaign because he felt that the administration plan should be defeated. Debates between Mayor Johnson and Attorney Homer H. McKeehan took place on the evenings of July 28 and 29. The first meeting was held in Rockefeller Park, on the east side, and was attended by 12,000 or 15,000 people. Mr. McKeehan stated before the meeting that he would answer no arguments or questions which did not pertain directly to the matter in hand. As a consequence he refused to answer some of the questions which the Mayor propounded. Asked by the Mayor to outline a better franchise for the people than the Schmidt grant, Mr. McKeehan stated that the Tayler plan contained all the provisions necessary to safeguard the public. Those in attendance at this meeting were very orderly, but at the meeting at Edgewater Park, on the west side, the following evening, order was preserved with difficulty.

At some of the meetings of the committee of 100 during the latter part of the week certain visitors became very unruly. This was particularly true of a meeting which Attorney Walter D. Meals addressed in the south end. A circular had been distributed previous to the meeting, in which Mr. Meals was accused of attacking the Jews in an address which he made before a jury some time ago. When

Mr. Meals attempted to deny this, several people in the tent caused a disturbance, probably intended to prevent his reply from being heard. The police succeeded in keeping very indifferent order, and it seemed for a time that the meeting would have to be adjourned. Mr. Meals, however, finally made himself heard, and evidently succeeded in refuting the charges made against him.

Chairman Homer McDaniel, of the committee of 100, issued a statement on July 31 showing instances in which passengers would have to pay 13 cents fare to reach certain points if the Schmidt grant prevails. Mr. Johnson said this is not true, because the law gives Mr. Schmidt the right to condemn the tracks of other lines for his use. The Mayor also stated that the city would be able to force the Municipal Traction Company to issue transfers from the lines now operated at a 3-cent fare and receive transfers from other companies.

On July 31 the committee of 100 offered rewards aggregating $5,000 for the discovery of concessions in the Schmidt grant which are usually found in grants of that kind, and which were prominent in the draft of an ordinance prepared by Judge Tayler. The offer is $1,000 each to the persons who find any or all of the following in the



"No, Thanks, I've Let You Run Things Before."

Cartoon Printed in Cleveland Leader Previous to Election

Schmidt franchise: The word "transfer"; any provisions limiting the profits to Mr. Schmidt; any provision giving the Council power to reduce fares; any provision for municipal ownership.

Mayor Johnson said in several of his addresses last week that the Cleveland Railway would be the only corporation to which a franchise could be legally granted if the Schmidt proposition should be defeated, and admitted that the Schmidt grant might be used merely to coerce others if it should be sustained. The committee of 100 has replied that the administration will only be asked to permit the people to express themselves upon the Tayler plan. The committee reiterates that the people want to settle the railway matter; that they favor low fare, but good service; that they desire transfers to any part of the city, and that they prefer the operation of the system to be in the hands of one corporation.

Information secured from the office of the Municipal Traction Company by the committee of 100 and others interested in the matter shows that the system is operating on an average about 11,000 car-miles more under the receiver than a year ago, when the service was fixed by Mayor Johnson and A. B. DuPont. Warren Bicknell, the receiver, says that all available cars are in operation, but that the service is still materially short of affording the accommodations which traffic demands. A comparison of the car-miles run from July 1 to 20, inclusive, as compared with a year ago follows:

	1908.	1909.	Increase.
July 1	63,979	71,093	7,114
July 2	63,413	70,294	6,881
July 3, Saturday	63,634	75,782	12,238
July 4	63,561	65,508	1,947
July 5	61,720	74,831	13,111
July 6	60,110	69,816	9,706
July 7	59,855	71,000	11,145
July 8	61,770	70,839	9,069
July 9	60,483	70,577	10,094
July 10, Saturday	60,150	77,379	17,229
July 11	61,663	61,606	*57
July 12	59,216	69,598	10,382
July 13	59,972	70,289	10,317
July 14	59,528	71,475	11,947
July 15	60,699	70,839	10,140
Jply 16	60,237	70,407	10,170
July 17, Saturday	59,286	77,740	18,454
July 18	61,464	64,264	2,800
July 19	59,199	70,468	11,269
July 20	59,239	70,705	11,466
Daily average	60,959	70,730	9,771

*Decrease.

The Cleveland *News* suggested on July 31 that Warren Bicknell restore for one day, Monday, Aug. 2, the schedule operated on Aug. 1, 1908, by way of contrast. Mr. Bicknell said that he would not be justified in reducing the service for even one day, especially as the court had instructed him to give the best service the equipment would permit, without regard to cost.

Several days during the week of July 26 were devoted to the registration of those who have moved from one precinct to another since the last election. The number registering indicated that the referendum vote would be large. Several charges of fraudulent registration were filed and two or three arrests were made. The city was thoroughly organized some time ago for work on election day and the few days previous. This work did not differ from that done during an important political campaign.

The greater part of Sunday, Aug. 1, was spent by both sides in giving final instructions to ward and precinct workers and completing the finishing touches in preparation for the election. Witnesses and challengers were enrolled and presented their credentials to the election officers on Aug. 2 and clerks in the office of the Board of Elections spent the day in inspecting the registration lists and collecting evidence in suspicious cases, so that warrants might be issued the following day for the arrest of those who enrolled illegally. The Board of Elections was also in session all day on Aug. 2, in order to give those who had been out of the city an opportunity to qualify. Almost 98,000 registered, a very large number. The large precincts were divided, so that the count might be completed early.

The closing tent meetings were held on the evening of Aug. 2. The citizens' committee held its meetings at Euclid Avenue and East Eighty-fourth Street and at Lincoln Park.

All the newspapers printed in English opposed the grant, because they did not believe that good service could be given under it and because they did not approve coercive measures. The *Leader* and the *News* have opposed the Mayor from the beginning of the traction controversy, but the *Plain Dealer* and the *Press* supported him up to the time he rejected the Tayler plan.

Mayor Johnson said several times during the campaign that if the Schmidt ordinance was defeated he would continue to oppose all grants that do not contain features which he claims make the franchise to Mr. Schmidt distinctive in the protection which it afforded the citizens.

COMMUNICATIONS

ADVANTAGES OF OPEN CARS

Galveston Electric Company,
Galveston, Tex., July 23, 1909.

To the Editors:

I notice in your issue of July 10, 1909, an editorial entitled "Open Cars for Pleasure Riding," in which you say that it takes longer to load an open car than it does a closed car or semi-convertible car. This is not the experience in Galveston. In this city we run more open cars than we do closed cars and we run them almost every month in the year. Through the summer, which with us is from April to October, we run open cars entirely, using the closed cars only as extras. We handle very large and very sudden crowds, and our experience is that an open car can be loaded and unloaded much more quickly and more safely than any closed or semi-convertible, or even a full convertible car with center aisle.

Our open cars are 8, 9 and 12-bench cars, the 12-bench being the Narragansett type, and as the curves on our streets necessitate that the wheels shall turn under the sills, our running-boards are very high from the ground.

With open cars running on double track on a two-minute headway in each direction we have recently brought to our electric parks and carried away from them over 5000 people within an hour. The cars used were eight-bench cars seating 40 people and averaging, with those on the back platform and some squeezed in between, about 50 people to the car. We have timed the unloading of a full car and its reloading from the minute of stopping to the minute of starting, and it is seldom 2 minutes and generally averages 1¾ minutes.

To unload 50 people from any closed or semi-convertible car and reload 50 more would take at the very least 3 minutes, even saying that they were allowed to unload and load through each end of the car, something that cannot always be done with a closed car.

On account of the double track at the point referred to and the frequent intervals at which cars pass one another it was necessary for us to unload and load on one side of the car and allow no one to get in or out on the side of the car next the other track. Of course it takes care and precaution to unload and load so large a number of people, especially as a very large proportion of the riders are excursionists who put off leaving the parks for their trains until the very last minute and consequently it is difficult to prevent them from riding in exposed places, such as the wrong side of the car, on the bumpers, etc.

We positively do not allow anybody to ride on the front platform of any of our cars under any circumstances whatever, nor to ride clinging to the wrong side of a car nor on the bumpers, nor do we allow standing in between the seats in front of sitting passengers. A great many of our excursions come from sections in Texas and adjoining States where the rules in regard to the location of riding are not as strict as with us. Consequently a portion of the time required to unload and load is spent in preventing such riding by these people. With our home people and those from neighboring cities who are familiar with our rules we can unload and load such cars as those described in 1½ minutes from the time they stop until the time the signal is given to start. On such occasions (which occur nearly every week) as we have traffic such as is indicated above, we use four men at this loading point, two of whom watch the "blind" side of the cars and the bumpers to see that no one gets in or rides there. The other two direct the passengers to vacant seats and see that the seats are properly filled. We also have an inspector who gives the signal for the starting of each car.

We have, we think, in Galveston also proved that when proper precautions are taken, an open car with full cross seats is much quicker and easier to unload and load for intermediate service, as well as at terminals. Of course, I am not comparing the ordinary open car with a car of the character of the "pay-as-you-enter" or any closed car that has platforms wide enough to permit people to leave and enter at the same time without obstructing one another. Our closed cars are the usual kind with, say, a 4 or 5-ft. platform, and with such a platform it is always necessary that the out-going passengers be allowed to alight before the in-going ones are allowed to enter.

Perhaps one reason for our success in this matter is that our men are very careful to direct or aid passengers to empty seats on the open cars, and as an additional point to aid both the passengers and the conductors, every seat on our open cars is numbered on the post with a distinct figure in aluminum leaf, plainly visible to the passenger from the ground by night or day. Our men are instructed to note as well as possible the numbers of the benches that are not filled to capacity and to call out these numbers to the passengers when there is quite a number to get on, and we find that the passengers are getting somewhat accustomed to this use of the numbers and take note of the announcements made by the conductor. This numbering also serves another purpose, in that, if a conductor, while collecting fares, is compelled to get down to assist ladies or children off or on, he will always be able to tell just where he ceased collecting by noting the number on the post to which he has fully collected his fares.

There is no question that open cars are promoters of traffic, both for pleasure and ordinary use, during the season in which they can be comfortably used. In sections where this season is very short and where a double equipment of bodies or of complete cars has to be kept, there is, of course, the question as to whether or not it pays to run open cars. There is also the question as to their use in any locality where there are many sudden or violent rains during the season of their use, as it is difficult to obtain any character of curtain that will fully protect the passengers from a driving rain.

The writer believes that the prejudice in many sections against the use of the open car on account of its supposedly greater danger than the closed or semi-convertible car is occasioned by the fact that proper precautions have not been taken to minimize or do away with the points of danger in which it differs from the closed or semi-convertible car. If the management allows the front platform to be crowded so that the motorman cannot move around freely; in fact, if any one is allowed on the front platform at all to disturb or distract the motorman, or if people are permitted to ride on the "blind side" of the car, on the bumpers or dashers, or to overcrowd the running-boards, then it may be expected that accidents will happen just as they would if such proceeding were allowed on a closed car or a semi-convertible. If patrons are not warned—and the warning enforced—in regard to jumping on and off open cars while in motion the ease with which this can be done will tempt them to try it with resulting accidents. But the same applies, although not in equal measure, to closed and semi-convertible and convertible cars.

It must be recognized in transportation that there are inherent dangers in the operation of every possible type of car that can be built. There is no question that certain types of car and the method in which they are operated makes them safer than other types, but there are exigencies of traffic which render it impossible in a great many cases to employ the very safest types of car or the very safest methods of operating them. If this were not the case and transportation companies were to run no cars but those that were absolutely without danger to anybody, then no cars would be run anywhere.

Traffic, especially where the public demands very rapid transit, is not a question of absolute safety, but of the minimum amount of danger consistent with the fast handling of the traffic forced on the transportation company. The American public demands a certain character of service very often, in fact, in nearly every case, determined by the local conditions. It insists upon obtaining this in one way or another, and the only thing left to the transportation company is to give it as nearly as possible what it desires in the matter of transportation and to take every possible precaution to make that character of transportation as safe as it can be made without regard to the cost to the transportation company.

That is the rule adopted by this company and under it in a city of less than 40,000 people we have again and again handled over 50,000 people in one day in our cars without any serious accident and in many cases without the loss of a trip by a single car. Of course, it takes constant watchfulness and the best of discipline to do this. It means that your public must be constantly trained by precept and by practice. It means that the dangers of your cars and every characteristic of your transportation must be learned and means taken to avert those dangers, and, such being done, there is no type of car that we find as safe and as convenient for our rush traffic as the ordinary open car with full cross seats.

H. S. Cooper, Manager.

ALTERNATING VS. DIRECT CURRENT

Berlin, July 22, 1909.

To the Editors:

In one of your recent issues* you published a letter contributed by H. F. Parshall, as part of the discussion on Mr. Murray's paper upon New Haven electrification. The statements made there by Mr. Parshall require an answer.

Mr. Parshall, originally, in the case of the Central London Railway, recommended the use of polyphase generation and continuous current distribution, the then standard American practice, with which he, as an American engineer, was naturally intimately connected. The proposals he then made were undoubtedly correct for that time, with the exception of a few mistakes, such as the adoption of gearless locomotives and the bad mechanical arrangement of the motors thereon. In 1901 Mr. Parshall was appointed by Mr. Yerkes to represent him as his arbitrator in connection with the arbitration held by the Board of Trade and presided over by the Hon. Alfred Littleton, who was nominated by it as umpire, when there was a dispute between the District and the Metropolitan railways as to whether the three-phase system with two overhead conductors or the continuous third-rail system of traction was to be adopted. Although at the arbitration referred to by Mr. Parshall the question of single-phase traction did not arise, as this system of traction was not in existence at that time, Mr. Parshall now states that he sees no reason to change the opinion he then formed as regards the relative advantages of the alternating and continuous current systems.

The disadvantages which he claims against single-phase traction may be summed up as follows:

1. The a.c. motor is essentially heavier and more complicated than the d.c. motor, and its first cost, as well as the cost of maintaining it, is essentially greater than that of the corresponding d.c. motor.

2. The high-tension overhead line is not cheaper and not more advantageous from the railway point of view than the third-rail.

3. The transformers on the motor cars are subjected to exceptional shocks and specially liable to derangement.

These statements of Mr. Parshall are essentially wrong. The a. c. motor of 200-hp one hour rating, at 500 r.p.m., would be able to give out continuously 115 hp, and would weigh 3000 kg; the most modern continuous-current motor for the same output would certainly weigh 2600 kg. In both cases water-proof enclosed motors have been compared.

The stator of the single-phase motor built on the Winter-Eichberg principle is simpler than the stator of the interpole continuous-current motor. The air-gap of all the modern a.c. motors built by the Allgemeine Electricitäts-Gesellschaft is 3 mm on each side, whereas the corresponding interpole continuous-current motors have an air-gap of 3 to 4 mm.

The first cost of a single-phase equipment is higher than that of a corresponding continuous-current equipment, but this is generally due to the high-tension transformer and other high-tension apparatus; but these higher costs are certainly not prohibitive.

As regards the cost of maintenance, experience extending over many years with single-phase systems has demonstrated that single-phase motors and single-phase control, with the exception of the large number of motor brushes required, do not call for any greater attention or maintenance than the continuous-current equipment.

It is true that the commutators are larger and require more brushes, but it is also true that these commutators and the brushes maintain themselves exceptionally well, even under the most severe conditions required by metropolitan railway service (Stadtbahn-betrieb). To these must be added that there is no tendency to spark or flash from brush to brush, and that the tension in the motor is lower and therefore the insulation easier, so that as the results of the comparison, the advantages of single-phase construction outweigh the disadvantages of a larger commutator and a larger number of brushes.

The transformers on the cars have in all cases given excellent results: they require practically no attention or maintenance. All the remaining high-tension apparatus, especially insulators, oil circuit breakers and similar equipment, require no special attention.

Summing up, I am glad to be able to state that the cost of maintenance, and the certainty and safety of operation, are at least equal with the a.c. system to anything that has so far been obtained with an equivalent d.c. equipment.

It is quite impossible to compare the results of American railways where combined alternating and continuous current equipments are generally adopted with the results obtained on European lines. The combined system must be incomplete and unsatisfactory, because the number of parts and the complications are more than double those of a

* See Electric Railway Journal, May 1, 1909.

simple single-phase system, and the consequent cost of maintenance and upkeep must be much greater. European engineers have never recommended the use of the combined system. Lines which are purely urban, such as the underground railways in London and New York, may work best with continuous current or with single-phase currents. Every such case must be considered by itself. Suburban railways (Stadt-und Vorortbahnen) and long-distance lines can only be equipped economically and with certainty of safe operation with alternating currents.

The overhead conductor system is the only one permissible in connection with main-line railway electrification. Complicated switch yards and freight yards cannot be equipped with the third-rail. The third-rail increases the cost of maintenance of the permanent way and renders it much more difficult. Independent engineers of the great railway systems of Europe have taken the position that if railway electrification is to take place and be satisfactory from the railway point of view, only the overhead-conductor system can be contemplated.

Mr. Parshall suggests that the pioneers of the single-phase system have considered too much the electrical, and too little the mechanical side of the question. This statement is quite incorrect. The overhead-conductor system is far better from a mechanical point of view, and much safer than the third-rail.

The total cost, including the power station and distribution, as well as the motor equipment, is much cheaper for single-phase than for d.c. and the general over-all efficiency is greater with a.c. than with d.c.

The statements made by Mr. Parshall seem to show that in the last few years he has not paid attention to the development of the modern a.c. system. For example, the Hamburg car is better in its mechanical details than any existing d.c. car, and the catenary overhead construction is ten times better, from a purely mechanical standpoint, than the third-rail.

Dr. Friedrich Eichberg.

PLATE FRAME M. C. B. TYPE ELECTRIC TRUCKS

A description of a short wheel-base motor truck with side frames of steel plate, built by the American Locomotive Company for the United Traction Company, of Albany, was published in the Electric Railway Journal for June 26, 1909. This same company has recently brought out another design of truck, in which the plate frame construction and a number of other new and interesting features are combined. One motor truck and one trailer truck of this design were applied to the gasoline-electric car built by the General Electric Company which was described in the issue of May 29, 1909.

The motor truck is designed to carry a load at the center plate of 30,560 lb. It is equipped with two GE 205-B motors, each having a rated capacity of 100 hp, inside hung, with nose type suspension.

The side frames are machined out of a solid, high tensile strength, ¾-in. steel boiler plate. Cast-iron shoes or guides are bolted to the pedestals on which the journal boxes slide. A novel feature of the frame construction is that no end frames are used. Lateral stiffness to the frames is provided by the light but stiff cast-steel transom gussets, which extend well out on the side frames, and by longitudinal angles bolted to the frames, both inside and outside. The inside angles extend from each transom to the end of the side frames and the outside angle extends in one continuous piece between the pedestals.

The transoms are of 10-in. 30-lb. channels, and are carried on shoulders provided on the cast-steel transom end brackets, thus taking the shear off the bolts securing them to the brackets. This same practice is followed throughout in the design, and wherever steel castings are used they are made to lip over the parts to which they are connected. The bolster is of light but strong construction, being of pressed steel, with the upper member made of a steel channel.

Canting or tripping of the bolster is prevented by vertical thrust bearings cast integral with the transom end brackets

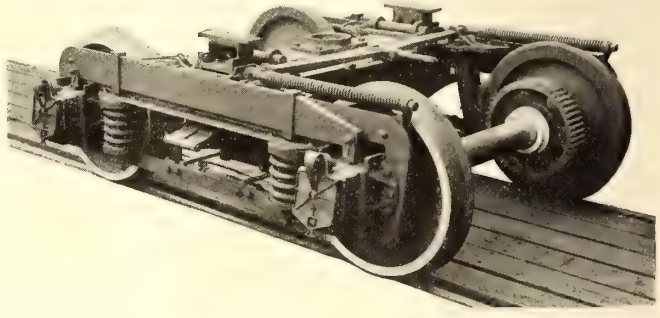


Plate Frame Motor Truck

and raised to the level of the center plate. These thrust bearings also serve to transmit the driving thrust of the motors from the truck side frames directly to the ends of the bolster and through the bolster to the center plate. This relieves the transoms of the driving stresses.

Another interesting feature is the design of the spring rigging. The swinging bolster is carried on double elliptic springs, while the weight of the truck is carried by coil springs on the equalizers in accordance with standard M.C.B. practice. In this design, however, a single straight equalizer, machined from a solid bar, is used on each side instead of two forged equalizers, as in the ordinary construction of M.C.B. type truck. The coil springs are carried on spring seats suspended from the equalizer bar by stirrups and bear against spring caps secured to the leg of the angle bolted to the outside of the frame. The use of a single straight equalizer simplifies the construction, and

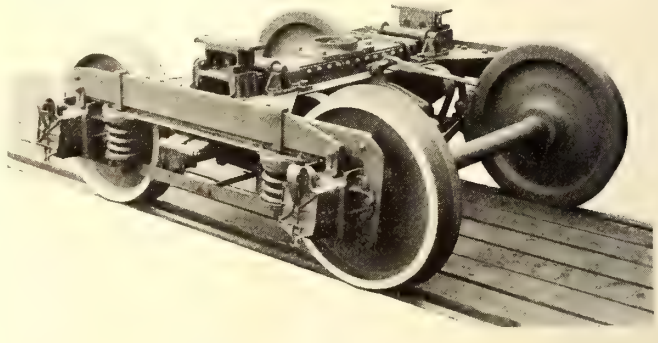


Plate Frame Trailer Truck

also provides greater strength than two forged bars of the same weight, as any injury to the bar due to internal stresses set up in the metal in forging is eliminated.

The same device is employed in this design for adjusting the angularity of the swing links as was used in the trucks built by the same company for the United Traction Company, of Albany, mentioned above. It consists of a special design of seat for the elliptic springs, in which three pockets are provided for the swing link rocker, so that, if necessary, the swing link rocker may be shifted from one pocket to the other.

In the design of the brake rigging the arrangement of the

compression brake release spring is worthy of note. The spring is guided by a small steel tube, which is riveted to the extension of the wrought-iron piece forming the connection to the brake-lever equalizer. The end of this piece is threaded and provided with two nuts, by means of which the proper compression may be put upon the spring. This makes a very simple arrangement and provides a positive compression spring easily adjusted.

In general, the trailing truck is of the same design as the motor truck, though it has a wheel base 1 ft. shorter and is of much lighter construction, being built for a load at center plate of 18,200 lb.

Both of these designs are characterized by light weight, and in view of the increase in weight of cars and motors to meet the more severe requirements of modern street and interurban railway service are of interest as showing the possibilities for a reduction in weight of equipment offered by the use of plate frames. The motor truck, with a carrying capacity at the center plate of 30,560 lb., weighs, without motors, wheels or axles, 4850 lb., which is about 2000 lb. less than an M.C.B. truck of the ordinary construction of the same capacity.

Some of the principal dimensions of the two trucks illustrated are as follows:

	Motor truck.	Trailer truck.
Gage of track	4 ft. 8½ in.	4 ft. 8½ in.
Wheel base	6 ft. 6 in.	5 ft. 6 in.
Length over all	8 ft. 3 in.	6 ft. 11 in.
Load carried at center plate	30,560 lb.	18,200 lb.
Weight without motors, wheels or axles	4,850 lb.	3,362 lb.*
Weight complete, without motors	9,000 lb.	6,850 lb.†
Weight of each motor complete	3,500 lb.	.....
Wheels, type	Solid rolled steel.	Solid rolled steel.
Wheels, diameter	33 in.	33 in.
Journals, diameter and length	5 in. x 9 in.	3¾ in. x 7 in.
Maximum operating speed	60 m.p.h.	60 m.p.h.
Radius of shortest curve	35 ft.	35 ft.

*Weight without wheels or axles.
†Weight complete.

BRITISH EXHAUST STEAM TURBINES

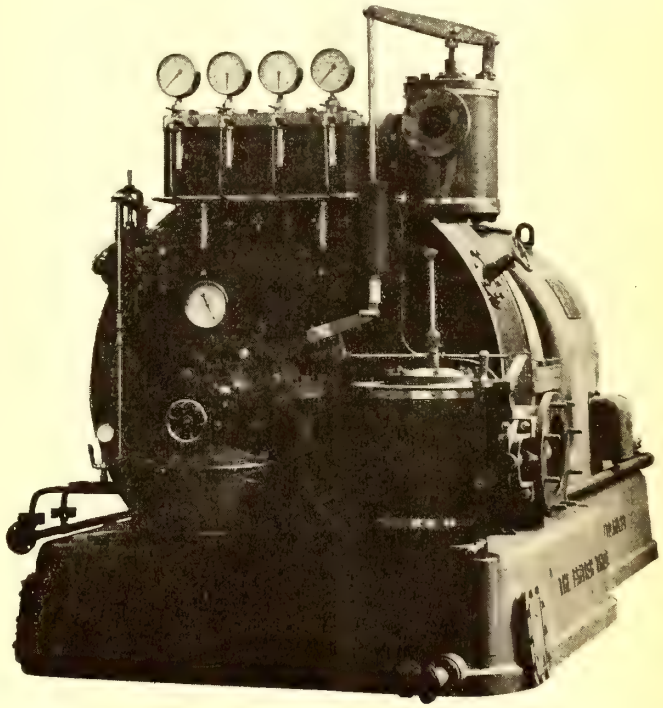
Foreign engineers have recently been giving a great deal of attention to the subject of exhaust and mixed pressure turbines, and most of the manufacturers of turbines have put machines of this type on the market. Some power-users do not always realize that theoretically about as much work is available when saturated steam is expanded from 1 lb. above the atmosphere to a vacuum of 28 in. as when expanded from 150 lb. to the pressure of 1 lb.; yet in the latter case the b.t.u. per lb. are about 175 and in the former 170. When an exhaust steam turbine is used with non-condensing engines of course the economy is the maximum, but a considerable increase in output can be secured by installing a turbine between the engine and the condenser.

The British Thomson-Houston Company manufactures both low-pressure and mixed-pressure turbines of the Curtis type, as well as standard turbines.

The "exhaust" turbine is provided with a low-pressure stage only, and is used when the turbine is required to operate principally or entirely with steam at about atmospheric pressure, but it is also fitted with an auxiliary valve under the control of the governor for admitting high pressure steam, either for starting up or when the low-pressure steam supply is insufficient.

The "mixed-pressure" turbine has both high and low pressure stages, similar to an ordinary high-pressure turbine, but an additional inlet is provided to the low-pressure stages, so that the turbine can make use of all the exhaust steam available at about atmospheric pressure, and the turbine is also arranged to utilize high-pressure steam with any degree of superheat in case the supply of exhaust steam fails, or is not sufficient to drive the alternator at its rated load. The turbine is fitted with an automatic governor gear so arranged that, when the exhaust steam supply fails or is reduced in quantity, the high-pressure side of the turbine is automatically opened, and the efficiency made up by live steam from the boilers. An important feature of this mixed-flow turbine is that the high-pressure steam is admitted when required to a high-pressure stage, without the intervention of a reducing valve, and thus the maximum efficiency possible is obtained from such high-pressure steam as may be used to practically the same degree as in an ordinary high-pressure turbine.

The accompanying illustrations show a side view of a 500-kw mixed-pressure turbine and a view of the rotating element of an exhaust-pressure turbine.



500-Kw Mixed Pressure Turbine

Some particulars of a recent trial test taken on a site in Scotland on a 750-kw Curtis mixed-pressure turbine plant may prove of interest.

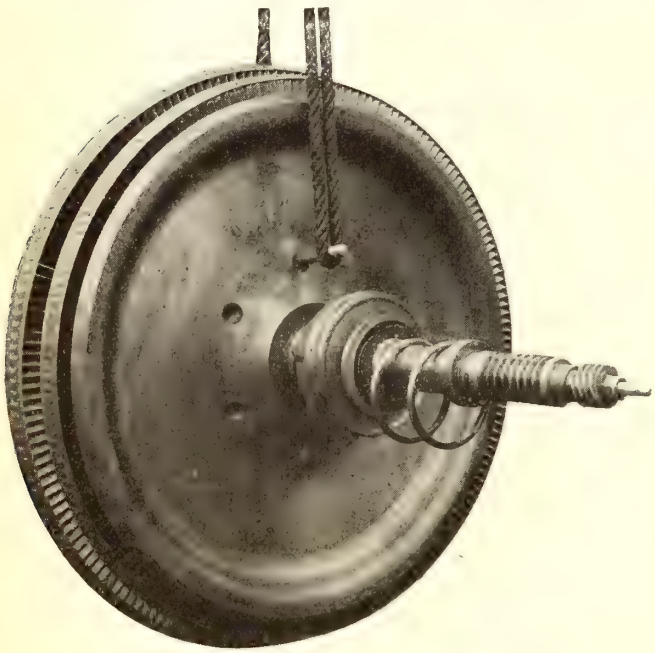
The plant consisted of a mixed-pressure turbine, 3000 r.p.m., three-phase generator, Korting jet condenser and a Rateau heat accumulator.

The tests were principally carried out for the purpose of ascertaining the power available from the exhaust steam. It was found with a few adjustments of the various valves that the steam accumulator would take care of all the exhaust steam and deliver it to the low-pressure stage of the turbine with a pressure difference of 1 lb. in the accumulator. As a vacuum on the intermittently working engines is not permissible, an automatic valve is placed in the pipe between the engines and the turbine, arranged to close if the pressure in the accumulator falls below the atmospheric pressure. From the reading of the instruments it was found that the load varied from 430 to 470 kw on low-pressure steam alone, exclusive of about 50 kw which was generated and delivered to the condenser pump motors.

During the low-pressure test the supply of exhaust steam

was at times insufficient for the load being carried by the generator, and high-pressure steam was taken in by the turbine automatically and without any hunting tendencies, the governing of the set being very steady. A load of 450 kw was repeatedly thrown off and on the set by opening and closing the main oil switch, the governing under these conditions being satisfactory in every respect. The vacuum registered on mercury column 28.3 in. at no load, and 27.3 in. with a load of 450 kw, the turbine using exhaust steam only.

A high-pressure steam test was carried out later; the approximate full load being carried with a steam pressure of 90 lb. and a vacuum of 27.4 in. As in the previous tests an artificial tank load was made use of, so that the load could be readily adjusted to the desired conditions. The wattmeter registered an hourly output of 728 kw, exclusive of the motor load, for the condenser pumps, which was equal to about 50 kw. The set was kept running at this



Rotary Part of Exhaust Pressure Turbine

load till a constant temperature was reached on the generator, the room temperature being 70 deg. Fahr. and the temperature in punchings and windings being 105 deg Fahr., showing a temperature rise of only 35 deg. Fahr. Full load was thrown off and on the machine by opening and closing the main oil switch, the momentary change in speed being 100 r.p.m., or about 3½ per cent.

TOOL STEEL PATENTS DECLARED INVALID

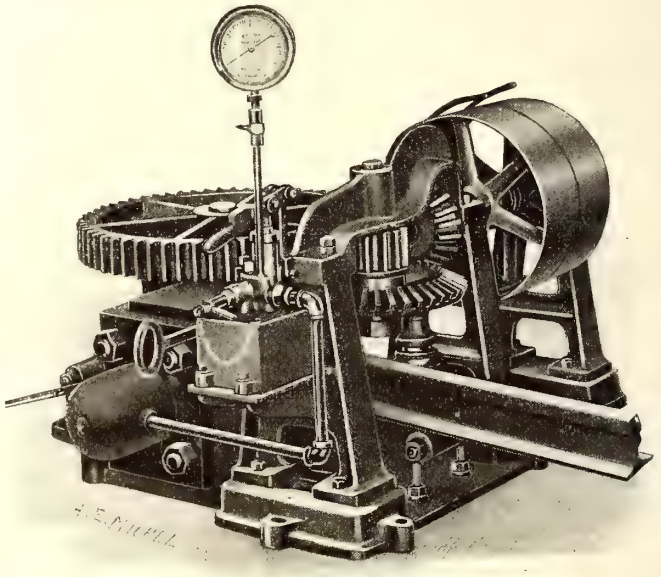
The United States Circuit Court of Appeals has rendered a final decision, declaring invalid all the principal claims of United States patents Nos. 668,269 and 668,270, relating to the composition and heat treatment of high-speed tool steels. The claims in these two patents, which were issued Feb. 19, 1901, were extremely broad, covering substantially all steels used for cutting tools in the composition of which chromium and tungsten or molybdenum appear, and to all steels heated to a temperature of 1725 deg. Fahr. or higher in the process of tempering.

The Liverpool tramways committee is disinfecting all cars at the end of each trip with a solution of chloride of mercury, applied by means of a force pump and spray.

A POWERFUL RAIL BENDER

The use of power may effect a considerable saving of time in bending large numbers of rails. With an ordinary hydraulic bender two men will bend, say, 40 30-ft., 90-lb. rails in a day, and six men, with the best of screw benders, cannot do the same work on more than 20 rails per day. The Watson-Stillman power bender shown in the illustration, when once adjusted, bends such rails at the rate of about one per minute, and is suitable for rails of any section. It has been used a great deal on construction work, as, in addition to having great capacity, the machine can be loaded onto a car and taken out into the field. A 15-hp motor is employed for driving. Where electric power is not available, the machine is furnished with belt drive. In either instance there is little manual labor required, and the solidity of the heavy cast-steel base insures a regularity of curvature not so easily obtained with a hand-operated bender.

The power-driven bender roll is mounted in a frame which is forced forward by any pressure up to 50 tons as



A Powerful Rail Bender

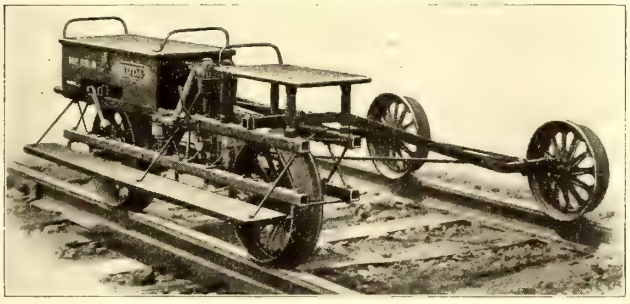
required to give the desired curvature. This pressure is obtained from a hydraulic cylinder, receiving its power, in turn, from a small hand pump mounted on the frame. The two fixed roll centers are 34 in. apart. A set of bending rolls, three for A.S.C.E. standards and six for other sections, is required for each shape of rail to be bent. The outer bending rolls are changed by loosening set screws and pulling out the pins. The ram holding the middle bending roll can be worked in and out by a lever without the aid of the pump, if the release valve is open. The pump is therefore necessary only when the ram is under load.

The bending is facilitated by providing roller runways to support the ends of the rail as it passes through the machine. For this purpose the Watson-Stillman screw jack rolls will be found convenient, as they permit adjustment to the correct height when set on uneven ground.

The report of the Glasgow Corporation Tramways for the year ending Dec. 31, 1908, shows gross earnings of $4,329,842, and operating expenses of $2,452,246. A total of 221,744,569 passengers was carried, and 20,802,797 car miles run. The average fare charged per passenger mile was 0.9 cent; average fare per passenger, 1.926 cents.

NEW TYPE OF MOTOR VELOCIPEDE

A three-man velocipede motor built for heavy service, such as construction and line repair work, has been placed on the market by the Buda Foundry & Manufacturing Company, Chicago, Ill. It is known as the No. 12 A. The other types of motor velocipedes made by the company have a 2¼-hp engine, but the No. 12 A has a 4-hp engine, and is not equipped with the hand propelling lever used on the other types of car. All the sills are of square steel

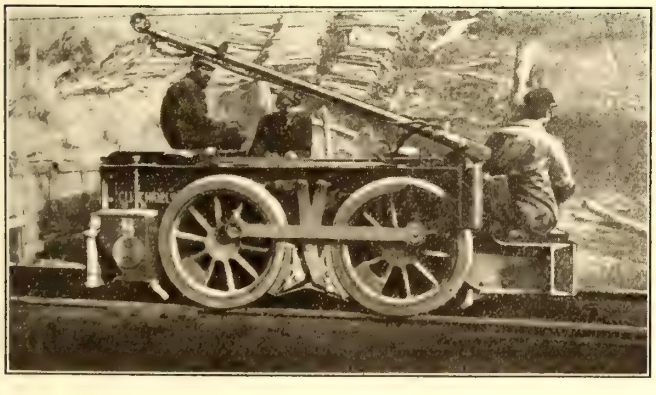


Three-Passenger Motor Velocipede

tubing held in position by iron X-bracing bolted. The guide arms are likewise of steel tubing. The car is what might be termed all-steel construction, only the seats, tool box and footboard being of wood. The steel construction adds only slightly to the weight of the car, but increases its strength considerably. In the one and two-man motor velocipedes made by the company, the two lower sills only, which carry the engine, are of steel tubing, this being considered sufficient for the service the cars are intended to perform.

AN ELECTRIC MINE LOCOMOTIVE

The Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., and the Baldwin Locomotive Works, Philadelphia, Pa., have built jointly a new type of electric locomotive, shown in the accompanying engraving. It is of the "gathering type," and a single powerful motor performs the functions of both propulsion and operation of the gathering reel. The design has been patented by J. M.



Gathering Type Electric Mine Locomotive

Roan, general manager of the Clinchfield Coal Corporation, who is a practical mine operator. The traction wheels or the gathering reel may be operated either independently or simultaneously, winding up the rope while the locomotive is moving. This arrangement secures flexibility, compactness and reduced amount and cost of electrical apparatus. When loaded cars are to be hauled from the working face to the butt heading, on which the locomotive stands, the rope is paid out and attached to the cars. The clutch on the main driving motor is then disconnected from the axle and connected to the reel which winds up the rope, drawing the car toward the locomotive which stands, with its brakes set, on the heading track. Many applications have suggested themselves for the combined tractive and hauling-in actions secured from the motor. Derailed cars may be easily placed on the track, timbers and rails recovered from under falls of rock, rails loaded on cars, or the reel can be used for any kind of general hoisting work. The motor transmits its power, through a single spur gear, directly to one axle. The two axles are connected together by side rods spaced 90 deg. apart.

IMPULSE TYPE STEAM TURBINE

The E. W. Bliss Company, Brooklyn, N. Y., has placed on the market a steam turbine on which it has been experimenting for several years past. The turbine is being manufactured in all sizes from 10 kw to 1000 kw, and the designs include machines for both condensing and non-condensing service, and also for utilizing the exhaust steam from reciprocating engines. The exhaust steam turbine is especially adapted to manufacturing plants running at present through direct drive from a steam engine where plant extensions are contemplated. The exhaust steam machines are built in sizes from 75 kw to 1000 kw.

The general construction of the turbine is shown in the engraving. The casing is of cast iron, having the steam chest radially inward to each of the nozzles. An even temperature is maintained around the circumference, which does away with the necessity of having to bring any of the steam outside of the casing and then back into it again. This is a very important point in the successful operation of the machine, as it is sometimes desired to look inside of the machine, and if it is necessary to break several steam joints much trouble and annoyance are caused.

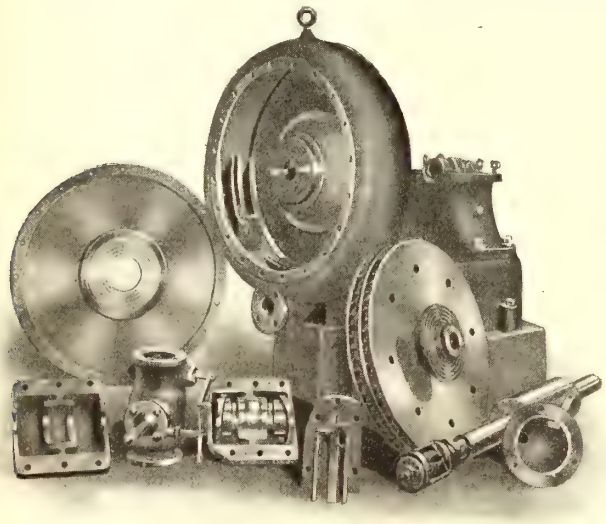
The rotor, or turbine, wheel is made of one solid piece of open-hearth steel, which has the bucket seats milled into the periphery. The buckets are separated from each other by sheets of a special anti-corrosive metal, which are held in place by three steel bands shrunk on over the periphery. This method of construction makes a solid unbroken surface on the periphery of the wheel with no projecting parts, yet the wheel is as indestructible as if no separating pieces were used, and has not the disadvantage of requiring a new wheel in case of any trivial accident like the damaging of a single bucket in transportation or handling. The running clearance is 1/16 in., so that the machine cannot be considered delicate in this particular, and the construction is such that if by any combination of circumstances the turbine wheel should touch the casing, it would be a case of two smooth surfaces rubbing, like a brake shoe on a car wheel, and would cause no damage.

The steam is expanded completely in the nozzles, so that there is no difference in pressure between the buckets in the wheel and the reversing chamber, and consequently no loss from leakage. The reversing chamber is common for all reversals, so that the steam runs on a film of steam instead of on metal, which greatly reduces the frictional losses, as the relative difference of velocity in each layer of steam with respect to the next is very small, whereas with separate reversing chambers the steam velocity relative to the metal is exceedingly high, and therefore causes large frictional losses, as the friction is very nearly proportional to the square of the relative velocities. The number of times which the steam is used on the wheel depends upon the steam pressure and the speed of the buckets, and in this

form of nozzle the steam continues to strike the wheel as long as there is any energy in it.

In most designs the rotor is overhung, primarily in order to make a two-bearing unit for fan, pump and generating sets; but four bearing units are built when desired by the customer and on all large machines. The center of gravity of the rotor is inside of the edge of the main bearing. This bearing is of the spherical type, and is designed with generous proportions.

As the only parts of the turbine requiring lubrication are the shaft bearings, it is absolutely impossible for any oil to become mixed with the exhaust steam. The method of oiling the bearings is by a ring oiler, which gives a positive feed lubrication without the use of an external pump. The oil is held in a rapidly revolving channel-shaped ring by centrifugal force, and is diverted to the bottom of the bearings by means of a scoop. This produces a positive oil pressure in the bearing at all times, whereas in the ordinary ring oiler most of the oil flies off from the ring, and very little is actually forced to the bottom of the bearings, where the greatest pressure and need of lubrication exist. Around the shaft is a steel labyrinth packing in which there is no contact between the stationary and rotating rings of the labyrinth. The packing prevents excessive frictional losses and does away with the trouble attendant with carbon packings or stuffing-box packings placed around a high-speed shaft.



Parts of Impulse Type Steam Turbine

The governor is of the centrifugal type, and consists of two revolving weights supported on hardened steel knife edges, and controlling a balanced governor valve through knife-edge connections. In addition to the main governor there is an emergency governor entirely independent and operating a separate valve. This emergency governor is set at a predetermined speed above normal, and in case of any possible overspeed of the turbine for any reason whatever, the emergency valve will be closed and the machine stopped.

Under the same conditions of steam pressure, back pressure and speed, the primary losses in efficiency in any turbine are caused by steam friction and leakage. In the Bliss turbine as the steam is expanded down to the back pressure in the nozzle, there is no difference in pressure between any part of the wheel and the reversing chambers, which makes it possible to run the machine with a very large clearance between the rotating and stationary elements, and still have no loss.

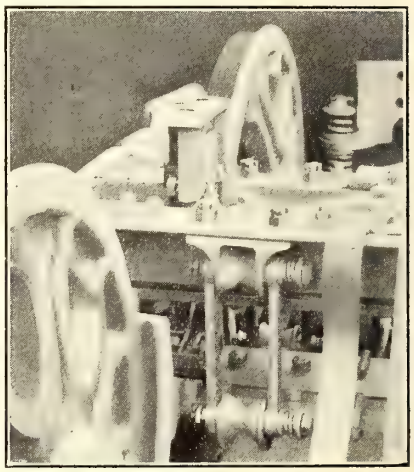
SELF-ADJUSTING, NON-CHATTERING TRUCK BRAKE HANGER

The accompanying engravings illustrate the construction and application of a new form of self-adjusting, noiseless brake hanger made by the J. G. Brill Company and known as the "Half-Ball" hanger. It does not require the use of adjusting nuts, which have defeated the purpose of most noiseless brake hangers, and is not only self-adjusting for wear of the hanger parts, but also for changes in the relative position of brake shoe and wheel, due to wear or strain on curves and uneven track. The wearing surfaces of the hanger are self-cleaning, so that there is no tendency for dirt to lodge and cut the metal.

The hanger consists of a pair of hanger forgings with half-ball ends. The ends are held firmly in hemispherical sockets, a spiral spring on a bolt, which is in tension against the spring, being utilized for each pair of hanger ends. These comprise all of the parts of the hanger. The half-ball ends of the hanger forgings are milled and the hemispherical sockets of the malleable castings into which they fit are reamed, providing a perfect fit. The load and all movement, and consequently all wear, are brought upon the two finished surfaces, for the bolt which passes through the malleable socket casting and the hanger ends, and on which the compression spring is placed, serves entirely as a compression member for the spring and carries no other load, and is never in shear. In fact, the hole in the socket casting through which the bolt passes is ⅛ in. larger than the diameter of the bolt. It is this feature which allows a slight torsional movement and makes the hanger self-adjustable for brake shoes and wheel wear and for any lateral motion of the wheels on curves. The compression spring which holds the two hanger forgings in their sockets serves also to take up the wear between the parts.



Half-Ball Brake Hanger



Half-Ball Brake Hanger Applied to Brill 27-G Truck

This hanger is adaptable to any type of truck with either inside or outside hung brakes. One of the illustrations shows its application to a Brill 27-G truck. The hanger has been patented in the United States, as well as in foreign countries.

Traffic on the tube lines of the Underground Electric Railways of London has shown a satisfactory increase for 1908 over 1907, accompanied by a marked reduction in operating expenses. In 1907 the ratio of operating expenses to gross earnings was 67.9 per cent, while in 1908 this was reduced to 54.5 per cent.

ELECTRIC RAILWAY LEGAL DECISIONS

LIABILITY FOR NEGLIGENCE

Alabama. — Carriers—Injuries to Passenger—Pleading—Negligence — Instructions — Damages—Nominal Damages for Loss of Earning Capacity.

Where, in an action for injuries to a passenger, the relation of passenger and carrier is averred, it was not essential that the negligence imputed to defendant's servants should be alleged to have been the result of acts within the scope of their duties.

It is not negligence in all cases, as a matter of law, for a passenger to step off a moving car at right angles therewith, since the speed of the car must materially influence the determination of the question.

In the absence of special circumstances, it is not negligence as a matter of law for a passenger to attempt to alight from a moving car.

Where the complaint, in an action for injuries to a passenger in alighting from a car, predicated a recovery on a jerk, resulting in the throwing of plaintiff to the ground. charges pretermitting consideration of this issue, and assuming that as a matter of law it is negligence to attempt to alight from a moving car, were properly refused.

In an action for injuries to a passenger while alighting from a car through an alleged negligent jerk thereof, an instruction that, if plaintiff got off the car at a place where it was not usual to discharge passengers, it was not negligence for defendant's servants to cause the car to suddenly jerk, was properly refused, since, if not otherwise bad, it hypothesized the departure of plaintiff from the car, whereas, if so, the jerk of the car could not be negligent under such circumstances.

Where, in an action for personal injuries, there was no evidence on which to base a conclusion as to loss of earning capacity from the injury, the court should have charged that plaintiff could recover only nominal damages for loss of earning capacity.—(Birmingham Ry., Light & Power Co. v. Harden, 47 S. Rep., 327.)

Georgia.—Railroads—Injury to Person Near Track—Contributory Negligence.

One who knowingly and voluntarily takes a risk of injury to his person or property, the danger of which is so obvious that the act of taking such risk, in and of itself, amounts to a failure to exercise ordinary care and diligence for his own safety and that of his property, cannot hold another liable for damages from injuries thus occasioned.

Applying this rule to the testimony of the plaintiff and that of the other witnesses introduced in his behalf, and considering all the testimony in the light most favorable to him, a verdict in his favor was without evidence to support it.—(Southern Ry. Co. v. Hogan, 62 S. E. Rep., 64.)

Illinois.—Trial—Remarks of Trial Judge—Misleading Remarks—Appeal and Error—Harmless Error—Exclusion of Evidence—Facts Otherwise Established—Prejudicial Error—Street Railroads—Actions for Injuries—Evidence—Admissibility—Descriptive Evidence—Contributory Negligence—Attempting to Board Car—Effect—Misleading Instructions.

In an action for personal injuries by being run over by a street car in the night time, where a witness testified that there was a light at the intersection of the streets where plaintiff was injured and he saw something near the cars, there being a lead car and a trailer, but could not tell whether it was a boy, and shortly thereafter saw a shadow falling very close to the cars, and was then asked what, if anything, he saw come from between the cars, which was objected to and sustained by the court, the trial judge stated that though the witness testified to seeing a shadow, it was not in the manner stated by the question, and the form of the question was thereafter changed, the court's remarks on sustaining the objection were not improper as tending to mislead the jury.

A witness testified that on the evening plaintiff was struck by a street car he saw something near the passing cars at a street corner, but could not tell whether it was a boy, and shortly thereafter noticed a shadow falling near the cars, there being a motor car and a trailer, and that he recognized the conductor on the trailer, and a question asked by defendant as to what, if anything, did he see come from between the cars, was excluded; and defendant insists that it was injured by the exclusion of this question because, as it was impossible to determine which car or set of cars caused the accident, if the question could have been asked to find out how long it was after the witness saw the shadow before he saw the conductor on the trailer, the car causing the accident, could have been determined. Held, that the objection was untenable, where, after the exclusion of the question by the court, the witness testified fully on the subject, and said the car had gone on 10 ft. or 15 ft. after the accident before he saw the conductor.

In an action to recover for injuries resulting from plaintiff being struck by a street car at night, where a witness testified that he saw a shadow falling near the cars, and all he thought the shadow was, was the boy as the car went up, what the witness "thought" was properly stricken out, and its exclusion was not prejudicial to defendant; wide latitude in the examination of the witness having been allowed, and the subject having been covered in detail several times.

In an action to recover for injuries to plaintiff by being struck by a street car, a witness testified that at the time he saw a flash of electricity and thought he saw something roll, but was not sure, which answer was objected to because it was "not descriptive," and the objection overruled. Held, that the question was not objectionable on the ground stated at trial.

In an action to recover for injuries received by being struck by a street car, if plaintiff was injured while attempting to jump on the car, he could not recover, and it would be immaterial whether he went out in the street with the intention to board the car, or whether the intention came to him after he was in the street.

In an action for injuries by being struck by a street car, plaintiff having been struck either by the first car or the trailer, an instruction that, if the front of the first car did not strike plaintiff, he could not recover, was erroneous, even after the trial court eliminated the word "first," where none of the counts alleged that plaintiff was struck by the front of the car, and there was no positive allegation that there was only one car in the train or that he was struck by the first car, as plaintiff would have been guilty of negligence if he had walked into the side of the car and was injured thereby.

While the instruction was improper either with the word "first" inserted or omitted, it would not mislead the jury any more after it was modified than as originally drawn, and defendant was not injured thereby.—(Leighton v. Chicago Consol. Traction Co., 85 N. E. Rep., 309.)

Louisiana.—Street Railroads—Injuries to Persons on Track—Negligence—Acts Constituting—Competent Employees—Motormen.

A motorman of an electric street car who sees a child playing upon one of the sidewalks, and in the discharge of his duty to others, who, for aught he knows, may be in danger, turns his eyes in another direction, is guilty of no negligence in failing to see the child leave the sidewalk and run in the direction of the approaching car, and where it appears that he saw the child a moment afterward running toward the track, but too late to enable him to stop the car, though he did all that could then be done to stop it, the blame for the resulting tragedy cannot be laid at his door.

Where, in the case presented for decision, the evidence leaves no room for doubt that the motorman did all that the most competent motorman could have been expected to do to avert the accident, the question whether, under other circumstances, he would have done as much, or by reason of his youth and alleged inexperience, would have been unequal to an emergency with which he might have been confronted, becomes irrelevant.

There appears to be nothing in the handling of an electric street car which demands that a person, otherwise competent, should have more instruction and experience than may be acquired during four months' service as conductor and one month's service as motorman.

A motorman should be cautious, alert, and physically capable. Alertness and physical capacity are as likely to be possessed by a youth of 17 as by an older person. Caution is, ordinarily, the attribute of age, and where, as in the position of motorman, caution is required, and human life depends upon its exercise, the employment of one who has not attained the age at which, by consensus of opinion, the judgment is sufficiently matured to enable him to assume the administration of his own affairs, is hazardous, and, if disaster follows, throws upon the employer an additional burden of proof.—(Cloud et ux. v. Alexandria Electric Rys. Co., 46 L. Rep., 1017.)

Massachusetts.—Witnesses—Cross-examination—Purpose—Carriers—Injuries to Passengers—Right to Board Car—Wanton Attack.

In an action for injuries to a passenger the court did not err in allowing plaintiff to cross-examine defendant's conductor as to his understanding of the rules of the road, to show that the conductor's failure to make a report as required by the rules was because a truthful report would have shown his own misconduct, and that his testimony at the trial was not, therefore, entitled to credit.

In the absence of an offer to accept plaintiff as a passenger after a car had started, the conductor was entitled to refuse to permit plaintiff to board the car, and after such refusal to use a reasonable degree of force to prevent plaintiff from boarding and entering the car, and for that purpose to lay hands on him and interfere with his person, using no more force than was necessary.

A conductor, though entitled to use reasonable force to prevent a passenger from boarding a car after it had started, had no right to use excessive or unreasonable force, or to wantonly attack such intending passenger.—(Sullivan v. Boston Elevated Ry. Co., 84 N. E. Rep., 844.)

Missouri.—Carriers—Injury to Passenger—Contributory Negligence—Instructions.

Where, in an action against a street railway company for injuries to a passenger received by his being knocked from the inner footboard by collision with a passenger on the inner footboard on a car going in the opposite direction, the issue as to plaintiff's contributory negligence was sharply presented by the pleadings, and there was substantial evidence introduced tending to establish plaintiff's negligence, it was proper to instruct that it was the plaintiff's duty in going upon the inner footboard to exercise such care as the position rendered reasonably necessary to prevent his being struck by passengers on the car, or by the car passing on the other track, and, if he could by standing upright thereon have avoided being struck by a passenger on or by the passing car and failed to do so, in consequence of which he was injured, he is not entitled to recover.—(Simonton v. St. Louis Transit Co., 106 S. W. Rep., 46.)

Missouri.—Master and Servant—Injuries to Servant—Negligence—Assumed Risk—Negligence of Master—Contributory Negligence.

Where plaintiff, a street railway motorman, was injured in a collision, caused by the motorman of the colliding car being unable to stop it, owing to defective brakes, of which defendant had notice some three days prior to the injury, defendant was negligent in failing to perform its duty to exercise reasonable care to provide efficient brakes.

A street railway motorman injured in a head-on collision on a single track did not assume the risk incident to the inability of the motorman of the colliding car to stop the same, because of the negligently defective condition of the brakes with which it was equipped.

Owing to a washout, the two tracks of a street railway were temporarily placed on the same ties for a distance of 425 ft., so that cars could not pass on such section. West-bound cars had the right of way. Owing to an obstruction to the vision, a motorman approaching the single track from either end could not see a car at the other end, so that another order was promulgated that a motorman in charge of an east-bound car should proceed over the track, if no car coming from the opposite direction was in sight. Plaintiff, in charge of an east-bound car, stopped at the west approach of the single track, saw no car ahead, and proceeded slowly until within 150 ft. from a point where the tracks diverged at the east end, when he saw a west-bound car approaching. He believed that the west-bound car would stop to enable him to pass, but the motorman was unable to do so, and a collision resulted after plaintiff had stopped his car, owing to defective brakes on the colliding car. Held, that plaintiff was not negligent.—(Garner v. Metropolitan St. Ry. Co., 107 S. W. Rep., 427.)

New York.—Carriers—Injury to Passenger—Collision of Car and Runaway Team—Negligence—Municipal Corporations—Streets—Collision of Runaway Horse—Evidence—Trial—Dismissal.

A street railway is not liable for injury to a passenger from collision of a car and a runaway team, though the motorman was signaled to stop, there being nothing to show that stopping would have prevented the accident, at least nothing to show that the motorman had reason to believe it was safer to stop than to attempt to run the car forward out of the way of the team.

Evidence in an action for injury to plaintiff while on a street car from collision of defendant's runaway horse held sufficient to go to the jury on the question of defendant's negligence in intrusting a green horse to an inefficient driver, and in not having a proper harness for it.

There being in an action for injury to plaintiff while on a street car from collision of defendant's runaway horse some evidence tending to show negligence of defendant in intrusting a green horse to an inefficient driver, and in not having a proper harness for it, it was error for the court on setting aside the verdict, as in its discretion it might, to dismiss the complaint.—(Ellis v. New York City Ry. Co. et al., 111 N. Y. Sup., 544.)

New York.—Carriers—Carriage of Passengers—Duty to Avoid Collision—Verdict—Correction by Jury.

A street car company owes to its passengers the duty to exercise ordinary care to avoid collisions with vehicles, and the fact that the driver of a truck which collides with a car is himself negligent does not relieve the company of the charge of negligence.

In an action against a street railroad company and the owner of a truck for injuries where a verdict of $500 against each defendant was returned, the court properly had the jury correct it by returning it against the defendants jointly for the full amount of the plaintiff's damage.—(Hanley v. Brooklyn Heights Ry. Co. et al., 111 N. Y. Sup., 575.)

New York.—Carriers—Injury to Passenger—Street Cars—Contributory Negligence.

As a street car approached the corner of a street, plaintiff signaled the conductor that he desired to alight. The conductor nodded his head, and plaintiff went onto the platform and then stood on the step, waiting for the car to reach the corner. He had one foot on the step and the other in the air, his hand on the rail, while the car was still between blocks, and as it suddenly accelerated its speed plaintiff was thrown off. There was no evidence that the conductor had signaled the motorman to stop at the corner, nor that the car prior to the accident had slowed down to enable plaintiff to alight. Held, that plaintiff voluntarily placed himself in a position of danger and was chargeable with contributory negligence.—(Bachman v. Union Ry. Co. of New York City, 111 N. Y. Sup., 586.)

New York.—Street Railroads—Collision—Negligence—Contributory Negligence.

In an action against a street railway company for the death of a horse in a collision with a car, evidence held to warrant a finding that the company was negligent, and that the driver of the horse was free from contributory negligence, authorizing a recovery.—(H. Koehler & Co. v. Brooklyn Heights Ry. Co., 111 N. Y. Sup., 600.)

Washington.—Street Railroads—Collision with Vehicle—Action for Injuries—Instructions—Negligence—Pleading.

In an action against a street railway company for injuries caused by a car striking a wagon, an instruction that running the car at a higher speed than allowed by ordinance would be negligent was not erroneous as declaring that failure of the driver of the wagon to avoid the collision, if he could have done so by exercising ordinary care after seeing the car, would not relieve the company of liability, where the court instructed that the driver was bound to exercise ordinary and reasonable care, and that, in the absence of such care, recovery could not be had.

It is negligent for a street railway company to run its cars at a speed exceeding that allowed by law.

If a street railway company, sued for injury caused by its cars striking a wagon while being run at a speed exceeding the lawful speed limit, desired to rely on facts justifying the excessive speed, it should have pleaded such facts.

An instruction that, if the car was running at an ordinary rate of speed—that is, not exceeding 12 miles per hour—and that plaintiff suddenly and without warning imprudently drove upon the track in close proximity to the car, plaintiff did not exercise ordinary care, was not erroneous, as instructing that, if the 12-mile speed limit was exceeded, the car was not running at an ordinary rate, and as making immaterial other instructions as to plaintiff's duty to observe care, especially in view of instructions that he could not recover unless he exercised ordinary care.—(Engelker v. Seattle Electric Co. Schmidt et al. v. Same, 96 Pac. Rep., 1039.)

CHARTERS, FRANCHISES AND ORDINANCES

Arkansas.—Municipal Corporations—Ordinances—Effect—Electricity—Injuries—Wires in Street—Negligence—Violation of City Ordinance—Actions—Evidence—Trial—Remarks of Judge.

An ordinance authorized by statute has the force of a statute within the city.

The failure of a street railway company and a telephone company to comply with an ordinance prescribing the minimum height and distance from each other that their wires shall be maintained, prima facie shows their negligence, in an action for injury caused by a live wire, resulting from a trolley pole leaving the trolley wire and breaking an overhead telephone wire.

In an action against a street railway company and a telephone company for injury caused by a live wire, resulting from a trolley pole leaving the trolley wire and breaking a telephone wire, due to a violation of an ordinance

prescribing the height and the distance from each other that their wires should be maintained, the telephone company having asked a witness whether a trolley pole would go straight up on being released from the trolley wire, it was not prejudicial to the telephone company for the judge to state that the testimony was immaterial, that the street railway company could operate the trolley in the most practical way, and that, if the telephone company was required to place its wires a certain distance above the trolley wire, and the length of the car and the height of the pole would not reach that requirement, it would not be negligent for the street railway company to allow the pole to "fly up there," since, even if each company's negligence was distinct, and they were not joint tort-feasors, as the negligence of each was an efficient cause of the entire injury, each is liable to the full extent of the injury.

But the remarks were prejudicial to plaintiff, as practically telling the jury that the street railway company owed no duty to the public, except that provided by ordinance, whereas it was a jury question whether the company was negligent in not protecting its wire, since it knew that its trolley pole would, at times, leave the trolley wire, and knew, or ought to have known, that the telephone wire was not high enough to prevent the pole striking it on leaving the trolley wire.

In an action against a street railway company and a telephone company for injury caused by a live wire, resulting from a trolley pole leaving the trolley wire and breaking a telephone wire, due to a violation of an ordinance prescribing the height and the distance from each other that their wires should be maintained, it was not error, prejudicial to the telephone company, for the trial judge to state that the company's witness, who had testified as to the height of the telephone wire at the place, did not know anything about it, where the witness had not measured the distance, and merely testified from his judgment after a view, the street railway company's witnesses having testified without contradiction, as to the distance from actual knowledge, and it not being the telephone company's purpose in offering the testimony to contradict such witnesses. —(Southwestern Telegraph & Telephone Co. v. Myane, 111 S. W. Rep., 987.)

Minnesota.—Municipal Corporations — Streets — Obstructions—Rights of Abutting Owners—Special Damages.

The occupation of a street by the construction of a permanent improvement at a point 88 ft. from premises fronting thereon, with the result that pedestrian travel on that side of the street was diverted in other directions, constitutes an interference with the natural property rights enjoyed by the owner.

Held, the construction of a tunnel and its approaches in the street upon which respondent's lot abutted constitutes special damages not suffered in common with the general public.—(Fitzer v. St. Paul City Ry. Co., 117 N. W. Rep., 434.)

New Jersey.—Street Railroads—Rights of Abutting Owner —Removal of Switch—Bill—Equity—Obstruction in Street—Abutting Owners—Remedy at Law—Municipal Corporations—Action by Abutting Owner—Rights in Street—Consent of Abutters—Use of Streets—Grant to Street Railroad—Review—Certiorari—Subject of Relief—Property Rights.

Where the complainant filed a bill against a street railroad company to compel the removal of a switch from the street in front of complainant's property, the bill should have alleged whether complainant owned the title to the middle of the street, so as to indicate whether the suit was based on complainant's property rights in the street or on its rights as an abutting owner.

An abutting owner owning title to the center of the street could not maintain a suit in equity to compel the removal of a street railway switch from the street, on the theory that the switch was laid in the street without authority, since, if such were the fact, complainant had an adequate remedy at law by ejectment.

Unless an abutting owner owns the fee to the middle of the street, he cannot maintain a suit to enjoin a nuisance in the street which injures him only in rights enjoyed by him as one of the public. The Attorney General in such case representing the public must file an information; and this, though the abutting owner would be much more inconvenienced by the nuisance than others.

Act April 21, 1896 (P. L. p. 329), gives the governing body of municipalities the right to grant a franchise for the construction and operation of street railways on highways, and declares that the permission to construct and operate such a railway shall not be granted unless the consent of the owner or owners of at least one-half of the amount in linear feet of property fronting on the streets through which permission to construct, etc., is asked shall be obtained and filed. Held, that the consent required was a limitation on the power of the governing body of the city, and belonged to every owner of property fronting on the streets selected, regardless of ownership to the center of such streets.

Act April 21, 1896 (P. L. p. 329), authorizes the governing body of a municipality to grant a street railway franchise provided that permission to construct a line on any street shall not be granted until the written consent of the owners of at least one-half in amount in linear feet of the property fronting on the street shall be filed. Held, that where complainant's consent to the construction of a street railroad in front of its property, which was necessary to make up the majority in linear feet of property owners to authorize construction on such street, was limited by a provision that no switch should be constructed in the street in front of complainant's property, but, notwithstanding this, the Common Council approved a plan provided for such a switch on the theory that the condition attached to complainant's consent was void, complainant's remedy was by certiorari to review the ordinance; the City Council being authorized to determine such question in the first instance.

Act April 21, 1896 (P. L. p. 329), gives the governing body of municipalities the right to grant street railroad franchises subject to certain consents of abutting property owners. Held, that the right of an abutting property owner to attach a condition to a consent necessary to authorize the construction of a road was a statutory privilege, and not a property right which a court of equity would protect. —(St. Columba's Church v. North Jersey St. Ry. Co., 70 Atl. Rep., 692.)

New York.—Street Railroads—Right of Way in Streets— Appeal and Error—Review—Harmless Error—Instructions.

A street railroad company has not a paramount right of way on every portion of the streets, except at adjoining streets, but has only a paramount right upon its tracks and for a sufficient space for the cars to pass, and beyond that has no greater rights than any other person using the highway.

In an action for injuries caused to a passenger by reason of a collision between a street car and a truck, defendant could not complain of a charge that it was the motorman's duty to stop the car only at the time he saw the truck driver going to go on the street car track, since the motorman's duty was not necessarily measured by the time he saw the truck moving onto his track; but his duty was to see it moving as soon as he could do so, in the exercise of that degree of care which the law exacts for the carrying of passengers.—(Newman v. New York & Q. C. Ry. Co., 111 N. Y. Sup., 289.)

Washington.—Street Railroads—Ordinance—Street Railway Franchise—Enactment—"Legislative Authority of City"—Statutory Provisions—Ratification by Voters— Necessity—Municipal Corporations—Charter Amendment.

The term "legislative authority of a city," as used in Laws 1903, p. 364, c. 175, as amended by Laws 1907, p. 192, c. 99, providing that the legislative authority of a city having control of any public street shall have power to grant authority for the construction of street railways thereon, of which the motive power is other than steam, and to prescribe the terms and conditions, and in Const. art. 11, § 10, providing that city charters may be amended by proposals therefor, submitted by legislative authority of the city to the electors thereof, etc., and in numerous statutes, means the mayor and council, and hence the mayor and council had the sole power to prescribe the terms on granting a street railway franchise; and an ordinance passed by the city council, and approved by the mayor, granting such a franchise; and an ordinance passed by the city council, and approved by the mayor, granting such a franchise is valid, notwithstanding an amendment to the city charter requiring the council to submit street railway franchises to the voters for their approval.

Laws 1903, p. 364, c. 175, as amended by Laws 1907, p. 192, c. 99, giving the legislative authority of a city having control of any public street the power to grant authority for the construction of street railways thereon, and to prescribe the terms and conditions, limit the power granted by the direct amendment statute (Laws 1903, p. 393, c. 186), for, while the latter authorizes the city to amend its charter, it cannot do so in such a manner as to override a statute of the Legislature, intended to deal specifically with the subject-matter in question; and hence amendments adopted under the direct amendment act, requiring submission of street railway franchise ordinances to the voters, are invalid.—(96 Pac. Rep. 1033.)

LONDON LETTER

(From Our Regular Correspondent)

From a report that it has just issued it would appear that the Great Eastern Railway, with its immense terminus at Liverpool Street and its large London suburban traffic in the north and northeastern districts, has lost about 25,000,000 passengers per annum since the advent of the London County Council tramways. The company has been frequently urged to electrify portions of its suburban routes, but, like all the other railways, it is awaiting the result of the electrification of the Brighton line. It cannot be said, however, that the company has made no effort to recover the lost traffic, for it has reduced fares from 10 per cent to 30 per cent and even 40 per cent. It is practically impossible for the company to increase the size of its railway station, but it has within the last few years lengthened its trains, widened its carriages and narrowed the space between the carriages.

The annual report of the tramways committee of the Manchester Corporation shows a total revenue for the year of £784,000 and a profit of more than £279,000. The committee has appropriated £70,000 for the relief of rates and has placed £76,000 to reserves, renewals and depreciation account. The average receipts per car mile are 10.87d., and the average working expenses slightly more than 7d. The parcels department handled nearly 700,000 bundles during 1908-9. The revenue from this source was £7,000 and profits more than £1,700.

The report of the tramway committee of the Glasgow Corporation has also been issued. It shows a total income of £892,000 with a balance of £387,000. After providing for interest, sinking fund and depreciation and after paying £50,000 to the Common Good Fund of the city, there is a net balance of £16,000, which has been carried to reserve. This shows a reduction of about £18,000 in the receipts, attributed to the depression in the city. The revenue per car mile is 10.26d. and the operating expense 4.83d.

The Newcastle Tramway has not been as profitable as was anticipated, and the corporation has placed five cars at the disposal of five different advertising contractors, who have had them fitted up with advertisements according to their own ideas, and put in service. It is estimated that should the committee decide in favor of accepting advertisements, it would mean an additional revenue of between £3,000 and £4,000 per annum.

The Board of Trade arbitrator has decided that £72,000 and costs, which amount to £5,000, is the price to be paid by the Urban District Council of Handsworth to the City of Birmingham Tramway Company for the portion of the cable route from Hockley to New Inns. The lease of the cable route, which extends from the center of Birmingham to New Inns, expires in 1911, after which the portion in the city will be electrified, leaving the Handsworth District Council to deal with that part of the road within its jurisdiction.

The Edinburgh Tramway Company is now exacting a charge for parcels and personal luggage carried by passengers and for dogs. The conductors' estimate of the weight and bulk of the parcel is taken as decisive, and luggage and parcels are paid for whether left on the platform or not. A golfer has been charged for the clubs which he carried, and another passenger has been charged for carrying a traveling rug. It is not the intention of the company to charge for such small articles, however, and the charges were exacted only because the employees misunderstood the instruction. The company will charge postmen who collect the mail and ride to the General Post-office with their heavy pouches, dairymen who use the cars instead of milk wagons, and fruit and flower merchants who in the morning use the cars to transport their merchandise. Parcels weighing less than 28 lb. are to be exempt, as are also workmen's tools. A clergyman sought recently to construe the last exception to mean than he should not be required to pay for a parcel of theological books, claiming that they were his working tools.

The tramways committee of the Edinburgh Town Council has replied favorably to a letter asking whether it would support a tramway from Edinburgh to South Queensferry. Rosyth will shortly be made a naval base and the prospect is that there will be considerable traffic between Edinburgh and South Queensferry. A line is proposed on the north side of the Firth from Kirkcaldy to North Queensferry, and the tramways committee is desirous of working in harmony with this proposal.

Amicable arrangements have been made by the Rochdale, Heywood and Bury corporations for the inter-running of cars, and these busy centers will soon enjoy the benefits of such a service. Each borough will take the earnings in its own district on the basis of the stage system. The agreement will be in perpetuity, Heywood to have the opportunity of terminating it at the end of every 10 years, though should the agreement be terminated Rochdale and Bury are to have running powers through Heywood into the other's district.

The Liverpool Corporation's plan to construct a tramway to Huyton was opposed by the London & North Western Railway. At the hearing before the Parliamentary committee the evidence showed that four members of the Parliamentary committee which was considering the matter were shareholders of the opposing railway. The corporation, however, did not view this circumstance as prejudicial to a fair investigation, and its view of the case was amply justified, as the committee found in favor of the bill and reported it to the House for third reading.

The Leeds Corporation has completed an extension of its tramways to Guiseley at a cost of between £50,000 and £60,000. The line is more than 9 miles long and the fare is 5d. A tramway was needed in the district, but the corporation was criticized for building the road as the prospects are that it will not pay for some time. To guard against any possible loss, the local district Councils of Rawden, Yeadon and Guiseley have jointly agreed to contribute £400 per annum to the company for a period of 11 years.

The London County Council was recently threatened with a strike of its tramway employees, and asked the Board of Trade to assist in the formation of conciliation boards, a plan suggested by Winston Churchill. The employees have decided in favor of the plan, and steps will be taken by the Board of Trade to conduct the election of the employees' representatives to such boards. The board will be composed of six representatives of the Council and six representatives of the employees. The Board of Trade will also have supervision over the interests from both points of view.

The London County Council has recently placed a contract for 200 tramcars, which are required for the routes being electrified and now rapidly approaching completion. The contract for the cars and the trucks was placed with Hurst, Nelson & Company, Motherwell. The British Westinghouse Company received the contract for the equipments.

The Corporation of London has decided to spend nearly £2,000,000 in the construction of a new bridge across the Thames and in improving Southwark Bridge. It is estimated that the new bridge will cost £1,647,000, while the improvements to Southwark Bridge will cost £231,000. The new bridge will be known as St. Paul's. It will be located between Southwark Bridge and Blackfriars Bridge, and it is intended that it shall accommodate tramways, so as to make another link between the north and the south. The tramways will be able to cross Newgate Street to Aldersgate Street, there joining the existing system of tramways in north London.

The construction has just been completed of the new tramway from Southgate to Enfield for the Middlesex County Council. The tramway connects Enfield Town with Southgate, Wood Green and Finsbury Park station, and forms a valuable addition to the portion of the extremely large system of tramways and light railways the Middlesex County Council has been constructing for six or seven years. At the meeting of the Council on June 25 a tender of £45,500 was accepted for the line from the Great Eastern Railway station at Enfield to the main Hertford road which will bring Enfield in touch with Waltham Cross, Edmonton, Tottenham, Stamford Hill and Finsbury Park stations. At the same meeting it was also resolved to extend the Edgware-road tramway from Cricklewood to Bridge-terrace, at an estimated cost of £150,000.

The report of the directors of the British Electric Traction Company, Ltd., and a statement of accounts for the year ended March 31, 1909, state: "The net profit after reserving £12,500 against depreciation of undertakings worked by the company, buildings and freehold land, stock, doubtful debts, and expenditure on undertakings not proceeded with, is £130,725 15s. 6d., to which must be added the sum of £35,393 12s. 8d. brought forward from last account, making a total of £166,119 8s. 2d. After deducting the interest on the 5 per cent debenture stock and the 4½ per cent debenture stock for the year, amounting to £97,484 15s. 4d., there remains a balance of £68,634 12s. 10d., out of which a dividend has been paid on the preference shares at the rate of 3 per cent for the year, amounting to £48,431 2s., leaving a net balance of £20,203 10s. 10d., which the directors propose should be carried forward. The full dividend on the 6 per cent cumulative preference shares of the company has been paid to March 31, 1908. The directors regret that the dividends and interest received from the associated companies during the past year show a diminution of £33,331 15s. 4d."

A. C. S.

News of Electric Railways

Meeting of the Central Electric Railway Association

The following program has been announced for a regular meeting of the Central Electric Railway Association, which is to be held in the assembly room of the Hotel Cadillac, Detroit, Mich., on Aug. 26, 1909:

Morning Session

10 a. m.—Business session and reports of special committees.

10:30 a. m.—"The Growth and Development of Express on Interurban Lines," paper by J. H. Crall, general passenger and freight agent of the Terre Haute, Indianapolis & Eastern Traction Company.

11:15 a. m.—"Application of Recording Watt Meters on Electric Cars," paper by T. H. Henkle, Electric Service Supplies Company.

12:15 p. m.—Adjournment for lunch.

Afternoon Session

1:30 p. m.—"The Development of Long Distance Passenger and Freight Business," paper by F. D. Norviel, general passenger and freight agent of the Indiana Union Traction Company.

2:15 p. m.—New things for the benefit of our members.

Program of New England Street Railway Club Outing

The program of the special day for ladies arranged by the New England Street Railway Club to be held on Aug. 12, 1909, at Canobie Lake Park, Salem, N. H., has been announced. Through the courtesy of the Boston Elevated Railway, the Boston & Northern Street Railway and the New Hampshire Electric Railways, the party will be taken in special cars from Boston to Canobie Lake Park, and on the return from the park will be taken to Haverhill, to connect with a train over the Boston & Maine Railroad for Boston. The Boston & Northern Street Railway will run special cars from Boston to the park without change, and the New Hampshire Electric Railways will run special cars from the park to Haverhill. Through the courtesy of D. A. Belden, president, and Franklin Woodman, general manager of the Canobie Lake Company, those who attend the outing will be admitted free to the theater and various attractions in the park, and will also be given a motor-boat ride on the lake. The tickets are $1.75 for each person for the day's entertainment, and include the trolley ride, dinner, theater, park attractions, return ticket over the Boston & Maine Railroad from Haverhill to Boston, etc. Special tickets, for which a rate of $1 has been fixed, will be sold to those who join the party at Canobie Lake Park, and who do not use the transportation ticket from Boston to the park and return. The itinerary of the outing follows:

9:30 a. m.—Board special cars on Brattle Street, near Adams Square, Boston, and proceed to Canobie Lake Park via Sullivan Square, Wakefield and Lawrence.

12:27 p. m.—Arrive at Canobie Lake Park.

1:00 p. m.—Dinner. Graves & Ramsdell will serve one of their celebrated dinners in the large restaurant.

Following dinner there will be an opportunity to enjoy a motor-boat ride around the lake and visit the numerous attractions in the park.

3:10 p. m.—Attend theater in the grove on the shore of the lake.

5:45 p. m.—Board special cars for Haverhill.

6:30 p. m.—Arrive at Haverhill.

6:41 p. m.—Leave Haverhill in special cars over the Western Division of the Boston & Maine Railroad for Boston.

8:00 p. m.—Arrive in Boston.

Kansas City Company Distributes New Franchise

Bernard Corrigan, president of the Metropolitan Street Railway, Kansas City, Mo., has had reprinted in pamphlet form on news paper the complete text of the ordinance approved by the West Twelfth Street traffic way commission, but subject to the approval of the voters of the city, granting the company an extension of its franchise. The negotiations which resulted in the drawing of this ordinance have been reviewed in the Electric Railway Journal and a digest of the modified ordinance was printed on page 120 of the issue of July 17, 1909. In presenting the ordinance to the people Mr. Corrigan has prefaced it with a letter over his signature telling in a general way what the public will gain by the new franchise and how the company will benefit. The pamphlets containing the ordinance and Mr. Corrigan's letter are being distributed on the cars of the company. Mr. Corrigan's letter follows:

"The Metropolitan Street Railway herewith presents to the public of Kansas City the full text of the proposed franchise ordinance, with the request and hope that every citizen will read it and thoroughly familiarize himself with its actual terms and conditions, so that when it is submitted to the people for their approval or disapproval, he will be in a position to cast his vote intelligently, and with a full knowledge of what advantages both the city and the company hope to derive from the agreement.

"While the negotiations during the past two or three months have been quite extensively reported in the daily papers, the impartial reader cannot have failed to observe that many fundamental and vital features of the proposed ordinance have been grossly misrepresented in both the news and editorial columns of the Kansas City *Star*. It would be a useless waste of time to enter into a discussion of these misrepresentations, and the company believes that the ordinance itself is the most conclusive answer to them.

"The company is now operating under the so-called 'peace agreement,' which went into effect in 1902, the salient feature of which, in addition to the ordinary and usual requirements of street railway franchises, obligates the company to pay 8 per cent of its gross receipts to the city in lieu of all taxes. Out of this 8 per cent of the gross receipts all State, county and city taxes are paid, and the balance, approximately $120,000 per annum, has been paid to the city.

"This company will have to pay off or renew in the next four years about $20,000,000 of its bonds. The largest portion of that amount will become due in 1913, when the present franchise will have but 12 years of life. It is unnecessary to tell any intelligent man that bonds issued on a property resting on a franchise of that short period would not sell on the market except at a great sacrifice, due to the reluctance of capital to invest in public utility properties.

"In addition to the above, large expenditures in extensions of its system will have to be made in the next 16 years, if we meet the demands of the city, which provide in the accompanying ordinance for building 2½ miles of double, or 5 miles of single track per year, which amounts to 80 miles of single track during the present life of the franchise, with power and equipment to operate this additional mileage, in addition to the demand for more cars, and consequently more power within the old limits.

"To meet the cost of these developments and provide funds for the rapid growth of the property as a whole will require large sums of money. It has also seemed highly desirable to take advantage of the experience of other American cities, where it has been fully demonstrated that franchises nearing the date of their expiration have brought about conditions which were highly detrimental both to the interests of the company and to the interests of the community. Chicago might be cited as a striking example of such a condition, where negotiations were carried on for a period of 10 years, during which time no improvements, extensions or additions could be made to the equipment of the company. Why should not the people of this city profit by the experience of Chicago, when they are offered a contract far more liberal than Chicago secured even after their long period of negotiations?"

Mr. Corrigan has summarized the benefits to the city as follows, under the heading "What the City Gets Under This Ordinance":

"First. On the adoption of this ordinance the company shall give half fare to children under 12 years of age; children under seven, accompanied by person paying fare, ride free. After the expiration of the present franchise the city has the right to regulate and reduce fares from time to time.

"The city reserves all its present rights to regulate fares during the life of the present franchise. (Section 1-E of Ordinance.)

"Second. The city reserves the right to apply its share of the net earnings, which is 50 per cent, and a guarantee that it will never be less than 5 per cent of the gross earnings, which is about 70 per cent more than the city will get under existing ordinances, to the reduction of fares morning and evening. This would furnish a sufficient amount to reduce fares morning and evening to six tickets for a quarter. (See Section 1-C.)

"Third. The city reserves the right to keep an auditor in the company's office at all times, at the company's expense. (See Section 40.)

"(a) The city reserves the right through its board of

public works to regulate Metropolitan salaries. (See Section 24.)

"(b) No addition to capital can be made by the company without the approval of the city. (See Section 31.)

"The city reserves the right to purchase the property at the expiration of the present franchise, and at any time during the 16 years of extension given under the ordinance, by giving six months' notice, at the present valuation of $33,500,000, and any additions to capital made with the approval of the city, or the city can sell the property to a third party. (See Section 36.)

"After 1913 a sinking fund of 4 per cent of gross earnings shall be set aside yearly for renewals. (See Section 55.)

"After 1925 a fund of 4 per cent of net earnings shall be set aside to reduce capitalization. (See Section 39.)

"The city binds the company to build 2½ miles of double or 5 miles of single track annually, and to purchase 50 cars.

"If the city elects, the company to furnish the money to build the Twelfth Street highway and provide an immediate solution of that problem, by the payment of the damages caused to property, and the termination of the pending litigation.

"The option was given the city's representatives by this company to have an appraisement made of the tangible property of the company and its unexpired franchise, or to take the actual money put into the property as found by city experts, Arthur Young & Company, as a basis of negotiations. This offer was made after the city had the report of Young & Company before them."

Mr. Corrigan has summarized the benefits to the company as follows, under the heading "Benefits to the Company Under This Ordinance":

"First. A reinforcement of its credit by an extension of 16 years to its franchise.

"Second. An agreement that should the city buy the property or sell it to a third party the money expended under the terms of this ordinance by the direction of the city will be in addition to the present valuation. (See Section 36.)"

Transit Talks in Philadelphia

Transit talk No. 5 of the Philadelphia (Pa.) Rapid Transit Company was dated July 27, 1909. It occupied approximately 84 square inches of space in the daily papers. The subject considered was "The Pay-Within Car." The company said in part:

Before we began this "Talk" we asked the claim department of the company to tell us what effect the introduction of the pay-within car had had in reducing accidents, both to passengers and cars. We also asked for a comparison between the number of accidents on pay-within cars and on cars of ordinary types.

The answer was that the pay-within car had reduced all classes of accidents to the vanishing point. Not one pay-within car passenger has had a bone broken since these cars were placed in operation nine months ago.

This fact alone, in our opinion, not merely justifies the introduction of the car, but makes it the duty of the company to increase as rapidly as possible the number in operation, which is now about 275.

The cars cannot be made any larger, for the reason that longer and wider cars cannot be operated on the narrow streets of Philadelphia. The larger cars used on some lines in New York at a corner like Seventeenth and Chestnut Streets would sweep over the curb.

It has been asserted that the pay-within car is objectionable because it does not leave people free to jump off at will when danger is apparent. This claim, however, is at variance with experience. In case of accident the real danger is usually over before the panic begins.

Always-in-a-hurry people may chafe at the momentary restriction of closed doors and platforms, but it has been amply demonstrated that they are safeguards—not dangers.

During the year 1907, before the pay-within car was introduced, damage claims cost this company over $1,200,000. That was about 7 per cent of the entire gross earnings. Every fourteenth fare collected went to pay damages, and to that extent the earnings of the company were depleted by an absolutely unproductive expense.

To sum up, the pay-within car very greatly reduces the chances of accidents of all sorts; the cars insure the collection of fares; they make *better* operation, as well as *safer* operation, possible; they are as comfortable in summer as any convertible car. The fact that the side doors are closed has no effect on the ventilation, which is mainly, of course, in the reverse direction from that in which the car is moving.

Transit talk No. 6 was dated July 29, 1909. The title of it was "100,000 Passengers Carried to Work in 90 Minutes Every Morning." The company said:

This is another chapter in the story of the part played by the trolley car in municipal development.

Think this over:

Within 90 minutes every weekday morning fully 100,000 *men and women are brought from every section of this city to that central portion bounded by Vine, Fifteenth, Walnut Streets and the river front.* Every evening this immense multitude is transported to their homes in the same number of minutes.

With inefficient or inadequate facilities such a feat would be impossible of accomplishment.

The entire business and manufacturing interests of Philadelphia depend upon street-car service. Without this means of transportation it is safe to say that 80 per cent of the working men and women of this city would be practically without employment or without decent places in which to live. It would be impossible for them to dwell within walking distance of their work.

That they can now enjoy comfortable homes at low rates in the healthful suburbs is due alone to rapid transit.

Many other facts can be produced to prove that traction facilities are the measure of a city's prosperity, but the above is enough to induce thinking minds to reflect upon the relation a traction company bears to a city's welfare and wealth.

We are looking up facts that will show the immense development that has *followed* the extension of our lines in sections where we were "there first" and had to wait a long time for enough fares to pay operating expenses.

Association Meetings

New England Street Railway Club, Canobie Lake Park, Salem, N. H., Aug. 12.

Central Electric Railway Association, Detroit, Mich., Aug. 26.

Association of Edison Illuminating Companies, Briarcliff Manor, N. Y., Aug. 31 to Sept. 2, 1909.

Central Electric Accounting Conference, Indianapolis, Ind., Sept. 11.

American Street & Interurban Railway Association and affiliated associations, Denver, Col., week commencing Oct. 4.

Colorado Light, Power & Railway Association, Denver, Col., Oct. 7, 8 and 9.

Empire State Gas & Electric Association, New York City, October, 1909.

Meeting to Consider Public Utilities Matters in Maryland.—A meeting of the State Cabinet of Maryland to consider the question of a public utilities commission law to be submitted to the Legislature has been called by Governor Crothers for Aug. 6, 1909.

Pamphlet of American Street & Interurban Railway Association on Engineering Standards.—The secretary of the American Street & Interurban Railway Engineering Association has just published in pamphlet form a set of standards and recommended practice of the association as adopted at the 1907 and 1908 conventions.

Hudson & Manhattan Railroad Opened to Erie Railroad Station.—The Hudson & Manhattan Railroad, operating under the Hudson River between New York and New Jersey, opened its line between Montgomery Street, Jersey City, and Erie Railroad Station, Jersey City, on Aug. 2, 1909. This makes it possible for commuters and others traveling over the Erie Railroad to avail themselves of the facilities of the Hudson & Manhattan Railroad for reaching down-town New York.

Public Service Commissioners Inspect Pennsylvania Terminal.—John E. Eustis and William McCarroll, members of the Public Service Commission of the First District of New York, and Henry B. Seaman, chief engineer of the commission, as the guests of Samuel Rae, vice-president of the Pennsylvania Railroad, inspected the new terminal of that company at Thirty-third Street and Seventh Avenue, New York, on July 30, 1909. Mr. Rae is said to have told the commissioners that he hopes to operate trains through the tunnels to Long Island by January, 1910.

Exhaust Steam Turbines for Interborough Rapid Transit Company.—The Interborough Rapid Transit Company, New York, is planning to install two General Electric 5000-kw low-pressure turbines, to be operated in connection with reciprocating engines of the same rating in the subway division power house on Fifty-ninth Street and Eleventh Avenue. The order hinges on the satisfactory performance of the 5000-kw unit now installed in the same power house, and which is now undergoing test. The turbines will be vertical machines driving 3-phase, 25-cycle, 11,000-volt induction generators, the leads from which will be connected without switching apparatus to the generators driven by the respective reciprocating engines. The turbines have no governors save for emergency use, and will be equipped with surface condensers.

Resubmission of Municipal Ownership Question to Be Recommended in San Francisco.—The public utilities committee, which has been considering the matter of resubmitting to the voters of San Francisco the question of equipping the Geary Street, Park & Ocean Railroad with electricity and operating it as a municipal enterprise, has decided to submit to the Board of Supervisors a report recommending that the question be again put before the people for approval. The committee will say that it will be impossible to hold the election until December, when all the work incident to the regular municipal contest will be over. In its report to the Board of Supervisors the committee will say: "Inasmuch as the public ownership proposition received very nearly the two-thirds vote required to issue bonds, we think it but reasonable and it will be easier for those who favor the project to win 400 votes from the opposition than it will be for the minority to gain 4,000 votes from their opponents, which would be necessary to insure the granting of a franchise. With these views, and with a determination to effect as speedy a change as is possible in the present operation of the road, your committee recommends the early submission of the matter."

Financial and Corporate

New York Stock and Money Market

August 3, 1909.

During every day of the past week stocks have been strong in the Wall Street market and in almost every one of the active issues daily advances have been recorded. Every condition has been favorable to a bull movement, and the trading has been considerably more active than during the early summer. Traction shares continue to be fairly active—especially Interborough-Metropolitan and Brooklyn Rapid Transit—and prices have made some advances. Less alarm is felt in financial circles over the outcome of the reorganizations that are contemplated and more hope that the stockholders will be protected.

The money market continues to be phenomenally easy. Rates are low and the banks are bountifully supplied with funds. Bonds are still in good demand, showing that investment money is still plentiful. Rates to-day were: Call, 1½ to 2 per cent; 90 days, 2¾ to 3 per cent.

Other Markets

The common stock of the Philadelphia Company has been the active traction feature of the Philadelphia market during the past few days. The price has advanced slightly and transactions have been liberal. Rapid Transit has sold above 32 during the week and has been fairly active.

In the Boston market, Massachusetts Electric common and Boston Elevated have been sold in small quantities with only slight changes in price.

In Chicago there has been practically no trading in tractions. A few shares of Chicago Railways, Series 2, and some small lots of Subway have covered the dealings.

United Railways securities continue to be active in the Baltimore market. The stock has been traded in at 12¾ to 13¼ and the bonds, especially the "incomes," have been sold in large quantities. Some City Passenger bonds have also been in the market, selling at 101¾.

Quotations of various traction securities as compared with last week follow:

	July 27.	Aug. 3.
American Railways Company	a45¾	a46
Aurora, Elgin and Chicago Railroad (common)	a41½	*41½
Aurora, Elgin & Chicago Railroad (preferred)	86½	*86½
Boston Elevated Railway	130½	127½
Boston & Suburban Electric Companies	17½	*17½
Boston & Suburban Electric Companies (preferred)	*72	*71
Boston & Worcester Electric Companies (common)	a13	a13
Boston & Worcester Electric Companies (preferred)	a56	55¼
Brooklyn Rapid Transit Company	78	81¼
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	85¾	87½
Capital Traction Company, Washington	a139	a140¾
Chicago City Railway	a190	a195
Chicago & Oak Park Elevated Railroad (common)	*2	*2¼
Chicago & Oak Park Elevated Railroad (preferred)	*10	*10
Chicago Railways, ptcptg, ctf. 1	a119½	a119
Chicago Railways, ptcptg, ctf. 2	a39	38
Chicago Railways, ptcptg, ctf. 3	a26½	25
Chicago Railways, ptcptg, ctf. 4s	a10½	a10½
Cleveland Electric Railway	*78	*78
Consolidated Traction Company of New Jersey	a77	76⅝
Consolidated Traction of N. J., 5 per cent bonds	a106	a106½
Detroit United Railway	a67¾	a70
General Electric Company	167⅛	172
Georgia Railway & Electric Company (common)	a92	92¼
Georgia Railway & Electric Company (preferred)	85	a88
Interborough-Metropolitan Company (common)	14½	15¾
Interborough-Metropolitan Company (preferred)	45½	49⅞
Interborough-Metropolitan Company (4½s)	79⅜	83½
Kansas City Railway & Light Company (common)	a49	a48
Kansas City Railway & Light Company (preferred)	a84½	84
Manhattan Railway	a146	144⅝
Massachusetts Electric Companies (common)	a13	a12¾
Massachusetts Electric Companies (preferred)	73½	a75
Metropolitan West Side, Chicago (common)	a15¾	a18
Metropolitan West Side, Chicago (preferred)	47	a48½
Metropolitan Street Railway	a20	24
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	a83¾	85
Northwestern Elevated Railroad (common)	20½	a22
Northwestern Elevated Railroad (preferred)	a71	a71
Philadelphia Company, Pittsburg (common)	41¾	42½
Philadelphia Company, Pittsburg (preferred)	42½	44½
Philadelphia Rapid Transit Company	29¼	32
Philadelphia Traction Company	a99⅞	a91
Public Service Corporation, 5 per cent col. notes	a100¼	a100¼
Public Service Corporation, ctfs	a89	a91
Seattle Electric Company (common)	*105	*105
Seattle Electric Company (preferred)	104¼	105
South Side Elevated Railroad, Chicago	a56	a58
Toledo Railways & Light Company	a10	a9⅛
Third Avenue Railroad, New York	20	20¾
Twin City Rapid Transit, Minneapolis (common)	103¾	a103⅞
Union Traction Company, Philadelphia	53½	55¾
United Railways & Electric Company, Baltimore	a12½	a13⅜
United Railways Inv. Co., San Francisco (common)	a38	a38½
United Railways Inv. Co., San Francisco (preferred)	53⅜	56
Washington Railway & Electric Company (common)	a18	a17
Washington Railway & Electric Company (preferred)	a93¾	a93
West End Street Railway, Boston (common)	94	a95
West End Street Railway, Boston (preferred)	*106	106
Westinghouse Electric & Manufacturing Company	85	86¼
Westinghouse Elec. & Mfg. Company (1st pref.)	a124½	a130

aAsked. *Last sale.

Judge Lacombe Upheld in a New York Suit

The appeal taken in the matter of the claim of William W. Ladd, as receiver of the New York City Railway, in the suit of the Barber Asphalt Paving Company against the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad, was dismissed by a decision filed on Aug. 3, 1909, in the United States Court of Appeals. The decision sustains the order of Judge Lacombe in which he remanded the cause for a rehearing to Edward H. Childs.

There were two parts to the claim, one being a balance alleged to be due upon an open account and the other a claim upon a promissory note for $893,433. The claimant asserted that he had made a case for the recovery of $107,830.54 upon the open account, and also that he had proved his right to recover on the promissory note. Upon these grounds he contended that the claim should be allowed in the total sum of $1,001,263.

Special Master Childs found that the amount charged and claimed for interest on the note by the New York City Railway and its receivers should be disallowed, as it exceeds the balance claimed to be due on the account. He also found that the New York City Railway, by virtue of its lease from the Metropolitan Street Railway, was bound with respect to "controlled companies" made by the Third Avenue Railroad in its first consolidated mortgage to the Morton Trust Company as trustee.

The protective committee of the Dry Dock, East Broadway & Battery Railroad, a party to the appeal, in the brief filed said in part:

"The contention was made upon the argument of this cause that it was a 'test case,' and the court below rendered a short decision upon the report of the master without an extended discussion of the many important questions involved in order that this court might as speedily as possible render a decision which would settle the law not only of this case but of other similar cases pending in the court below.

"A suit is pending in the court below similar to the suit at bar, brought by the American Hay Company against the Dry Dock Company. In that suit the Central Trust Company, as trustee, has intervened as a party defendant. A claim has also been filed against that company as a trustee upon a note similar to the note for $6,000,000 in the case at bar. The testimony on that claim has not yet been completed. The two notes amount to about $2,000,000.

"A similar suit involving similar issues is pending in the court below against the Union Railway, brought by the Lorain Steel Company.

"The master disallowed the claim because it was not known that the note was based upon any consideration; in our cause we believe that we have affirmatively shown both failure of consideration and the existence of a counter claim in favor of the Dry Dock, East Broadway & Battery Railroad against the claimant in excess of the amount of its claim."

The decision of the Court of Appeals follows:

"Judge Lacombe's order is in no sense final, even assuming that a decree finally determining this proceeding is itself a final decree in the suit from which an appeal can be taken. The reference which he has directed the master is not a mere ministerial act in execution of a final order; it is a substantial part of the litigation upon the determination of which the rights of the parties wholly depend. Although no parties to the record have raised this point, the brief of others interested does raise it, and in any case no jurisdiction can be conferred by consent, for the proceedings are coram non judice.

"We must, therefore, dismiss the appeal, and the parties must prosecute the reference before the special master."

Central Pennsylvania Traction Company, Harrisburg, Pa.—At the annual meeting of the Central Pennsylvania Traction Company, held recently, Frank B. Musser, the president, presented his report and the following directors were elected for three years: E. S. Herman, James Russ, W. H. Seibert, T. E. Walz and E. Z. Wallower. Subsequently the directors organized and re-elected the officers. The matter of a cash dividend was discussed, but no action taken at the meeting. President Musser's report showed that the company now operates about 71 miles of track and 133 cars. During the last four years the company has expended $264,390 for paving and about an equal amount for track reconstruction. Relaying tracks last year cost $38,340. Twenty-seven miles of track have been paved. A $300,000 bond issue recently authorized will take care of the cost of the new work planned. The gross receipts last year were $731,261. The company paid $51,826 in taxes. A script distribution of $2 per share was allowed on the stock.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—The Chattanooga Railway & Light Company was incorporated on July 24 with an authorized capital stock of $5,000,000, divided into $3,000,000 of common stock and $2,000,000 of 5 per cent cumulative preferred stock, as a consolidation of the Chattanooga Railways Company and Chattanooga Electric Company. Mention of the ratification of the plan to consolidate these companies was made on page 1140 of the Electric Railway Journal of June 19, 1909.

Dayton & Xenia Transit Company, Dayton, Ohio.—The reorganization committee of the Dayton & Xenia Transit Company has been given until Aug. 28, 1909, to complete the payment for the property. The foreclosure sale was confirmed by the court on June 29. The company will be reorganized under the name of the Dayton, Springfield & Xenia Southern Railway.

Interstate Railways Company, Philadelphia, Pa.—A bill in equity has been filed in Common Pleas, Court No. 5, by the American Railways Company against the Interstate Railways Company, the United Power & Transportation Company, the Real Estate Title, Insurance & Trust Company and the Real Estate Trust Company for an injunction to restrain the United Power & Transportation Company from pledging its securities for moneys to be borrowed by the Interstate Railways Company for improvements or to pay interest on bonds of the Interstate Railways.

Interborough Rapid Transit Company, New York, N. Y.—The $10,000,000 of 3-year 5 per cent notes of the Interborough Rapid Transit Company dated March 1, 1907, have been called for payment on Sept. 1, 1909, at 101 and interest at the office of the Morton Trust Company, New York, N. Y., trustee.

New York State Railways, Rochester, N. Y.—The Public Service Commission of the Second District of New York gave a further hearing on July 22, 1909, on the petition of the New York State Railways for permission to issue a first consolidated and refunding mortgage to secure bonds to the amount of $35,000,000. Walter N. Kernan appeared for the company. Horace E. Andrews, president, and A. L. Linn, Jr., general auditor, testified concernings the details of the various applications. Complete financial statements of the companies comprising the New York State Railways as of March 22, 1909 (the date of consolidation) were filed.

Northwestern Elevated Railroad, Chicago, Ill.—The Northwestern Elevated Railroad has declared an initial dividend of 1 per cent on the $5,000,000 of 5 per cent noncumulative preferred stock, payable Oct. 18, 1909, to holders of stock of record on Oct. 9.

Portland Railway, Light & Power Company, Portland, Ore.—An initial dividend of 1 per cent has been declared by the Portland Railway, Light & Power Company on the $10,000,000 of common stock, payable Sept. 1, 1909, to holders of record on Aug. 15.

Puget Sound Electric Railway, Tacoma, Wash.—The Puget Sound Electric Railway recently concluded negotiations for the purchase of the property of the Pacific Traction Company and formally took over the holdings of the company on Aug. 1, 1909.

San Francisco (Cal.) Electric Railways.—The San Francisco Electric Railways, which is a subsidiary of the United Railways Investment Company, with $10,000,000 of authorized stock and $10,000,000 of bonds, has taken over the Parkside Transit Company.

Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y.—The Syracuse, Lake Shore & Northern Railroad has obtained through Willis A. Holden, who purchased the same at mortgage foreclosure sale, all the property, franchises, etc., of the Oswego Traction Company, and will operate them in the name of the Syracuse, Lake Shore & Northern Railroad Company, Oswego division.

Third Avenue Railroad, New York, N. Y.—Judge Lacombe, in the United States Circuit Court, has filed an order postponing the foreclosure sale of the Third Avenue Railroad from Sept. 2, 1909, to Oct. 27, 1909. The order also postpones until Sept. 27, 1909, the filing by the special master of the inventory of the property of the company. The postponing of the foreclosure sale was made at the request of Bowers & Sands, counsel for the Central Trust Company, which procured the decree of foreclosure.

Toledo Railways & Light Company, Toledo, Ohio.—The protective committee of the stockholders of the Toledo Railways & Light Company, through H. F. Swift, of Toledo, its secretary, is sending out another appeal to holders to deposit their stock with the committee. The committee announces that a majority of stock is now controlled by it, but that work of refinancing is being retarded by many small holders failing to lend their support.

Traffic and Transportation

Hearing by Massachusetts Commission on Salem Willows Fares

The Massachusetts Railroad Commission gave a public hearing on July 30, 1909, in connection with the petition of the Selectmen of Peabody for a reduction in the fare from 10 cents to 5 cents between Peabody Square and Salem Willows. The petitioners were represented by Town Counsel Donnell, and the Boston & Northern Street Railway, respondent, by its counsel, Bentley W. Warren, Esq., Assistant General Manager Reynolds and Division Superintendent Chalmers.

The petitioners attempted to show the existence of heavy traffic between Peabody Square and Salem Willows by records of car register readings taken recently at Town House Square, Salem, a point on the route about 1.5 miles west of the Willows, which is the electric railway transportation center of the Salem district. For the company Mr. Warren said that the travel between the points named in the petition is heavy in the summer season, but very light at other times of the year, and showed that the figures submitted by the petitioners are of little value, since they do not show the travel from Peabody Square to Town House Square alone, but count everyone who boarded the cars and paid fare in Salem. The figures were also defective in not showing where the passengers in the car at Town House Square traveled after leaving that point, since a mere register count at a point on the route gives no indication of the distribution of travel or the fitness of the service between specified points.

Mr. Warren also emphasized the characteristics of the Salem Willows travel, showing by questions addressed to the petitioners and reference to the knowledge of the company's officials of the situation from month to month that the place is solely a summer resort, with approximately 19 permanent residences. The territory between the Willows and Salem is sparsely settled. The company believes that a line built to accommodate summer travel in this way should be permitted to reap greater profits per car and per trip in the short portion of the year when it can earn its right to exist than a line favored with a more substantial and regular travel.

Patrons of the company, according to Mr. Warren, can go from any part of Peabody to any part of the settled district of Salem for 5 cents, and the company feels that it is more important to maintain a 5-cent fare between Peabody and the great shoe manufacturing section of Lynn than to establish a 5-cent fare between the Willows and Peabody Square. It holds that the workingmen who are obliged to travel daily between their homes and the shops are more justly entitled to such low fares than persons who ride merely for pleasure. The distance from Peabody Square to Salem Willows is 3.78 miles, and under the conditions of travel the year through this is not an unreasonable fare. A fare of 10 cents here is a rate very much below what it would cost a passenger to go to the Willows by any other conveyance. If the commission should order a reduction it would deter the company from building similar lines to summer resorts. The matter of distance is not the whole consideration. Mr. Warren concluded by saying that in his opinion it is impossible to carry passengers with profit on a street railway in Massachusetts under the conditions there imposed at a rate of a cent a mile.

Counsel for the petitioners, in reply to a question by Mr. Warren, admitted that the present 5 per cent dividend of the Boston & Northern Street Railway is by no means too high, and acknowledged that if the company's revenues are cut at one point, they have to be made up elsewhere. Chairman Hall suggested that the petitioners and the company prepare figures, if possible, showing the traffic at the present season between Peabody Square and the Willows, and said that in deciding the case the commission would consider existing fares in Massachusetts, the earnings and fares of the company, and any other points of direct relation.

Chicago Companies Refuse Wage Demands of Employees

Opinions in Chicago regarding the possible amicable settlement of the differences between the employees of the Chicago City Railway and the company and the employees of the Chicago Railways and the company differ. Both companies have refused to comply with the demands of the men for increases in wages. The agreement between the Chicago Railways and its employees and the Calumet & South Chicago Railway and its employees expired on May 31, 1909, and a settlement was postponed until Aug. 1, 1909,

on which date the agreement between the Chicago City Railway and its employees expired.

T. E. Mitten, president of the Chicago City Railway, said personally some time ago that he did not feel that the company could afford to grant the increase of 3 cents an hour demanded by the men, but that he would submit the matter to the directors. To substantiate his statement that the men are receiving wages that are fully commensurate with the services they perform and that they compare more than favorably with the wages paid in other cities where conditions are equally severe, he presented a comparative table of wages in 16 cities, including New York, Boston, Philadelphia, Pittsburg, Detroit, Minneapolis, Milwaukee, New Orleans and Cincinnati. He also submitted the following statement of wages in cents per hour paid to platform men on the Chicago City Railway since 1901:

	Cents.		Cents.
1901	22.69	1905	24.88
1902	23.59	1906	24.69
1903	25.10	1907	26.20
1904	25.08	1908-1909	26.68

The directors of the Chicago City Railway were of the same opinion as Mr. Mitten. On July 30 Mr. Mitten addressed the men by letter and suggested that the matter be submitted to a board of arbitration. In this communication Mr. Mitten said:

"The earnings of our older employees, taken from the May pay roll, vary from $80 to $100 a month. The average wage for all conductors and motormen was $70.01 per month, the average time on duty per man per day being 8 hr. and 28 min. The wages now paid by the company are much higher than the wages formerly paid, and are also higher than the wages paid elsewhere, including Philadelphia and Pittsburgh, where strike conditions have recently prevailed and new contracts have been entered into at prices lower than the existing contract price paid by this company. The facts clearly do not justify an increase in the wage scale.

"The company is willing to renew the existing contract or submit the whole question of wages (not simply the question of an increase of wages) to arbitration, the arbitrators also to fix the duration of the new contract."

The demands of the employees of the Chicago & Oak Park Elevated Railway for an increase in wages through a reduction of hours and changes in working conditions have also been rejected by Clarence A. Knight, president of the company.

The refusal of the Chicago City Railway to comply with the demands of its employees for an increase in wages was met by a call for a special meeting of the men on Aug. 2, at which they voted down the proposition of Mr. Mitten to arbitrate the matter and ordered an immediate referendum strike vote. The men say that the statement that the company cannot afford to increase their wages is not well founded, and point to the moneys received by the city in two years as its share of the receipts of the company to substantiate their contention. Mr. Mitten is reported to have said that he would be perfectly willing to have the city stand the expense of any increase, deducting the additional charge for wages from its percentage of the earnings of the company under the new franchise.

Report on Pay-Within Cars in Washington

H. C. Eddy, executive officer and secretary of the District Electric Railway Commission, Washington, D. C., reported to the commission under date of July 21, 1909, on the operation of pay-within cars in Washington. The Capital Traction Company has been operating pay-within cars on its Chevy Chase line between Chevy Chase Lake and Fifteenth Street and New York Avenue, N. W., for some time. Mr. Eddy in his report describes briefly the pay-within cars used in Washington and recites the claims of the patentees regarding the safety and comfort of this type of equipment. In his report, he says:

"It will be remembered that I visited Philadelphia on my return from the convention of the American Street & Interurban Railway Association at Atlantic City in October, 1908, and witnessed the construction and operation of pay-within cars, after which I made a brief report to your commission in regard to the same. Since that time I have been investigating the operation of the pay-within car and have received considerable information in regard to the same from the Philadelphia Rapid Transit Company and the Electric Service Supplies Company, the patentee of the pay-within principle.

"I am informed by the general manager of the Philadelphia Rapid Transit Company, which now has about 300 pay-within cars in operation, that this company has found the cars very satisfactory in every way, the chief complaint in regard to the same being from ladies who are afraid that they might be injured in boarding or alighting from the cars, and I have been informed through another source that a few such accidents have actually happened, clothing being sometimes caught in the folding step. I believe, however, that the pay-within car is a long step toward the increased comfort, convenience and safety of passengers.

"The cars of this type now being operated by the Capital Traction Company are typical pay-within cars. They are provided with 14 transverse and four short longitudinal seats, giving a seating capacity of 44 adults. The seats are covered with rattan. Four motor equipments and semi-automatic air brakes, with the usual hand brakes are provided. Illuminated end signs and side signs (not illuminated) are also provided. The doors are wide and a rear exit arrangement is provided. It is to be hoped that the Capital Traction Company will be more liberal in allowing the use of this rear exit than it has been generally in the case of the P. A. Y. E. cars. The cars are richly finished within and without, the exterior being painted a dark olive. They ride very easily, especially over the new tracks which have recently been laid on Connecticut Avenue extended, and the patrons of this line are to be congratulated on being provided with an up-to-date car which is safe, convenient and comfortable."

Accident Report of Indiana Commission

The accident report of the Railroad Commission of Indiana for the quarter ended June 30, 1909, follows:

PASSENGERS INJURED	
By collisions	64
By getting on or off moving trains	17
By getting on or off moving cars after stops are made	4
Miscellaneous	3
Total	88
RESULTS	
Deaths	12
Fractures or dislocations	12
Sprains	7
Cuts and bruises	43
Miscellaneous	14
Total	88
TRAVELERS ON HIGHWAYS HURT	
To vehicles	8
On foot	1
Total	9
CAUSES	
Struck on crossings	3
By teams frightened	5
Miscellaneous	1
Total	9
INJURIES TO EMPLOYEES	
Conductors	5
Motormen	4
Laborers	5
Total	14
CAUSES	
By collisions	2
Miscellaneous	12
Total	14
RESULTS	
Deaths	2
Fractures or dislocations	3
Cuts and bruises	3
Miscellaneous	6
Total	14
INJURIES TO TRESPASSERS	
On track	10
Miscellaneous	1
Total	11
RESULTS	
Deaths	6
Fractures or dislocations	5
Total	11

New York Commission Against Separate Cars for Women

The Public Service Commission of the First District of New York, by a vote of two to one on Aug. 3, 1909, denied the request of the Women's Municipal League for an order directing the Interborough Rapid Transit Company to install a special car for women on all subway express trains in rush hours. Commissioner Eustis voted for a trial of the women's cars during this month and next, but he was voted down by Commissioners McCarroll and Bassett.

Commissioner Bassett, in his report, admitted the existence of undesirable conditions in the subway service, but made the following objections to the proposed change:

"Special cars for women will unbalance the loading of trains and discommode many of both sexes. Women will be compelled to stand in special cars much the same as now. Overcrowding would still take place in certain trains and hours. At other times the unnecessary cost of running an almost empty special car will be incurred. Un-

doubtedly women suffer inconvenience and sometimes indignities in the subway cars, but I do not believe that the operation of special cars will ameliorate these conditions—at least not sufficiently to warrant the new inconveniences and risks that would be created. Moreover, I do not believe that there is any preponderant demand among the women of the city for special cars.

"It is to be further noted that after this complaint was filed the Hudson & Manhattan Railroad voluntarily set aside the rear car on its trains for the exclusive use of women. After this test, which was apparently fairly and carefully conducted, it was abandoned on the ground that there did not appear to be a demand on the part of women for such a car and the commission has been so advised by that company."

Commissioner Eustis, although advising that the Interborough Rapid Transit Company be required to try the plan, admitted that there was much to be said against the special car project as well as for it. In his report Mr. Eustis said in part:

"It was conceded at the hearing that for a certain period each day, morning and night, women are compelled to ride in the subway trains in close proximity to men; in fact, they are often crowded in as closely as they can stand together. This condition of travel was very strongly objected to, and a large number of letters have been received calling attention to the indecency of such mode of travel. On the other hand, almost an equal number of people have taken the opposite side, and stated that one car would not begin to be sufficient for the women, and that the men are a protection to the women in a crowded car, and that they prefer to ride in cars where men and women are together; that while there are rare occasions when some brute will take advantage of the situation to insult a lady, on the whole the gentlemen are the best protection that the ladies want against such conduct."

Increase in Wages of the Interstate Railways' Employees.—The wages of the employees of the Interstate Railways have been increased from 17 cents to 18½ cents an hour.

Accident on Spokane & Inland Empire System.—Several persons were killed and more than two-score were injured on July 31, 1909, in a head-on collision between two trains of the Spokane & Inland Empire System near Cadwell, Wash, the station between Cœur D'Alene, Idaho, and Spokane, Wash.

Increased Service on Elevated in Brooklyn.—The Brooklyn (N. Y.) Rapid Transit Company has recently put into effect a number of changes in the service on its elevated lines on Saturday afternoons and on Sundays which are estimated to have increased the capacity of the lines 35 per cent and 40 per cent, respectively.

Arbitration in La Crosse.—The La Crosse (Wis.) City Railway and its employees have decided to submit to arbitration the differences between them regarding the conditions that shall govern the terms of service of the men with the company. The board of arbitration is to consist of a member of the State Board of Arbitration, a representative of the men and a representative of the company.

Another Side-Door Train in New York Subway.—Another side-door train was put in operation on the West Farms subway express line of the Interborough Rapid Transit Company, New York, on Aug. 3. This is the second 8-car train of this type now in use by the company. The side doors are used only in the rush hours. By Aug. 15 the company expects to have four more side-door trains in operation.

Traffic Circulars in Cleveland.—J. W. Butler, manager of the touring car service of the Municipal Traction Company, Cleveland, Ohio, has issued a number of circulars about the company's seeing-Cleveland-by-trolley service. One of these is a poster in red and black. It is 12½ in. wide by 19 in. high, and contains detailed information about the service. The seeing-Cleveland trip is one of two hours, and the cost is 25 cents per passenger. Mr. Butler has also issued several other attractive circulars printed in colors, which tell about the special service of the company and how it is possible for visitors to the city to see the city conveniently at small cost by means of the facilities afforded by the company.

Refrigerator Service of the Inland Empire System.—The Inland Empire System, Spokane, Wash., has published an attractive traffic sheet calling attention to the summer refrigerator service on its Spokane & Inland and Cœur D'Alene divisions. Refrigerator cars leave Spokane on Monday, Wednesday and Friday nights and arriving at Colfax on Tuesday, Thursday and Saturday mornings. Other cars leave Colfax on Monday, Wednesday and Friday mornings and arrive at Spokane the same afternoons. A similar schedule is maintained between Spokane and Moscow. On the Cœur D'Alene division refrigerator car service is provided daily, except Sunday. The company accepts perishable shipments at the shippers' own risk on days when the refrigerator service is not operated.

Hearing on Coney Island Fare.—The matter of the 5-cent fare to Coney Island on week days will be given a public hearing by the Public Service Commission of the First District of New York on Aug. 11, 1909. The hearing will be on the new complaint entered by Jonas Monheimer, requesting the commission to order the Coney Island & Brooklyn Railroad to establish the 5-cent rate on all days save Saturdays, Sundays and holidays, allowing the collecting of the 10-cent fare, the present regular rate, for these days. The first complaint filed by Mr. Monheimer demanded the 5-cent fare every day. The rate he now specifies is the one that the Public Service Commission has reported as being fair. The railway company has intimated that it will secure an injunction and contest the matter in court if the change is ordered.

Another Philadelphia Suggestion Card.—The Philadelphia (Pa.) Rapid Transit Company has issued its second suggestion card. It is dated Aug. 3, 1909, and says: "About every so often a car slides past its regular stop on the near side of a right-angle crossing and bumps into the broadside of another. Whether the rail was bad or the judgment of the motorman was poor, the bump counts against our record at the end of the month. Now, in the future, when ready to take a crossing, with another car approaching at right angles, let's hold up for a second or two, until we are satisfied that he is going to be able to make his stop safely. Furthermore, let us approach these same crossings ourselves with a keen appreciation of this very danger." The purpose of these cards was explained on page 161 of the Electric Railway Journal of July 24, 1909.

Views On and About Mt. Tom.—As is well known, Mt. Tom is one of the wonder sights of the East. It is the highest peak of the Mt. Tom range, and dominates the beautiful and picturesque section of the country of which it is the central figure. A publication just issued by the Holyoke Street Railway is devoted entirely to Mt. Tom and the surrounding country. The first part of the book is given over to representative views on and about Mt. Tom, done by the tri-color process. Six pages at the back of the book are devoted to the description of the surrounding country and the summit house. The company has set a price of 15 cents by mail for the book, as the publication is distinctly in the nature of a souvenir. The company has also issued a series of postal cards, with the Mt. Tom country as a subject.

Historical Leaflet of the Berkshire Street Railway.—C. V. Wood, traffic manager of the Berkshire Street Railway, Springfield, Mass., has prepared a circular which gives information about 60 spots of historical, geographical and industrial interest on the company's lines between Great Barrington, Mass., and Bennington, Vt., which have been marked by the company to correspond with the descriptions in the circular. In all there are 62 descriptions. To convey an idea of the character of the circular, the following descriptions, numbered 12, 18, 40 and 62, were selected at random: "12.—Stockbridge. The old Indian town. Home of the Stockbridge Indians. Here was established in 1734 John Sargent's Indian Mission, and here Jonathan Edwards lived and wrote 'The Freedom of Will.'" "18.—Lee. Town incorporated in 1777 and named in honor of General Charles Lee of the Revolutionary Army. A pioneer town in paper manufacturing, at one time having 22 paper mills. Known also for its marble quarries, which have furnished material for part of the Capitol at Washington, St. Patrick's Cathedral, New York City, and other noted buildings." "40.—Adams, originally East Hoosuck. Incorporated as a town in 1778 and name changed in honor of Samuel Adams, 'The Father of the American Revolution.' In 1878 the township was divided and North Adams was set off as a separate township. Population of Adams, 14,000. Here are located the Berkshire Cotton Company's mills, one of the largest plants in New England, and the Renfrew mills and the noted L. L. Brown Paper Company's plant." "62.—Bennington. A village of great historical interest. Noted as a summer resort. At Bennington Center may be seen the Bennington battle monument, 308 ft. high, built of native stone, the highest battle monument in the world. This marks the site of the Revolutionary storehouse, the objective point of one of General Burgoyne's expeditions. At Bennington Center may also be seen the monument marking the site of the old Catamount Tavern, the William Lloyd Garrison monument and the old cemetery with the monument to the British soldiers who fell in the battle of Bennington. In another part of the town is the Vermont State Soldiers' Home, with its noted fountain."

Personal Mention

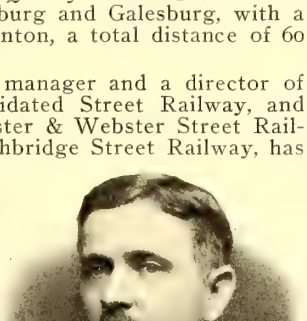
Mr. A. J. Sampson has resigned as secretary-treasurer of the Saginaw Valley Traction Company, Saginaw, Mich., and Mr. Harry G. Kessler has been elected secretary, and Mr. John W. Glendenning has been elected treasurer to succeed him.

Mr. Henry Floy has been retained by Mr. Bion J. Arnold in direct charge of the appraisal of the street railway properties in Greater New York and of the elevated railroads in Brooklyn which Mr. Arnold is making in behalf of the Public Service Commission of the First District of New York.

Mr. C. F. Richardson has been appointed superintendent of the Terre Haute, Indianapolis & Eastern Traction Company at Brazil, Ind., to succeed C. W. Turner, resigned. Since 1897 Mr. Richardson has been connected with the Fond du Lac Street Railway & Light Company, Fond du Lac, Wis.; Trinidad Electric Light & Railway Company, Trinidad, Col., and the Lincoln Railway & Light Company, Lincoln, Ill.

Mr. B. R. Stevens, who resigned as general traffic manager of the Illinois Traction System, Champaign, Ill., on July 1, 1909, has been elected president and general manager of the Peoria & Galesburg Railway, Peoria, Ill., which proposes to build an electric railway between Peoria and Galesburg and has secured all the right of way and practically all the franchises. The road will extend directly west from Peoria to Farmington along the Iowa Central Railroad, thence northwest to Maquon, Ill., thence parallel to the Chicago, Burlington & Quincy Railroad to Knoxville, Ill., thence to East Galesburg and Galesburg, with a branch from Farmington to Canton, a total distance of 60 miles.

Mr. E. G. Connette, general manager and a director of the Worcester (Mass.) Consolidated Street Railway, and general manager of the Worcester & Webster Street Railway and the Worcester & Southbridge Street Railway, has been appointed chief of the transportation department of the Public Service Commission of the First District of New York, a position which has not heretofore been filled although contemplated in the original scheme of organization of the commission. Under this department will come the bureau of equipment inspection, formerly headed by Mr. A. W. McLimont; the bureau of transit inspection, headed by Mr. Daniel L. Turner, and the bureau of accidents and complaints, headed by Mr. George F. Daggett. According to the commission, the present bureaus of the body have rendered effective service in the inspection of equipment and operating details, but it was thought that a man of considerable practical experience as an operating manager, with knowledge of both engineering and transportation, should be secured to supervise the work. Mr. Connette will assume the duties of his new office on Sept. 1, 1909. Mr. Connette has been engaged in street railway work since 1890, and has been connected during that time with the Nashville (Tenn.) Street Railway, Syracuse (N. Y.) Rapid Transit Company and the Worcester Consolidated Street Railway, in the management of all of which he has been very successful. He was born in Austin, Ind., on Dec. 29, 1863. Mr. Connette's father died when Mr. Connette was only three years old, and the boy was compelled to earn his own way when only 13 years old. He secured a position at the local railroad station in Austin and qualified as an operator after 18 months' service. He then held various positions in the railway field until he accepted an appointment as telegraph operator at the general office of the Louisville, Cincinnati & Lexington Railroad, at Louisville, Ky. Subsequently he was transferred to the office of the general superintendent of the company. Shortly after the Louisville & Nashville Rapid Railroad purchased the Louisville, Cincinnati & Lexington Railroad Mr. Connette was transferred to the engineering department of the company. Two years later he was made chief clerk of the Henderson division of the company, with headquarters at Henderson, Ky. Mr. Connette was next appointed assistant to the superintendent of the company at Nashville, Tenn., and when the street railways in that city were consolidated in 1890, Mr. Connette accepted the position of superintendent of the consolidated company. In 1891 he was made general manager of the company and in 1897 he was made chief engineer of the Cumberland Electric Light & Power Company in addition to general manager of the street railways. On April 1, 1900, Mr. Connette accepted the appointment of vice-president of the Syracuse Rapid Transit Company, which position he retained until 1905, when he was appointed general manager of the Worcester Consolidated Street Railway. Mr. Connette has been active in the affairs of the American Street Railway Association and its successor, the American Street & Interurban Railway Association, and has contributed several papers at meetings of the association. He was president of the Street Railway Association of the State of New York in 1903-04, and third vice-president of the American Street Railway Association in 1897-98. He is also chairman this year of the committee on the welfare of employees of the national association.



E. G. Connette

Mr. J. W. Wolfe, who was recently appointed superintendent of the Ohio River Electric Railway & Power Company, Pomeroy, Ohio, to succeed Mr. I. L. Oppenheimer, who has become general superintendent of the Lexington & Interurban Railway, entered electric railway work in 1894 as a conductor on the West Side Street Railway, Elmira, N. Y. In May, 1900, he accepted a position as conductor with the Elmira & Watkins Electric Railway, at that time operated by Mr. John Blair MacAfee, Philadelphia, Pa. In November, 1900, he was transferred to Pomeroy, Ohio, with the Ohio River Electric Railway & Power Company. Mr. Wolfe continued with the Ohio River Electric Railway & Power Company until May, 1902, when he was appointed assistant superintendent of the company. On June 12, 1909, he was appointed superintendent of the Ohio River Electric Railway & Power Company and the Pomeroy & Middleport Electric Company. He is also connected with the General Managers' Association, consisting of the managers of the various properties owned and controlled by Chandler Brothers & Company and Mr. John Blair MacAfee, Philadelphia, Pa.

Mr. B. J. Jones, manager of the electrical department of the Cincinnati Gas & Electric Company, Cincinnati, Ohio, who has been appointed district manager of the Ohio Electric Railway with headquarters at Springfield, Ohio, to succeed Mr. W. A. Gibbs, resigned, has had a very wide experience in both railway and lighting work and has been connected with the Cincinnati Gas & Electric Company since 1905. Previous to that he was associated with Sargent & Lundy, Chicago, Ill., consulting engineers, with whom he served from 1897 until 1905. His first work with Sargent & Lundy was that of supervising the electrical equipment of the South Side Elevated Railroad. Mr. Jones was prominently identified with a number of other important contracts taken by Sargent & Lundy, and in this way came into close touch with the electrical work of the Cincinnati Gas & Electric Company, with which he afterward became connected. Previous to his connection with Sargent & Lundy, Mr. Jones was superintendent of the South Chicago City Railway and before becoming connected with that company served in a similar capacity with the Sioux City (Ia.) Traction Company. Mr. Jones is the inventor of the flat flexible bond and solid terminal designed to go under the fish-plate which was sold originally as the Atkinson bond. He also designed many of the details of the high-tension construction used on the Indianapolis & Cincinnati Traction Company's single-phase line between Indianapolis and Rushville, which were adopted later by the Westinghouse Electric & Manufacturing Company as standard construction for certain classes of single-phase railway work.

OBITUARY

J. B. Peddle, assistant treasurer of the Philadelphia (Pa.) Rapid Transit Company, is dead. Mr. Peddle was born in Philadelphia in 1831, and had been connected with the Philadelphia Rapid Transit Company and subsidiary companies for many years.

Henry N. Putney, chairman of the Railroad Commission of New Hampshire, died at his home in Manchester, N. H., on July 30, after having been in ill health for two years following a slight paralytic shock. Mr. Putney was born in Dunbarton on March 22, 1840, and was graduated from Dartmouth College in 1861. After beginning the practice of law in Manchester, he developed a strong interest in things political and he soon began writing political articles. In 1873 he became connected with the Manchester *Mirror*, to which he contributed until shortly before his death. Appointed chairman of the Railroad Commission by Governor Currier in 1886, he held the office until his death, being successively reappointed by several Governors. In 1899, President McKinley appointed Mr. Putney a commissioner to the International Exposition at Paris.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Los Angeles Railway Land Company, Los Angeles, Cal.**—This company has been incorporated by interest identified with the Huntington System, but no announcement of its purpose has been made. Capital stock, $50,000. Directors: Howard E. Huntington, G. S. Patton, G. C. Ward and E. T. Cook.

***Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.**—This company has applied for a charter to build an electric railway from Kansas City, Mo., to Topeka, Kan., via Bonner Springs and Lawrence. Capital stock, $1,500,000. Headquarters, Bonner Springs. Incorporators: John W. McDaniel and John C. Finney, Bonner Springs; Charles Knabb, Hiawatha; A. L. Cooper and W. H. Caffrey, Kansas City, Mo.

***Michigan & Chicago Westbound Railway, Kalamazoo, Mich.**—Incorporated to build an electric railway between Kalamazoo and Grand Rapids. Capital stock, $3,000,000. Alfred Henry Brown, Chicago, Ill., is mentioned as the principal incorporator.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—Incorporated under the laws of Tennessee as the merger of the Chattanooga Railways and of the Chattanooga Electric Company, in accordance with a plan mentioned on page 1140 of the issue of the Electric Railway Journal of June 19, 1909. Capital stock, $5,000,000. Incorporators: Joe Brown, J. C. Lightfoot, Jr., T. G. Newman, M. J. Horan and W. E. Boileau.

FRANCHISES

***Birmingham, Ala.**—W. J. Cameron, F. Y. Anderson, Geo. C. Kelley and associates have petitioned the City Council for a 30-year franchise to build an electric railway on certain streets of Birmingham and to use the tracks of the Birmingham Railway, Light & Power Company.

Los Angeles, Cal.—M. Welch, who was originally granted a 21-year franchise for the construction of an electric railway in Los Angeles on Aug. 6, 1906, with the stipulation that the road be completed in three years, has been granted an extension of three months from Aug. 6, 1909, in which to comply with the conditions of the original grant to him.

Mayfield, Cal.—The Peninsular Railway, San José, has applied to the Town Trustees for a franchise for an electric railway, to be advertised for sale, to extend through Main Street from the northern limits to the San Jose & Los Gatos Interurban Railway tracks south of Mayfield.

Vallejo, Cal.—Randall, Trowbridge & Wright, Oakland, have abandoned the attempt to secure a franchise for an electric railway from the City Trustees of Vallejo. They proposed to build a line to connect Vallejo, Benicia and White Sulphur Springs. R. L. MacFarlane, local representative. [E. R. J., May 22, '09.]

Lewiston, Idaho.—M. A. Means, president and general manager of the Lewiston Terminal Company, has applied to the City Council for a franchise to operate a street car system over the tracks that are being laid by the company in Lewiston. Gasoline motor cars will be used at first, but it is proposed eventually to electrify the system. [E. R. J., July 3, 1909.]

Champaign, Ill.—The Danville, Urbana & Champaign Railway has applied to the City Council for a franchise to extend its electric railway through the city to connect with the tracks of the St. Louis, Decatur & Champaign Railway on Neil Street and the tracks of the Urbana & Champaign Railway, Gas & Electric Company on Walnut Street.

***Brandon, Manitoba.**—J. H. Ingram writes that the application for a franchise made by him to the City Council of Brandon will probably not be granted as the city has the construction of a municipal railway in contemplation, when it deems that conditions will justify the expenditure. The proposed system was to be operated by gasoline motors.

Wellesley, Mass.—The Selectmen have granted the Natick & Cochituate Street Railway an extension of one year in which to double-track its system between Lake Crossing and the Wellesley College on Central Street. A bond of $20,000 was given. [E. R. J., June 5, '09.]

Elmira, N. Y.—The Elmira Water, Light & Railroad Company has applied to the City Council for a franchise to build an extension on Maple Avenue from Miller Street south to the city limits.

New York, N. Y.—Adrian H. Joline and Douglas Robinson, receivers of the Metropolitan Street Railway, have applied to President McGowan of the Board of Aldermen, as chairman of the select committee of the Board of Estimate and Apportionment, for an extension of time from Aug. 1 to Sept. 1 in which to file an amended application for a franchise over the Manhattan Bridge.

Dennison, Ohio.—The Wheeling, Cadiz & Tuscarawas Traction Company has applied to the City Council for a franchise through Thornwood Park and along Logan Street, but action on the matter has been deferred to permit the company to comply with certain legal requirements. A. E. Townsend, president and general manager of the company. [E. R. J., April 17, '09.]

Norwood, Ohio.—The Cincinnati Traction Company, through its president, W. K. Schoepf, has applied to the City Council for a 25-year franchise to build a new street railway into West Norwood.

***Corpus Christi, Tex.**—Application has been made to the City Council by Daniel Hewitt, Salina, Kan., for a franchise to construct an electric railway in Corpus Christi.

Nashville, Tenn.—The City Council has granted the Nashville Railway & Light Company a franchise to extend its system from Sixteenth Street on Broad Street out to Hillsboro Pike.

Salt Lake City, Utah.—The municipal laws committee of the City Council has approved the proposed amendment to the Salt Lake & Ogden Railway's franchise whereby it can operate its cars over the street car tracks of Salt Lake City.

Waukesha, Wis.—The Milwaukee Western Electric Railway has applied to the City Council for a franchise in Waukesha via North Street. W. A. Dunn, president.

TRACK AND ROADWAY

Birmingham & Edgewood Electric Railway, Birmingham, Ala.—The organization of this company, which proposes to build a railway from the South Highlands line to Red Mountains, has been perfected by the election of the following officers: Stephen Smith, president; George H. Harris, first vice-president and general manager; M. A. Miller, second vice-president; G. T. Brazelton, secretary and treasurer. Headquarters, 103 North Twentieth Street. It is stated that the contract will be awarded to a company which is now being organized. [E. R. J., July 17, '09.]

Northwest Arkansas Electric Interurban Railway, Bentonville, Ark.—P. H. Sackett, chief engineer of the Arkansas Co-operative Construction Company, which is building this company's proposed railway, writes that the surveys between Bentonville and Gentry, Ark., Springdale, Ark., and Joplin, Mo., a total distance of 103 miles, are completed. Right-of-way is now being secured. Location work is being completed between Joplin and Neosho, Mo., and grading is soon to start on the Gentry division. Several branches are contemplated which will open up the territory between the Kansas City Southern Railroad and the St. Louis & San Francisco Railroad. The new railway will connect with the Southwest Missouri Electric Railroad at Joplin, Mo. It is expected that the railway will be in complete operation within 18 months. [E. R. J., Feb. 27, '09.]

Helena Street & Interurban Railroad, Helena, Ark.—It is stated that this company has completed one mile of its street railway and has about three miles more of railway to be constructed. J. W. Burks, Helena, president. [E. R. J., Jan. 2, 1909.]

British Columbia Electric Railway, Vancouver, B. C.—This company has announced its intention to extend the electric railway south to the American boundary at Huntington, where it has secured a site for a terminal.

Santa Barbara (Cal.) Consolidated Railway.—This company expects to place within six months the contract for constructing 2 miles of extension in Santa Barbara.

Manitou & Pike's Peak Railway, Manitou, Col.—This company, which operates a cog railroad up Pike's Peak, will install a third-rail electrical system at a cost of $750,000. The railway will have to be widened the entire distance of 9 miles and will use cogs, as on the old system. C. W. Sells, Manitou, president and general manager.

Meriden, Middletown & Guilford Railway, Meriden, Conn.—Surveys are being made for this company's proposed electric railway from Meriden to Guilford, a distance of 22 miles. Francis Atwater, Meriden, president. [E. R. J., July 31, '09.]

Kissimmee, Fla.—Messrs. McKinlay, McClintock and Sperry are said to be interested in the proposition of constructing an electric railway or motor car line from Kissimmee to Sanford. Mr. McKinlay is general manager of the proposed railway.

Pensacola (Fla.) Electric Company.—This company has opened an extension of its electric railway from Pensacola to Magnolia Bluff.

Georgia Railway & Electric Company, Atlanta, Ga.—The work of extending this railway on West Peachtree Street to Buckhead has been started. As soon as this is finished the extension on Ponce De Leon Avenue will be started. [E. R. J., June 19, '09.]

Belleville & Mascoutah Traction Company, Mascoutah, Ill.—It is reported that this company, which proposes to build an electric railway to connect the cities named in the title, has secured all rights of way and has let the contract for grading 3 miles east from Belleville. E. J. Kohl and Adolph Knobeloch, Belleville, are among the directors. [E. R. J., July 10, '09.]

Metropolis & Joppa Railway, Joppa, Ill.—William H. Kershner, general manager of the American Engineering Company, Indianapolis, Ind., who made the people of Golconda, Unionville, Brookport, Metropolis and Joppa, Ill., a proposition to build an interurban railway through these towns, writes that this matter is only in the preliminary stages and as yet no progress has been made. [E. R. J., July 17, '09.]

Bluffton, Geneva & Celina Traction Company, Bluffton, Ind.—This company has awarded the contract for building its railway from Bluffton to Geneva to Bears, Brown & Company. Fred Davenport, chief engineer. [E. R. J., July 10, '09.]

Columbus, Greensburg & Richmond Traction Company, Indianapolis, Ind.—W. J. Gimmell and Edward Fee, Clarksburg, are consulting with the directors of this company with a view of arranging for the early construction of the railway connecting the cities named. The right of way has been secured and other preliminary work done, but the financial arrangements have not yet been completed. A. M. Kuhn, Indianapolis, president. [E. R. J., June 19, '09.]

East St. Louis, Columbia & Waterloo Electric Railway, Columbia, Ill.—E. F. Schoenning, president, states that this company will award contracts for construction shortly. H. Reichenbach, Waterloo, secretary and treasurer. [E. R. J., May 8, 1909.]

Louisville & Eastern Railroad, Louisville, Ky.—This company has awarded the contract for building an extension of its system to Shelbyville to Chas. L. Christopher, superintendent of construction of the Louisville Railway.

Lake Charles Railway, Light & Water Works, Lake Charles, La.—This company expects to extend its Hodge Street system 1⅛ miles to the Hi Mount Addition.

Detroit, Lansing & Grand Rapids Railway, Detroit, Mich.—Oliver H. Lau, president and general manager of this company, writes that the grading of the line from Detroit to Grand Rapids via Lansing, a distance of about 135 miles, has been started. The railway is independent of any other system, and will be operated by overhead trolley. Capital stock, authorized, $25,000; bonds, authorized, $5,000,000. Headquarters, 706 Union Trust Building, Detroit. Officers: Henry M. Wallace, vice-president; George Valentine, secretary and treasurer; and F. A. Bean, chief engineer, all of Detroit. [E. R. J., July 24, 1909.]

Manistee, Mich.—The R. G. Peters Salt & Lumber Company denies the statement that it proposes to electrify the railway from its timber land on Lake Mitchell to Manistee, about 7 miles distant. [E. R. J., July 24, 1909.]

Butte (Mont.) Electric Railway.—J. R. Wharton, general manager, advises that this company is building a 1-mile extension south of the city to connect with round houses and shops of a steam railroad and 1 mile north from the Columbia Garden route to a new addition.

Rochester & Manitou Beach Railroad, Rochester, N. Y.—The new trestle of this railway at Braddock's Bay has been opened and cars are now operated over it. The approaches to the trestle are built of solid reinforced concrete and the trestle proper is built on piles 40 ft. in length and driven through two depths of sand to a foundation of rock. A number of concrete jetties have been built out from the approaches to serve as breakwaters. The route across the trestle is a single track. The trestle was constructed by A. F. Chapman, Buffalo. [E. R. J., March 26, '09.]

Albany & Hudson Railroad, Hudson, N. Y.—Raymond H. Smith, receiver, announces that the plans for the reorganization of this company will include the purchase of the Greenbush bridge, double tracking and straightening of the railway to Electric Park at Kinderhook Lake, building of a direct line to Pittsfield, Mass., and improvements at Electric Park.

Burgrahaw Interurban Company, Burlington, N. C.—Grading is practically completed for this railway, which is to connect Burlington, Graham and Haw River, 8 miles distant. The power house will be located midway between Burlington and Graham, and an amusement park will be laid out near it by the company. Jas. W. Murray is president. [E. R. J., May 1, '09.]

Southwestern Ohio Traction Company, Cincinnati Ohio.—The Board of Directors of this company has been increased from 9 to 15 members, as follows: B. H. Kroger, Henry H. Hoffman, General Lewis Seasongood, Charles H. Davis, J. M. Hutton, C. B. Matthews and B. W. Campbell, Cincinnati; George H. Worthington, Cleveland; Charles R. Mayers, Columbus; W. L. Moyer, A. S. White, John E. Bleekman, Jacob L. Greatsinger, Samuel M. Jarvis and Charles Hansel, New York. [E. R. J., July 3, '09.]

People's Railway, New Hamburg, Ont.—H. B. Stuart, engineer, writes that this company has commenced its surveys on its proposed railway to connect Stratford, Berlin, Guelph and Woodstock by way of New Hamburg, Berlin, Fergus and Eldora. A. N. Warfield, New Hamburg, construction engineer. [E. R. J., June 5, '09.]

Dunnville, Wellandport & Beamsville Electric Railway, Wellandport, Ont.—The by-laws granting aid to this company have carried in the townships of Moulton and Gainsboro, each voting a bonus of $5,000. [E. R. J., June 12, '09.]

Cumberland Railway, Carlisle, Pa.—F. A. Zimmerman, secretary and treasurer of the Carlisle & Mt. Holly Railway, advises that the Cumberland Railway has taken over all the property of his company and proposes to build an extension from Carlisle to Newville, 12 miles, and later to Shippensburg. The officers of the Cumberland Railway are: John Graham, Newville, president; Walter Stuart, Carlisle, secretary and treasurer, and W. F. Pascoe, Carlisle, general manager. [E. R. J., July 10, '09.]

Delaware County & Philadelphia Electric Railway, Clifton Heights, Pa.—This company has started construction at Baltimore Avenue, Lansdowne, on its extension through the eastern section of Delaware County to the Sixty-ninth Street Terminal, Philadelphia and westerly to Lansdowne, and will be able to operate cars to Chester and Wilmington, Del., and to Media and Glen Riddle when the system is completed. The company also intends to improve the Chester, Wilmington & Darby system, and has ordered the material necessary for the work. The new line will connect with the elevated terminal at Sixty-ninth Street (Philadelphia). Bridges will be constructed at Maylor's Valley, over the Cardington branch of the Pennsylvania Railroad, at Cardington; over Darby Creek, between Lansdowne and Aldan, and under the Baltimore & Ohio Railroad crossing.

Southern Cambria Railway, Johnstown, Pa.—This company writes that the roadbed of its electric railway is completed between Johnstown and South Fork, 3½ miles. Tracks will be laid the balance of the 12 miles within 6 weeks, when the South Fork system is in operation. The bridges are all completed, except the viaduct at South Fork, which is about 250 ft. long.

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.—This company has started work on a 1-mile extension of its railway in Chambersburg to the town limits. The work is being done by the company itself. The track will be laid with 7-in. girder rails furnished by the Pennsylvania Steel Company. The cross ties and line material have been provided.

Greenville (S. C.) Interurban Railway.—Grading has been started by this company on its proposed railway from Greenville to Williamston, a distance of 18 miles. H. H. Prince, president. [E. R. J., Feb. 20, '09.]

***San Antonio & Vernon Railway, Amarillo, Tex.**—It is reported that this company has been financed by Eastern capitalists. R. O. Whyman of the Whyman Construction Company, New York, has organized a construction company in Amarillo, with a capital stock of $50,000, which will be interested in the construction of this railway, which will connect San Antonio and Vernon.

Bryan, Tex.—The promoters of the electric railway between Bryan and the State College, a distance of 5 miles, have retained T. L. Fountain, Fountain & Shaw, Houston, to make preliminary surveys and estimate the cost of construction along the several routes surveyed. [E. R. J., April 17, '09.]

Cleburne, Tex.—The preliminary surveys for the electric railway connecting Fort Worth, Cleburne and Dallas have been completed, according to B. G. Leake, chief engineer, and the estimates of the costs are being prepared. H. M. Hyatt, Kansas City, Mo., is interested. [E. R. J., Jan. 16, '09.]

El Paso (Tex.) Electric Railway.—This company has contracted with the Stone & Webster Engineering Corporation, Boston, Mass., for constructing 7180 ft. of double track on Boulevard Street and for double tracking 2100 ft.

of Park Line in El Paso. The track will be laid with 80-lb., 7-in. T-rail on Boulevard Street and 60-lb. T-rail on Park Line. The contract includes the removal of about three miles of old track.

El Paso Valley & Fort Hancock Electric Railway, El Paso, Tex.—It is reported that this company will soon apply for a charter to build an interurban railway from El Paso to Ysleta, a distance of 32 miles. The board of directors contemplate the purchase of McKeen motor cars. Surveys will be started within a few days from El Paso, and bids for material will be opened. The company's office has been established at the headquarters of Thomas O'Keefe, secretary of the company, Plaza Block, El Paso. Officers: C. N. Bassett, president; Felix Martinez, vice-president, and W. Cooley, treasurer, all of El Paso. [E. R. J., June 26, '09.]

Milwaukee Western Electric Railway, Milwaukee, Wis.—This company announces that it expects to begin grading this Fall on its electric railway from Milwaukee to Beaver Dam, if most of right of way is acquired. Contracts for material will not be let until the latter part of the year. W. D. Chapman, 1537 Marquette Building, Chicago, Ill., has the contract for constructing the railway. The railway has a total length of main line and branch approximately 68 miles. Headquarters, Majestic Building, Milwaukee. J. W. Barber, secretary.

SHOPS AND BUILDINGS

Santa Barbara (Cal.) Consolidated Railway.—This company announces that it expects to build a car house within 6 months at Santa Barbara.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—It is stated that this company will erect a freight depot on Court Street, Cedar Rapids.

Topeka (Kan.) Railway.—This company expects to place contracts during the next two weeks for building an extension 75 ft. x 104 ft. to its car house at Topeka. A. M. Patten, general superintendent.

Old Colony Street Railway, Boston, Mass.—The car house of this company at Avon has been completely consumed by fire with some 20 street cars, which were stored in the building. The loss is estimated at $40,000. The car house was 200 ft. x 75 ft. and was used for storing cars out of season.

Interborough Rapid Transit Company, New York, N. Y.—This company has purchased 80 lots just west of Van Cortlandt Park, which will be used as a car storage yard. The company owns five city blocks between 240th and 242d streets and the Spuyten Duyvil Parkway and Corlears Avenue, and will immediately commence to build a terminal to relieve the present yards at 137th and 145th Streets.

People's Railway, Dayton, Ohio.—This company has issued a call for plans and specifications for a car house at Bolender Avenue and the Big Four Railroad. The building will cost about $250,000. V. R. Powell, superintendent.

POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway, Vancouver, B. C.—This company has made application for 30,000 miners' inches from Indian River, near Vancouver, and propose to build an auxiliary power plant. R. H. Sperling, Vancouver, general manager.

Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y.—This company has decided to increase the capacity of its power station at Lyons by installing a 5000-hp turbo-generator. The boiler capacity of the plant will also be increased and transformers will be added. The capacity of the plant will be 8400 hp when the new unit is installed.

Columbus Railway & Light Company, Columbus, Ohio.—This company has purchased from the Alberger Condenser Company a 4000-sq. ft. surface condenser, a 6-in. x 14-in x 10-in. air pump, an 8-in. x 16-in. x 12-in. air pump, and 12-in. turbo volute circulating pump.

Mahoning & Shenango Railway & Light Company, New Castle, Pa.—This company has purchased a 600-kw Westinghouse motor generator set and a 200-kw General Electric motor generator set.

Boyertown & Pottstown Street Railway, Reading, Pa.—This company has commenced the construction of a substation at its park in Reading. W. J. Hardaker, superintendent.

Sea View Railroad, Narragansett Pier, R. I.—This company has installed in its Hamilton power station two 400 k.w. Westinghouse turbines driving Westinghouse 3-phase, 60 cycle, 360 v. alternators. This equipment is additional to a set of horizontal cross-compound reciprocating engines driving Westinghouse generators, already installed. The plant is supplied with Westinghouse Le Blanc condensers, which preserve a 28-in. vacuum.

Manufactures & Supplies

ROLLING STOCK

Fresno (Cal.) Traction Company has recently purchased two 40-ft. cars and expects to have some more cars built.

Pittsburgh (Pa.) Railways has placed an order for 50 cars with the St. Louis Car Company and 30 cars with the G. C. Kuhlman Car Company.

Twin City Rapid Transit Company, Minneapolis, Minn., has recently shipped 11 cars which were built in the company's shops for use on its Duluth lines.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., is reported to be planning to rebuild a large number of its cars for pay-as-you-enter operation.

Compania Electrica y de Ferrocarriles de Chihuahua, Chihuahua, Mex., has placed in service four motor and four trailer cars, recently purchased from the Danville Car Company and the American Car Company.

Norfolk City & Suburban Railway, Norfolk, Va., mentioned in the Electric Railway Journal of May 1, 1909, as contemplating the purchase of two interurban cars, will close the contract for these cars during August.

Hornellsville-Canisteo Railway, Hornell, N. Y., reported in the Electric Railway Journal of June 26, 1909, as being in the market for two open cars, has decided not to purchase this rolling stock owing to the lateness of the season.

Peoria (Ill.) Railway, reported in the Electric Railway Journal of July 24, 1909, as being in the market for 10 cars, has ordered this number from the American Car Company. They will be single-truck cars of the pay-as-you-enter type.

Detroit (Mich.) United Railway, which was reported in the Electric Railway Journal of July 17, 1909, as being in the market for 50 cars, has placed an order for 25 cars each with the G. C. Kuhlman Car Company and the Cincinnati Car Company.

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa., is in the market for a double-truck car with 5-ft. 2¼-in. gage and four-motor equipment, suitable for freight purposes. It also desires to purchase one second-hand single-truck passenger car.

Chicago & Oak Park Elevated Railroad, Chicago, Ill., has placed an order with the American Car Company for the 20 cars, referred to in the Electric Railway Journal of July 24, 1909. These cars will be of the standard now in use on the company's lines and will have an over-all length of 47 ft. 5 in.

Seattle, Renton & Southern Railway, Seattle, Wash., is just completing the construction of the fifth of nine all-steel cars for city and suburban service. These cars have many radical features in their design and ride remarkably smooth. The new car without motors, but with electrical equipment, weighs 41,500 lb. and seats nearly 70 people.

Interurban Company, Burlington, N. C., which was reported in the Electric Railway Journal of Dec. 12, 1908, as being in the market for cars, has purchased six second-hand motor cars and six second-hand trail cars from the Dorner Railway Equipment Company, of Chicago. The purchase was made through the Interstate Construction Company, of Richmond, Va.

Illinois Tunnel Company, Chicago, Ill., will soon ask for proposals on 1000 all-steel freight cars, to be used in the underground tunnels of Chicago. The specifications which are now being prepared will designate that the cars are to have an over-all length of 10 ft. 6 in.; width, 46 in.; height of bed-plate above the ground, 17 in., and are to be provided with sheet-steel side and end boards.

TRADE NOTES

Brennan Electric Company, Chicago, Ill., has moved from 330 Dearborn Street, Chicago, to 127 LaSalle Street, Chicago.

Grip Nut Company, Chicago, Ill., announces that Universal window fixtures will be used on 16 chair cars, 25 coaches and six 70-ft. all-steel dining cars to be built by the American Car & Foundry Company for the Rock Island-Frisco lines.

Lord Electric Company, New York, N. Y., has just received a very substantial order for Earll catchers and retrievers as the result of a service test of eight months. Those interested in catchers and retrievers will be supplied with information regarding this equipment or other representative users.

Dossert & Company, New York, N. Y., have concluded an arrangement with the Western Engineering Specialties

Company, 1732 Glenarm Street, Denver, Col., to act as agents for Dossert solderless connectors in the Rocky Mountain territory. A large stock of connectors will be carried in Denver.

Edgar Allen & Company, Ltd., Sheffield, Eng., announce that the sole agency which has been held for some years past by Edwin R. Kent & Company for the sale of Allen products in the United States terminated on June 30, 1909, and that the business of Edgar Allen & Company, Ltd., in the United States will in the future be conducted in the firm's own name and under its own direct and personal management from 23 West Randolph Street, Chicago, Ill., and 282 Pearl Street, New York, N. Y.

Ernst Schiess - Werkzeugmaschinenfabrik, Düsseldorf, Germany, has recently brought out a machine for grinding corrugations off of rails. It consists of a carriage with three wheels, two of which, with the grinder, rest on the rail to be ground, and the other on the opposite rail of the same track. The grinding machine proper is equipped with a 10-hp motor supplied with current from the overhead line and an emery wheel which can be raised or lowered on the track. The inclination of the emery wheel can also be adjusted. By this machine, two workmen mill from eight to ten joints an hour.

M. L. Newman & Company, New York, N. Y., through a typographical error in the ELECTRIC RAILWAY JOURNAL of July 24, 1909, were reported to have opened an office at 26 Broad Street for the practice of industrial engineering in a consulting capacity. Newman & Company are at 25 Broad Street, Broad Exchange Building. M. L. Newman, the senior member of the firm, is perhaps best known by his long experience in the employ of the Government at the Brooklyn Navy Yard. Alfonse Kaufman, who recently severed his connection as manager of the Alaska Chemical Company, has become actively engaged with the new firm.

Mirrlees-Watson Company, Ltd., Glasgow, Scotland, has been making the Diesel type of oil engine for some time, but as the company has a very large business of its own in other engineering departments, it has been thought better recently to have an entirely separate company for the manufacture of this type of engine. A new company, Mirrlees, Bickerton & Day, Ltd., has therefore been formed, and it has now a thoroughly well-equipped and extensive factory at Hazel Grove, near Stockport. The chairman of Mirrlees, Bickerton & Day, Ltd., is Allan F. Baird, who is also the chairman of the Mirrlees-Watson Company, Ltd., and the managing director is Charles Day, who is also managing director of the Mirrlees-Watson Company, Ltd.

Peter Smith Heater Company, Detroit, Mich., reports that it has received during the past 60 days orders for its hot-water heaters as follows: The Milwaukee Electric Railway & Light Company, 121 type 1-C which was especially designed to suit Milwaukee conditions; Omaha & Council Bluffs Street Railway, 25 type 2-C; Indianapolis Traction & Terminal Company, 44 type 2-C; Salt Lake & Ogden Railroad, 10 type 1-C; Topeka (Kan.) Railway, 12 type 3-C; Grand Rapids (Mich.) Railway, 12 type 3-C, for pay-as-you-enter cars; New York & North Shore, 3 type 2-C; Rochester (N. Y.) Railway, 4 type 2-C; Maner Valley Railway, 3 type 3-C; Pittsburgh Railways, 20 type 2-C; Ft. Wayne & Wabash Valley, 4 type 1-C; Ohio Electric Company, 6 type 1-C.

H. M. Byllesby & Company, Chicago, Ill., announce that in order to meet the requirements for space resulting from the merger of the American Trust & Savings Bank and the Continental National Bank they vacated the fifth floor of the American Trust Building on Aug. 1, 1909, and have opened temporary offices in the banking rooms at Dearborn Street and Monroe Street, formerly occupied by the Continental National Bank. On Oct. 1, 1909, Byllesby & Company will move to the quarters at present occupied by the Continental National Bank and will remain in this location until June 1, 1910, when they will return to the American Trust Building. These removals are brought about solely to accommodate the banks, whose business demands the possession of the fifth floor of the American Trust Building, which has been occupied by Byllesby & Company since the opening of the building.

Willans & Robinson, Ltd., Rugby, England, report an excellent demand for their Willans-Parsons turbine. This machine, while of the standard Parsons type, includes a number of modifications for which Willans & Robinson are responsible, particularly in the method of fixing the blades in the foundation rings. Special means are also employed in the construction of the rotor so that the end shaft shall always be maintained in rigid connection with it, and in balancing the pressure of the steam against the rotor. The experience of the manufacturers has also led them to pay special attention to insuring ease of inspection and other features of a mechanical character, quite as important, often, to the power user as features of design. While the firm will quote prices on complete turbo-generator sets, it prefers to leave the manufacture of the purely electrical parts to those who make a specialty of this work, but the company is in close touch with such manufacturers so that standard patterns of generators are suitable for direct connection with standard patterns of Willans & Robinson turbines.

ADVERTISING LITERATURE

Lea Equipment Company, New York, N. Y., has issued a pamphlet in which is described its Lea high-duty turbine pump.

Cooper Heater Manufacturing Company, Dayton, Ohio, has issued a card describing and illustrating its improved Cooper heater.

Western Electric Company, New York, N. Y., is issuing folders on Hawthorn magneto test sets and Hawthorn resin core solder.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., describes a new five-line combination swtiching telephone and a two-line switching device in pamphlet No. 18, just issued.

Walter A. Zelnicker Supply Company, St. Louis, Mo., lists large quantities of new and second-hand T and girder rail suitable for street and interurban railway track in bulletin No. 90, dated July 24, 1909.

Watson-Stillman Company, New York, N. Y., is distributing Catalog No. 74, devoted to hydraulic beam shears and coping machines, which have been added to its large line of hydraulic tools. A hydro-pneumatic accumulator which is used in connection with the coping machines and beam shears is also illustrated and described.

A. G. Spalding & Brothers, Chicopee, Mass., have issued a catalog of their playground apparatus, also a little souvenir pamphlet, "Playtime." The latter quotes the opinions of many authorities as to the value of playgrounds for children; the former describes the many types of swings, seesaws and other equipment suitable for such places, as well as for trolley parks.

J. G. Brill Company, Philadelphia, Pa., in the July issue of *Brill's Magazine*, publishes the seventh of a series of articles on conditions which govern the type of car used in large cities. The article in the current issue discusses the conditions in Washington, D. C. Other articles describe new cars for the Joliet & Southern Traction Company and for the Atlantic Shore line.

British Thomson-Houston Company, Limited, London, has just issued a bulletin giving the partial list of users of Curtis steam turbines, including a number of prominent tramway systems. The British Thomson-Houston Company has installed a number of horizontal Curtis turbines, as well as vertical, but all of the horizontal turbines have been in small sizes.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4677. It contains data relative to the Sprague-General Electric Type M system of control, and forms a revision of similar data contained in a previous bulletin on this subject. The publication contains numerous illustrations showing the various pieces of apparatus used in connection with this system, with a description of each and table of weights of this style of equipment for various horse-power capacities. Bulletin No. 4675 of the company describes and illustrates a new single-phase induction motor of the repulsion induction type, designated as Type "RI," and developed for use in connection with installations where the starting torque of the resistance reactance type of induction motor will not meet the demand of the driven machine, or where within certain limits variable speed is required.

Keystone Lubricating Company, Philadelphia, Pa., in a leaflet published recently entitled "High Grade Petroleum Grease for Electric Railway Lubrication," presents a brief for mineral grease in place of the animal fats oftener used. The point is very clearly set forth that the bearing needs the viscosity of its lubricant most when the bearing gets hot and that this is precisely the time when animal fats show a disposition to thin and run away from their work. The thinner the grease the more easily it is squeezed out under the overlaid, which probably causes the heating. On the other hand, mineral grease has the property of retaining its consistency under all ordinary changes in temperature. It is therefore fed, not by the softening due to heat, but by pressure or gravity, according to the density employed, and if a certain grade maintains a film at one temperature it will do the same at any other temperature within the normal loading of the journal.

TABLE OF MONTHLY EARNINGS

Notice:—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including Taxes. †Deficit. ‡Includes Ferry earnings up to April 1.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., June '09	198,203	107,976	90,227	44,245	45,982
	1 " " '08	174,444	98,895	75,549	44,120	31,429
	6 " " '09	973,942	553,365	420,577	263,320	157,257
	6 " " '08	837,744	517,658	320,087	263,898	56,189
BELLINGHAM, WASH., Whatcom Co. Ry. & Lt. Co.	1m., May '09	30,607	18,105	12,503	8,074	4,429
	1 " " '08	28,958	17,696	11,262	8,003	3,259
	5 " " '09	158,424	93,153	65,271	42,011	23,260
	5 " " '08	147,121	81,959	65,162	39,899	25,263
BINGHAMTON, N.Y. Binghamton St. Ry.	1m., May '09	28,823	17,782	11,041	8,935	2,106
	1 " " '08	26,638	14,435	12,203	7,284	4,919
	5 " " '09	129,703	76,883	52,820	45,403	7,417
	5 " " '08	115,506	71,204	44,302	40,495	3,807
CHAMPAIGN, ILL. Illinois Tr. System.	1 m, May '09	350,157	209,723	*140,434	3,204	137,230
	1 " " '08	319,592	192,692	*126,900	.....	.....
	5 " " '09	1,713,026	1,007,357	*705,669	15,851	689,808
	5 " " '08	1,589,246	950,335	*638,911	.....	.....
CHARLESTON, S. C. Charleston Con. Ry. Gas & Elec. Co.	1m., June '09	67,481	38,906	28,575	13,917	14,658
	1 " " '08	67,940	40,971	26,969	13,817	13,152
	4 " " '09	251,821	153,531	98,290	55,667	42,623
	4 " " '08	254,180	161,747	92,434	55,267	37,167
CHICAGO, ILL. Aurora, Elgin & Chicago Railroad.	1m., May '09	133,029	71,356	61,673	28,549	33,123
	1 " " '08	119,049	62,770	56,279	28,423	27,856
	11 " " '09	1,316,430	724,796	591,635	308,794	282,840
	11 " " '08	1,275,516	704,279	571,236	306,145	265,091
CLEVELAND, O. Lake Shore El. Ry.	1m., May '09	89,535	*47,111	42,424	34,582	7,842
	1 " " '08	81,474	*48,105	33,370	31,187	2,182
Cleveland, Painesville & Eastern R.R. Co.	1m., June '09	30,771	*14,221	16,550	9,044	7,506
	1 " " '08	28,050	*15,867	12,184	8,224	3,960
	6 " " '09	136,430	*71,754	64,675	50,169	14,506
	6 " " '08	129,945	*72,755	57,189	48,052	9,137
DALLAS, TEX. Dallas Electric Corporation.	1m., May '09	103,525	66,183	37,342	28,839	8,503
	1 " " '08	90,460	64,063	26,397	29,939	†3,543
	5 " " '09	1,230,639	790,087	440,553	343,417	97,136
	5 " " '08	1,140,405	750,981	389,424	345,925	43,499
DETROIT, MICH. Detroit United Railway.	1m., May '09	677,175	389,178	287,997	154,932	133,065
	1 " " '08	604,107	365,875	238,232	135,661	102,571
	5 " " '09	2,999,479	1,827,532	1,171,947	769,337	402,610
	5 " " '08	2,673,579	1,726,116	947,463	675,794	271,669
DULUTH, MINN. Duluth St. Ry.	1m., May '09	81,533	47,231	34,302	18,417	15,785
	1 " " '08	71,695	44,509	27,186	18,417	8,769
	5 " " '09	369,455	233,514	135,941	92,083	43,858
	5 " " '08	335,828	218,350	117,478	92,083	25,395
EL PASO, TEX. El Paso Elec. Co.	1m., May '09	47,510	28,681	18,829	7,900	10,929
	1 " " '08	42,634	28,480	14,154	7,247	6,907
	12 " " '09	552,237	374,729	177,508	90,739	86,769
	12 " " '08	532,527	375,284	157,242	77,650	79,592
FAIRMONT, W. VA. Fairmont & Clarksburg Tr. Co.	1m., May '09	42,122	13,363	28,760	1,893	26,867
	1 " " '08	35,682	12,176	23,506	1,069	22,437
	5 " " '09	170,171	63,940	106,231	9,481	96,750
	5 " " '08	152,876	59,123	93,753	5,375	88,378
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., May '09	111,702	66,890	44,812	.....	.....
	1 " " '08	107,190	63,337	43,853	.....	.....
	5 " " '09	532,674	320,147	212,526	.....	.....
	5 " " '08	505,166	295,152	210,014	.....	.....
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., May '09	104,900	57,947	46,953	17,190	29,763
	1 " " '08	83,808	54,856	28,952	16,553	12,398
	12 " " '09	1,163,602	671,214	492,388	201,085	291,303
	12 " " '08	1,063,615	596,627	466,988	168,920	298,068
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., May '09	103,604	58,732	44,872	21,420	23,453
	1 " " '08	91,024	54,701	36,323	19,740	16,583
	12 " " '09	1,142,031	659,766	482,264	251,422	230,842
	12 " " '08	1,072,171	627,729	444,442	235,462	208,980
GRAND RAPIDS, MICH. Grand Rapids Railway.	1m., May '09	85,243	40,707	44,536	18,892	25,644
	1 " " '08	80,986	38,834	42,152	18,567	23,585
	5 " " '09	388,045	190,921	197,124	94,574	102,550
	5 " " '08	352,341	192,200	160,141	91,364	68,777
HARRISBURG, PA. Central Penn. Trac. Co.	1m., June '09	67,257	51,578	15,679	.....	.....
	1 " " '08	64,823	46,677	18,146	.....	.....
	6 " " '09	358,107	272,355	85,752	.....	.....
	6 " " '08	335,141	273,521	61,620	.....	.....
HOUGHTON, MICH. Houghton County Tr. Co.	1m., May '09	25,964	13,953	12,011	6,242	5,770
	1 " " '08	21,504	12,089	9,415	4,648	4,768
	12 " " '09	290,184	160,568	129,616	64,718	64,898
	12 " " '08	256,162	146,468	109,694	57,360	52,334
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., May '09	39,656	23,181	16,475	9,281	7,194
	1 " " '08	37,668	23,825	13,843	9,711	4,132
	12 " " '09	451,825	260,973	190,852	111,004	79,849
	12 " " '08	408,908	245,763	163,146	100,634	62,512
LEXINGTON, KY. Lexington & Interurban Rys.	1m., May '09	111,702	66,890	44,812	.....	.....
	1 " " '08	107,190	63,337	43,852	.....	.....
	5 " " '09	532,674	320,147	212,526	.....	.....
	5 " " '08	505,166	295,152	210,014	.....	.....
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., June '09	350,412	164,471	185,941	106,445	79,496
	1 " " '08	330,189	162,755	167,434	115,330	52,104
	6 " " '09	2,038,506	1,014,561	1,023,945	624,046	399,900
	6 " " '08	1,890,419	1,004,765	885,654	591,717	293,938
Milwaukee Lt., Ht. & Trac. Co.	1m., June '09	128,009	32,732	95,277	65,898	29,378
	1 " " '08	127,278	31,416	95,862	59,392	36,470
	6 " " '09	656,530	179,570	476,960	370,296	106,665
	6 " " '08	633,230	176,368	456,862	346,094	110,768
MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., May '09	569,217	260,970	308,247	140,251	167,996
	1 " " '08	527,393	254,577	272,816	126,972	145,843
	5 " " '09	2,656,965	1,361,601	1,295,364	687,507	607,857
	5 " " '08	2,429,349	1,265,571	1,163,777	621,178	542,600
MONTREAL, CAN. Montreal St. Ry.	1m., June '09	354,918	190,320	164,597	48,134	116,463
	1 " " '08	331,212	166,084	165,128	48,993	116,136
	9 " " '09	2,791,973	1,714,403	1,077,570	309,891	767,679
	9 " " '08	2,672,764	1,651,707	1,021,056	319,564	701,492
NORFOLK, VA. Norfolk & Portsmouth Trac. Co.	1m., May '09	151,599	92,659	58,939	.....	.....
	1 " " '08	‡152,176	90,262	61,913	.....	.....
	5 " " '09	759,016	450,221	308,795	.....	.....
	5 " " '08	‡711,093	448,912	262,181	.....	.....
OKLAHOMA, OKLA. Oklahoma City Ry.	1m., June '09	39,630	24,515	15,115	.....	.....
	1 " " '08	23,771	15,571	8,200	.....	.....
	6 " " '09	186,726	121,311	65,415	.....	.....
	6 " " '08	121,603	84,283	37,320	.....	.....
PADUCAH, KY. Paducah Traction & Light Co.	1m., May '09	17,698	10,418	7,280	7,027	253
	1 " " '08	18,406	11,803	6,603	7,053	†450
	12 " " '09	222,930	132,169	90,761	82,598	8,162
	12 " " '08	237,156	144,086	93,071	83,416	9,655
PENSACOLA, FLA. Pensacola Electric Co.	1m., May '09	20,172	10,902	9,271	4,342	4,928
	1 " " '08	15,084	12,073	3,012	4,328	†1,316
	12 " " '09	228,046	139,199	88,846	52,013	36,834
	12 " " '08	217,191	150,376	66,815	49,793	17,022
PHILADELPHIA, PA. American Rys. Co.	1m., June '09	259,834	.....	.....	.....	.....
	1 " " '08	254,314	.....	.....	.....	.....
	12 " " '09	2,844,831	.....	.....	.....	.....
	12 " " '08	2,896,314	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., May '09	12,088	7,923	4,166	1,716	2,450
	1 " " '08	10,643	8,219	2,425	2,343	82
	12 " " '09	125,866	85,682	40,184	24,705	15,478
	12 " " '08	122,249	89,321	32,928	27,560	5,368
PORTLAND, ORE. Portland Ry., Lt. & Pwr. Co.	1m., June '09	430,742	194,692	236,050	124,877	111,173
	1 " " '08	392,272	180,227	212,045	114,646	97,399
	6 " " '09	2,272,778	1,072,425	1,200,353	734,038	466,315
	6 " " '08	2,096,804	1,057,934	1,040,870	696,196	344,674
RICHMOND, VA. Virginia Railway & Power Co.	1m., May '09	178,350	101,320	77,030	.....	.....
	1 " " '08	167,383	108,667	58,716	.....	.....
	5 " " '09	834,570	471,505	363,065	.....	.....
	5 " " '08	781,538	523,334	258,203	.....	.....
ST. JOSEPH, MO. St. Joseph Ry., Lt., Heat & Pwr. Co.	1m., June '09	80,871	40,517	40,264	21,758	18,506
	1 " " '08	72,434	37,726	34,618	20,610	14,008
	6 " " '09	458,605	245,788	212,817	126,627	86,190
	6 " " '08	413,057	224,117	188,940	122,670	66,270
ST. LOUIS, MO. United Railways Co. of St. Louis.	1m., June '09	964,024	*600,617	363,407	232,322	131,085
	1 " " '08	915,339	*572,259	343,080	230,833	112,247
	6 " " '09	5,391,569	*3,431,193	1,960,376	1,404,630	555,746
	6 " " '08	5,163,555	*3,367,497	1,796,058	1,395,548	400,510
SAN FRANCISCO, CAL. United Railroads of San Francisco.	1m., May '09	634,169	349,263	284,906	.....	.....
	1 " " '08	661,914	383,187	278,727	.....	.....
	5 " " '09	2,971,421	1,740,534	1,230,887	.....	.....
	5 " " '08	2,790,260	1,862,080	928,180	.....	.....
SAVANNAH, GA. Savannah Elec. Co.	1m., May '09	50,275	32,624	17,651	17,375	276
	1 " " '08	48,097	30,244	17,854	17,003	850
	12 " " '09	603,848	373,147	230,701	209,357	21,344
	12 " " '08	602,988	407,218	195,769	202,187	†6,418
SEATTLE, WASH. Seattle Elec. Co.	1m., May '09	457,259	274,460	182,799	103,314	79,485
	1 " " '08	386,961	216,857	170,104	87,432	82,672
	12 " " '09	4,791,491	2,845,254	1,946,238	1,168,204	778,034
	12 " " '08	4,365,742	2,593,274	1,772,467	1,001,956	770,511
TAMPA, FLA. Tampa Elec. Co.	1m., May '09	47,821	27,162	20,658	4,759	15,900
	1 " " '08	45,405	32,254	13,151	2,303	10,848
	12 " " '09	572,553	358,284	214,269	51,995	162,274
	12 " " '08	535,859	379,408	156,451	18,676	137,774
TOLEDO, O. Toledo Rys. & Lt. Co.	1m., June '09	216,345	129,075	87,270	70,917	16,353
	1 " " '08	201,775	107,459	94,317	71,762	22,554
	6 " " '09	1,302,586	750,185	552,401	425,569	126,832
	6 " " '08	1,233,158	682,389	550,770	420,136	130,633

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Special Cars at Central Electric Meetings

The program for the next meeting of the Central Electric Railway Association, to be held at Detroit, on Aug. 26, includes a paper by F. D. Norviel, Indiana Union Traction Company, on "The Development of Long Distance Passenger and Freight Business." It has been suggested that the time will be an appropriate one for officials of various properties to make the trip from their homes to the meeting place in special cars. At several recent meetings of the association special cars have been features which have attracted sufficient attention from the daily newspapers and the public to be effective advertising. The possibilities of long-distance travel on interurban lines, where the length of road or connections make it possible, are understood reasonably well by those whose business or pleasure leads them to make periodical trips, but there are many who are not acquainted with the opportunities afforded by electric roads, and their patronage may be secured by advertisement. A special electric car that has carried delegates to a meeting a long distance from their homes is a novelty that has proved to be an attraction not only for outsiders, but also one that stimulates interest in the work of the association.

Rules for Interurban Railways

Elsewhere in this issue will be found the complete revision of the code of interurban rules to be presented at the Denver convention by the committee on interurban rules of the Transportation & Traffic Association. It will be remembered that the committee presented to the association last year a tentative code, which was referred back to it for further consideration. On May 25 a conference was held by the committee in Washington, D. C., and the discussion of the rules at that time resulted in the formulation of a number of radical changes, some of which were discussed editorially in the issues of this paper following the meeting. Several of the rules about which there were wide differences of opinion among those present at the Washington conference were passed for further study by members of the committee, and these rules, together with all the other proposed changes, were carefully considered at a subsequent meeting held in Fort Wayne, Ind., July 27. The revisions printed elsewhere in this week's issue are the present conclusions of the committee. Some of the changes made are comparatively unimportant, but the adoption of 19 and 31 forms of train orders, with the rejection of the coded form of blank, the change in rule 203 relating to trains leaving initial station, the method outlined for the protection of trains proceeding under a flag, and the procedure prescribed for calling the dispatcher when an opposing car has not arrived at a meeting point, are vital.

Throughout all of its work the committee has given the widest publicity to the proposed revision of the rules, and has invited suggestions and criticisms by letter, or in person at its meetings, from operating officials of railway companies and any others who are interested in interurban railway rules. The publication at this time of the changes at present proposed in the code is in line with this policy of publicity, and when the rules are finally adopted at Denver they should represent the best opinion of all who take an interest in interurban railway operation.

Restriction of the Tayler Plan

The attitude of the daily newspapers of Cleveland and the tone of public comment on the disaster to Mayor Johnson's plans in the referendum of last week indicates the general desire for a return to the Tayler ordinance, or a modification thereof. Probably the main features of the Tayler plan would have formed the framework of an ordinance that would have been accepted by the company operating the street railway, notwithstanding some objectionable provisions, if the negotiations had not been discontinued by the Mayor. He and his supporters did all that lay in their power to discredit this plan, in spite of the demand of the public for its adoption. If the Tayler plan, amended or as drawn originally, is brought forward again, a change should be made in the provision of the measure, as drafted, which was designed to restrict the return on the investment represented by the capital stock to 6 per cent annually. No matter how the earnings of the property developed, or what degree of operating efficiency might be attained, the maximum return was to be fixed at this figure. If the property could be made to pay this rate of dividend, either with low fares or the usual prevailing rates, that was all the stockholders could expect. It appears that the real effect of a limitation of that nature would be to destroy the incentive to initiative arising from the hope of profit greater than that which may be obtained by ordinary effort only.

Mountain Railways in Europe and America

One of the features of travel in Switzerland is the large number of mountain railways, steam, cable and electric, which reach almost every coign of vantage for very moderate fares. In fact, throughout Europe, almost every acclivity from which a view can be had and which is at all accessible to the tourist is provided with means by which he can easily gain the summit. Of course, Switzerland is the home of this class of road. There they are the most numerous and longest, and, according to the published returns, they are quite profitable. Thus, during the year of 1907 the Rigibahn, the pioneer of them all, paid 10 per cent; the Wengernalp paid 8 per cent; the Glion-Rochers paid 7 per cent; the Pilatusbahn paid 6½ per cent; the Gornergrat paid 5 per cent, and the Jungfraubahn, still incompleted, 4 per cent. These are the six principal mountain railways in Switzerland. Owing to their unique character, some of the unit figures of cost of construction and receipts of these lines are worth publishing. The Pilatusbahn, being typical of all, can be taken as an example. Its total cost of construction was $887,121, or about $216,000 per mile. In all, 143,640 passengers were carried in 1907, and the average fare paid was $1.17. The gross receipts were about $21,000 per mile. Of all the lines, that up the Jungfrau has been the most expensive. Up to the end of 1907 $1,451,462 had been spent in its construction, which has cost practically at the rate of $400,000 per mile of track.

This satisfactory financial condition often suggests to the American traveler that mountain railways here might be profitable, but a little thought will disclose, we think, that there are not the same opportunities in this country as abroad. The number of visitors to any single mountain resort here, like the Adirondacks or the White Mountains, is very much less than where a small territory is the recreation ground of an area as populous as the Continent of Europe. The season at our Eastern mountain resorts is also much shorter than that in Switzerland, and the altitudes to be ascended are less, so that there is less dependence on transportation lines for reaching the summits. Probably, also, the cost of construction would be considerably greater in this country than in Switzerland. The possibilities are worth considering where the conditions are favorable, but we do not believe there is any very great unoccupied field for mountain railways in this country. The most prominent example in the Eastern States of a mountain railway is that up Mt. Washington, in the White Mountains. This line has been in operation for many years, and, although profitable, has not been a very conspicuous example of financial success. The lack of any considerable number of imitators and the abandonment of one or two other lines in the East do not encourage the construction of similar roads. There are several scenic roads in the Far West, and from appearances they have had better fortune. That up Mt. Lowe, near Los Angeles, and the Pike's Peak line in Colorado carry a goodly number of passengers, and it is said that the latter is to be considerably extended. Another important road of this character is that up Lookout Mountain, near Chattanooga. But it may fairly be said that to insure success a long season is necessary, longer than that which exists in most of our Eastern mountain resorts.

Clerical Work in the Engineering Department

Observation of the amount of clerical work imposed upon the engineering departments of large electric railway and lighting companies prompts the suggestion that here is a possible source of extra expense and reduced divisional efficiency. In the nature of things the technical branch of a public service corporation must keep accurate records of or have immediate access to tests, designs, contracts, specifications and reports; but unless care is taken to dispose of these systematically among the departments most concerned, after a given line of practice has been established, the engineering staff may find itself overwhelmed with papers, and very likely overburdened with routine clerical labor that should be done by less expensive men than compose its personnel. In other words, the primary function of a technical department like the engineer's is advisory, originative and critical, and so far as possible repetitive clerical work should be performed by other branches of the service. There are plenty of things for an engineering department to do besides writing detailed specifications for long-standardized products, copying power station logs from day to day, and in general recording statistics which can be more cheaply prepared where they originate, duplicated if necessary, and then submitted to the department for approval and filing, criticism or other appropriate action.

The best practice tends toward the subdivision of clerical labors by the location of one or more clerks at large power stations, car houses and division superintendents' offices to handle routine matters, leaving the engineering department free to take up the special work which is responsible for its existence. Of course, no hard and fast line can be drawn

here, but if all the clerical work is measured by its value in a routine or a special case, much will be learned. The engineering department can still be held responsible for all specifications if the purchasing agent's staff prepares them in detail, though in cases where wide departures from previous practice are contemplated an exception may fairly be made in favor of their preparation by the technical staff. With the advance in technical knowledge now being gained by the best auditing and purchasing departments, there is no reason why many of the routine clerical matters formerly handled by the engineering division should not be disposed of elsewhere, and without any sacrifice of full and regular review by the technical staff of all conditions of operation which naturally should pass before it.

Securing Right-of-Way

Many volumes have been written upon different phases of electric railway engineering and there is some literature on the conduct of the real estate departments of steam railroad companies, but there is comparatively little information, in published form, as to the proper methods of securing a right-of-way through country districts for proposed electric railways. The reason for this is undoubtedly because this work is usually undertaken by local promoters who have been attracted to the proposition because of its effect on their other interests or because they think it will be profitable. Not having been actively associated with similar undertakings, they often make mistakes which prove embarrassing to the engineers who subsequently have to construct the line, and to the company which has later to operate it.

The three factors principally to be considered in securing a right-of-way of, say, 40 ft. in width, with slopes, are (1) the best engineering line; (2) the line best serving the country and, therefore, the road; and (3) the line of least cost for land. The adjustment of these conditions takes time and tact.

A good right-of-way man is essential, and he should accompany the engineers who make the preliminary survey. Experience has shown that the best way to gain right-of-way is to have the owner of the land sign a simple agreement to deed to the company the necessary ground. To obtain a deed with the owner's signature and that of his married consort, duly acknowledged in legal form, is rarely possible, until the line is staked out. The owner requires the knowledge on the ground by stakes 100 ft. apart of just where his land will be occupied. This engineering accuracy is rarely possible in a preliminary survey, owing to the subsequent changes of line made to suit some other land owner, and any change alters the alignment for a thousand or more feet both ways. Hence, it is best to defer the deed signature for a more certain location on the ground. Of course, the agreement in writing of a land owner to deed a piece of ground is not binding, but the owner usually regards it as such; it is far better than a verbal promise, and it permits the right-of-way agent to close up his work with the least effort.

By traveling with the preliminary survey party, the right-of-way man gains acquaintance with the line, the country and—of greatest importance—with the people. He readily finds out who will be the difficult grantors of land; by gaining the consent of these first, he will find the other grantors more easily signed. Briefly, the success on right-of-way lies entirely on the man, so no effort should be spared to secure the best, and three-quarters of the country portions of the line should be obtainable free.

It is usually judicious to proceed along the entire road and gain all the free grants before making any intimation of payment, for news of such a proposition travels fast, and after that it is difficult to secure more free grants.

As a rule, it is as easy to gain deeds to property, exempting mineral and perhaps the timber, so as to secure merely an easement, and such a deed is by far a better asset for a company. As a rule, also, it is well to insert at the beginning of the deed a clause that the land will revert to the grantor provided the road is not built within a specified number of years. A demand for this clause is invariably made on right-of-way work, and negotiations will be more quickly completed if it is inserted at the start. The question of what is a fair amount to pay for grants of right-of-way is governed by too many conditions to permit a definite answer. When the line lies through country farming sections, one factor is the way in which the proposed line will cut the property. Twice the local estimate of value per acre is, perhaps, a fair average.

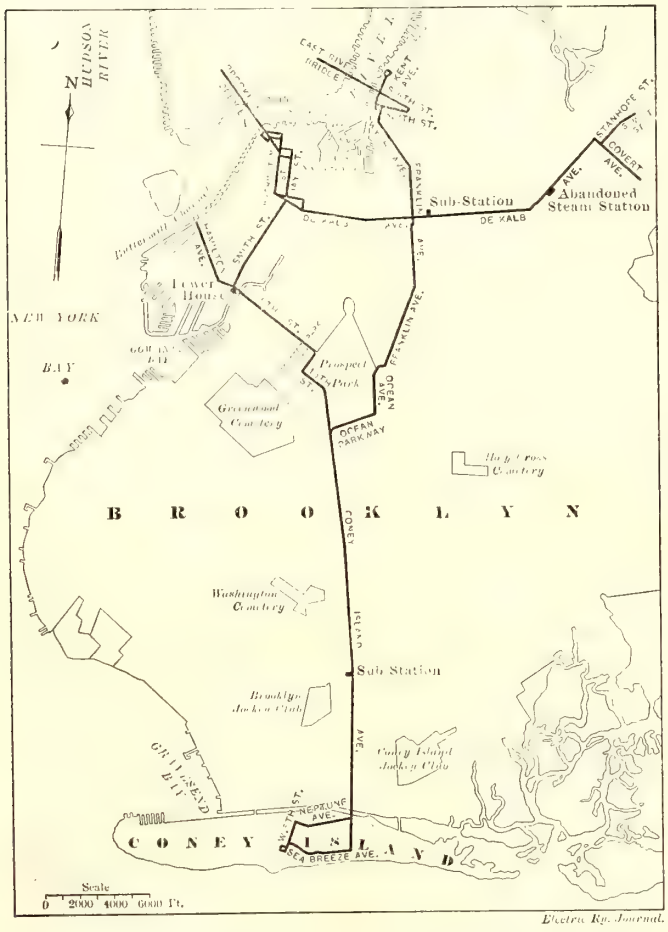
For right-of-way through incorporated towns the principal questions are usually length of franchise, paving and type of rail. Usually the negotiations take months, and can be most quickly concluded by inducing the authorities to appoint a committee, of not more than five, for the conferences between the company and the town. In these cases it is always advisable to secure the confidence of the town attorney or solicitor. His influence is great and, though he is rarely a business man, his decisions on business as well as on legal points are generally final with his associates.

After the preliminary work is concluded the road must be financed. Many propositions go to financiers in such a very crude state that the latter gain no intelligent idea of their value. As a rule, those bankers who entertain railway propositions are most interested in the man who presents them. If his judgment is thought good the proposition will receive respectful attention. Next in order is the manner in which the scheme is compiled, so as readily to bring out all the facts necessary for the banker's attention. In addition to a word picture of a proposition, a copy of each franchise, of the charter and of all agreements bearing on the financing is essential.

The first thought in the banker's mind is the one, "Will it pay?" The answer should be prominently set forth in the report on the proposition, and is chiefly the population per mile and the size of the terminal towns. The character of the country and its industries have much to do with admissible "population per mile." The second thought is: "Will the securities per mile be low enough to market them readily?" Earning capacity, of course, governs, and hard-and-fast rules are impossible. The best way is for promoters to obtain first an opinion from a responsible engineer experienced in this class of work, as to the probable success of the enterprise, before spending the money to place the proposition in banking shape. Moreover, the year's work of preparation of a project will proceed more rapidly if there is fair assurance of ability to find the construction capital on completion of the get-ready work.

POWER IMPROVEMENTS OF THE CONEY ISLAND & BROOKLYN RAILROAD COMPANY

During the past two years the power system of the Coney Island & Brooklyn Railroad Company has undergone a complete transformation. Prior to July 1, 1908, the company had in operation three steam generating stations, with a combined capacity of about 6500 kw, supplying current for the operation of approximately 160 cars. The main plant was located where Ninth Street crosses the Gowanus Canal, was condensing and secured its coal by water. The other two plants, on DeKalb Avenue and Coney Island Avenue, were non-condensing and required the haulage of coal and ashes. All of these plants contained Westinghouse "Kodak" engines and Climax vertical boilers, and the machinery in every case was from 4 to



Coney Island & Brooklyn Power Improvements—Map of Lines Showing Location of Power Station and Substations

13 years old. The main station contained, in addition to the five "Kodak" units, two 800-kw compound Corliss engine-driven units.

The new power system of the company was put in operation Nov. 1, 1908, and since that time has consisted of a central power house at Ninth Street and Gowanus Canal, containing two steam turbine units with a total rated capacity of 7000 kw, supplying 11,000-volt alternating current to rotary converters contained in substations, one of which is located at the power house, one on Sanford Street near DeKalb Avenue, and one on Coney Island Avenue at King's Highway, through high-tension underground distribution system. These two turbine units, with six water-tube boilers, are to-day doing the work which was formerly required of 19 engine units and 20 boilers.

It is instructive to note the economic result of this change. For the last fiscal year, or that ended June 30, 1908, before any of the old plants were shut down, the cost of manufacturing power, including maintenance but no fixed charges, amounted to $352,440. This was at the rate of 6.3 cents per car-mile operated from this power house, or about 2.2 cents per d.c. kw-hour sent out on the line. For the last six months of the present fiscal year, namely, from Jan. 1 to June 30, 1909, the cost of manufacturing current at the new plant, including maintenance but no fixed charges, has been $41,922, or at the rate of $83,844 per year. This corresponds to a cost of 1.8 cents per car-mile operated, or 0.7 cent per d.c. kw-hour sent out on the line. Consequently the saving in cost of operation of the new plant over the old is at the rate of over $250,000 per year, or approximately 4.5 cents per car-mile, or 1.5 cents per d.c. kw-hour. Perhaps a better idea of the relative importance of this saving can be had when it is stated that for the month of June, 1909, $3,123 was spent for coal in the new plant, as compared with $19,419 for June, 1908, in the old plants. Another significant comparison is that in June, 1909, 37 men were employed in the new power house and substations, as against 93 men in the old power houses during June, 1908.

The fixed charges on the new plant, it is believed, will be as low as possible on a plant of this size, inasmuch as its first cost is understood to have been probably lower than any plant of similar size in this vicinity, due to the purchase of the new apparatus and material at exceedingly low prices.

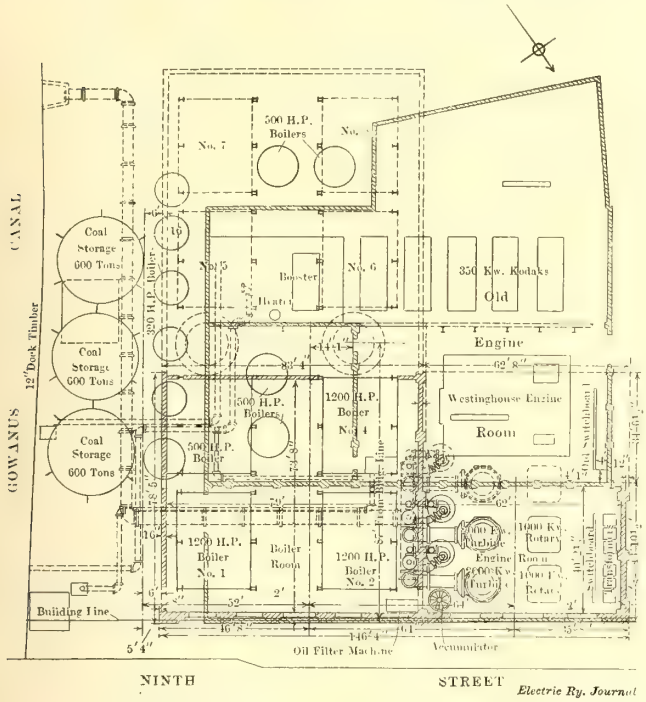
All of this work has been carried out under the direction of Ford, Bacon & Davis, who were engaged in May, 1907, by the company as consulting engineers for the reconstruction of its power system. Before commencing actual work complete reports were prepared by these engineers covering the power capacity required for future operation and estimates of cost of construction. From a study of the transportation records the peak loads and kilowatt-hours output required at the station were calculated and plotted for the years 1907 to 1912, and the size and number of units were selected accordingly. For the generating station it was apparent that two turbines of approximately 3500 kw capacity each (maximum rated capacity) would be needed to carry the load and that spare capacity should be provided in case one of the turbines broke down. The two 800-kw, d.c. units at Smith Street were in fair condition for use at peak loads during days of heavy traffic and if necessary could be reinforced by the five "Kodak" units at the same place. While these "Kodaks" were very uneconomical, it was considered more satisfactory for the present at least to have them for occasional use rather than buy a third turbine and accessories. The consulting engineers recommended that the other steam stations should be entirely dismantled and the apparatus sold.

LOCATION OF POWER PLANT AND SUBSTATIONS

The most favorable site for the power plant from the standpoint of coal delivery and the distributing system was that at Smith and Ninth Streets, on the bank of the Gowanus Canal. Although the water of this canal was not entirely desirable for condensing purposes, it can be used, and in view of the proposed flushing of this waterway, will be more satisfactory in the future.

The first substation was located in the power plant itself. The second was placed at Avenue Q and Coney Island Avenue, on the site of one of the discarded steam plants, as this was near the center of gravity of the

Coney Island load. The remaining site, that of the old steam plant at DeKalb and Central Avenues, was located entirely too far out for economical substation distribution.



Coney Island & Brooklyn Power Improvements—Plan of Reconstructed Power Station

The proper center of load for the third converter plant was placed on DeKalb Avenue, near Franklin Avenue. It was deemed expedient to purchase the plot for this station on Sanford Street, at a place slightly off DeKalb Avenue. The latter is an important business street where high prices prevail for real estate. The general layout of the lines and power buildings of the Coney Island & Brooklyn Railroad Company is shown in the accompanying map.

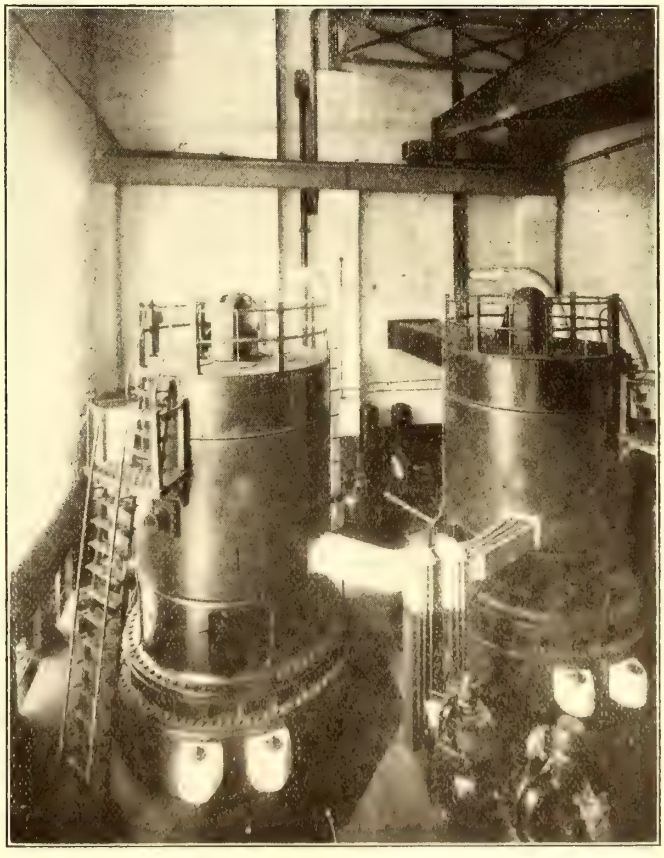


Coney Island & Brooklyn Power Improvements—Reconstructed Power Station

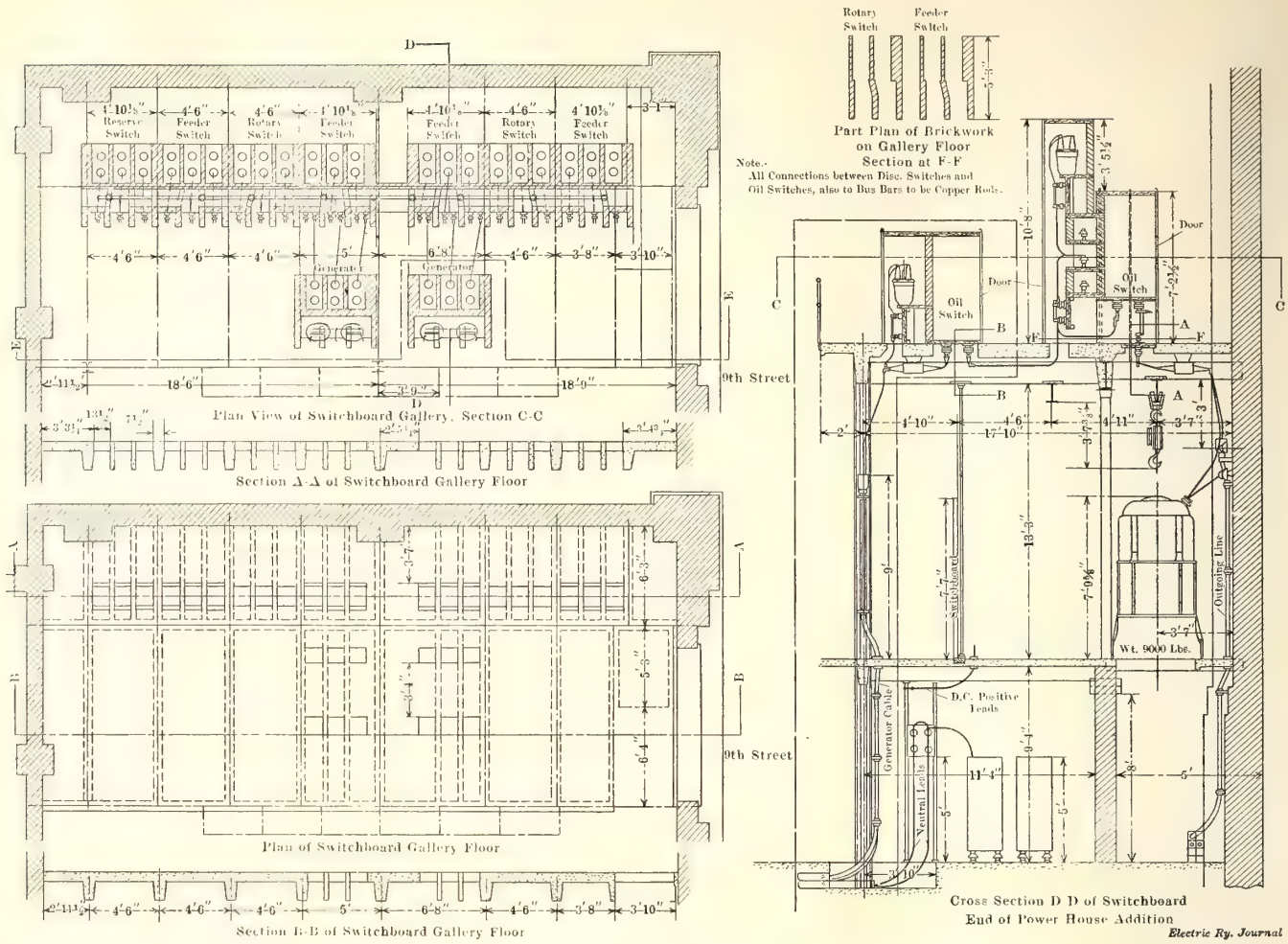
POWER-HOUSE CONSTRUCTION AND FOUNDATIONS

From reading the specifications for the construction of the power station one would gather the impression that the structure, while fireproof and substantial, was that of a plain brick factory building. The appearance of the finished structure, however, is extremely tasteful. The use of red mortar to match the bricks, which of themselves were carefully selected for color, is most harmonious. Even more noticeable are the practically perfect symmetry and proportions. This building brings out forcibly the fact that for power-station purposes, the proper proportioning of the parts of a comparatively plain building gives a more satisfactory appearance than is had in many buildings of more ornamental and costly design. North River bluestone was used exclusively for water tables, belt courses and for all sills and copings. No exposed wood was permitted in any part of the building, which is as fireproof as possible, with the exception that no attempt was made to inclose all the steel work in concrete because the proposed decrease in the insurance rate did not justify the additional expense.

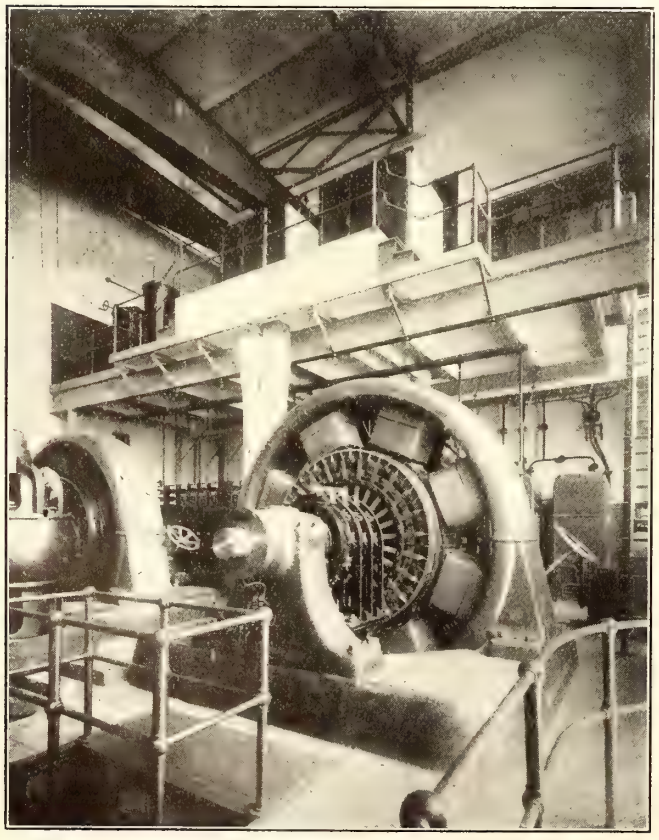
All window and door frames are of No. 22 galvanized iron. The window sash are all equipped with sash-operating devices and the windows are glazed with wire glass. Exterior doors are covered with galvanized iron and the windows above the doors on Ninth Street were constructed removable for the entrance of large machinery. The interior openings are protected by standard tin-covered fire doors, constructed and installed in conformity with the requirements of the underwriters having jurisdiction. On account of its fireproof qualities cinder concrete was installed where its strength permitted.



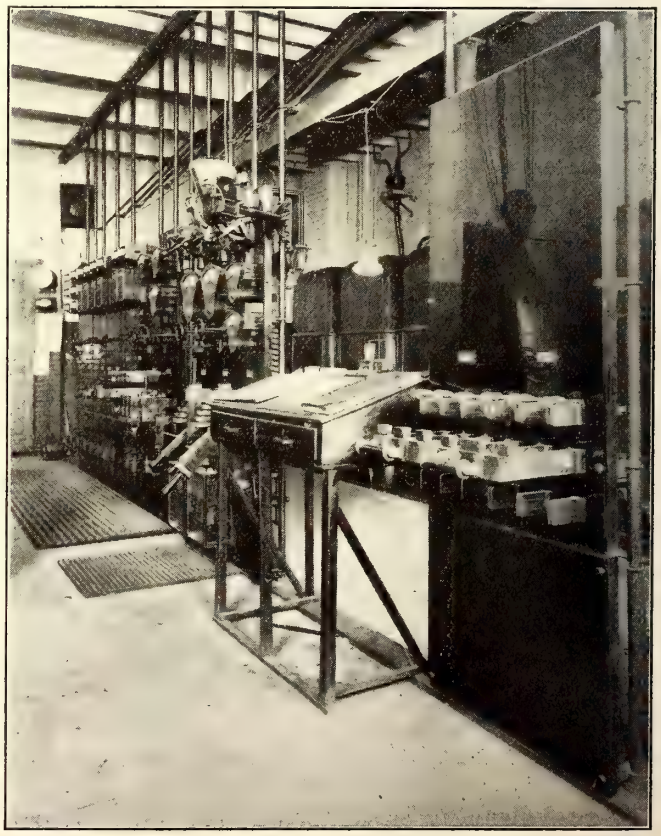
Coney Island & Brooklyn Power Improvements—Turbine Room in Reconstructed Power Station



Coney Island & Brooklyn Power Improvements—Switchboard in Power Station



Coney Island & Brooklyn Power Improvements—Rotaries in Power Station

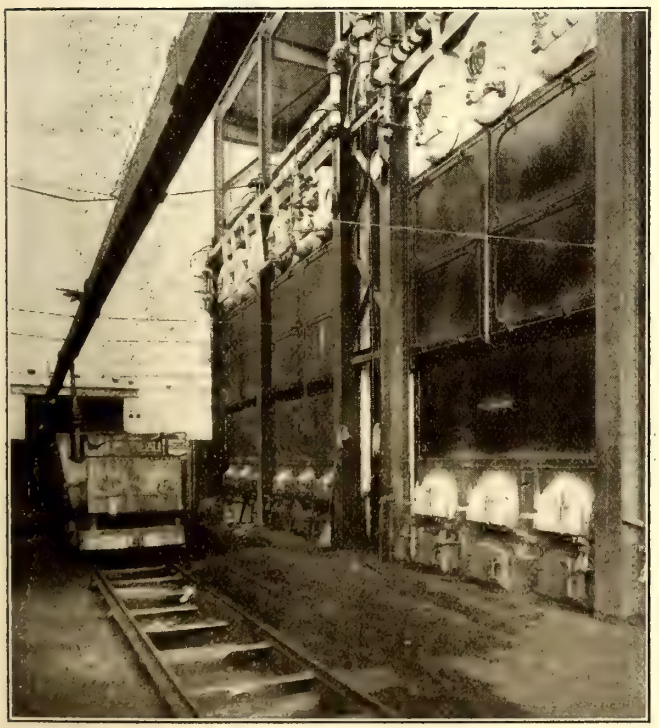


Coney Island & Brooklyn Power Improvements—Switchboard in Power Station

In sounding for foundations it appeared that all the soil in this vicinity is made ground. In addition there was found at a depth of about 20 ft. large quantities of unstable, easily flowing sand. The Raymond system of concrete piling was used and has given very satisfactory results. This choice resulted in a considerable saving in money and time over the use of wooden piles, which would have required extra excavation for capping at the water line. It was further figured that the concrete piles were good for loads of 30 to 40 tons, or about double that allowed for wooden piles. The concrete piles were about 20 in. diameter at the top and were driven 24 ft. to 30 ft. At times some trouble was experienced from the buckling or crimping of the No. 18 steel of the shell, but this occurred infrequently, and the difficulty was obviated by driving a new shell inside the old one. After the first few days no more trouble was experienced from water getting into the shell, as great care was taken to have the concrete ready to dump in quickly as soon as the core was withdrawn and before the water had a chance to enter. It might be added that as the site of the new plant was on that of the old one, it was necessary to remove large quantities of steel rails and concrete which had formed the original foundation.

CONDENSER CONDITIONS

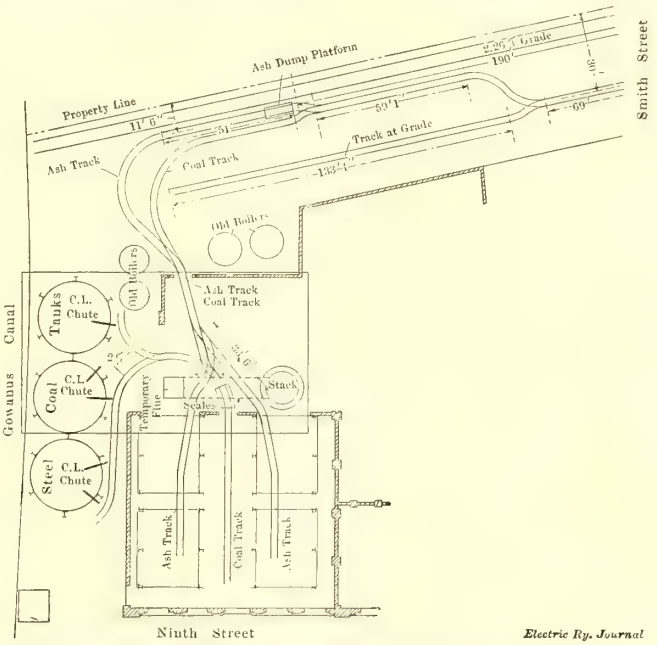
The water in Gowanus Canal is not fit for use in a surface condenser, as it is made foul by the refuse of oil refineries and chemical factories along its banks and there is no movement in it except from the tide. However, the



Coney Island & Brooklyn Power Improvements—Boiler Room, Showing Coal Cars

city is now establishing a pumping station at the upper end of the canal, so that the water will be changed twice a day, making it almost as good and cold as that in New York Bay. This new work will obviate any troubles caused by the high temperature of the present stagnant water. The unsatisfactory water conditions led to the adoption of the Alberger barometric condenser. To obviate the usual trouble from leakage of the intake lines when the water in them is under pressure, it was decided to place the intake pipe which carries water from the canal to the barometric condenser below water level. By so doing any small leakage in the intake pipe would give no trouble. Consideration was given to the plan of placing the centrifugal circulating water pump at the canal. In that case the intake pipe would have been located approximately on the surface of the ground level with the canal bank.

The intake line consists of a cast-iron pipe 48 in. in diameter, delivering the water to the centrifugal circulat-



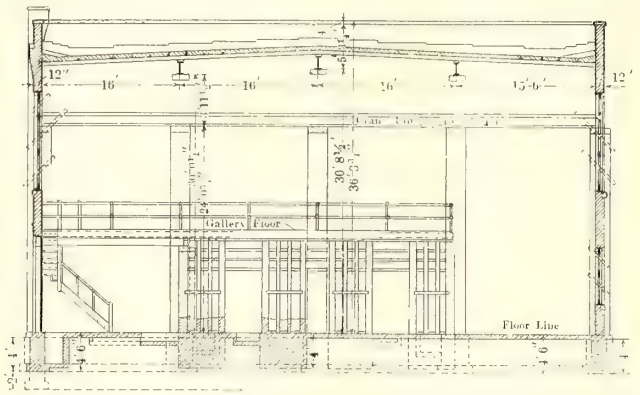
Coney Island & Brooklyn Power Improvements—Plan of Coal and Ash Handling Facilities at Power Station

ing water pump located in a pit in the engine room basement, so that the pump is flooded at all times and the liability of leakage trouble and necessity of priming the pump is entirely obviated. Close to the canal there is an intake well, from which the intake pipe leads. This well is fitted with two fine-mesh, heavy wire removable screens. During the latter part of the work much trouble was experienced in the installation of the intake well and pipe, due to the flooding of the ditch when the work was being carried out below low tide. The greater portion of the job was carried on by laborers working at low tide, but the latter part was accomplished entirely by divers. While this work was comparatively expensive, the cost was considered fully justified. The rate of flow in the 48-in. intake pipe is approximately 3 ft. per second for the maximum conditions under which this pipe will be used in the future.

It was intended to install a 36-in. cast-iron pipe for the overflow from the condenser back to the canal. It was found impossible, however, to obtain clearance for such a pipe on account of the presence of the steel tie rods which tie the bulkhead back to the old foundations. Consequently, the overflow was built as a brick flume, wide enough, but not so high, to secure the same capacity as would have been given by a 36-in. pipe. The overflow had been figured for a maximum rate of flow of about 5 ft. per second. By a material widening of the flume this speed was reduced just before the overflow entered the canal, so as to give an easy exit for the water and prevent its washing over the canal boats at low tide. This overflow empties into the canal at a point as far from the intake as possible, so that the hot discharged water will not go back when the tide is running toward the intake.

As there is no electrical apparatus located in the base-

ment and no other reason for an electrical attendant in this part of the building, it was decided that it would be preferable to locate the centrifugal pump motors on the turbine room floor. These pumps, therefore, are driven by vertical motors through vertical shafts and rigid couplings. There is a separate pump and motor for each of



Coney Island & Brooklyn Power Improvements—Longitudinal Section of Substation

the two turbines. Each motor is approximately 100 hp, and is of the variable speed type, so that at light loads in the winter it will not be necessary to run at the maximum speed demanded at times of heavy loads in the summer when the water in the canal is very warm. The pit in which the circulating water pumps are located is of waterproofed concrete. There was no objection to a moderate amount of water in the pit, as there is a sump at one corner, and an arrangement was made for siphoning out water if necessary, but as the top of the pit is at the level of the basement floor and slightly below maximum high water, it was necessary to waterproof it in order to keep out tide water.

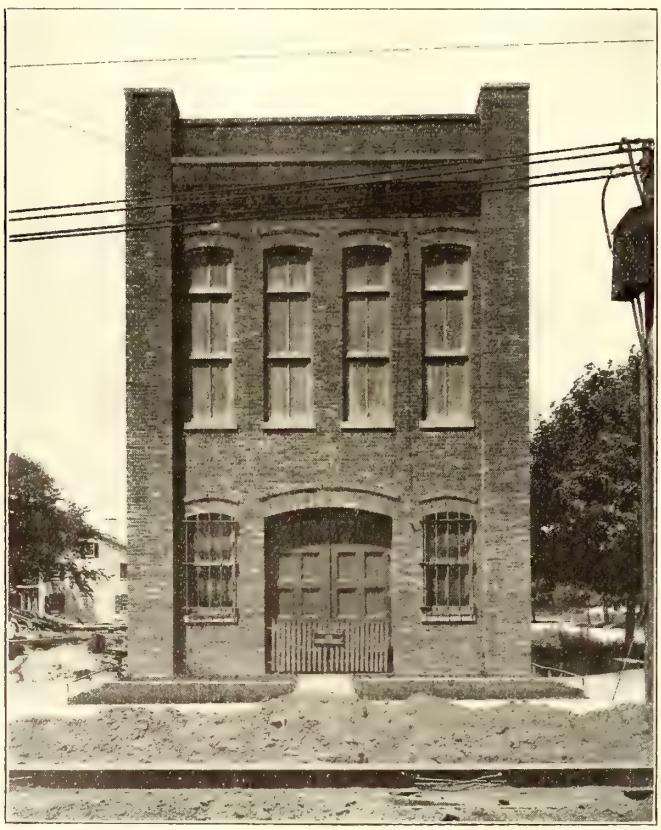
The equipment furnished by the condenser company included the following: Two 44-in. exhaust entrainers; two 44-in. barometric condensers, each complete with air cooler and tail pipe; two 16-in. suction and 14-in. discharge centrifugal circulating water pumps, having a rated capacity of 5800 gal. per minute; two 12-in. x 22-in. x 18-in. horizontal, single-stage, rotative, dry vacuum pumps; four thermometers. The condenser company guaranteed that with injection water at 70 deg. Fahr., each condenser would condense 52,500 lb. of steam per hour and produce 28 in. vacuum; also, that when furnished with injection water at 85 deg. Fahr., each condenser would condense 72,500 lb. of steam per hour and produce 26 in. vacuum.

GENERATING MACHINERY

The new generating equipment consists of two Curtis turbines rated at 3500 kw each on a 24-hour basis. The machines are of the four-stage type, run at 750 r.p.m., and deliver 11,000-volt, three-phase, 25-cycle current. The steam is delivered at 175 lb. with 110 deg. superheat. The guaranteed steam consumption per kw-hour at 28-in. vacuum with different loads is as follows:

Load	Lb. steam per kw-hour
1000 kw	20.0
2000 kw	17.8
3000 kw	16.4
3500 kw	16.4

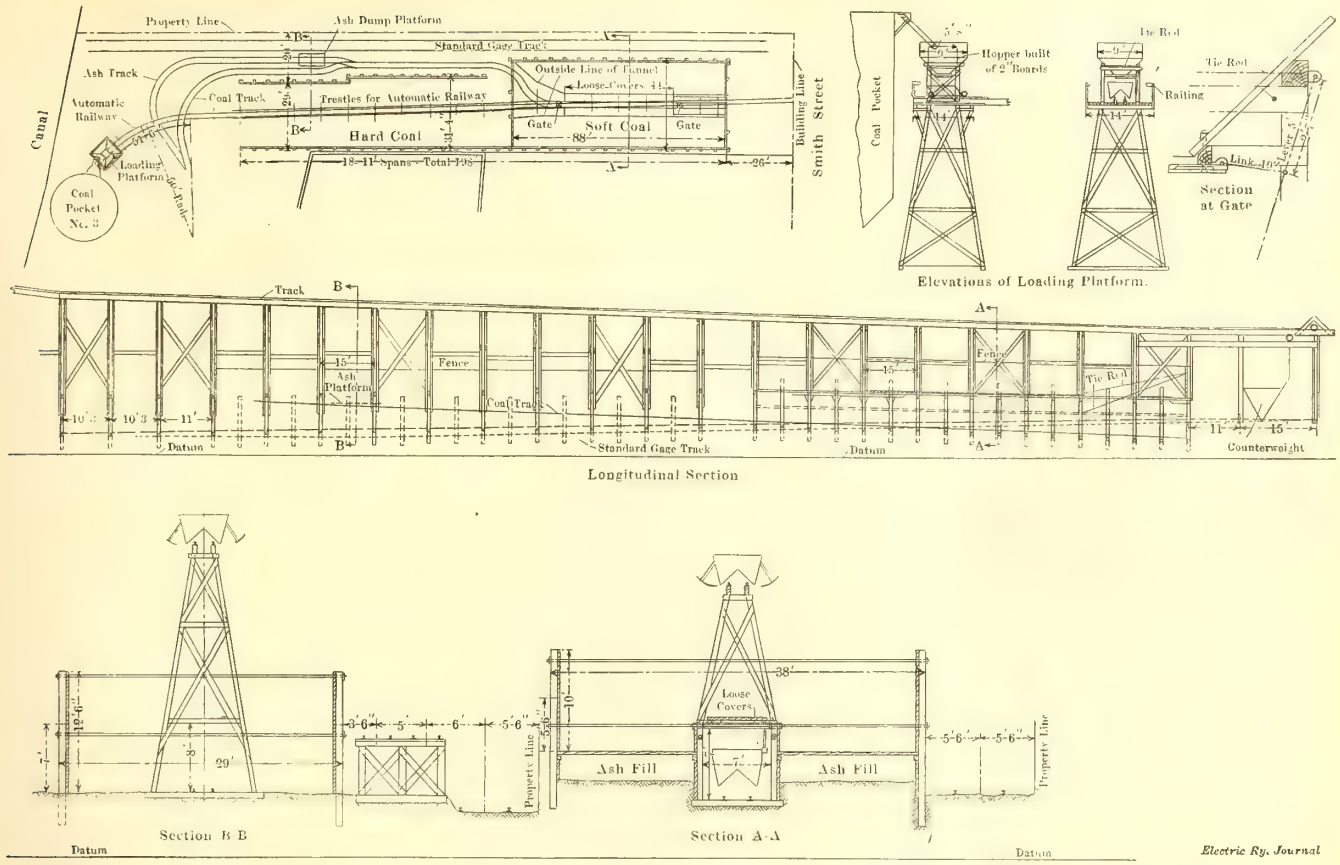
There was some question as to whether the generators should be wound for 6600 volts, which is the prevailing potential used for all the other large power equipments in Brooklyn. The higher potential was finally adopted by the engineers by connecting the generators in star for 11,000 volts (with the neutral grounded) and making the proper provision on the connecting board for changing over to a delta connection to secure 6600 volts.



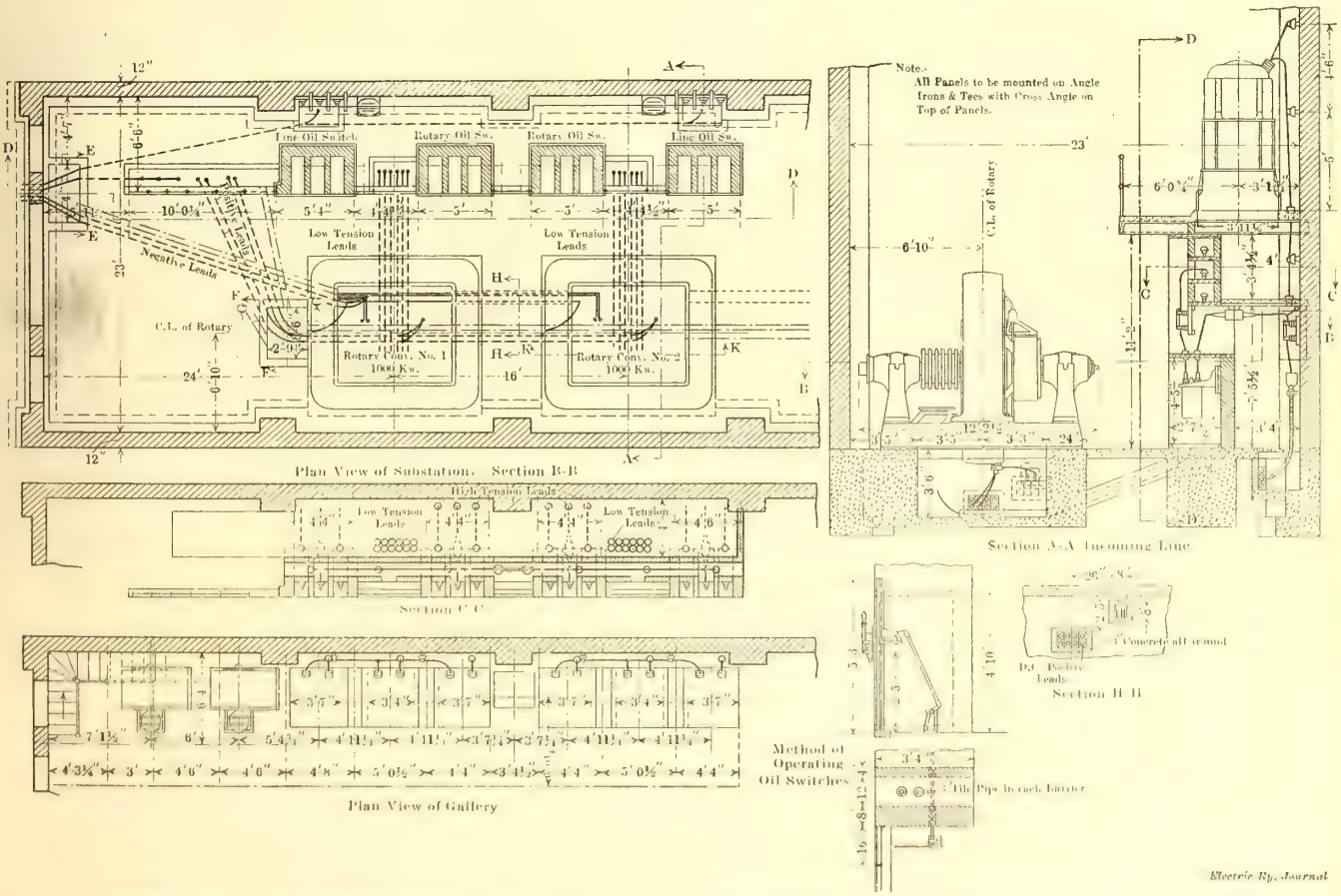
Coney Island & Brooklyn Power Improvements—Substation 25 ft. Wide on Coney Island Avenue



Coney Island & Brooklyn Power Improvements—Interior of Coney Island Avenue Substation

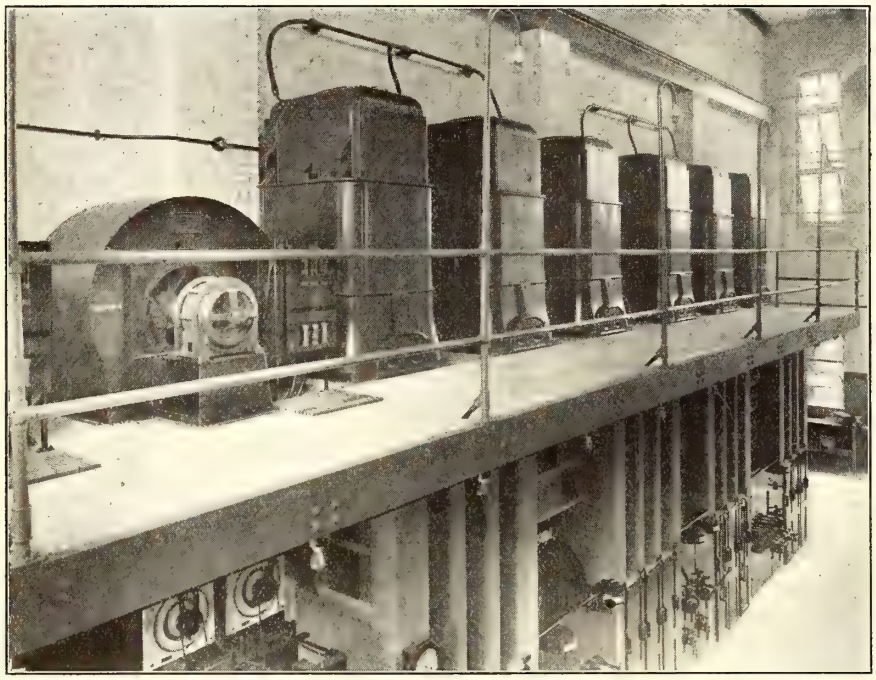


Coney Island & Brooklyn Power Improvements—Details of Coal Storage and Trestle at Power Station



Coney Island & Brooklyn Power Improvements—Plan and Sections of Substation Built on 25-ft. Lot

One 50-gal. accumulator at 650 lb. to 800 lb. pressure is used for the oiling system of both turbines. This capacity is sufficient to supply one machine at rated load for six minutes, or both machines for three minutes. An alarm has been installed in connection with the accumulator to attract the attendant's attention in case of trouble. This alarm sounds early enough to enable the attendant to shut down the turbine before any damage can be done to it. The accumulator was not considered absolutely necessary, but was installed because the added reliability of operation greatly exceeded the small extra cost.



Coney Island & Brooklyn Power Improvements—Transformers on Gallery of Coney Island Avenue Substation

One of the accompanying drawings shows the method of carrying the high potential leads from the connection board on the turbine to the high-tension compartments in the gallery. In this construction the high-tension cables are carried in a duct made of steel framing covered with asbestos board. The leads themselves are cambric-insulated single conductors carried on insulators. Special attention was given to this point, as these leads naturally are not protected by oil switches in all cases, and it was therefore necessary to protect the cables from mechanical injury in every possible way.

The exciting current is furnished by two 75-kw, 2400 r.p.m., 120-volt horizontal turbo-generators of GE type. One of these exciters acts as a spare while the other is used for excitation, lighting and remote electric switch control. No storage battery was installed for the last-mentioned purpose.

HIGH-TENSION EQUIPMENT

The high-tension busbars and switches are placed on a steel and concrete gallery over the main switchboard in the turbine room. The busbar compartments are of hard pressed brick. In most places concrete is used for the shelves and the tops of the busbar and potential transformer compartments, but in some instances Alberene stone was used where special insulating qualities were desired. The 2-in. concrete tops used were made on the ground. They have proved both economical and satisfactory. The electrically operated oil switches are all of the electrical contractor's H-3 type for the substation and main station apparatus. In the other substations the oil switches are of the hand-operated K type.

Behind the switchboard on the engine room floor there are two banks of three air-cooled GE transformers, each unit of 375 kw capacity. These are also connected in star like the generators, so that 6600 volts can be secured by changing to delta. The wiring is so arranged that the connections can be changed to 6600 volts very readily. In fact, the transformers in any of the substations could be changed over in about an hour. The DeKalb Avenue station was operated for several months with Brooklyn Edison power at 6600 volts before the Smith Street station had been completed. The transformers in the Smith Street station are cooled by two Buffalo forge blowers driven by 430-volt induction motors.

The cables, which were furnished by the National Conduit & Cable Company, are somewhat different from the ordinary 11,000-volt type lead-covered cables. Although the insulation between the conductors is 7/32-in. paper, as is standard, yet the insulation around the three conductors is only 6/32 in. thick. It was thought that on account of the star connection not as much insulation was needed between the conductors and ground as between the conductors themselves. Two No. 000 cables are run to the DeKalb Avenue station and two No. 2 cables to the one at Avenue Q. In each case one of the cables serves as a spare. Vitrified multiple duct conduit is installed between the power house and the two substations for carrying all the a.c. cables, and also the d.c. cables where advisable on account of local conditions.

LOCAL ROTARIES AND SWITCHBOARD

The Smith Street plant contains two 1000-kw, GE rotary converters placed opposite the turbines. This installation is in the main turbine room, to minimize first cost and avoid the need of a separate attendant for the substation apparatus.

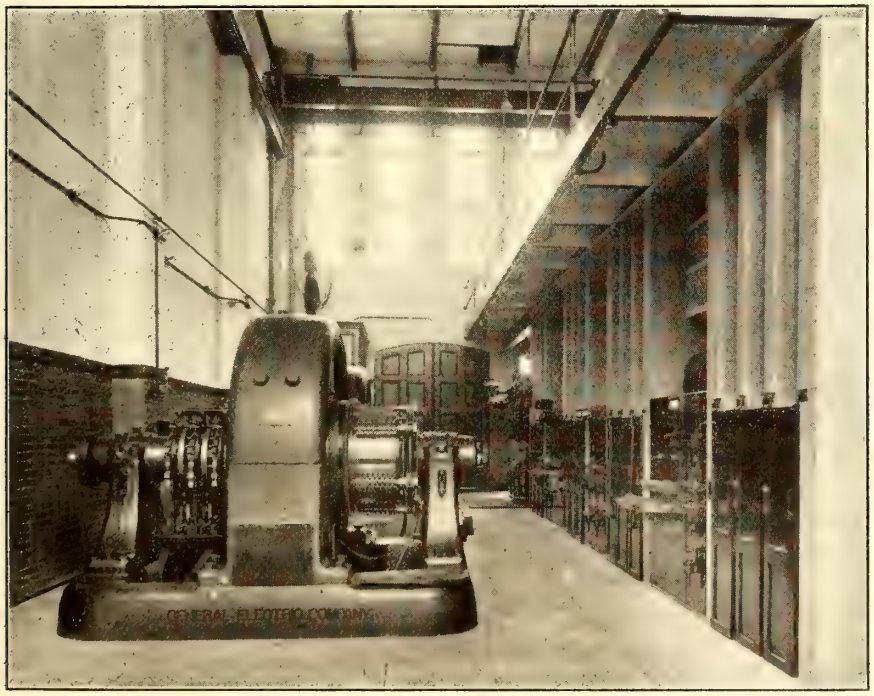
The main switchboard in the turbine room is made of slate panels carrying the control apparatus and instruments for the generating plant. Recording wattmeters are provided on all three substation feeders, and indicating wattmeters are used only on the generator panels. The substations have no a.c. recording wattmeters, but each rotary converter has a d.c. recording wattmeter. The d.c feeders are controlled from panels in their old location in the engine room.

COAL SUPPLY AND COAL HANDLING

The coal for the Smith Street station is taken from barges by clam-shell buckets which dump into a hopper, feeding a scraper conveyor, which passes over three vertical steel pockets, each of about 700 tons capacity. These pockets are located on the canal bank, and were erected some years ago for the old plant. For the new plant these vertical bunkers were not as economical as could be desired, but since they had been put up at a considerable expenditure, it was decided to utilize them as far as possible. The regular supply of hard coal is kept in these

three pockets, but their capacity would not be enough to take care of the company's needs in case of a protracted coal strike or ice blockade in the canal. Consequently, it was deemed necessary to provide in the yard adjoining the power house facilities for storing on the ground an extra supply of 2000 tons, enclosed at the side with wooden planking. The cost of the extra storage was estimated at $12,000, as against $20,000 previously figured for a fourth steel bunker of about one-third the proposed capacity. This open storage is used for all soft coal and the emergency hard coal. Fuel for the open storage is delivered by an extension of the old conveyor into a new hopper, which is arranged to drop its contents into a car running over an automatic railway. The soft coal is dumped over a tunnel, so that when the gates are opened the cars beneath will load without shoveling until the bin is three-quarters empty. One man handles all the coal and ashes. The former amounts to about 70 tons a day.

A 2-ton capacity, 30-in. gage trolley electric locomotive is used to haul coal from either the vertical bunkers or the yard storage, and also for hauling 1-ton ash cars from the boiler room to a track where their contents can be dumped into standard gage cars. The coal-car tracks from the storage bin to the boiler room have an up-grade of approximately 5 per cent, and the ash-car track also has a 5 per cent up-grade from the basement to the platform where the ashes are dumped into the large ash cars, to be delivered at Coney Island and elsewhere, where they are sold for sidewalks and filling. The general plan of both tracks is shown on an accompanying plan. The steel building columns in the boiler room are strong enough so that coal bunkers can be placed over the boilers at some future time simply by raising the present roof.



Coney Island & Brooklyn Power Improvements—Switchboard Panels in Coney Island Avenue Substation

Arrangements were made to use low-grade No. 3 buckwheat anthracite and mix it with 10 per cent to 15 per cent bituminous at times of heavy load. The use of a low-grade anthracite made it advisable to provide for Sturtevant forced draft up to a pressure of 2½ in. of water, but normally a pressure of 1 in. is used.

BOILER EQUIPMENT

The boiler room is arranged for eight boilers, but at present the equipment consists of three pairs of B. & W. water-tube boilers aggregating 3600 hp. The boilers are carried from straps and the settings on steelwork. All boilers are furnished with Webster furnaces and Neems Brothers grates, 12½ ft. wide by 12 ft. long, designed for low-grade anthracite. The heating surface of each boiler consists of three steam and water drums 42 in. in diameter, 23 ft. 5 in. long, placed above and connected to a set of 21 sections of tubes. Each set consists of 14 tubes 4 in. in diameter and 18 ft. long. Hand firing is now used, but the arrangements permit the ultimate use of mechanical stokers. The boilers are designed for 200 lb. pressure per square inch, but at present they are operated at 180 lb. pressure, with 110 deg. superheat. The superheaters, which are also of B. & W. type, are placed between the first and second passes of the gases.

The chimney is a steel, self-supported stack, 200 ft. high, of 12 ft. inside diameter and lined with red brick to a height of 40 ft. The choice of steel over brick was influenced by the fact that there was no room for the extra large base needed with brick. This stack is designed to care for 4800 hp in boilers, it being the intention to erect a second stack of similar size when the boiler room is extended for a greater capacity than that mentioned. To avoid cinder trouble as much as possible, the breeching just before entering the stack entrance was very much enlarged in cross-section to reduce the flow of gases to approximately 11 ft. per second under the maximum conditions under which the stack would be used. A settling pit filled with water was provided for the deposit of cinders, it being intended to drop the cinders before they entered the stack, due to the lower velocity of the gases at that point.

STEAM AUXILIARIES AND LUBRICATION

In addition to the exciters and forced-draft fans, the steam auxiliaries include the vacuum pumps, oil and pressure pumps, two duplex feed pumps, which were installed in the old power house, and a new Cochrane open-type feed-water heater and purifier. The feed-water heater is rated at 4000 hp, and when supplied with 20,000 lb. exhaust steam per hour at atmospheric pressure will raise the temperature of 125,000 lb. of water from 50 deg. Fahr. to 210 deg. Fahr., or it will raise 210,000 lb. of water per hour from 50 deg. Fahr. to 115 deg. Fahr. It was not considered advisable to pay for an equipment which would raise the temperature of the maximum amount of water used to 210 deg. Fahr. The oil separator of this equipment does not allow more than one-half a grain of oil per gallon.

All oils are stored in a fireproof room separated from adjoining sections by brick walls and a fireproof door. The capacity of the combined filter and storage tanks is 650 gal., which is sufficient to insure a continuous supply of cool, clean oil for three turbines of the size installed.

PROVISION FOR STATION GROWTH

As the Smith Street installation is now laid out, any desired extensions can be made by adding equipment in

the older portions of the layout south of the new apparatus. The boiler room can be thus extended for an ultimate capacity of 9600 hp. There would likewise be plenty of room for new turbines and switchboard extensions. Many of the details have already been arranged for the reception of a third turbine, as there is sufficient room between the second turbine and the reserve Westinghouse generating set to install a new machine simply by removing a portion of the present dividing wall. If the building is extended only in a southern direction, the limitation of growth, of course, will be the capacity of the boiler room. After this limitation has been reached, it would still be possible to double-deck the boiler room or construct an additional boiler room on the opposite side of the turbine room on ground now used as a car house. It will thus be seen that, although the present power house is comparatively small for New York City, the design and location are such that as much capacity could be ultimately secured as would probably ever be needed by the Coney Island & Brooklyn Railroad Company.

SUBSTATIONS

The larger of the two outside substations is on Sanford Street near DeKalb Avenue. Like the substation in the power house, it contains two 1000-kw rotaries and six 675-kw transformers. The switches are of the K type and are hand operated. All of this equipment is housed in a building of selected red brick and colored mortar, after the general style of the power house. The architectural features also follow the same design.

The arrangement of the apparatus at Sanford Street deserves special attention. As shown on the accompanying plan, the building itself is only 25 ft. wide, and yet there is plenty of room from an operating standpoint. The switchboard and high-tension apparatus being on the same floor as the rotaries, but one attendant is needed for the operation of the substation. If the station had been wider than 25 ft., two lots would have been required. The substructure has space for three 1500-kw rotaries and is capable of extension throughout the lot, which is 100 ft. deep, thus allowing more than enough room for future requirements.

The third substation is at Coney Island and Avenue Q, close to the location of the old steam plant. This building is of similar construction as the Sanford Street station, and contains two 500-kw rotaries, six 185-kw transformers and K-type switches. The electrical equipment in the substations, like that of the power plant, is of the General Electric Company's manufacture throughout.

There is no spare equipment at either outside substation, but one of the 1000-kw rotaries at Smith Street may be considered as a spare when the reserve d.c. generators are taken into consideration. In case of trouble with a rotary converter at either outside substation, part of the d.c. load can be shifted to Smith Street.

ENGINEERING AND MANAGEMENT

The entire reconstruction of the power houses, substations and feeder system was carried out by Ford, Bacon & Davis, W. H. Sawyer being directly in charge of this work for them. S. W. Huff is president and general manager of the Coney Island & Brooklyn Railroad Company, and the operation of the power system is in charge of P. J. Murphy, superintendent of power.

Bucharest, the capital of Roumania, has authorized a loan of $2,000,000, of which $600,000 will be used in the construction of a municipally owned tramway system.

WHAT CONSTITUTES A LEGAL TENDER FOR A FARE

BY HOWARD C. LAKE, OF THE NEW YORK CITY BAR

While a passenger on a street railway is ordinarily not expected always to have the precise amount of fare to tender, the carrier's employees are not required by law to furnish change for anything more than a reasonable amount. By the passenger's boarding the car the relation of debtor and creditor is established with all its rights and liabilities, consequently a person may be ejected from the car, no more force than is necessary being used, for his failure to comply with a reasonable rule of the company. Hence the question has often been raised: What is a reasonable request of a street railway conductor with respect to the changing of bills of comparatively large denomination in payment of fares?

Three times within the last quarter of a century the highest courts of as many leading, although widely separated, States have adjudicated the question. In California and Tennessee it has been held that a $5 bill or coin is a reasonable amount to tender in payment of a 5-cent fare and that the company's representative is required to change it. But New York's highest tribunal, the Court of Appeals, holds that a company rule requiring change to the amount of $2 to be furnished by conductors on street cars is a reasonable provision for the convenience of the public and the conductor cannot be required to furnish change for a $5 bill. The question of what is a reasonable amount to require changed has uniformly been held one of law for the court or judge to decide rather than one of fact for the jury.

The California decision, rendered in 1889, seems to have been prompted, at least in part, by prevailing conditions which were purely local, for the judge who wrote the opinion said therein: "It is a well-known fact that the $5 gold piece is practically the lowest gold coin in use in this section of the country." The facts in the California case, briefly stated, were that the passenger had no coin of any smaller denomination than a $5 gold piece, which he offered to the conductor in response to his demand for fare. This the conductor refused because he could not change the coin. Thereafter the crew of the car forcibly ejected the passenger, injuring him. The passenger's recovery of $500 damages against the company, which counsel for both parties had stipulated at the trial was a fair estimate of the passenger's damages, if he were entitled to any, was sustained on appeal. After disposing of the proposition that a passenger on a street car where a uniform sum is charged for any distance, does not have to tender his exact fare, the court says that it does not follow that he may tender any sum, however large, saying: "The true rule must be, not that the passenger must tender the exact fare, but that he must tender a reasonable sum, and that the carrier must accept such tender and must furnish change to a reasonable amount."

The company argued that the establishment of a rule requiring change for $5 would lead to great inconvenience, requiring the company to furnish its conductors "with sufficient small coin to do a general exchange business with all passengers, thus requiring the company to intrust to a class of employees who are usually of no pecuniary responsibility large sums of money." The court's answer was that with the question of convenience it had nothing to do "except insofar as it bears upon the question whether the amount tendered was a reasonable sum, such as the carrier was bound to accept. * * * The fears of the appellant [company] are based upon the assumption that passengers

generally will contumaciously, to avoid the payment of fare and require the companies to carry them free, offer coin of a large denomination. But these fears, we think, can safely be set aside upon the theory that a question like this will, as is usual, settle itself through a spirit of mutual accommodation between carrier and passenger."

The decision in New York came about a decade ago, where the reasonableness of the rule requiring change for a $2 bill, but no larger, was argued with unusual ability and distinction. The passenger, Barker, was apologetic as he tendered a $5 bill, saying, "I have only got a $5 bill," and the court remarked that he himself regarded his offer as unusual and requiring explanation. The court said it agreed with the California court that a passenger is not bound to tender the exact fare, but must tender a reasonable sum, but could not assent to the conclusion that a tender of $5 is a reasonable sum. The court said:

In the case at bar the reasonableness of the rule established by the defendant is obvious. In a large city like New York the round trip of a car on any street line means a very considerable number of fares paid in and the necessity for the conductor to carry and pay out a large amount of small change. When the defendant enacted the rule requiring its conductors to furnish change to a passenger to the amount of $2 it did all that could reasonably be expected of it in consulting the convenience of the general public and it would be unreasonable and burdensome to extend the amount to $5. It would require conductors to carry a large amount of bills and small change on their persons and greatly impede the rapid collection of fares.

When the question arose in Tennessee not long ago the court sided with its far Western sister in holding that a rule fixing a $5 bill or coin as the maximum amount required to be changed was reasonable. The paragraph from the New York case which we have given above was quoted.

The passenger in most, if not in all, the above cases contended that the rule was unknown to him and that he could not be said to be bound thereby. This contention has each time been briefly and firmly overruled. Said one judge:

It is so reasonable in its terms and so necessary to the convenience of the company in the collection of fares that the public was charged with notice of it. When the fare to be paid, as in this case is so small, and the number of passengers so numerous, any one proposing to take passage upon one of the cars of the company is bound to know the necessity of providing himself with change reasonably near the amount of fare to be paid and of the inconvenience and probable impossibility of the conductor furnishing change in large amounts.

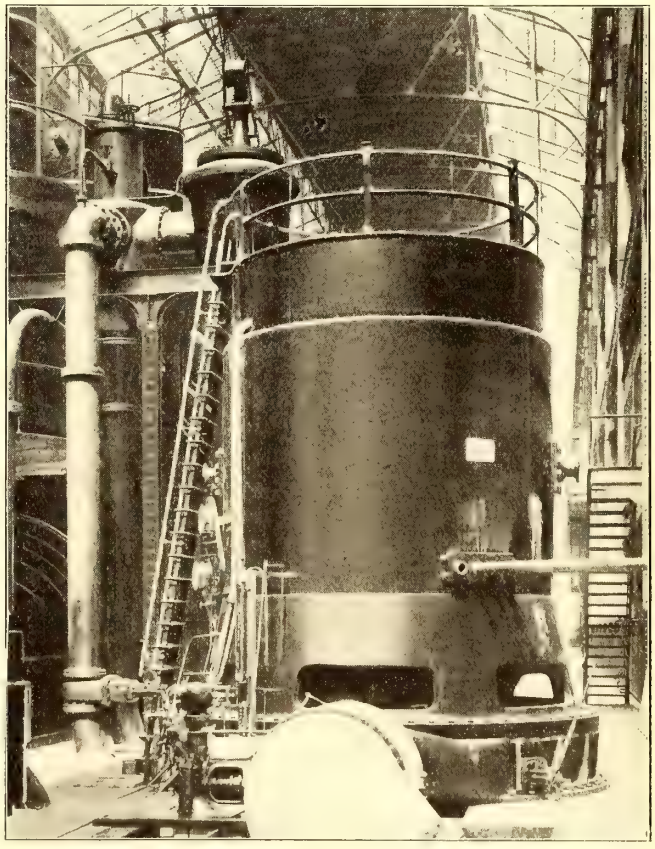
In view of the decisions quoted it is interesting to inquire what the respective rights and duties of the passenger and conductor are when the amount tendered is above the legal fare, which in New York State has been held to be $2 and in Tennessee and California $5. It is safe to say that the passenger always has the right of giving the large bill to the conductor and obtaining from him a receipt for it so that he can present his claim to the main office at some later date and collect the change. It would be well for the conductor in any case to suggest this course. If the passenger declines to do so and is unable or unwilling to give any smaller change and the conductor cannot change the large bill the passenger can legally be ejected, although some companies provide in their rule books that in cases of this kind the passenger should be allowed to continue his ride. If ejectment is decided upon care should be taken that it is carried out in a perfectly legal manner so far as the force used and the time and place chosen. These matters are fully covered by legal decisions.

The question of the character of the bill tendered by the passenger has some bearing on the subject at issue because while all forms of United States currency are received as par at the banks, banknotes themselves are not a legal tender. A newspaper paragraph some time ago stated that a company had successfully defended a suit for ejectment in a lower court in a State where the legal tender for a fare is $5 because the passenger tendered a $5 banknote instead of a greenback or silver certificate. It is questionable whether this difference would be recognized by the highest tribunal in a State if the case of the passenger otherwise was good, but the question of character of bill is at least an interesting one.

5000-KW. EXHAUST-STEAM TURBINE IN INTERBOROUGH POWER HOUSE

The Interborough Rapid Transit Company, of New York City, has just placed in operation in its subway division power house at Fifty-ninth Street and Eleventh Avenue, a 5000-kw Curtis exhaust-steam turbine, on the performance of which hinges the immediate installation of two others of the same size and the ultimate doubling of the station output by this means.

The Interborough power house contains at the present time nine Allis-Chalmers combined double horizontal and



5000-kw, Low-Pressure Steam Turbine in Power House of Interborough Rapid Transit Company

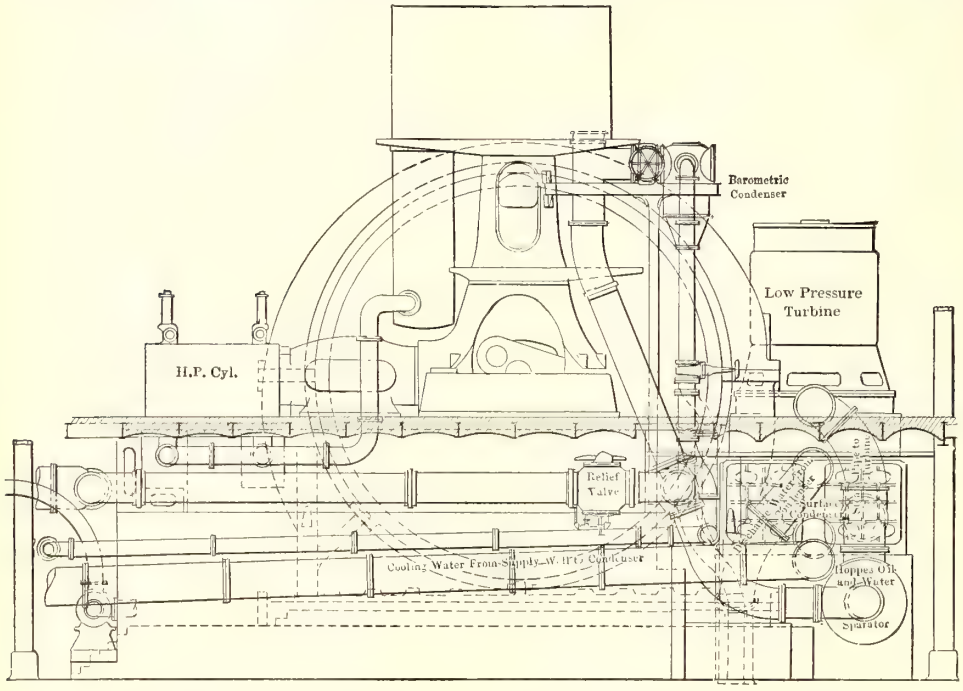
vertical engines, having a nominal rating of 7500 ihp each, and three Westinghouse-Parsons turbines rated at 1250 kw each. The low-pressure turbine is located between the first and second engines, and the relative size of both units is well shown in the side elevation. The high-pressure cylinders of the engine are horizontal and the low-pressure cylinders vertical. The dimensions of the cylinders are 42 in. and 86 in. in diameter by 60 in. stroke, and the speed is 75 r.p.m. Both pistons of each side of the engine are connected to one crankpin. Steam enters each high pres-

sure cylinder at from 175 lb to 200 lb. pressure through a 14-in. pipe, and from there passes into a receiver through a 16-in. pipe, whence it passes to the low-pressure cylinder. This receiver is not steam jacketed. The engines have poppet valves on all the high-pressure cylinders to provide for the use of superheated steam; but the usual Corliss valve gear is employed on the low-pressure cylinders. The generators are of the Westinghouse revolving-field, flywheel type, the field structure being mounted directly on the engine shaft. The generators are rated at 5000 kw, 25 cycles, three-phase, 11,000 volts.

Ordinarily, the exhaust piping from the engine starts from the condensers with a 30-in. relief valve. From this valve the pipe, which is 30-in. in diameter, drops through the main operating floor to the basement, where the exhausts from the two units unite into one 40-in. riser, which is carried to the roof. The exhaust piping is of riveted steel and is equipped with both corrugated copper and slip expansion joints. The condensing system for each engine generator unit consists of two Alberger jet condensers with barometric column discharge, two hot wells of concrete and expanded metal, one dry vacuum pump and one cross-compound circulating pump. Each condenser is supported on specially designed steel work placed in front of the engine, and is connected directly to the exhaust outlet of the low-pressure cylinder by means of a single elbow on one side and the relief valve of the atmospheric exhaust line on the other. The condenser head or chamber is 50 in. in diameter and terminates at the bottom in a cone-shaped connection to the tail pipe, while the top is provided with a chamber in which the entrained air and vapor collect and to which is connected the air pipe to the dry vacuum pump. On the side, 90 deg. from the steam pipe and the exhaust relief valve, the circulating water enters, while directly opposite in the vapor chamber is the air-pump connection. The water for use in the condensers is taken from the North River through a concrete tunnel.

The use of the low-pressure turbine has necessitated some changes in the exhaust lines and condensers. The jet condensers are not used on the engine to which the exhaust turbine is connected, the turbine being equipped with a surface condenser instead. The turbine resting directly over the condenser not only makes a better vacuum possible, but by equipping the exhaust pipe between the low-pressure cylinder of the engine and the turbine with an oil separator, the condensation is made available for boiler feed purposes. At present all the boiler feed-water is purchased from the city at a large annual expense, and if the condensation from the turbine can be utilized again a saving will result.

The low-pressure turbine is directly coupled with an induction generator rated at 5000 kw, three-phase, 25 cycles, 11,000 volts, and the leads are connected to the reciprocating engine generator without switching apparatus. The turbine, which is a three-stage machine, has no governor, and is controlled in speed by the engine generator, which latter is controlled by the engine governor. On a vacuum of 28 in. and with the low-pressure cylinders exhausting at a back pressure from 12 lb. to 17 lb. absolute, the steam consumption is less than 15 lb. per kw-hour. The combination is still under test, and the results are not at present available for publication. However, it may be stated that the output of the station can be doubled by the installation of exhaust steam turbo-generator sets at a cost of about one-third of that of the original installation.



Side Elevation of Engine and Turbine, Interborough Power Station

The power house occupies the entire square block at Fifty-ninth Street, Eleventh Avenue and the North River, and the structure and site represent the largest item in the investment. Doubling the output does not entail the expenditure of any money for real estate, it being possible to install the added equipment in the present structure. If reciprocating engines were employed, another structure of the same size would be required. H. G. Stott, superintendent of motive power, has given serious thought to this work for some time, and it is to him that the credit is due of installing the largest low-pressure turbine at present in use.

ENTERTAINMENT AT DENVER

The entertainment committee of the Manufacturers' Association is desirous of continuing at the Denver convention the annual supply men's vaudeville performance which has met with such favor in years past. Some of the former participants will not be able to attend the convention this year, and others have reached the age limit; therefore the committee is obliged to engage some new talent. Judging from what has already been produced, it should be possible to arrange an entire bill composed only of railway supply men. The committee would like to be advised of the names and addresses of amateur specialists who expect to attend the convention, and guarantees to any volunteers immunity from expressions of disfavor. Communications should be addressed to A. L. Whipple, chairman of the entertainment committee, 50 Church Street, New York.

MEETING OF THE COMMITTEE ON INTERURBAN RULES

A meeting of the committee on interurban rules of the American Street & Interurban Railway Transportation & Traffic Association was held at Fort Wayne, July 27, to summarize the work accomplished by the committee during the year, and also to put in final form the conclusions reached by the committee at the meeting at Washington, May 25. It will be remembered that at the Washington meeting, which was reported in the ELECTRIC RAILWAY JOURNAL for May 29, one of the most important changes in the rules was the tentative adoption, as nearly as possible, of the American Railway Association rules for the movement of cars by train orders. Another was in regard to the conditions under which trains may proceed, preceded by a flag. At the meeting at Fort Wayne these changes were formulated, and it is the intention of the committee to recommend them at the Denver convention.

Through the courtesy of J. N. Shannahan, chairman of the committee, the following summary of the changes tentatively adopted at the Fort Wayne meeting of the committee is published.

The rules which are changed are printed in consecutive order. The additions to old rules and the new rules are set in italic. Words or phrases in the old rules which are omitted in the new rules are enclosed by brackets. In a few cases, as in the rules of audible signals and the method of obtaining train orders, certain portions of the old rules have been retained, but to avoid confusion of the reader, the entire new rule is set in italic. The rules which are not printed below have not been changed in wording, except that rule 430, which was the same as rule No. 24, has been omitted entirely.

GENERAL RULES

Packages.

26. Employees must not carry packages, letters or newspapers [for any one not having business with the Company] without an order from the proper authority.

Switch Keys.

31. *The ..... will be the custodian of switch keys, and will be held strictly responsible for their distribution, delivering them to such persons as are required to use them in the performance of their duties, and taking receipt therefor on forms provided for that purpose. Employees to whom switch keys have been delivered will be held responsible for their use and must report at once any loss of same. All employees must report at once in writing to their superior officer any misuse of a switch key, or any person having a switch key in his possession who is not so entitled, and it shall be the duty of such superior officer to see that any such switch key or keys are recovered and returned to the ..... A deposit will be required to guarantee the return of switch keys, badges and rule book and other property of the company upon leaving the service.*

Laws of.....

32. [31] All laws of the State of ..... covering common carriers, and applicable to interurban operation, must be observed. *Extracts from important laws will be found in the back of this book.*

DEFINITIONS

Train.

50. An engine or motor, or more than one engine or motor, coupled with or without cars, displaying markers.

Current of Traffic.

62. *The movement of trains on a main track, in one direction, specified by the rules.*

STANDARD TIME

Standard Clocks.

82. *The clock in the dispatcher's office at ....., and such others as may be hereafter designated, are standard clocks.*

Station Clocks.

82. (*a*) When station clocks are provided, station agents must see that they show correct time; but trainmen must not take time from such clocks unless they are designated as standard clocks.

AUDIBLE SIGNALS

Communicating Signals.

103. *CONDUCTOR TO MOTORMAN*

SOUND	*INDICATION*
(*a*) *One*	*When train is running, stop at next station.*
(*b*) *Two*	*When train is standing, start forward.*
(*c*) *Three*	*When train is running, stop at once, emergency.*
(*d*) *Four*	*When train is standing, back the train.*
(*e*) *Four*	*When train is running, reduce speed to four (4) miles per hour until two (2) taps of the bell or two whistle cord signals are given, when the train will proceed at scheduled speed.*
(*f*) *Five*	*When train is standing, call in flagman.*

104. *MOTORMAN TO CONDUCTOR*

(*a*) *One*	*Come forward.*
(*b*) *Two*	*Pull trolley down to roof.*
(*c*) *Three*	*Set rear brakes.*
(*d*) *Four*	*By motorman is signal to conductor that he wishes to back train, and must be answered by conductor before train is backed.*
(*e*) *Five*	*Watch trolley.*

TRAIN SIGNALS

Rear End Signals.

110. *The following signals will be displayed, one on each side of the rear of every train, as markers, to indicate the rear of the train: By day, green flags; by night, green lights to the front and side and red lights to the rear; except when the train is clear of the main track, when green lights must be displayed to the front, side and rear.*

USE OF SIGNALS

Signals at Switches.

130. After a regular scheduled train clears the main track, and switches are properly set for main track, the conductor must step to the side of the track opposite the switch stand until after the opposing train has passed, keeping his hand lantern at night in full view of the approaching train, *but giving no proceed signal.*

CLASSIFICATION OF TRAINS

Extra Trains.

202. Extra trains are [of] inferior [class] to all scheduled trains of whatever class, and have no rights except those conferred upon them by train order.

MOVEMENT OF TRAINS

Trains Leaving Initial Stations.

203. A train must not leave its initial station on any division or a junction, or pass from double to single track, *without order or clearance, and* until it *is* [has] ascertained, *by asking the dispatcher,* whether all trains due have arrived or departed, *mentioning particularly the last train due, giving the train number.*

Where *a* train register is maintained, it shall be the duty of the conductor to register and to note carefully whether all trains due have arrived.

If *in such case* the motorman or conductor cannot reach the dispatcher, the train will proceed on time table rights *"protected by flag,"* then call from all succeeding telephone stations until he has succeeded in reaching the dispatcher.

Explanation of "Protected by flag" as used in rule 203.

203. (*a*) *Trains will be operated under control within one-half of the range of vision on straight track. At all curves, dangerous and obscure places, conductor will go ahead of his train, using red flag by day and red and white lantern by night (white lantern to signal his train ahead and red lantern to stop any opposing train) a sufficient distance to fully protect his train.*

Trains of Inferior Class.

205. A train of inferior class must in all cases keep out of the way of trains of a superior class, and must clear the time of *such* [scheduled] trains five minutes unless a meeting or passing order has been given.

Scheduled Trains Have Equal Rights to Meeting Points.

206. All scheduled trains of the same class, or sections of scheduled trains, have equal rights to scheduled meeting points *between reporting stations.*

Distance Required Between Following Trains.

210. *Unless some form of block signal be used, clearing at least five minutes apart,* trains running in the same direction must keep not less than three thousand (3000) ft. apart, except in closing up at stations or meeting points. When the view is obscured by curves, fog, storms, or other cause, they must be kept under such control that they may be stopped within the range of vision.

Arrangements for Sections when Telephone Defective.

213. When telephone line is out of order, any scheduled train when requested by conductor of any train, may carry

signals for such, as a section following, without first obtaining orders from the ..... *The conductor of train desiring signals displayed shall issue second section order in duplicate as per Number 3, Form F, Rule 280, to be duly signed by the respective conductors.* Both copies of order to be turned in by the conductors of the respective trains. Scheduled train, under such arrangement, will immediately display signals, though extra train must not follow the regular train until it is certain that signals are so displayed.

Delayed Trains.

230. All regular trains, or sections of a regular train, when becoming ..... minutes late, must report to the dispatcher, and will also report for each successive ..... minutes lost. *If unable to get the dispatcher by company or long distance telephone, the train may proceed on its time card rights until it is ..... minutes late, after which it must not proceed except by flagging, according to Rule 203a.*

All regular trains, or sections of a regular train, after they have become ..... minutes late, [such trains] will lose their time card rights.

Rights of Delayed Trains.

[231. A train which is delayed and falls back on the time of another train of the same class does not thereby lose its rights.]

RULES FOR MOVEMENT BY TRAIN ORDERS

Train Orders.

250. For movement of trains not provided for by time table, train orders will be issued by authority and over the signature of the Superintendent or other designated authority. Train orders must contain neither information nor instructions not essential to such movements.

Train orders must be brief and clear, and in the prescribed form, when applicable, without erasure, alteration, or interlineation.

Train orders shall be numbered consecutively, commencing with No. 1 at midnight.

How Addressed.

252. Train orders must be addressed to those who are to execute them, designating the place at which each is to receive his copy. They must be addressed to the conductor and motorman, and also to any one who acts as pilot. A copy for each person addressed must be supplied by the person taking the order.

Orders addressed to agents or operators restricting the movement of trains must be respected by conductors and motormen, the same as if addressed to them.

Designation of Trains.

254. Scheduled trains will be designated in train orders by their numbers, as "No. 10" or "2d No. 10," adding *motor* [car] numbers; extra trains by *motor* [car] numbers, as "Extra 798," with the direction as "East" or "West."

How to Obtain Orders.

256. To obtain orders at telephone stations, the motorman will call the dispatcher, and report train number and location. The dispatcher will then *indicate whether a 31 or 19 order is to be taken.*

Procedure if 31 order is given:

The dispatcher will give such orders as are necessary to the motorman, who will write the same plainly, and without unauthorized abbreviation, on the blank provided for that purpose, with sufficient carbon copies for each member of the crew, and when he has finished writing the order he will read it to the dispatcher, who will O.K. the same, if correct. The motorman will thereupon sign his name upon the order. The conductor will then read the order to the dispatcher, and if correct, the dispatcher will complete the order, by giving the initials of the superintendent, or other designated authority, and the time of completion, which initials and time of completion, together with the signature of the conductor, shall be promptly written upon the order by the conductor, after which the order shall be in full force and effect.

Procedure if 19 order is given:

The dispatcher will give such orders as are necessary to the motorman, who will write the same plainly, and without unauthorized abbreviation, on the blank provided for that purpose, with sufficient copies for each member of the crew, and when he has finished writing the order the motorman will read it to the dispatcher, who will complete the same, if correct, by giving the initials of the superintendent, or other designated authority, and the time of completion. The motorman will thereupon write upon the order the word "complete," with the time given, and his last name in full, and deliver a copy to each person addressed. Each person in turn will read the order aloud to the motorman.

If for any reason the line should fail before the dispatcher completes an order, it is of no effect, and must then be treated as though it had not been given.

Issuing Orders at Stations.

258. To issue orders at stations where there are operators or agents, the dispatcher will instruct the operator or agent to display the stop signal for the motorman and conductor to *stop* [call] for orders. The motorman and conductor must not pass a station where such signals are displayed without reporting to the agent or train dispatcher, and until such signals have been taken down, removed or cleared.

When an order is given through an agent, he must read it back to the dispatcher, and complete it in the same manner as a motorman. The conductor and motorman receiving such an order must each read it aloud back to the agent, and receipt for the same by writing their names upon it before detaching the copies intended for them.

Call Dispatcher if Opposing Train has Not Arrived.

261. When any train reaches a meeting point and finds that the train or trains to be met have not arrived, the motorman [or conductor] shall immediately call the dispatcher for orders, as provided in Rule *256* [195]. *If the train is a scheduled train, and the motorman is unable to reach the dispatcher, the train may proceed by flagging under Rule 203a, after waiting ..... minutes, keeping in mind that the opposing train may be approaching at high speed.*

Manifold Copies of Train Orders.

262. The person receiving [a] train order*s* must write [it] *them* in manifold during transmission, and if they cannot at one writing make the requisite number of copies, *they* must [trace] *make* others from one of the copies first made, *but the same must be repeated back to the dispatcher same as first copy before being acted upon.*

Train Orders in Effect.

267. Train orders once in effect continue so until fulfilled, superseded or annulled.

Any part of an order specifying a particular movement may be either superseded or annulled.

FORMS OF TRAIN ORDERS

Form A. Fixing Meeting Point for Opposing Trains.

277. (1) *No.....Motor.....and No.....Motor..... meet at.....*

(2) *No.....Motor.....meet No.....Motor.....at .....at....., and.....at.....*

EXAMPLES

(1) *No. 1, Motor 201 and No. 2, Motor 202, meet at "A."*
(2) *No. 3, Motor 203 and 2d No. 4, Motor 204, meet at "B."*
(3) *No. 5, Motor 205 and Extra 65, east, meet at "C."*
(4) *Extra 29, north, and Extra 72, south, meet at "D."*
(5) *No. 1, Motor 29, meet 1st No. 2, Motor 33, at "B"; 2nd No. 2, Motor 38, at "C," and Extra 73, west, at "D."*

Trains receiving this order will, with respect to each other, run to the designated point, and, having arrived there, will meet in the manner provided by the rules.

275. Form of Train Order Blank.

Form No.

Train Order No.....Date.....19..

TO CONDUCTOR & MOTORMAN:

.....Train No.....Car No.....At.....
.....Train No.....Car No.....At.....
.....Train No.....Car No.....At.....
.....Train No.....Car No.....At.....

Motorman.	*Conductor.*	*Train No.*	*Time.*	*Made*

Form B. Authorizing a Train to Run Ahead of or Pass Another Train Running in the Same Direction.

278. (1) *No.....Motor.....pass No.....Motor..... at.....*

(2) *No.....Motor.....pass No.....Motor..... when overtaken.*

(3) *No.....Motor.....run ahead of No.....Motor .....to.....*

(4) *No.....Motor.....pass No.....Motor..... at.....and run ahead of No.....Motor....., ...to.....*

EXAMPLES

(1) *No. 1, Motor 201, pass No. 3, Motor 203, at "D."*
(2) *No. 6, Motor 206, pass No. 4, Motor 204, when overtaken.*
(3) *Extra 59, east, run ahead of No. 6, Motor 206, "M" to "B."*
(4) *Extra 95, west, run ahead of No. 3, Motor 203, at "K" and run ahead of No. 7, Motor 207, "M" to "Z."*

When under (1) a train is to pass another both trains will run according to rule to the designated point, and there arrange for the rear train to pass promptly.

Under (2) both trains will run according to rule until the second-named train is overtaken, and then arrange for the rear train to pass promptly.

Under (3) the second-named train must not exceed the speed of the first-named train between the points designated.

Under (4) the first-named train will run ahead of the second-named train from the designated station until overtaken, and then arrange for the rear train to pass promptly.

When an inferior train receives an order to pass a superior train, right is conferred to run ahead of the train passed from the designated point.

Form C. Giving Right to a Train Over an Opposing Train.

279. *No.....Motor.....has right over No.....Motor ....., ...to.....*

EXAMPLES

(1) *No. 1, Motor 201, has right over No. 2, Motor 202, "G" to "X."*
(2) *Extra 37, east, has right over No. 3, Motor 203, "F" to "A."*

This order gives right to the train first named over the other train between the points named.

Under (2) the regular train must not go beyond the point last named until the extra train has arrived, unless directed by train order to do so.

Form F. For Sections of Scheduled Trains.

280. (1) *Motor.....display signals and run as....., ..., ...to.....*
(2) *No.....Motor....., run as....., ...to .....*
(3) *No.....Motor....., display signals.....to .....for.....*
(6) *Motor.....is withdrawn as.....at.....*
(7) *Motor....., instead of Motor....., display signals and run as....., ...to.....*
(8) *No....., and....., reverse positions as..... and....., ...to.....*

EXAMPLES

(1) *Motor 201 display signals and run as 1st No. 1, "A" to "Z."*
(2) *Motor 250 run as 2d No. 1, "A" to "Z."*
(3) *No. 101, Motor 205, display signals "A" to "G" for Motor 65; 2d No. 1 display signals "B" to "E" for Motor 99.*

These examples may be modified as follows:

(4) *Motors 20, 25 and 99 run as 1st, 2d and 3d No. 1, "A" to "Z."*

Example (1) is to be used when the number of the motor for which signals are displayed is unknown, and is to be followed by example (2), both being single-order examples.

Under examples (2) and (3) the motor named will not display signals.

Under example (4) the motor last named will not display signals.

For changing sections:

To add an intermediate section, the following modification of example (1) will be used:

(5) *Motor 85 display signals and run as 2d No. 1, "N" to "Z." Following sections change numbers accordingly.*

Under (5) Motor 85 will display signals and run as directed, and following sections will take the next higher number.

To drop an intermediate section, the following example will be used:

(6) *Motor 85 is withdrawn as 2d No. 1 at "H." Following sections change numbers accordingly.*

Under (6) Motor 85 will drop out at "H," and following sections will take the next lower number.

To substitute one motor for another on a section, the following will be used:

(7) *Motor 18, instead of Motor 85, display signals and run as 2d No. 1, "R" to "Z."*

Under (7) Motor 85 will drop out at "R," and Motor 18 will run as directed.

If Motor 85 is last section, the words "display signals and" will be omitted. Following sections need not be addressed.

To discontinue the display of signals, the following example will be used:

(8) *2d No. 1 take down signals at "D."*

Under example (8) 2d No. 1 will take down signals as directed, and a following section must not proceed beyond the point named.

To pass one section by another, the following will be used:

(9) *Motors 99 and 25 reverse positions as 2d and 3d No. 1, "H" to "Z," and, if necessary, both motors will arrange signals accordingly. Following sections, if any, need not be addressed.*

The character of a train for which signals are displayed may be stated. Each section affected by the order must have copies, and must arrange signals accordingly.

To annul a section for which signals have been displayed over a division, or any part thereof, when no train is to follow the signals, Form K must be used.

Form G. Extra Trains.

281. (1) *Motor..... run extra.....to.....*
(2) *Motor.....run extra.....to.....and return to.....*

EXAMPLES

(1) *Motor 99 run extra "A" to "F."*
(2) *Motor 99 run extra "A" to "F" and return to "C."*

Under (2) the extra must go to "F" before returning to "C."

(3) *Motor..... run extra, leaving.....on..... as follows, with right over all trains.*
Leave.....
Leave.....
Arrive.....

EXAMPLES

(3) *Motor 77 run extra, leaving "A" on Thursday, February 17th, as follows, with right over all trains:*
Leave "A" 11.30 p. m.
" "C" 12.25 a. m.
" "E" 1.47 a. m.
Arrive "F" 2.22 a. m.

This order may be varied by specifying the kind of extra and the particular trains over which the extra shall or shall not have right.

Trains over which the extra is thus given right must clear the time of the extra .... minutes

Form H. Work Extra.

282. (1) *Motor.....works.....until.....between .....and.....*

EXAMPLES

(1) *Motor 292 works 7 a. m. to 6 p. m. between "D" and "E."*

Under (1) the work extra must, whether standing or moving, protect itself against extras within the working limits in both directions as prescribed by rule. The time of regular trains must be cleared.

This may be modified by adding:

(2) *Not protecting against (eastward) extras.*
(3) *Not protecting against extras.*

Under (2) the work extra will protect only against (westward) extras. The time of regular trains must be cleared.

Under (3) protection against extras is not required. The time of regular trains must be cleared.

When a work extra has been instructed by order to not protect against extra trains, and, afterward, it is desired to have it clear the track for (or protect itself after a certain hour against) a designated extra, an order may be given in the following form:

(4) *Work extra 292 clears (or protects against) extra 76, east, between "D" and "E" after 2.10 p. m.*

Under (4) extra 76, east, must not enter the working limits before 2.10 p. m., and will then run, expecting to find the work extra clear of the main track (or protecting itself), as the order may require.

To enable a work extra to work upon the time of a regular train, the following form will be used:

(5) *Work extra 292 protects against No. 55 (or..... class trains) between "D" and "E."*

Under (5) the work extra may work upon the time of the train or trains mentioned in the order, and must protect itself against such train or trains, as prescribed by Rule ..... The regular train or trains receiving the order will run, expecting to find the work extra protecting itself.

When a work extra is to be given exclusive right over all trains the following form will be used:

(6) *Work extra 292 has right over all trains between the points designated between the times named.*

Work extras must give way to all trains as promptly as practicable.

Whenever extra trains are run over working limits they must be given a copy of the order sent to the work extra. Should the working order instruct a work extra to not protect against extra trains in one or both directions, extra trains must protect, as prescribed by Rule ...., against the work extra; if the order indicate that the work extra is protecting itself against other trains, they will run, expecting to find the work extra protecting itself.

The working limits should be as short as practicable, to be changed as the progress of the work may require.

Form J. Holding Order.

283.
Hold.....

EXAMPLES

Hold No. 2.
Hold all (or ward) trains.
When a train has been so held it must not proceed until the order to hold is annulled, or an order given to the operator in the form:
"..... may go."
These orders will be addressed to the operator and acknowledged in the usual manner, and will be delivered to conductors and motormen of all trains affected.
Form J will only be used when necessary to hold trains until orders can be given, or in case of emergency.

Form K. Annulling a Schedule or a Section.

284.
.....of.....is annulled.....to.....

EXAMPLES

No. 1 of Feb. 29th is annulled "A" to "Z."
2d No. 5 of Feb. 29th is annulled "E" to "G."
The schedule or section annulled becomes void between the points named and cannot be restored.

Form L. Annulling an Order.

285.
Order No. .... is annulled.

EXAMPLE

Order No. 10 is annulled.
If an order which is to be annulled has not been delivered to a train, the annulling order will be addressed to the operator, who will destroy all copies of the order annulled but his own, and write on that:
Annulled by Order No. ....
An order which has been annulled must not be reissued under its original number.

Form M. Annulling Part of an Order.

286.
That part of Order No. ...., reading....., is annulled.

EXAMPLE

That part of Order No. 10, reading No. 1 meet No. 2 at "S," is annulled.

Form P. Superseding Order or a Part of Order.

287. *This order will be given by adding to prescribed forms the words, "instead of....."*
(1) *No.....Motor.....meet No.....Motor.....at .....instead of.....*
(2) *No....Motor.....has right over No....Motor....., ...to.....instead of.....*
(3) *No....Motor.....display signals for Motor....., ...to.....instead of.....*

EXAMPLES

(1) *No. 1, Motor 50, meet No. 2, Motor 55, at "C" instead of "B."*
(2) *No. 1, Motor 60, has right over No. 2, Motor 65, "G" to "R" instead of "X."*
(3) *No. 1, Motor 70, display signals for Motor 85, "A" to "Z" instead of "G."*
The order which has been superseded must not be reissued under its original number.

Form R. Providing for a Movement Against the Current of Traffic.

288. *No....Motor.....has right over opposing trains on .....track.....to.....*

EXAMPLE

(1) *No. 1, Motor 50, has right over opposing trains on No. 2 (or eastward) track "C" to "F."*
A train must not be moved against the current of traffic until the track on which it is to run has been cleared of opposing trains.
Under this order the designated train must use the track specified between the points named, and has right over opposing trains on that track between those points. Opposing trains must not leave the point last named until the designated trains arrive.
An inferior train between the points named moving with the current of traffic in the same direction as the designated train must receive a copy of the order, and may then proceed on its schedule by right.
This order may be modified as follows:
(2) *After No.... Motor.....arrives at.....No..... Motor.....has right over opposing trains on.....track, ...to.....*

EXAMPLE

After No. 4, Motor 54, arrives at "C," No. 1, Motor 51, has right over opposing trains on No. 2 (or eastward), track "C" to "F."
Under (2) the train to be moved against the current of traffic must not leave the first-named point until the arrival of the first-named train.

Form S. Providing for the Use of a Section of Double Track as Single Track.

280. *.....track will be used as single track between .....and..... If it is desired to limit the time for such use, add (from.....until.....)*

EXAMPLE

No. 1 (or westward) track will be used as single track between "F" and "G." Adding, if desired, "from 1 p. m. to 3 p. m."

CONDUCTORS

Signal to Start.

398. Conductors must never get a signal to start unless they can see the rear steps and know that passengers leaving the train are clear of same, or that passengers boarding the train are safely on the car. They must be careful not to give a starting signal when passengers are approaching, or close to a train and about to board it. [When flagging railroad crossings, conductors will keep the rear door closed, opposite to the side of the car from which they will flag crossing.]

Display of Signals.

399. Display proper *markers* [signals] at rear of train and have all appliances ready for use.

ACCIDENT AND PERSONAL INJURY

Immediate Report.

421. Conductors and motormen will make immediate verbal report to the dispatcher of any accident, blockade or serious mishap of any kind. (*See Rule 24.*)

EXHIBITORS AT THE DENVER CONVENTION

The following list gives the names of all companies from which applications for exhibit space at the Denver convention had been received by the committee on exhibits of the Manufacturers' Association up to July 31, 1909:

A. & J. M. Anderson Manufacturing Company, Boston.
Automatic Ventilator Company, New York.
American Brake Shoe & Foundry Company, Mahwah, N. J.
Allis-Chalmers Company, Milwaukee, Wis.
Anglo-American Varnish Company, Newark, N. J.
American Steel & Wire Company, Chicago, Ill.
Black Diamond Boring Company, Monongahela, Pa.
Berry Brothers, Detroit, Mich.
H. P. Brown, New York.
Buda Foundry & Manufacturing Company, Chicago, Ill.
The J. G. Brill Company, Philadelphia, Pa.
Burroughs Adding Machine Company, Detroit, Mich.
Bayonet Trolley Harp Company, Springfield, Ohio.
Badger Fire Extinguisher Company, Boston, Mass.
Curtain Supply Company, Chicago, Ill.
Carnegie Steel Company, Pittsburgh, Pa.
Climax Railway Supply Company, Chicago, Ill.
Consolidated Car Fender Company, Providence, R. I.
Coin Counting Machine Company, Chicago, Ill.
Consolidated Car Heating Company, New York.
Chicago Varnish Company, Chicago, Ill.
Cincinnati Car Company, Cincinnati, Ohio.
Crouse-Hinds Company, Syracuse, N. Y.
Chisholm & Moore Manufacturing Company, Cleveland.
Chicago Car Heating Company, Chicago, Ill.
Duff Manufacturing Company, Pittsburgh, Pa.
Duplex Metals Company, New York.
Dearborn Drug & Chemical Company, Chicago, Ill.
Emery Pneumatic Lubricator Company, St. Louis, Mo.
Electric Railway Journal, New York.
Electric Service Supplies Company, Philadelphia, Pa.
Electric Renovator Manufacturing Company, Pittsburgh.
Eureka Tempered Copper Works, North East, Pa.
O. M. Edwards Company, Syracuse, N. Y.
Electric Railway Improvement Company, Cleveland, Ohio.
Forsyth Steel Tie Company, Pittsburgh, Pa.
Galena-Signal Oil Company, Franklin, Pa.
General Electric Company, Schenectady, N. Y.
Globe Ticket Company, Philadelphia, Pa.

Griffin Wheel Company, Chicago, Ill.
Goldschmidt Thermit Company, New York.
Heywood Brothers & Wakefield Company, Wakefield, Mass.
International Register Company, Chicago, Ill.
W. J. Jeandron, New York.
Kenfield Publishing Company, Chicago, Ill.
Lorain Steel Company, Philadelphia, Pa.
McConway & Torley Company, Pittsburgh, Pa.
McCord & Company, Chicago, Ill.
National Carbon Company, Cleveland, Ohio.
Niles-Bement-Pond Company, New York.
National Brake Company, Buffalo, N. Y.
National Lock Washer Company, Newark, N. J.
Ohio Brass Company, Mansfield, Ohio.
Ohmer Fare Register Company, Dayton, Ohio.
Pennsylvania Steel Company, Steelton, Pa.
Rail Joint Company, New York.
Sherwin-Williams Company, Cleveland, Ohio.
Speer Carbon Company, St. Marys, Pa.
Standard Varnish Company, New York.
Stromberg-Carlson Telephone Mfg. Co., Rochester.
T. H. Symington Company, Baltimore, Md.
Star Brass Company, Kalamazoo, Mich.
Tool Steel Motor Gear & Pinion Company, Cincinnati.
Trolley Supply Company, Canton, Ohio.
Under-Feed Stoker Company, Chicago, Ill.
W. T. Van Dorn Company, Chicago, Ill.
Wonham, Magor & Sanger, New York.
Wheel Truing Brake Shoe Company, Detroit, Mich.
Western Electric Company, New York.
William Wharton, Jr., & Company, Inc., Philadelphia, Pa.
Westinghouse Companies, Pittsburgh, Pa.
Wagner Electric Manufacturing Company, St. Louis, Mo.

CONVENTION PROGRAM

The following program of the Denver convention has been announced:

MONDAY, OCT. 4

8:00 a. m.—Opening of exhibits of Manufacturers' Association.
9:00 a. m.—Registration and issuance of badges at Auditorium.
2:00 p. m.—Session of Claim Agents' Association.
2:00 p. m.—Session of Transportation & Traffic Association.

TUESDAY, OCT. 5

9:30 a. m.—Session of Claim Agents' Association.
9:30 a. m.—Session of Transportation & Traffic Association.
2:00 p. m.—Session of American Association.
2:00 p. m.—Session of Engineering Association.
2:00 p. m.—Session of Claim Agents' Association.

WEDNESDAY, OCT. 6

9:30 a. m.—Session of Engineering Association.
9:30 a. m.—Session of Transportation & Traffic Association.
9:30 a. m.—Session of Accountants' Association.
9:30 a. m.—Closing session of Claim Agents' Association.
2:00 p. m.—Session of American Association.
2:00 p. m.—Session of Engineering Association.

THURSDAY, OCT. 7

9:30 a. m.—Session of Accountants' Association.
9:30 a. m.—Closing session of Transportation & Traffic Association.
2:00 p. m.—Closing session of American Association.

FRIDAY, OCT. 8

9:30 a. m.—Session of Engineering Association.
9:30 a. m.—Closing session of Accountants' Association.
2:00 p. m.—Closing session of Engineering Association.

ENTERTAINMENT FEATURES

General direction of the entertainment features during convention week is in the hands of Charles C. Peirce, vice-president of the Manufacturers' Association, and A. L. Whipple, chairman of the entertainment committe. As usual, a pleasing variety of entertainment will be provided, including (according to the tentative plans so far made) an informal entertainment for Monday night, Oct. 4; reception to the officers of the associations on Tuesday night; annual supply men's vaudeville on Wednesday night; grand ball on Thursday night, and trip over the celebrated Moffat Road on Friday. Special arrangements will be made for afternoon entertainments for the ladies, including a trip around the city, afternoon at country club, etc. The ELECTRIC RAILWAY JOURNAL Convention Dailies will publish the correct programs of the day's entertainment each morning.

DETAILED PROGRAMS OF AFFILIATED ASSOCIATIONS

The detailed program of the Transportation & Traffic Association was published in the ELECTRIC RAILWAY JOURNAL for July 24, and the list of topics to be considered by the Claim Agents' Association was printed in the issue of June 26. It is understood that these topics will be taken up in consecutive order until they have been disposed of. The following tentative programs have been drawn up by the Accountants' and Engineering Associations:

ACCOUNTANTS' ASSOCIATION

Wednesday Morning

Convention called to order.
Annual address of president.
Annual report of executive committee.
Annual report of secretary-treasurer.
Paper—"Interurban Statistics," by S. C. Rogers, treasurer and secretary, Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.
Appointment of convention committees.
New business.
"Get-together Luncheon."

Thursday Morning

Paper—"The Census and Electric Railway Statistics," by W. M. Steuart, chief statistician for manufactures, Bureau of Census, Washington, D. C.
Paper—"Place of the Accountant in an Electric Railway Organization," by W. B. Brockway, general auditor, Birmingham Railway, Light & Power Co., Yonkers, N. Y.
Paper—"Payrolls and Timekeeping," by N. E. Stubbs, auditor, United Railways & Electric Company, Baltimore.
Report of committee on interline accounts.
Report of committee on standard classification of construction and equipment accounts and form of report.

Friday Morning

Paper—"Storeroom Accounting and Inventory," by E. S. Pattee, secretary and comptroller, Twin City Rapid Transit Company, Minneapolis, Minn.
Report of joint committee on shop accounting.
Report of nominating committee.
Election of officers.
Installation of officers.
Adjournment.

ENGINEERING ASSOCIATION

Tuesday Afternoon

Convention called to order.
Annual address of president.
Annual report of executive committee.
Annual report of secretary-treasurer.
Appointment of convention committees.
Report of committee on way matters.

Wednesday Morning

Report of committee on equipment.

Wednesday Afternoon

Report of committee on power generation.
Appointment of nominating committee.

Thursday

Inspection of exhibits.

Friday Morning

Report of committee on standards.
Report of committee on power distribution.

Friday Afternoon

Question box.
General business
Report of nominating committee.
Election of officers.
Installation of officers.
Adjournment.

NEW REPULSION MOTOR FOR RAILWAY WORK

Brown, Boveri & Company, of Baden, Switzerland, have recently brought out a single-phase repulsion railway motor of the Deri type, which is a modification of a motor of the same type built by the manufacturers and in experimental use on the Stansstad Engelberg Railway. A list of the contracts which the manufacturers have closed for this new type of motor is shown in the accompanying table.

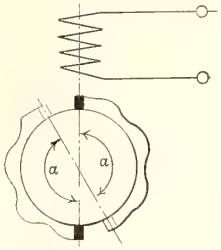


Fig. 1—Deri Motor

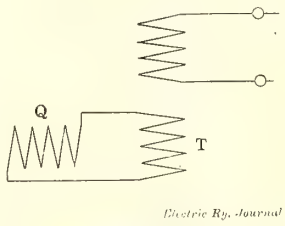


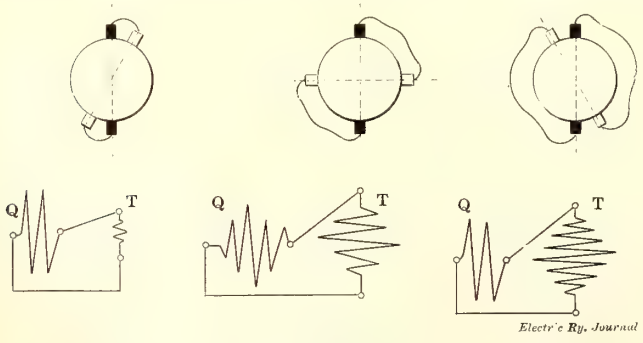
Fig. 2—Equivalent Electrical Circuits

As the Deri type of single-phase motor has not been used in this country to any great extent, a short account of the principles on which it operates will be of interest.

The motor consists of a single stationary primary winding and a revolving secondary winding, short-circuited upon itself along certain axes which are stationary with respect to the primary magnetism. It differs from the plain (Thomson) repulsion motor in requiring twice as many brushes on the commutator. These brushes are short-circuited in pairs.

A diagram of the motor is given in Fig. 1, which shows the scheme for arranging the brushes and inter-connecting them in a two-pole model. The two brushes in line with the stationary primary coil are held stationary in space, while the other two are shifted manually for varying the torque. This produces on each side of the armature a pulsating torque the net result of which is to tend to turn the armature in a common direction. The value of the torque depends not only upon the current, the magnetism in space-quadrature therewith and the cosine of the time-angle between the two, but also upon the space distribution of the coils in which the secondary current is produced.

In dealing quantitatively with the physical relations, it is convenient to consider that the armature winding is divided into two completely superposed armature windings receiving current along two axes separated by an angle equal to the space-angle spanned by the coils actually short-circuited



Figs. 3, 4 and 5—Equivalent Electrical Circuits

between the brushes. Evidently, the actual condition relating to the current values will be faithfully represented if each superposed winding is assumed to receive a current equal in value to one-half of the real current in the armature coils. Under the assumed conditions the coils spanned by the brushes will carry the full value of current, while the others will be free from current. One of the assumed superposed armature windings has its axis in line with the primary field magnetism, and hence it may be called the transformer winding. The other superposed winding occupies a position depending upon the adjustment of the brushes, but a certain component of the effect produced by the current in this winding is in space-quadrature with the primary field magnetism—the other component being in direct space-opposition therewith, and hence this winding may be called the quadrature coil.

On the basis of the above assumption the connection of a Deri repulsion motor with two brush axes in space-quadrature can be represented as shown in Fig. 2. Any flux produced by the current in the "quadrature" winding will be in time-phase with the current in the transformer winding, and will produce accelerating torque at the rotor. The time-place relation between the current in the transformer winding and the flux in space-quadrature therewith will not be altered by any motion of the rotor or change in its speed.

Figures 3, 4 and 5 indicate three positions of the brush axes and show the equivalent connections for the "transformer" and "quadrature" windings on the motor. With the axes close together, the transformer opposing compo-

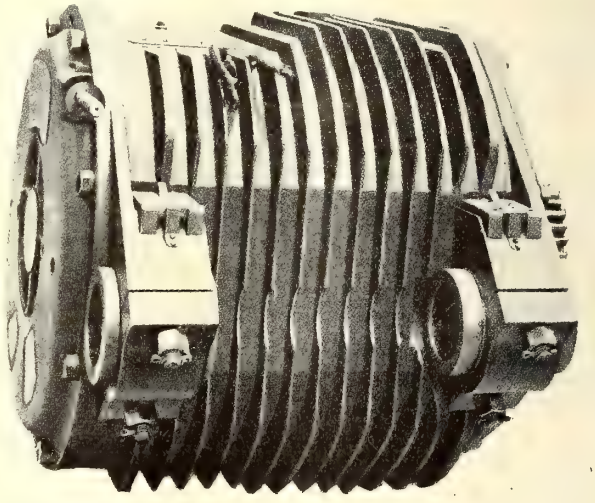


Fig. 6—New Single-Phase Repulsion Motor

nent of the "quadrature" winding is large, so that the resultant "transformer" winding is small, even in comparison with the fairly small space-quadrature component of the "quadrature" winding. With a wider separation of the axes the "transformer" winding produces a greater effect in comparison with the "quadrature" winding.

Both when the axes are together and when they are separated by 180 electrical space degrees the torque is zero. In the former case the transformer effect is zero, while in the latter case there is no quadrature effect.

Under speed condition there are produced two e.m.fs., which affect the value of the secondary current and therefore alter the torque, which for each position of the brushes varies directly with the square of the current in the armature. One e.m.f. appears at the "transformer" axis and the other at the "quadrature" axis; the former is proportional to the product of the speed and the quadrature flux, and the latter varies directly with the product of the speed and the transformer (primary) flux. In any event, there two e. m. f.'s have such values and time-place position as to tend to decrease the armature current with increase of speed.

It will be seen from the above that the machine pos-

sesses the speed-current and speed-torque characteristics of the direct-current series motor with constant primary e.m.f. and at any set position of the brushes the current decreases with increase of speed, while the torque varies with the square of the current. With the brushes in a constant position, at any chosen speed the current varies directly with the e.m.f., but the torque varies only with the square of the current independently of the e.m.f. or the speed at which it may be produced. With constant impressed primary e. m. f. at any given speed the current, the torque and the relation between the current and the torque can be varied throughout a wide range by merely shifting the brushes, as explained above.

Owing to its construction, it is possible to connect the primary winding directly to the high-tension circuit, thus eliminating the necessity for a transformer. Moreover, the regulation of speed, torque and direction of rotation is obtained without the use of a resistance, by the mere movement of the brushes. Thus the machine operates at high efficiency during acceleration, and the acceleration can be made as gradual as desired.

No information has been made public by the manufacturers as to methods for reducing sparking under starting conditions.

STATISTICS OF BROWN-BOVERI REPULSION MOTORS IN USE OR UNDER CONTRACT.

Line.	Number of locomotives or motor cars.	Number of motors per machine.	Power of each motor in hp.	Voltage.	Frequency.	Speed of motor in r.p.m.	Length of line in km.
Baden State Railways, Wiesental	2	2	500	500	15	225	49.1
Seetal Railway, Switzerland	2	2	50	500	25	600	..
Martigny-Orsieres Railway, Switzerland	4	4	80	500	15	450	19
Parma Tramways, Italy	20	2	15	400	25	500	10.5
Buer Mine	1	1	5	150	50	1,000	..
E. W. Mark Switching Service	1	2	40	1,000	50	500	..

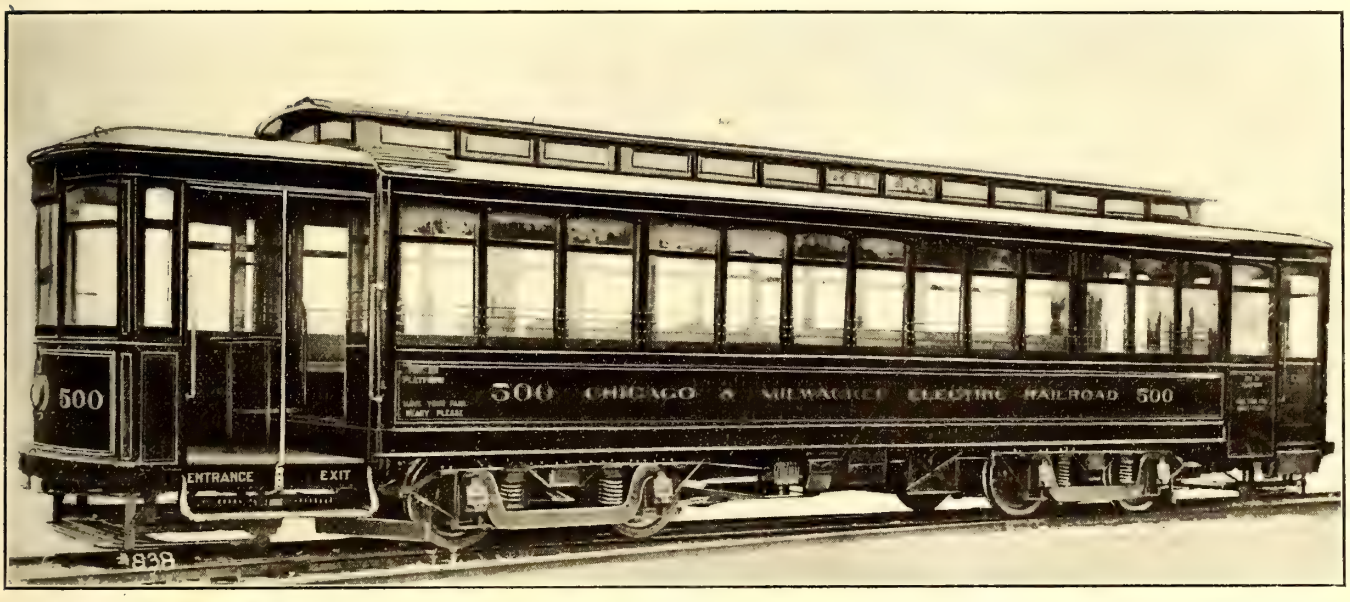
The Manhattan Bridge, spanning the East River about half-way between the Williamsburgh Bridge and the Brooklyn Bridge, will be completed and open for traffic early in 1910. It will carry four subway car tracks on the lower deck and four surface car tracks on the upper deck.

NEW CARS FOR THE CHICAGO & MILWAUKEE ELECTRIC RAILROAD COMPANY

The St. Louis Car Company has recently delivered to the Chicago & Milwaukee Electric Railroad Company 10 "pay-on-platform" type cars for operation in and about Milwaukee. These cars were designed jointly by the St. Louis Car Company and A. W. McLimont, general manager, and L. L. Smith, master mechanic, of the Chicago & Milwaukee Railroad Company.

The bodies are 34 ft. long over cornerposts, and 49 ft. 2 in. over bumpers. The width over all will be 8 ft. 8 in. The platforms are 7 ft. 3 in. in length, and are provided with the Birney "pay-on-platform" arrangement.

The doors in the body of the cars are of the twin type, operating singly, with a door opening 5 ft. wide, which gives ample room for ingress and egress of passengers when the swinging gate is in its normal position. The bottom framing of the cars is of the St. Louis Car Company's channel-iron construction. The side panels are straight, with inside sheathing of yellow poplar, covered on the outside with heavy sheet steel.



Prepayment Car for City and Suburban Service in and Around Milwaukee, Wis.

The seats are of the St. Louis Car Company's K type, covered with rattan, and the interior finish is of birch, stained mahogany. The sliding door in the vestibule is operated by an entirely new mechanism, designed by W. S. Miller, works manager of the St. Louis Car Company. This mechanism operates the folding step on the exit side of the front vestibule. This device has recently been patented.

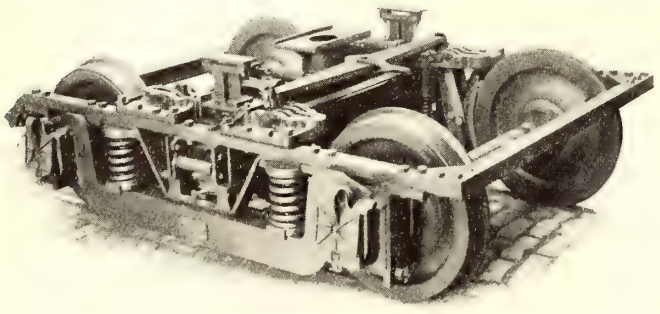
The curtains are of Pantasote, and the glass in all side and end windows is double-strength AA. Florentine glass is used in the deck sashes.

Fenders of the Chicago City Railway disappearing type are provided at each end of the cars, built and installed by the St. Louis Car Company. Six of these cars are now in operation.

The *Daily Arkansas Democrat* recently contained an interesting popular article on the work of the Little Rock Railway & Electric Company, Little Rock, Ark., illustrated with views along the company's line and in Forest Park, the terminal of the company's line.

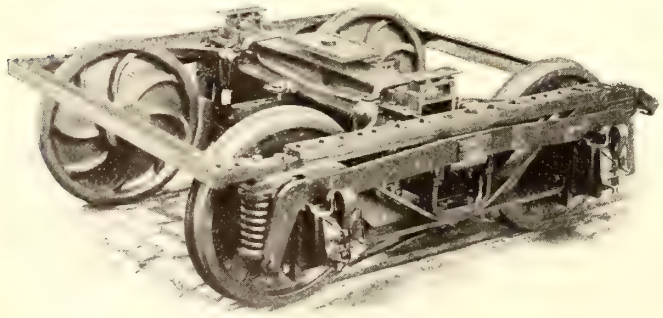
NEW DESIGNS OF ELECTRIC MOTOR AND TRAILER TRUCKS

The accompanying engravings illustrate two types of electric trucks recently built by the Baldwin Locomotive Works. The truck for the United Railways of Portland, is one of eight built for this road, and is designated by the builders as class 78-30-A. It is built for standard-gage track, and is designed for a center-pin load of 30,000 lb. The wheelbase is 78 in., which allows ample room for two inside-hung Westinghouse 112-B motors. The truck is of the equalized pedestal type, and the general design of its



Motor Truck for United Railways of Portland

details is in accordance with American Street & Interurban Railway Engineering Association standards. The equalizing beams are punched from steel boiler plates; the pedestals and side frames are of forged iron, while the end frames consist of 3-in. x 3-in. angles. The connections between the side and end frames are strengthened by gusset plates, and the result is an exceedingly stiff construction, while at the same time the frame can be readily dismantled if necessary. The transoms consist of steel channels secured to the side frames by substantial cast-steel gussets. These gussets also serve as brake lever guides and brake-hanger supports, and to them are bolted chafing plates which prevent the bolster from bearing directly against the transoms. The equalizing beam springs are double coil, while the springs supporting the bolster are double elliptic. The bolster is a steel casting, suspended on swing links in accordance with the usual practice. The wheels were manufactured by the Standard Steel Works Company. They are forged and rolled steel, 33 in. in diameter, with rims



Trailer Truck for Chicago & Southern Traction Company

3 in. thick. The journals are 5 in. x 9 in. The brake is arranged with a transverse beam, connected directly to the upper ends of the live levers, and actuated by a central pull rod which extends over the motor. The release springs are attached to the transverse beam.

The second engraving shows one of eight trailer trucks built for the Chicago & Southern Traction Company. These trucks are classified by the builders as 60-22-T, and are designed for standard-gage track, to be used in interurban service. The wheelbase is 5 ft., and the maximum center-pin load 22,000 lb. The truck frame is supported by two coiled springs on each side. These springs are suspended from the ends of the equalizers, and as the latter extend beyond the truck boxes a long spring base is provided. This arrangement, in conjunction with the use of double-elliptic springs under the bolster, assures easy riding qualities. The angle-iron end frame, which has proved so efficient on motor trucks, is used in this design also. The bolster is a steel casting, hung on swing links. The wheels are of cast iron, with chilled treads, 33 in. in diameter; while the journals are 4¼ in. x 8 in. The side frames are strongly reinforced between the boxes, and are united to the transoms by cast-steel gussets, as in the truck previously described.

LARGE RAILWAY CONTRACT FOR ELECTRICAL ENERGY

On July 30, after negotiations extending over a considerable period of time, the Chicago Railways Company, which operates the surface street railways on the north side and west side of Chicago, entered into contract with the Commonwealth Edison Company for a large portion of the electrical energy needed to operate its cars. The contract calls for not less than 30,000 kw of electrical energy, and will cover a period of about six years. The rate is $15 per kilowatt of maximum demand per year, with an additional current consumption charge of 0.415 cent per kw-hour until Jan. 31, 1910. After that date the current consumption charge will be 0.4 cent per kw-hour for the remainder of the period. In its provisions the contract is substantially the same as the one previously entered into by the Chicago City Railway Company and the Commonwealth Edison Company for a similar service and for about the same amount of electrical energy. The Commonwealth Edison Company does a remarkably large business in the way of supplying electrical energy at wholesale rates to electric railway companies in and near Chicago. Under existing contracts, at the time of maximum demand next winter the Commonwealth Edison Company will be supplying about 80,000 kw to customers of this character—a record significant of the modern expansion of the business of supplying electricity.

Ramona Park, the resort of the Grand Rapids Railway Company, at Reed's Lake, one mile east of Grand Rapids, recently has undergone some improvements. A large tract of land along the lake front has been transformed into a free playground for children, and swings, seesaws and slides have been installed. A caretaker is employed to see that none of the little ones are hurt while at play.

At a recent meeting of the Chicago Electric Club Edward N. Lake, division engineer of the Board of Supervising Engineers of Chicago, gave an interesting address on the subject, "Some Phases of Steam Railroad Electrification." Mr. Lake briefly reviewed the growth of electric railway systems in the United States. In 1890 there were 8123 miles of single-track street railways in the United States, of which 15.5 per cent or 1262 miles were operated by electricity. In 1907 there were 34,404 miles of street railways in the United States, of which 99 per cent or 34,060 miles were operated by electricity. Mr. Lake predicted that within the next 10 years New York City and Chicago will be zone centers for great activity in the line of electrification of steam railroads.

News of Electric Railways

Transit Affairs in New York

The absence from New York of several members of the Public Service Commission of the First District resulted in hearings being deferred on several street railway matters recently. The question of the 5-cent fare to Coney Island was put over until Wednesday, Aug. 11. The matter of the character, extent, location and value of the structure, facilities and property of the Third Avenue Railroad was also considered on Aug. 11. Several other matters affecting the electric railways were also before the commission during the week commencing on Aug. 9, among them the application for a reduction of the stock of the Long Island Electric Railway and the application of the Third Avenue Bridge Company for a certificate of convenience for a railway across the Queensboro Bridge to Long Island City.

The Public Service Commission is making a determined effort to arrange with property owners along the route of the proposed Broadway-Lexington Avenue subway for the installation of the entrances and exits to the stations through private property, after the manner of the new Washington Street subway in Boston, instead of by kiosks on the sidewalks. Commissioner Maltbie, who is looking after the matter, said recently:

"The commission has met with quite general success in obtaining consents of property owners to the plan of double-decking the Lexington Avenue line, which is of such advantage from the point of view of property owners. The obtaining of those consents now stands in the way of the advertising of contracts, and the commission is urging property owners to send in these consents as rapidly as possible, so that progress may be rapidly made."

Commissioner Bassett has returned from a tour of the Middle West, where he studied local public service problems at close range. Mr. Bassett is more than ever convinced that the day of perpetual franchises for public service corporations is passed and that the indeterminate franchise, which is favored by the Public Service Commission, is superior to the fixed term grant and is the best form of franchise for public service corporations. Mr. Bassett was accompanied by A. C. Duncan, his private secretary, and visited Buffalo, Niagara Falls, Toronto, Detroit, Chicago, Milwaukee, St. Paul, Minneapolis, Cleveland and Toledo.

Commenting on what he had observed, Mr. Bassett called particular attention to the low cost of power in Buffalo and Chicago, the first a water-power development and the latter steam, and referred to the peculiarities of the systems in Milwaukee and Minneapolis, and the franchise questions which are up for settlement in Toledo, Detroit and Cleveland. Much that Mr. Bassett said in an interview after his return is of general interest only, but his comments in regard to Toronto and Detroit are especially significant, his criticism of Toronto showing how a city may defeat its own ends by burdensome enactments. Mr. Bassett said:

"The street railways in Toronto are all owned by one company operating under definite-term franchises from the city. Under these franchises, the city receives cash payments of $800 for every mile of track operated and also 12 per cent of the annual gross income of the company. Thus a large part of the company's earnings goes into the city treasury, but the result works against the interests of the community in this way: The city is growing and more street car lines are needed, especially in the suburbs. The company does not wish to increase its mileage on account of the payments required by its franchises. It does desire extensions of trackage in the built-up portions of the city, but the administration will not give it the right to build these extensions until the lines needed in the suburbs are built. The result is that the mileage is small and inadequate. This is concrete proof of the wisdom of the stand taken by the Public Service Commission in New York City —that franchises which provide for too large cash payments into the city treasury regardless of net earnings and adequacy of service are bad and tend to prevent corporations receiving such franchises from providing extensions and good service.

"In Detroit I found that a single corporation, the Detroit United Railway Company, operates the entire surface car system. On most of the lines the fare is 5 cents, but on some a fare of 3 cents is charged. During the last few years a fight has been waged in all of the three Lake Erie cities, Detroit, Toledo and Cleveland, for a 3-cent fare with universal transfers, and there is a large sentiment in favor of it. The Detroit franchises are for fixed terms—and I might say here that in few of the cities outside of New York State did I find any of the so-called perpetual franchises, such as prevail in New York, in existence. These fixed-term franchises will be expiring from time to time in the near future and the city of Detroit is anxious to make the best possible terms for the new grants which will be made upon their expiration. Mayor Breitmeyer has appointed a committee of 50 citizens to appraise the traction property and to propose a plan for the extension or reletting of the present franchises. While this is going on there is no incentive to the company to improve or extend its system. This condition is the invariable result of limiting franchises to a fixed term. As the time of expiration draws near, the operating companies are apt to allow their structure and equipment to deteriorate because they do not wish to incur expenditure for extensions and improvements in view of the approaching termination of their grants and the possibility of losing their franchises."

The Interborough Rapid Transit Company proposes to change the color scheme of 1600 cars in use on the elevated lines from the prevailing color of red to olive green. Three cars were recently painted in the company's shops, one with the present coloring, one with what is known as the Alton standard—the same color used on the coaches of the Chicago & Alton Railroad—and the third, olive green, or what is known as the Pullman standard color. The last was finally decided upon as being the most serviceable.

The commission has set Sept. 8 for a hearing on the question whether an extension of the elevated structure to the proposed Eastern Parkway in Brooklyn shall be erected on the assessment plan provided in the Travis-Robinson amendment to the Rapid Transit act. This is the first matter to come up involving the construction of rapid transit facilities to the plan of assessing the cost wholly or in part on the property benefited.

Theodore P. Shonts, president of the Interborough Rapid Transit Company, has announced that his company will not build any more subways if the Broadway-Lexington Avenue route, favored by the Public Service Commission, is constructed. Mr. Shonts regards that proposed line as an "isolated independent route, wholly on the East Side, with no transfer connections, and which would not touch the hotel, theater and shopping districts." The plans submitted by the Interborough, on the other hand, he contends, provide for "a comprehensive unified transit system for the city with transfers between the elevated and subway lines and the longest ride in the world for 5 cents."

Mr. Bassett, of the commission, has replied that there is nothing to prevent the Interborough Rapid Transit Company from bidding for the Broadway-Lexington Avenue system and, in fact, its lease of the present subway and its ability to issue transfers between the present subway and the new subway would give it an advantage over other bidders. The commission, however, is authorized under the law to take this matter of transfers into consideration in awarding the contract. Furthermore, the commissioner stated, the extension proposed by the Interborough Rapid Transit Company would by no means meet the needs of the city for the next 25 years. The Interborough Rapid Transit Company's plan, according to Mr. Bassett, does not provide for the Broadway-Lafayette route in Brooklyn, which is designed to provide for a constantly expanding traffic, or the construction of a Fourth Avenue subway or of a subway along the Eastern Parkway. Neither does it provide for additional tunnels under the river or for an additional East Side line in Manhattan.

Judge Lacombe, in the United States Circuit Court, has issued an order giving Adrian H. Joline and Douglas Robinson, receivers of the Metropolitan Street Railway, permission to make expenditures out of current earnings for improvements on the company's car houses at Lenox Avenue and 146th Street, Ninth Avenue and Fifty-fourth Street, and elsewhere in the city. The Morton Trust Company, as trustee of the refunding mortgage of the Metropolitan Street Railway of 1902, objected to making any of these expenditures beyond such as were required to keep the car houses in working condition, because the real estate in question is pledged under the collateral trust mortgage of 1897, of which the Guaranty Trust Company is trustee, and claiming that if the receivers improved these car houses out of current earnings they favored unduly those whose interest in the property came through the collateral trust bonds of 1897, and discriminated against the holders of the refunding bonds of 1902. In his decision Judge Lacombe said that the Morton Trust Company seemed to assume that there would be a complete disruption of the property,

which assumption, he declared, the receivers were not entitled to act upon. That being the case, and as the mortgage of the Morton Trust Company covers the entire property of the Metropolitan Street Railway, subject to the prior lien of the Guaranty Trust mortgage on certain specified parcels, Judge Lacombe took the position that the expenditures benefited everybody interested in the property. The receivers altogether want to spend $394,205 on these car houses, and when the work is completed the receivers will have spent on repairs, alterations and rebuilding of car houses $1,784,498.

Bridge Commissioner James W. Stevenson has received from the engineer in charge of traffic on the Brooklyn Bridge a report showing the number of trolley cars operated over the bridge during afternoon rush hours throughout the month of July. Saturdays, Sundays and holidays are omitted from the computation. The daily average from 5 p. m. to 6 p. m. was 329, against 293 in 1908. The daily average from 6 p. m. to 7 p. m. was 279, against 265 in 1908. The average number of cars operated during the 5 p. m. to 6 p. m. rush hour was the highest monthly average ever operated over the bridge for any single hour, and is 36 cars more than were operated the same period in 1908.

Annual Convention of the German Street Railway Association.—The twelfth annual convention of the German Street & Interurban Railway Association will be held at Hamburg on Sept. 8, 9 and 10. Among the subjects to be discussed are the following: "Recent Legislation Relative to Accident Damage Claims," "Specifications for Rails and Other Parts of Track Construction," "Standardization of Rail Sections," "Track Construction in Paved Streets," "Rail Corrugation," "Welded Joints," "Snow Plows," "Cars for Mixed Service on Trolley Lines and Highways," "Improvements in Traction Motors," "Welfare of Employees," "Methods of Printing Tickets."

Club Houses for Employees in New York.—The directors of the Interborough Rapid Transit Company, New York, have appropriated $50,000 to be used in the erection of club houses for the company's employees at six of the most important terminal points as follows: 159th Street and Eighth Avenue; 129th Street and Third Avenue; 179th Street yard; Third Avenue and Bronx Park; 242d Street and Broadway; 148th Street and Seventh Avenue. It is estimated that the club houses, which will be 65 ft. deep by 36 ft. wide, will cost $8,000 each. They will contain shower baths, kitchens, smoking and reading rooms, and will be free to the men. The plans for the first of these houses have been filed with the building department of New York by George H. Pegram, chief engineer of the company. It is expected that four of the clubs will be completed and ready for use in the early fall. The other two will be completed as soon thereafter as possible. In addition to the amount voted by the directors of the company, August Belmont, chairman of the board, has donated his personal check for $10,000, which will be used in supplying the clubs with books, magazines and newspapers.

Electrification of the New York Central & Hudson River Railroad.—In the expense budget of the New York Central & Hudson River Railroad for the year which ends June 30, 1910, there appears an item of $8,477,682, for the electrification of suburban lines and for a New York terminal. A large portion of this money will be spent on the New York terminal; some of it will be used in adding extra tracks within the electric zone, but only a comparatively small part of it will be expended for electrification proper. One of the engineers of the New York Central & Hudson River Railroad, in outlining the plans of the company for the coming year, said that it is proposed to extend the electric zone on the Harlem division from Mount Vernon to North White Plains, a distance of about 10 miles. Curves and grade crossings will be eliminated, and the road will be put in first-class shape for express service. Substations are to be constructed at Tuckahoe and White Plains. They will be equipped with three 1000-kw rotary converters, similar in design to those which are now in service in the other substations of the company. In fact, the entire equipment will be installed according to the standards adopted by the New York Central & Hudson River Railroad. Circuit-breaker houses will be established about every 2 miles. The company contemplates making its Hudson division a four-track line all the way to Yonkers. At present there are four tracks to Spuyten Duyvil, but only two to Yonkers.

Electrification of Canadian Main Lines.—Hitherto the proposals to electrify main lines of railroad in Canada have been limited chiefly to the Western sections of the Dominion where large water-powers are abundant. U. S. Deputy Consul C. A. Steeves, at Moncton, now reports that the electrification of the Grand Trunk Pacific, or National Trans-continental Railway, from the St. Lawrence River to Moncton, is now under the serious consideration of the railway company, the Dominion Government and the New Brunswick cabinet. Electrical engineers who have given the subject consideration declare the conditions to be entirely favorable. The distance between the St. Lawrence and Moncton is about 460 miles, and for a considerable part of the distance the road passes through dense forests of spruce and fir in lower Quebec and northern New Brunswick, as well as through the rich farming country along the upper St. John Valley. What has given impulse to the new plan is that at Grand Falls on the St. John River, 170 miles from the St. Lawrence and 160 miles from Moncton, is located water-power sufficient to develop energy enough for the working of the whole road. At this point the river has a natural fall of about 130 ft. and a flow that electrical experts estimate will be sufficient to furnish from 100,000 to 125,000 hp continuously by the utilization of comparatively inexpensive means of storage and conservation. As the requirements of the road are estimated at not more than 40,000 hp, there is every reason to believe that the supply will be more than equal to the needs.

Attorney-General of Maryland to Draw Utilities Bill.—The meeting of Governor Crowthers' cabinet at Baltimore, Md., on Aug. 6, 1909, resulted in the selection of Attorney-General Straus to prepare a bill to create a public service commission in keeping with the ideas expressed publicly by the Governor. Governor Crothers, State Comptroller Hering, State Treasurer Vandiver, Secretary of State Williams, Attorney-General Straus and Adjutant-General Warfield were all present at the meeting. The Governor stated the purpose for which the meeting had been called and directed attention to the gas ordinance now pending in the City Council of Baltimore, which was, he said, in the nature of things, beyond the province of the cabinet. He said that he had received a copy of the ordinance, but that he presumed it had been sent to him as a matter of courtesy, as the original idea was to submit a proposition for contractual relations to which the State was to have been a party. Continuing on the question of public service legislation, the Governor is reported to have said: "Upon this subject of a public utilities commission, after much consideration, thought and study (not as much as I would like, but enough to make me sure of my ground), I have no hesitancy in declaring myself unreservedly in favor of such a commission. A public utilities commission in Maryland at this time is wise. I do not believe that it will accomplish everything that is expected of it. I do not believe, on the other hand, that it will hamper the success of the corporations nor drive from us others that might otherwise have come to us. Such a law as contemplated, if prepared with care, will do more to relieve agitation and excitement against corporations than any other single agency. It will prove a protection to corporations rather than a hindrance." The question of who should draw the bill received considerable attention. By some the opinion was expressed that the measure should be prepared by the Supreme Bench of Baltimore, but it was finally decided to entrust this work to Mr. Straus. The question of who should appoint the members of the commission was also discussed at considerable length. The opinion finally prevailed that the Governor should appoint the members.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—The Senate on Aug. 3 passed the utilities bill recommended by the majority of the special joint committee of the Legislature. This measure provides for a board of three members to have jurisdiction over the telephone, lighting and water companies, and leaves the control of the electric railways and railroads with the Railroad Commission. An effort was made to put through the substitute measure bringing the electric railways and the railroads within the province of the commission, but it was defeated by a vote of 16 to 15. On Aug. 5 the matter came before the House. After debating the subject from 10:45 a. m. until 4 p. m., with an hour excepted for luncheon, the House refused to amend the bill passed by the Senate by striking out all after the enacting clause and substituting for it the minority bill reported by Messrs. Chandler and Whiton, of the select committee on public utilities, by the close vote of 104 to 103. Before further action was taken the House adjourned and final action on the matter was thus postponed. Meantime honors rest with the supporters of the Barnum bill, which is the most conservative of all the public utilities commission measures which has been reported this session. The House on Aug. 10 refused by 117 votes to 113 to substitute an amended Whiton-Chandler bill for the Barnum bill on public utilities, and then indefinitely postponed the Barnum bill itself by an overwhelming viva voce vote. This in effect disposes in all probability of the whole public utilities subject for this session.

Financial and Corporate

New York Stock and Money Market

August 10, 1909.

The stock market paused for an instant to-day in its persistent upward climb. There were no serious losses, but the enthusiasm for buying which has marked the course of trading for the past few weeks was absent. Although it is admitted that prices are not justified by the trade conditions, confidence prevails that further advances are in sight. The traction shares have been fairly active and have, to a limited extent, shared in the general advance. Interborough-Metropolitan preferred, especially, has been a favorite with the traders.

The money market has finally indicated some disposition to tighten up. There is more demand upon the banks for loans, and rates in consequence are somewhat higher. Quotations to-day were: Call, 2 to 2½ per cent; 90 days, 3 to 3¼ per cent.

Other Markets

Rapid Transit has again been the leading traction feature in the Philadelphia market. Throughout the week it has been fairly active, but at the end quotations are practically unchanged. There has also been a fair amount of Union Traction in the market at unchanged prices.

In the Chicago market, there has been little doing in traction shares, although Subway continues to be active and higher. Large transactions in this issue have occurred and the price within the week has advanced from 19⅜ to 24.

Massachusetts Electric has been the only traction issue in the Boston market that has had any sale, and even this has only come into sight in small lots. There have been no changes of any importance in the quotations.

In Baltimore, the remarkable activity of the bonds of the United Railways continues. Very large sales have been made although prices have remained practically unchanged. The stock has also been rather active, with a stronger tendency.

Quotations of various traction securities as compared with last week follow:

	Aug. 3.	Aug. 10.
American Railways Company	a46	46
Aurora, Elgin & Chicago Railroad (common)	*41½	*41½
Aurora, Elgin & Chicago Railroad (preferred)	*86½	*86½
Boston Elevated Railway	127½	127⅜
Boston & Suburban Electric Companies	*17½	*17½
Boston & Suburban Electric Companies (preferred)	*71	*70
Boston & Worcester Electric Companies (common)	a13	a13
Boston & Worcester Electric Companies (preferred)	55¼	54½
Brooklyn Rapid Transit Company	81¼	80⅜
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	87½	87½
Capital Traction Company, Washington	a140¾	a142
Chicago City Railway	a195	a190
Chicago & Oak Park Elevated Railroad (common)	*2¼	*3
Chicago & Oak Park Elevated Railroad (preferred)	*10	*12
Chicago Railways, ptcptg, ctf. 1	a119	a112
Chicago Railways, ptcptg, ctf. 2	38	a39
Chicago Railways, ptcptg, ctf. 3	25	a25
Chicago Railways, ptcptg, ctf. 4s	a10½	a10
Cleveland Electric Railway	*78	*78
Consolidated Traction Company of New Jersey	76⅝	a78
Consolidated Traction of N. J., 5 per cent bonds	a106½	a106½
Detroit United Railway	a70	a70
General Electric Company	172	171⅜
Georgia Railway & Electric Company (common)	92¼	*94
Georgia Railway & Electric Company (preferred)	a88	*88
Interborough-Metropolitan Company (common)	15¾	15½
Interborough-Metropolitan Company (preferred)	49⅞	48⅛
Interborough-Metropolitan Company (4½s)	83½	83¼
Kansas City Railway & Light Company (common)	a48	a50
Kansas City Railway & Light Company (preferred)	84	83⅛
Manhattan Railway	144⅝	144½
Massachusetts Electric Companies (common)	a12¾	12⅞
Massachusetts Electric Companies (preferred)	a75	73½
Metropolitan West Side, Chicago (common)	a18	15⅛
Metropolitan West Side, Chicago (preferred)	a48½	48½
Metropolitan Street Railway	24	a23
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	85	85
Northwestern Elevated Railroad (common)	a22	a21
Northwestern Elevated Railroad (preferred)	a71	a70
Philadelphia Company, Pittsburg (common)	42½	44
Philadelphia Company, Pittsburg (preferred)	44½	44½
Philadelphia Rapid Transit Company	32	31
Philadelphia Traction Company	a91	a91¼
Public Service Corporation, 5 per cent col. notes	a100¼	a100½
Public Service Corporation, ctfs	a91	a92½
Seattle Electric Company (common)	*105	112½
Seattle Electric Company (preferred)	105	*105
South Side Elevated Railroad, Chicago	a58	a58
Toledo Railways & Light Company	a9⅛	10½
Third Avenue Railroad, New York	20¾	19¼
Twin City Rapid Transit, Minneapolis (common)	a103⅞	103¾
Union Traction Company, Philadelphia	55¾	55¼
United Railways & Electric Company, Baltimore	a13⅜	14
United Railways Inv. Co., San Francisco (common)	a38½	a38½
United Railways Inv. Co., San Francisco (preferred)	56	54
Washington Railway & Electric Company (common)	a47	a47
Washington Railway & Electric Company (preferred)	a93	a92½
West End Street Railway, Boston (common)	a95	96½
West End Street Railway, Boston (preferred)	106	*105
Westinghouse Electric & Manufacturing Company	86¼	88
Westinghouse Elec. & Mfg. Company (1st pref.)	a130	120

aAsked. *Last sale

Reorganization Plan of Ocean Shore Railway

The reorganization committee of the Ocean Shore Railway, San Francisco, Cal., consisting of Homer S. King, Henry P. Scott, J. D. Grant and Charles Dutton, has made public the proposed plan of reorganization of the Ocean Shore Railway. It calls for the deposit of bonds of the company with the Mercantile Trust Company, San Francisco, Cal., as depositary.

The Ocean Shore Railway was incorporated in May, 1905, to build an electric railway from San Francisco to Santa Cruz. It was capitalized at $5,000,000, and had an authorized bond issue of $5,000,000, secured by a mortgage dated Nov. 1, 1905, and due Nov. 1, 1935. Of these bonds, $1,300,000 was sold during 1905 and 1906 and work was begun on the company's line. The San Francisco disaster affected conditions adversely on the Coast, however, and the company was unable to sell any more of its bonds for some time. Within the last two years it has sold $1,700,000 additional bonds, making the total amount of bonds outstanding about $3,000,000 with the remaining $2,000,000 used as collateral for temporary loans. The present stockholders of the company have paid in cash $2,250,000, which has been invested in property. This property consists of 38 miles of line completed south of San Francisco, and 14 miles of line north of Santa Cruz, there being an intermediate distance of 26½ miles yet to be completed to connect San Francisco and Santa Cruz. The company has secured valuable terminal facilities in San Francisco and has valuable terminal sites under contract in Santa Cruz. J. G. White & Company, Inc., who reported on the condition and prospects of the company, say that the grading and track can be completed for approximately $850,000, and estimate that the net earnings of the company after allowing for operation and maintenance for the first year of complete operation will be not less than $250,000, and that the country tributary to the road is of such character as to insure a steady increase in earnings.

The plan of reorganization calls for the incorporation of the San Francisco & Ocean Shore Railroad or a company with a similar name to be capitalized at $15,000,000. Of this, $7,500,000 will be common stock and $7,500,000 will be 5 per cent non-cumulative preferred stock. It is also proposed to issue $3,500,000 of first mortgage 30-year gold bonds and $15,000,000 of consolidated mortgage 5 per cent sinking fund bonds. Of this $15,000,000, $3,500,000 will be reserved to retire the new first mortgage bonds, $5,000,000 will be exchanged for present bonds of the Ocean Shore Railway dollar for dollar, and $6.500,000 will be reserved in the hands of trustees for future extensions and improvements. Provided all of the Ocean Shore Railway's first mortgage bonds are deposited with the depositary in exchange for San Francisco & Ocean Shore Railroad consolidated mortgage bonds, the San Francisco & Ocean Shore Railroad will purchase from the Ocean Shore Railway all its property, assets, franchises, real estate, etc., and will execute a first mortgage to the Union Trust Company as trustees to secure $3,500,000 of first mortgage bonds. The consolidated mortgage bonds will be a lien on all the property of the company, subject to the $3,500,000 of first mortgage bonds and as an equivalent number of consolidated bonds are reserved to retire the first mortgage bonds at such time as it can be done advantageously, the consolidated mortgage bonds will eventually become a first mortgage on the property. If this plan is carried out the company will have in its treasury $3,500,000 of first mortgage bonds, which it will be able to sell or use as collateral for temporary loans. This will be sufficient to enable the company to procure immediately funds to pay off the real estate mortgages on its present terminals and complete the road from San Francisco to Santa Cruz and put it in first-class shape for operation.

Beaumont (Tex.) Traction Company.—The United States Circuit Court at Sherman, Tex., on the application of the Interstate Trust & Banking Company, New Orleans, La., the mortgage trustee, has appointed James F. Weed, Beaumont, receiver of the Beaumont Traction Company, in order to protect the bondholders, the city having threatened a suit to forfeit the company's charter.

Boston & Northern Street Railway, Boston, Mass.—The Massachusetts Railroad Commission has approved the issue by the Boston & Northern Street Railway, at the price of $115 per share as fixed by its stockholders, of not exceeding 5883 shares of 6 per cent cumulative preferred stock.

Buffalo, Lockport & Rochester Railway, Buffalo, N. Y.—Judge Hazel in the United States Equity Court at Buffalo on Aug. 5, 1909, appointed John M. Campbell, Rochester, and Milford W. Childs, Medina, receivers of the Buffalo, Lockport & Rochester Railway. The application for the receivership was made by the National Bond & Share Company, Ltd., Toronto, Ont., which is a creditor of the Buffalo,

Lockport & Rochester Railway for about $28,000 and owns 2340 shares of the stock of the company.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—Judge Baston G. Young, in the Court of Common Pleas of Franklin County, Ohio, at Marion, has appointed George Ehysall, general manager of the Columbus, Delaware & Marion Railway, receiver of the company on a petition filed by N. J. Catrow, treasurer of the company and president of the First National Bank, Miamisburg. Mr. Cartow is holder of a collateral note for $372,381, dated June 1, 1907, and due Sept. 1, 1907, and he asserts that since June 1, 1907, part of the interest on the $2,500,000 mortgage bonds has been paid from capital and not from earnings, and that $23,000 bond interest due Aug. 1, 1909, has not been paid.

Inter-State Railways, Philadelphia, Pa.—Owing to the delay in the acceptance of the reorganization plan, the Inter-State Railways on Aug. 1, 1909, notified the Philadelphia Stock Exchange that interest coupons of the 4 per cent bonds due Aug. 1, 1909, would not be paid on that date, and that the exchange would be informed of any arrangements made for payment of said coupons. John C. Bell, attorney of the Carson Estate, has received permission from Judge Solly, of the Orphans' Court, at Montgomery County, Pa., to deposit the bonds of that estate, amounting, it is said, to $4,000,000, under the terms of the Earle plan. The following unofficial statement was made recently regarding the progress of the reorganization plan: "There have already been deposited about $750,000 bonds under the plan. The directors own and control approximately $2,000,000 additional bonds, so that the total of $6,750,000 is now assured. The directors had agreed to deposit their bonds at the same time the Carson bonds are deposited, and that is the reason why they were not put in before this. With $6,750,000 secured, it should not be difficult to get in the additional $750,000 to make a total of $7,500,000, or 75 per cent of the outstanding issue, which the Earle committee desires before declaring the plan operative."

Jacksonville (Fla.) Electric Company.—The stockholders of the Jacksonville Electric Company will meet on Aug. 16, 1909, to vote to increase the capital stock of the company from $1,100,000 to $1,500,000.

Metropolitan Crosstown Railway, New York, N. Y.—The bondholders' protective committee of the Metropolitan Crosstown Railway, J. Augustus Barnard, chairman, announces that the time for deposits of first mortgage 5 per cent bonds with the Columbia Trust Company, New York, has been extended until Oct. 15, 1909.

Old Colony Street Railway, Boston, Mass.—The Massachusetts Railroad Commission has approved the issue by the Old Colony Street Railway, at the price of $115 per share, as fixed by its stockholders, of not exceeding 4042 shares of 6 per cent cumulative preferred stock.

Philadelphia, Bristol & Trenton Street Railway, Philadelphia, Pa.—At the sale of the Philadelphia, Bristol & Trenton Street Railway under foreclosure of the first mortgage at Doylestown, Pa., recently, the bidding started at $200,000, the upset price, and the property was finally purchased for $380,000 by Carl N. Martin, Philadelphia, Pa., and John Redmond, Baltimore, Md., representing the bondholders' committee, which holds $627,000 of the issue of $650,000 bonds. The plan of reorganization is not yet ready for publication. Mr. Martin is a member of the firm of R. T. Martin & Company, 302 Stock Exchange Building, Philadelphia, Pa., and is secretary of the bondholders' committee of the Philadelphia, Bristol & Trenton Street Railway.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa.—The Pittsburgh, McKeesport & Westmoreland Railway has purchased about the last block of bonds of the Pittsburgh & Westmoreland Railway, and now owns about 90 per cent of the stock and bonds of that company. The receivers of the Pittsburgh & Westmoreland Railway are preparing an application for permission to sell the property of the company to the Pittsburgh, McKeesport & Westmoreland Railway, free and clear of all liabilities.

Public Service Corporation, Newark, N. J.—To take up $7,250,000 of collateral trust notes due on Nov. 1, 1909, and approximately $500,000 of outstanding convertible gold notes, the Public Service Corporation of New Jersey has sold to J. P. Morgan & Company, New York, N. Y., and Drexel & Company, Philadelphia, Pa., $8,000,000 of its first mortgage 5 per cent bonds of 1908, authorized for $50,000,000.

Worcester (Mass.) Consolidated Street Railway.—The Massachusetts Railroad Commission has approved the petition of the Worcester Consolidated State Railway for an issue of mortgage bonds to an amount not exceeding, at par, $3,182,000, payable 20 years from date thereof, with interest at a rate not exceeding 5 per cent.

Traffic and Transportation

Prospects for Amicable Settlement of Labor Differences in Chicago

What was considered to be one of the critical points in the wage dispute between the railway companies of Chicago and their employees was quietly passed the latter part of the week which ended on Aug. 7. A referendum vote was taken on Aug. 3 by the employees of the Chicago Railways Company, Chicago City Railway Company and the Calumet & South Chicago Railway Company, and it was announced that the men were almost unanimous in favor of declaring a strike unless the demands made to the companies were met. The State board of arbitration, the Mayor of Chicago and many of the leading business men of the city worked to bring about an amicable settlement. Representatives of the employees conferred several times during the week with Thomas E. Mitten, president of the Chicago City Railway, and John M. Roach, president of the Chicago Railways, and it was announced that negotiations were under way for a peaceful settlement. After one of these conferences Mr. Mitten presented a proposition to the wage scale committee of the Calumet & South Chicago Railway, which is operated by the Chicago City Railway, whereby the 268 employees of that line are to be granted an increase in wages. The agreement, in the event of acceptance by the men, will date back to June 1, 1909, when the contract between the company and its employees expired.

The scale of wages called for in the suggested plan was as follows: For the next nine months of service, 24 cents per hour; after nine months, 26 cents per hour. The following scale of wages was suggested to begin May 1, 1910: First three months, 22 cents; next six months, 24 cents; after nine months, 26½ cents. It was announced from President Mitten's office that any increase in salary that may be granted to the employees of the Chicago City Railway will apply proportionately to the employees of the Calumet & South Chicago line.

At the first conference of the week between Mr. Mitten and the Chicago City Railway employees, it was stated that no definite propositions had been presented by either side, but that the subjects of wages, cost of living, possibility of arbitration and other subjects pertaining to the labor troubles, were discussed by Mr. Mitten and the men in a general way.

On Aug. 7 the Chicago City Railway issued a statement which set forth its side of the controversy. This statement is given below.

"The management of the Chicago City Railway desires that all interested be fully informed as to the actual facts concerned in the present wage controversy.

"The total revenue of the company from the operation of the street railway represents the following annual return upon the value of the property as certified by the Board of Snpervising Engineers and accepted by the city:

	1907.	1908.	1909.
Value of property	$28,168,980	$36,170,482	$38,630,418
Annual income	1,634.976	2,194,276	2,261,421
Annual return	6.33 per ct	5.60 per ct.	5.85 per ct.

Average annual return for the 3 years, 5.93 per cent.

"While it is true that during the rehabilitation period, now closing, the company, in the position as broker and contractor, receives an allowance of 15 per cent upon the funds used in the rehabilitation, this cannot be considered as an earning of the property in which the men should participate, nor will it continue to any great extent in future, due to the completion of the rehabilitation work.

"During the negotiations prior to the passage of the settlement ordinances the representatives of the union appeared before the transportation committee and presented their demands for a rate of 33 cents an hour. A committee consisting of Professor Cooley, B. J. Arnold and Mr. Du Pont investigated the reasonableness of this demand at the request of the transportation committee, and their report of Dec. 22, 1906, was to the effect that the payment of this wage would bankrupt the company, their further statement being that a possible improvement in wage conditions lie in the direction of increased speed of cars to be secured by the co-operation of the men and rehabilitation of the property.

"In December, 1906, when urging the co-operation of the men in effecting a settlement with the city President Mitten made the statement that the then speed of the cars averaged 8.3 miles an hour for the system, the then scale of wages being 19 cents an hour for the first six months, 24 cents for the next six months, and 25 cents thereafter, with an average wage of 24 cents an hour; that this, by the co-operation of the men and rehabilitation of the system could

be increased to 9.03 miles an hour, which would enable the company to pay a scale of wages as follows: 25 cents first year, 26 cents second year, 27 cents third year, 28 cents fourth year, 29 cents fifth year, 30 cents sixth year, making an average wage of 26.20 cents an hour.

"After the passage of the ordinance and its ratification at the polls the company advanced the wages of the men to the now existing scale of 23 cents first three months, 25 cents next nine months, and 27 cents thereafter, paying an average wage of 26.20 cents an hour.

"The speed of the cars in May, 1909, reached an average of 8.8 miles an hour. The natural increase in the average wage of the men due to their increased age in service and without any change in the scale now produces an average of 26.68 cents an hour, which approximates proportionately the advance now due to the men on the theory of increased speed attained.

"The company, in order to secure the co-operation of the men, thus discounted the future and increased the wages two years ago proportionate to that which is only now justified by the speed obtained. This action should, in the opinion of the company, be given consideration in the event of arbitration.

"The company is desirous of having the wage question settled in such a way as to prevent its being brought up annually, for the reason that any question which serves to agitate the minds of the men is productive of accidents, and is generally detrimental to the service and discipline of the company.

"The company recognizes that there may be fair differences of opinion as to the merits of the case, and, as it is the policy of the company to treat its men in fairness at all times, there should be no question of a strike or any disturbance which would result in the interruption of the service or the discommoding of the public. The contract with the men expiring Aug. 1, the conditions of which the company is still fulfilling, provides a method of arbitration for the settlement of all disputes, the company being willing to abide by the decision of arbitration so selected under this agreement as final and binding in the settlement of this dispute."

John M. Roach, president of the Chicago Railways, met committees on Monday, Aug. 9, and made conciliatory offers from which it is expected a satisfactory adjustment of the entire wage question with his employees will develop. The proposition presented provides for the following wage scale: First year, 22 cents per hour; after one year, 25 cents per hour; after third year, 27 cents per hour; after five years, 28 cents per hour; after 10 years, 29 cents per hour, and after 15 years, 30 cents per hour. Mr. Roach stated that he believes the older men in the service should be the ones to receive the maximum salary. He also stated that under this arrangement practically 65 per cent of the employees of the Chicago Railways would receive an immediate increase in salary. During the day President Mitten, of the Chicago City Railway, also submitted to his employees a schedule similar to that presented by Mr. Roach. The following shows the scale of wages as now paid to the employees of the Chicago Railways and the wages demanded by them: First six months, present scale 23 cents; demand, 25 cents. After six months, present scale 25 cents; demand, 28 cents. After one year, present scale 27 cents; demand, 30 cents.

The present wage scale and demand of the employees of Chicago City Railway follows: First six months, present scale 23 cents; demand, 24 cents. After six months, present scale 25 cents; demand, 27 cents. After one year, present scale 27 cents; demand, 30 cents.

Conferences were held daily during the week between the officers of the Chicago Railways and the Chicago City Railway and the committees named by the employees to negotiate with them. It is generally conceded that the efforts that have been made to conciliate the men will result in an amicable settlement of the differences between the companies and their employees.

Transfer Charge Sustained on Newton System

The Massachusetts Railroad Commission has issued an order dated Aug. 4, 1909, in which the continuance of withdrawal of free transfers for another year upon the Newton lines of the Middlesex & Boston Street Railway is approved. On July 23, 1909, the company petitioned the commission to extend the time in which 1 cent may be charged for each transfer issued, stating that the earnings of the company do not warrant the restoration of free transfers upon the lines formerly operated by the Newton Street Railway and recently taken over by the Middlesex & Boston Street Railway.

A hearing was given by the commission on Aug. 3, 1909, and no one was present to oppose the petition. M. C. Brush, vice-president and general manager, represented the company. He stated that, in order to secure, with least burden upon the public, a proper and just return upon capital actually invested, it is necessary to continue to make the charge of 1 cent for each transfer, as during the past year. He submitted figures showing that the gross passenger receipts of the Newton lines from September, 1908, to June, 1909, inclusive, were only seven-tenths of 1 per cent greater than the same period with free transfers a year before, being $287,799.93 this year, against $285,688.72 last year; the number of passengers carried was 6,284,241 in 1909, against 6,434,602 in 1908; the number of transfers issued was 549,159 this year, against 733,733 last year, when transfers were free; and the number of transfers received was 531,125 in 1909, against 623,556 in 1908. In other words, 96.5 per cent of the transfers issued were turned in when the extra cent was imposed and 85 per cent were turned in when the transfers were free. The number of unredeemed transfers decreased from 15 per cent to 3.5 per cent by charging for transfers, while the total number of transfers issued decreased 25 per cent and the total number of passengers carried decreased about 2.3 per cent.

The following figures were presented, showing the gross passenger receipts of the Newton lines, the number of passengers carried, and the number of transfers issued and received by lines for the 10 months ending June 30, 1909, and the same period of 1908:

GROSS PASSENGER RECEIPTS.

	1908-9, Transfer Charge 1 Ct.		1907-8, Free Transfers.
September	$34,262.95	September	$33,277.87
October	29,576.95	October	28,632.07
November	26,522.22	November	26,781.86
December	26,025.61	December	25,235.50
January	24,139.55	January	23,819.66
February	22,750.53	February	22,497.73
March	24,545.00	March	24,433.88
April	26,426.12	April	26,007.07
May	32,887.62	May	32,516.11
June	40,663.38	June	42,486.97
Total	$287,799.93	Total	$285,688.72

NUMBER PASSENGERS CARRIED.

	1908-9, Transfer Charge 1 Ct.		1907-8, Free Transfers.
September	749,402	September	750,001
October	644,382	October	649,828
November	577,448	November	607,122
December	565,811	December	569,603
January	528,744	January	539,431
February	497,148	February	508,227
March	537,120	March	552,253
April	575,303	April	579,697
May	718,698	May	728,993
June	890,185	June	949,447
Total	6,284,241	Total	6,434,602

TRANSFERS ISSUED AND RECEIVED.

	1908-9, Transfer Charge 1 Ct.		1907-8, Free Transfers.	
	Issued.	Received.	Issued.	Received.
September	63,484	61,266	84,615	72,461
October	58,076	55,341	80,236	66,497
November	51,501	48,733	73,324	61,709
December	49,804	47,870	66,713	56,801
January	47,532	46,154	62,237	52,975
February	44,247	42,784	54,813	48,638
March	48,324	46,212	62,587	53,712
April	52,735	49,996	64,309	53,458
May	61,866	59,848	84,541	69,846
June	71,590	72,921	100,358	87,459
Total	549,159	531,125	733,733	623,556

During the period from Sept. 1, 1908, to July 1, 1909, the Newton lines received $5,491.59 on account of transfers issued at 1 cent each, and paid foreign roads (the Lexington & Boston Street Railway and the Newton & Boston Street Railway) $1,093.53, at one-half cent additional, per transfer, making the net gain to the Newton lines on account of the additional charge, $4,398.06.

The earnings of the consolidated Middlesex & Boston system for July, 1909, are $59,427.13, compared with $57,783.19 for the component lines in July, 1908, the free transfer being in effect at the latter-named period. The passenger traffic of the consolidated lines for July, 1909, was 1,217,850, against 1,206,392 in July, 1908. The transfers issued on the Newton lines in July, 1909, were 69,706, against 93,077 in July, 1908. During July, 1909, the Newton lines paid $573.41 to the connecting roads above named, on transfer accounts.

The decision of the commission follows:

"On July 31, 1908, the board made a decision upon the petition of the Newton Street Railway, as follows:

"'We have therefore determined to approve a withdrawal of free transfers on the Newton Street Railway for a limited period as an experimental measure, being of the opinion that at the end of this period, or prior thereto if

conditions should warrant, and unless unexpected loss of business necessitates the further extension of time, the company would restore the free transfers. We take this course that the company, rather than the public, may carry the burden of bringing this matter formally before us in the event of an occasion arising for such action. * * *

"'It is therefore ordered that the petition of the Newton Street Railway be granted for an experimental period of one year from the date hereof.'

"The petitioner requests the board to approve the withdrawal of free transfers beyond the period limited in said order and alleges that the earnings of the Middlesex & Boston Street Railway, which has succeeded to the property and franchises of the Newton Street Railway by consolidation, do not warrant the restoration of free transfers upon lines formerly operated by the Newton Street Railway as required by said order.

"After a careful examination of the statement of receipts of the Newton Street Railway prior to consolidation and of the Middlesex & Boston Street Railway for July, 1909, we are of opinion that we ought to approve the withdrawal of free transfers for a further period. We deem it in the public interest, however, that the period should be a limited one, in view of the consolidation of the companies, and therefore order that the petition of the Middlesex & Boston Street Railway be granted for an experimental period of one year from the date hereof."

Evansville Strike Ended

After being locked out for 69 days the striking employees of the Evansville & Southern Indiana Traction Company, Evansville, Ind., have given up their fight and thrown themselves on the mercy of the company. Each time any new proposal of settlement or arbitration was made to the company, it replied that the first move looking toward any settlement must be made by the strikers declaring the strike off and lifting the boycott. This they did. The company will now take back some of the men who were previously loyal and efficient. The majority of the men, however, will never be re-employed, as the company has re-established its service with permanent employees whom it will prefer in all cases. Any of the strikers re-employed will be considered as new men and compelled to take their place on the extra list. The fight was a very bitter one. Organized labor is well entrenched in Evansville, and the boycott was maintained until the last. Considerable violence occurred from time to time, including an assault on one of the conductors in which a man was killed, and the dynamiting of four or five cars. The situation is now greatly improved, and the opinion is expressed that conditions in Evansville are likely to be much better in the future than they have been in the past.

Freight Rights Granted in Memphis.—The Memphis (Tenn.) Street Railway has been granted the privilege of carrying freight on four lines in Memphis, two in New South Memphis and one to Buntyn and Raleigh, in accordance with the recommendation of the railroad committee of the City Council.

Western Ohio Railway Readjusts Passenger Rates.—Local passenger tariffs on the Western Ohio Railway, Lima, Ohio, have been readjusted according to a recent ruling of the Railroad Commission, with the result that commutation tickets have been withdrawn and the coupon books which have been sold for $7.50 will hereafter be sold for $8.75. While there are several reductions, the new rates show a general advance.

Booklet of the Historic Mt. Vernon Line.—Richard W. King, general manager of the Washington, Alexandria & Mt. Vernon Railway, Washington, D. C., has issued a booklet containing scenes along that line which is divided into four parts. In Part 1, scenes along the route to Mt. Vernon are shown. In Part 2, views of the Arlington National Cemetery are shown. In Part 3, views at Ft. Myer, Va., are shown. In Part 4, views along the Falls Church division en route to historic Fairfax are shown.

Summer Dress in New Haven.—The Connecticut Company recently posted in its barns at New Haven the following order regarding the dress of its trainmen during the summer months: "Uniform coats must always be kept buttoned when on duty, except from May 15 to Oct. 1, when they may be worn unbuttoned, provided a uniform vest is worn and the vest kept buttoned. If a uniform vest is not worn during this period, coats must be kept buttoned. Conductors and motormen must wear white collars and neckties; negligee shirts with soft collars do not make a very presentable appearance."

Camera Sketches of Sacandaga Park.—The Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., has issued a very beautiful booklet of camera sketches for Sacandaga Park and the territory along the company's lines so that the summer tourist may appreciate the attractions better. The publication is 12 in. long by 9 in. wide, and contains 80 pages of heavy coated paper, all of which are given over to half-tone illustrations. Some of the illustrations are grouped, but many of them occupy a page each. There are only 50 words of text and these concern the purpose of the publication and the facilities of the passenger department of the company for answering inquiries. A brown-black ink has been used with excellent results, the illustrations being free from the garish effect of a light ink and the somber effect of solid black ink.

Action to Revoke Franchise of the Indiana Union Traction Company.—On complaint of patrons of the Indiana Union Traction Company, Anderson, Ind., the Commissioners of Cass County, Ind., have summoned the officials of the company to appear before them on Sept. 7, 1909, and show cause why the franchise of the company should not be revoked. The complainants asked that the commissioners compel the company to restore the fares formerly in use under penalty of forfeiture of its franchise, which it is claimed provides for a maximum charge of only 1½ cents per mile in Cass County. The complainants allege discrimination and violation of the provision of the franchise and cite the following: The distance between Galveston to Kokomo is 7 miles and the fare is only 10 cents. The distance between Galveston and Walton is only 6 miles and the fare is 15 cents. The distance from Walton to Logansport is 10 miles and the fare is 20 cents.

"Trolley Trips in Central New York."—This is the title of a folder issued by the Auburn & Syracuse Electric Railroad, Auburn & Northern Electric Railroad, Rochester, Syracuse & Eastern Railroad, Newark & Marion Railway, Syracuse; Lake Shore & Northern Railroad and the Syracuse & South Bay Electric Railroad, through J. Stanley Moore, general passenger agent. Each road is described separately, the idea being to furnish a short description of the roads, and the territory through which they operate and to give some facts concerning points of general interest along the several routes. The publication is printed in colors on cream-tinted blocks. There is also a double-page map of the different lines including the territory between Syracuse on the East and Rochester on the West and Canandaigua Lake, Seneca Lake, Cayuga Lake, Owasso Lake and Skaneateles Lake on the south and Lake Ontario on the north. The cover is printed in colors.

By Trolley in Rochester and Vicinity.—The New York State Railways, Rochester Lines, through B. E. Wilson, general passenger and express agent, has issued a folder descriptive of the lines of the New York State Railways in and about Rochester. The descriptions of places of interest are brief, but the circular is replete with pictures that tell the story of the attractions of the territory served by the company better than could even a master of the art of description with his pen. The principal places of interest in Rochester are tabulated for ready reference, and complete instructions are given regarding fares and accommodations on both the city and the interurban lines. A particularly interesting feature of the publication is a map showing the electric railway lines in and about Rochester. In one corner of this map are tabulated and numbered the depots, buildings, hotels, cemeteries, hospitals and theaters, the map being made to correspond, thus establishing the location of the principal points of interest.

Washington, Baltimore & Annapolis Railway Advertises Excursions.—The Washington, Baltimore & Annapolis Electric Railway advertised in the daily papers four special excursions for Sunday, Aug. 8, and Monday, Aug. 9. They included excursions on Aug. 8 to Gettysburg, Tolchester Beach and St. Michaels, Md., on the Eastern Shore, and on Aug. 9 to Ocean City, Md. There was also an excursion to Annapolis and West River, including a steamer ride on Chesapeake Bay. The excursion to Gettysburg was by special train on Aug. 8, leaving the White House station, Fifteenth and H Streets, Northeast Washington, at 6:55 a. m., returning same evening, and allowing six hours to view points of interest on the famous battlefield. Special trains also left from the White House station for Annapolis at 11 a. m. for steamers for Tolchester Beach and St. Michaels. Both these trips include steamer rides across Chesapeake Bay at one of its widest points. On Aug. 9 an unusual one-day excursion to the seashore was operated. A special train left White House station at 6:50 a. m. for Annapolis, where a steamer transferred the passengers across the bay to Claiborne. At Claiborne a special through train was taken to Ocean City, arriving at that point at 12:30 noon. The return trip was made at 6:45 p. m. from Claiborne.

Personal Mention

Mr. Adrian H. Joline, receiver with Mr. Douglas Robinson of the Metropolitan Street Railway, New York, N. Y., has sailed for Europe, to be gone until Oct. 1. In his absence Mr. William H. Coleman, assistant to the general counsel of the Metropolitan Street Railway, will take Mr. Joline's place, by order of Judge Lacombe of the United States Circuit Court.

Mr. Charles Macloskie, Brussels, Belgium, who has been spending a short vacation in New York State, sailed for home on Aug. 5. Mr. Macloskie is one of the well-known men of the industry, having been identified with the Bentley-Knight Company, the Thomson-Houston Company and the Allgemeine Elektricitäts Gesellschaft. He was one of the engineers of the intra-mural road at the Chicago World's Fair.

Mr. J. W. Glendenning, who has been elected treasurer of the Saginaw Valley Traction Company, Saginaw, Mich., was connected with the Camden (N. J.) Suburban Railway from 1899 to 1904, and was assistant secretary of the company when the property was leased to the Public Service Corporation in 1904. From May, 1904, until April, 1907, he acted as assistant railway auditor of the South Jersey division of the Public Service Corporation. Since 1907 Mr. Glendenning has been clerk to the general manager of the Bay City Gas Company, Saginaw Valley Traction Company, Bay City Traction & Electric Company, Bartlett Illuminating Company and the Saginaw City Gas Company, and since June, 1908, has also filled the position of general passenger and freight agent of the company.

Mr. Oscar L. Young, Laconia, N. H., has been appointed a member of the Railroad Commission of New Hampshire to succeed Henry M. Putney, deceased. Mr. Young was born at Ossipee, N. H., on Sept. 11, 1874. He was educated in the public schools of Ossipee and Effingham and at Brewster Free Academy, from which he was graduated in 1895. Mr. Young then entered the law office of Judge S. W. Adams, where he studied law for two years. In 1898 he entered the Boston University Law School and was graduated in June, 1900, with the degree of LL.B. In March, 1900, Mr. Young was admitted to the bar, and in 1901 became associated with Mr. Edwin H. Shannon in the practice of law at Laconia and continued to be associated with Mr. Shannon until 1903, when he opened an office for himself. He was appointed judge of the Laconia Police Court in September, 1903.

Mr. Arthur G. Whittemore, who has been a member of the Railroad Commission of New Hampshire, has been appointed chairman of that body. Mr. Whittemore was born in Pembroke, N. H., on July 26, 1858, and was educated at Pembroke Academy and the Harvard Law School and was admitted to the bar in March, 1879. Soon after he became associated with C. W. Woodman, Dover, in the practice of law, the partnership continuing until the death of Mr. Woodman in 1888. Since that time Mr. Whittemore has practised alone. In 1885 he was appointed receiver of the Dover National Bank and later assisted in reorganizing the First National Bank, Somersworth. In 1887 the city of Dover built a new water works and Mr. Whittemore was elected water commissioner. Later, he was elected Mayor of Dover, a position which he held for three successive terms. In May, 1903, he was appointed a member of the railroad commission to succeed the late Francis C. Faulkner, Keene, and has served on the board continuously since that time. Mr. Whittemore succeeds Mr. Putney as chairman of the commission, Mr. Putney's place on the commission being taken by Mr. Young, as mentioned above.

The electric railway up Mont Blanc was started on Sunday, July 25, and the first section is open to the public, which is now able to ascend to the Col de Voza, 5495 ft. high. The first train up took an hour to accomplish the journey of about 4½ miles. There are no tunnels, and the steepest grade is 20 ft. in the 100. Some magnificent views of Alpine scenery can be had from the cars. Having accomplished the first stage of the journey up Mont Blanc, the plan is to continue along the ridge of the Col de Voza, tunneling through first the Aiguille and then the Dôme du Goûter, coming out by the Observatoire Vallot. From there a tunnel will have to be made right underneath the Bosses du Dromadaire, into the heart of Mont Blanc, and then the summit is to be reached, as in the case of the Jungfrau, by means of a lift. This is the plan for the continuation of the line, and it has even been calculated that the cost of the return ticket is to be $20.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Ohio Valley Traction Company, Brookport, Ill.**—Incorporated to build an electric railway from a point at or near Golconda via Brookport to Joppa, Ill. Headquarters, Brookport. Capital stock, $10,000. Incorporators: O. H. Margrave, G. W. Tucker, William Pell, H. W. Holifield and William D. Harrington, Brookport; Chenault Webb and Robert C. Leeper, Unionville and C. L. Robertson, Paducah, Ky.

Jackson Interurban Railroad, Light & Power Company, Jackson, Miss.—Incorporated to build an electric railway from Jackson to Clinton, a distance of 10 miles. The company also proposes to operate gas and electric light and power plants. Capital stock, $100,000. Incorporators: R. E. Kennington, W. J. Davis, W. H. Watkins, Jake Ehrman, H. L. Hicks, H. R. Henry, P. B. Bridges, W. M. Anderson, A. C. Jones, Jackson; J. W. Provine and D. N. McLean, Clinton. [E. R. J., July 31, '09.]

***Enid (Okla.) Central Traction Company.**—Incorporated to build an electric interurban railway to connect Guthrie, Enid, Lawton, Chickasha, El Reno, Kingfisher, Cherokee, Pond Creek, Medford and Blackwell, 70 miles distant. The company expects to begin construction by Sept. 1. Headquarters, Enid. Capital stock, $1,000,000. Incorporators: W. H. Stewart, R. W. Whittinghill and C. E. Burkhart, Enid; M. F. McMahon and J. W. Smith, Toledo, Ohio.

***Farmers' Railway & Navigation Company, Pendleton, Ore.**—Incorporated in Oregon to construct a railroad with electricity, gasoline or steam as motive power to connect Umatilla, Holdman, Helix, Hermiston, Echo and Pendleton. Headquarters, Pendleton, Ore. Capital stock, authorized, $250,000; issued, $125,000. Officers: Chas. A. Hill, Pendleton, president; A. A. Cole, Pendleton, secretary, treasurer and purchasing agent; E. T. Erickson, Hermiston, chief engineer.

Johnstown & Gallitzin Railway, Johnstown, Pa.—Chartered to construct an electric railway to connect Johnstown, Dale, Walnut Grove, Geistown, Elkton, Salix, Lovett, St. Michaels, South Fork, Summerhill, Wilmore, Portage, Lilly and Gallitzin, a distance of 32 miles. Capital stock, authorized, $200,000; issued, $70,000. Headquarters, Suppes Building, Johnstown. Officers: Wallace Sherbine, president; Alian Sherbine, secretary; H. W. Storey, treasurer; G. U. G. Holman, general manager and electrical engineer. [E. R. J., June 12, '09.]

***Cook Creek Electric Light & Railway Company, Clinton, Tenn.**—This company has been granted a charter to build an electric railway in Anderson County. Capital stock, $25,000. Incorporators: Chas. Loyd, J. P. Stanton, E. M. Beasley, J. S. Stanton and S. B. Faris.

***Kanawha & Ohio Valley Traction Company, Charleston, W. Va.**—Incorporated to build an electric railway from Kanawha Falls on the north side of the Kanawha River to Point Pleasant. The company is having surveys made between Charleston and Kanawha Falls. Incorporators: Geo. S. Couch, F. P. Crosscup and others, of Charleston.

***Superior (Wis.) Traction Company.**—Incorporated to operate an electric railway system in Superior. Capital stock, $100,000. Incorporators: Richard Russell, P. J. Eckstand and S. L. Perrin.

FRANCHISES

***Troy, Ala.**—The City Council has granted to W. R. White and associates a franchise to build a street railway in Troy.

Los Angeles, Cal.—The City Council has granted a franchise to the Pacific Electric Railway to operate a street railway on Sixth Street between Olive Street and Figueroa Street. [E. R. J., Jul. 3, '09.]

San Diego, Cal.—G. W. Pursell has petitioned the City Council for a franchise to operate an electric railway in San Diego. The railway is to connect San Diego, La Mesa, El Cajon, Bostonia, Lakeside, Poway and Escondido, and is estimated to cost about $2,000,000. [E. R. J., July 24, '09.]

Meriden, Conn.—The Board of Selectmen has granted a franchise to Francis Atwater, president of Meriden, Middletown & Guilford Railway, to build an electric railway over Middletown Road from the tracks of the Connecticut Company to the town limit. [E. R. J., Aug. 7, '09.]

***Dublin, Ga.**—P. L. Wade, S. M. Kellam, W. W. Bush, A. W. Garrett, W. R. Brigham, A. P. Hilton and W. W.

Robinson have applied to the City Council for a 25-year franchise to operate an electric railway over certain streets of Dublin.

Belleville, Ill.—The City Council has granted a franchise to the Belleville & Interurban Railway to build an electric railway on Ninth Street between Huff Avenue and Illinois Street and on Illinois Street from Ninth Street to the Public Square, Belleville. The company plans to use gasoline motor cars. B. A. Gundlach is interested. [E. R. J., July 17, '09.]

Chrisman, Ill.—The City Council has granted a 50-year franchise to the Paris & Northern Railway, Danville, to operate its electric railway in Chrisman. The railway is to run from Ridgefarm to Paris, a distance of 26 miles. [E. R. J., March 20, '09.]

***Jeanerette, La.**—Henry A. Mentz, New Orleans, has been granted a franchise by the City Council to operate a railway by electricity or other motive power than steam in Jeanerette. The railway which Mr. Mentz proposes to build will connect Jeanerette and other towns of Teche Valley.

Waterville, Maine.—The Board of Railroad Commissioners has rendered a decision approving the amended petition of the Portland, Gray & Lewiston Railroad to build an electric railway between Auburn and Portland via New Gloucester, Gray, Cumberland and Falmouth. [E. R. J., Jan. 2, '09.]

Westfield, Mass.—The Western Massachusetts Street Railway has petitioned the Board of Selectmen for a franchise to extend its line in Westfield.

***Clayton, Mo.**—James D. Houseman, St. Louis County, has applied to the County Court for a franchise to build an electric railway from Jefferson Barracks via Maplewood, Webster Groves, Clayton, University City, Ferguson and Florisant to a point near Spanish Lake.

Asbury Park, N. J.—The Township Committee has granted a 34-year franchise to the Asbury Park & Sea Girt Electric Railroad to operate a double track railway over Main Street, Asbury Park.

Brooklyn, N. Y.—The Public Service Commission has adopted a resolution granting permission to the Brooklyn Heights Railroad to change the motive power of the Montague Street route from cable to overhead trolley. The company, when it made the application, stated its intention, if permitted, to run trolley cars from the Wall Street Ferry to Court Street, the present terminal, and over Fulton Street to the Fulton Street Ferry. This would enable passengers to transfer directly to all Brooklyn Rapid Transit cars that come to the Brooklyn Bridge or to the Fulton Street Ferry.

Mount Vernon, N. Y.—The City Council has granted the application of the New York, Westchester & Boston Railway for an amended franchise which will enable the company to continue the construction of its four-track, third-rail line to connect Mount Vernon, Pelham, New Rochelle and other towns, with the Interborough Rapid Transit subway at Bronx Borough.

Utica, N. Y.—The City Council has sold at public auction to the Utica & Mohawk Valley Railway, the highest bidder, a franchise to operate a double-track street railway on Mohawk Street from Bleecker Street to Pleasant Street. C. Loomis Allen, general manager.

***Ironton, Ohio.**—William Lemley, representing A. E. Cox and associates, Huntington, has petitioned the County Commissioners for a franchise to construct an electric railway from Gallipolis to Ironton.

***Ironton, Ohio.**—Thurman Braley, Proctorville, has applied for a franchise to the County Commissioners, to build an electric railway from Ironton to Millersport.

Oregon City, Ore.—The City Council has granted a 25-year franchise to F. M. Swift, of the Oregon City, Beaver Creek & Molalla Railway, to operate through the Mount Pleasant and Green Point sections of the city. Thos. F. Ryan and G. W. Dimmick are also interested. [E. R. J., Aug. 22, '08.]

Bryan, Tex.—The City Council has granted a franchise to Judge V. B. Hudson to construct an electric railway from Bryan to the Agricultural and Mechanical College, a distance of five miles. [E. R. J., Aug. 7, '09.]

Corpus Christi, Tex.—Daniel Hewitt, Salina, Kan., has been granted a franchise by the City Council, to build an electric street railway in Corpus Christi. [E. R. J., Aug. 7, '09.]

Dallas, Tex.—The Northern Texas Traction Company has applied, through its attorney, R. E. L. Knight, to the City Council for a franchise to double track Tyler Street west to the city limits.

Houston, Tex.—The County Commissioners have granted a 28-year franchise to L. A. Anderson representing the Westmoreland Railroad to construct an electric railway from Houston to the Westmoreland Farm near Bellaire, a distance of 7 miles. W. W. Baldwin is an incorporator. [E. R. J., July 31, '09.]

Salt Lake City, Utah.—The County Commissioners have amended the 50-year franchise of the Utah Light & Railway Company to extend its railway from Murray to Sandy and Bingham Junction. By the amendments the company is given until Jan. 1, 1914, to complete its double track to Murray and until Jan. 1, 1911, to complete a macadam road of crushed slag. [E. R. J., March 13, '09.]

Bellingham, Wash.—The Whatcom County Railway & Light Company has applied to the City Council for a franchise to extend its line on Donovan Avenue.

TRACK AND ROADWAY

British Columbia Electric Railway, Vancouver, B. C.—This company has awarded the contract for the construction and grading of the New Westminster and Chilliwack section of its extension, a distance of 12 miles, to the Puget Sound Ditch & Dredging Company. It has also awarded contracts to Palmer Brothers and Peter Henning, Everett, Wash., for the Chilliwack and Abbotsford, B. C., section, which will cost $150,000. The contractors' headquarters will be at Chilliwack. The contracts call for completion in six months.

***Upland & Claremont Railroad, Los Angeles, Cal.**—William G. Kerckhoff, representing this company, which proposes to build an electric railway from San Bernardino to Los Angeles, has awarded the contract for the first stretch to Garnsey & Pitzer.

San Bernardino Valley Traction Company, San Bernardino, Cal.—Work on the Colton extension of this railway is to be resumed at once, the contract having been awarded to Garnsey & Pitzer, who did the original grading. O. K. Dunham, field engineer for the San Bernardino Interurban Railway, which is the construction company to do the work, will have personal charge of construction.

Colorado Interurban Railroad, Denver, Col.—The financing of this interurban system is said to have been successfully consummated and the work of constructing the proposed electric railway to connect Denver, Brighton, Fort Lupton, Greeley and other towns of the northern coal district, will commence within a few weeks. C. H. Pierce is general counsel for this company. [E. R. J., Nov. 28, '08.]

Norwich, Colchester & Hartford Traction Company, Norwich, Conn.—This company has completed all surveys for its proposed electric railway and expects to begin construction soon. It is hoped to have the first 15 miles in operation next year and complete the road by 1911. This will give a direct route between Norwich and Hartford, a distance of 40 miles. [E. R. J., Jan. 2, '09.]

Cienfuegos, Palmira & Cruces Electric Railway & Power Company, Cienfuegos, Cuba.—This company expects to place contract within two months for the construction of 39 miles of railway from Cienfuegos to Manicaragun. Contract for rails has been closed with the Lorain Steel Company, Lorain, Ohio. Hugh J. Reilly, Ceinfuegos, Cuba, contractor, desires to buy two gasoline motor cars, but the company has a concession for the development of water power and will probably use electricity as motor power. Bruno Diaz, Ceinfuegos, president.

Sanford (Fla.) Traction Company.—It is stated that this company has ordered material for completing its electric railway from Sanford to Everglades and that work will be started within two weeks. The road will be extended to Orlando, making a total distance of 8 miles. A. P. Connelly is manager of the company. [E. R. J., Sept. 10, '09.]

Belleville & Interurban Railway, Belleville, Ill.—This company is said to have ordered 20,000 ties for the construction of its railway, which is to connect Belleville and Smithton, a distance of 10 miles. Jacob Gundlach and Thos. A. Bell, St. Louis, Mo., are said to be interested in this project. [E. R. J., July 17, '09.]

Rock Island Southern Railroad, Monmouth, Ill.—A bonus of $10,000 has been raised by the people of Aledo to be given to this company in consideration of the building of a branch line into Mercer County.

Fort Wayne & Toledo Electric Railway, Harlan, Ind.—This company is making location maps and profiles for its proposed electric railway from Fort Wayne and Maysville, Ind., to Hicksville, Bryan and Toledo, Ohio, a distance of 42 miles. It is expected that construction will be started about Sept. 15, by the Keystone Construction of Indiana, which has the contract for building the road. The railway

will be standard gage and will be operated by the overhead trolley system. The power will be furnished by the Toledo & Indiana Railway. Capital stock, $200,000, preliminary, bonds authorized, $1,000,000. Company address, E. A. Tennis, president, Garden City, Kan. Officers: Chas. H. Baker, 3704 Spruce Street, Philadelphia, Pa., vice-president; Robert T. Bastress, Jr., secretary and treasurer, and W. H. Cost, chief engineer, Harlan. [E. R. J., July 31, '09.]

Gary, Hobart & Valparaiso Traction Company, Hobart, Ind.—B. A. Mapledoram, general manager of this company, writes that all plans for building the railway to connect the cities named in the title are ready and that the road will be graded and the culverts put in this fall preparatory to pushing construction work in the spring. [E. R. J., May 22, '09.]

Sioux City & Eastern Traction Company, Climbing Hill, Ia.—It is stated that the proposed Sioux City, Climbing Hill & Ida Grove Electric Railway will soon be incorporated as the Sioux City & Eastern Traction Company. R. H. Baldwin, Chicago, Ill., engineer, is making the preliminary surveys. [E. R. J., July 14, '09.]

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—This company expects to make improvements which will involve an expenditure of $500,000. An extension from Denver Junction to Waverly, a distance of six miles, will be constructed and much reconstruction and double tracking between Waterloo and Cedar Falls will be done. All the bridges will be replaced with concrete arches and a steel arch bridge will replace the present viaduct. A new car house and shops will be erected and the capacity of the power station will be increased. C. D. Cass, Waterloo, is general manager.

Arkansas Valley Interurban Railway, Wichita, Kan.—This company is reported to have completed the preliminary surveys of its electric railway from Wichita to Hutchinson, a distance of 50 miles, via Newton. J. B. Hodgson is constructing engineer. [E. R. J., July 17, '09.]

Kentucky Electric Railway, Providence, Ky.—W. G. Roney, secretary of this company, announces that plans for the financing of this railway are not yet completed, so no definite date is yet set for commencing construction. The railway, which is to connect Providence, Nebo, Madisonville and Dawson, 22 miles distant, will be standard gage and operated by the overhead trolley system. The power stations will be located at Dawson and Providence. Capital stock, $10,000, preliminary, to be increased to $300,000; bonds, authorized, $300,000. Officers: J. T. Edwards, president and general manager; B. H. Roney, treasurer, Providence; Ben Sisk, Silent Run, vice-president, and R. D. Orsburn, care J. T. Edwards, Providence, chief engineer. [E. R. J., July 24, '09.]

***Belfast, Maine.**—The surveys for the electric railway from Camden to Belfast have been completed and work will begin the present season. The charter of this railway is held by the Waldo Street Railway, some of the directors of which are identified with the Rockland, Thomaston & Camden Street Railway, although this company is not concerned in the new project. John A. Jones, Lewiston, engineer.

***Aroostook Valley Railroad, Presque Isle, Maine.**—A. R. Gould, Presque Isle, president, advises that the grading of this standard-gage electric railway to connect Presque Isle and Washburn, 12 miles distant, is practically completed. The roadbed is of steam railroad construction, and also the bridges and culverts. The heaviest grade will be ½ of 1 per cent and the sharpest curve 5 deg. The company will use 70-lb rails. All equipment has been purchased. An electric locomotive will be used for freight. The company has retained Murray Brothers, Houlton, to construct the railway. The repair shops are to be located at Presque Isle. The 1200-volt trolley system will be used and power will be furnished from the power station of the Maine & New Brunswick Electrical Power Company, Ltd., at Aroostook Falls, of which Mr. Gould is general manager. The company also intends laying out an amusement resort, but has not decided upon the location of it. Capital stock, authorized, $100,000; issued, $100,000; bonds authorized, $300,000. Officers: A. R. Gould, president, general manager and purchasing agent; A. E. Irwing, Presque Isle, vice-president; H. W. Heath, Augusta, secretary; Fred Barnes, treasurer; Ross Thomson, superintendent; E. S. E. Mosher, electrical engineer, and W. A. Arthur, chief engineer, all of Presque Isle.

Hannibal & Jefferson City Interurban Traction Company, Mexico, Mo.—C. W. Gaither, secretary of the Mexico, Santa Fé & Perry Traction Company, advises that the property of the Hannibal & Jefferson City Interurban Traction Company is controlled by the Mexico, Santa Fé & Perry Traction Company. Mr. Gaither also writes that 8 miles of grade is completed on the standard gage electric railway which his company is constructing to connect Hannibal, New London, Perry, Santa Fé, Mexico, Columbia and Fulton. Capital stock, authorized, $850,000; issued, $140,000. Bonds, authorized, $850,000. Officers: Matthias Crum, president; C. C. Heizer, vice-president; W. W. Botts, treasurer, and S. L. Robison, general manager, Mexico: C. O. Thon, Belleville, Ill. [E. R. J., July 17, '09.]

Grand Valley Railway, Brantford, Ont.—This company is double-tracking Colborne Street and relaying all the old track of the Brantford Street Railway with 80-lb. T-rails. A. S. C. E. section. The company purchased the rails from the Algoma Steel Company. All special work is being furnished by Edgar Allen & Company, Sheffield, England.

Irwin-Herminie Traction Company, Irwin, Pa.—It is reported that this company has about completed its electric railway from Irwin to Herminie, a distance of 4 miles. John S. Pearce is interested. [E. R. J., June 5, '09.]

***Spartanburg, S. C.**—F. H. Knox, Pittsburg, vice-president and general manager of the Electrical Manufacturing & Power Company; J. B. Lee, president of the Glenn Springs Hotel Company, and A. L. White, president of the Merchants' & Farmers' Bank, are said to be interested in the proposition of constructing an electric railway from Spartanburg to Glenn Springs and Union.

***Medicine Mound, Tex.**—W. J. Johnson and associates are at work securing bonuses and townsites for the proposed electric railway to be built from Quanah to Medicine Mound, a distance of 18 miles. Hillsboro, Tex., and St. Louis, Mo., capitalists are behind the enterprise. Mr. Johnson may be addressed, care of Porter A. Whaley, Quanah Chamber of Commerce, Quanah, Tex.

Helper Western Railway, Helper, Utah.—John F. Williamson, president, advises that this company will construct a standard-gage steam railroad, instead of an electric railway as reported in a recent issue. [E. R. J., July 24, '09.]

Whatcom County Railway & Light Company, Bellingham, Wash.—This company announces that it has material on hand and is relaying 9000 ft. of 40-lb rails with 73-lb rails and paving with asphalt, and that it also has material and apparatus for constructing 2900 ft. of track to Lehome Wharf and for an extension of 15,400 ft.

Fairmont & Northern Traction Company, Fairmont, W. Va.—This company announces that its railway connecting Rivesville, Federal, Fairview and Fairmont, 14 miles, is chiefly controlled by the Fairmont & Clarksburg Traction Company, and that all contracts for construction will be awarded by that company. Clement L. Shaver, Fairmont, is interested. [E. R. J., July 24, '09.]

SHOPS AND BUILDINGS

Fresno (Cal.) Traction Company.—This company has selected a site near Pollasky for the erection of the car houses, which are to be built this fall.

Freeport Railway, Light & Power Company, Freeport, Ill.—Plans are being drawn for the car houses of this company to be erected on the East Side, Freeport.

Atlantic Shore Line Railway, Sanford, Maine.—This company announces that it expects to place contract within a week for a car house and office at Kennebunk. Edw. B. Kirk, general manager.

Interborough Rapid Transit Company, New York, N. Y.—This company is to erect a station at Westchester Avenue and Intervale Avenue, Bronx, on the West Farms division of its subway, midway between the present station at Simpson Street and at Prospect Avenue, which are 16 blocks apart.

York (Pa.) Railways.—This company is building a trolley freight station and waiting room on its grounds on Main Street.

POWER HOUSES AND SUBSTATIONS

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—This company has let contracts for the improvement of its power house at Cedar Rapids, aggregating $125,000. A concrete smoke-stack is being built, which will be 210 ft. high, with an inside diameter of 16 ft. at the base and 10 ft. at the top. The capacity of the power plant will be increased to 8000 kw. H. M. Byllesby & Company, Chicago, Ill., are the consulting engineers for the work. [E. R. J., July 3, '09.]

***Hagerman, Idaho.**—H. A. Stroud and associates, Hagerman, are formulating plans for the installation of a 75,000 hp electric plant and the construction of electric railway.

Memphis (Tenn.) Street Railway.—Meers & Dayton, Chattanooga, have been awarded the contract for the erection of the 3-story addition to this company's power house on Broadway Avenue. The contract calls for the completion of the work within four months.

Manufactures & Supplies

ROLLING STOCK

Lexington (Ky.) Railway has recently constructed one freight car in its own shops.

Illinois Traction System, Champaign, Ill., has ordered 10 pay-as-you-enter cars from the Danville Car Company, for use in Champaign.

Chicago (Ill.) Railways has ordered 350 quadruple motor equipments for replacement from the Westinghouse Electric & Manufacturing Company.

San Diego (Cal.) Electric Railway, it is reported, expects to build 12 new large cars to be equipped with air brakes, in its own shops, turning out two cars a month until the 12 are finished.

Detroit (Mich.) United Railways is remodeling 100 cars for pay-as-you-enter service on its lines. The 50 new cars mentioned in the Electric Railway Journal of Aug. 7, 1909, will also be of the pay-as-you-enter type.

Illinois Traction System, Champaign, Ill., has ordered 50 40-ton coal cars from the American Car & Foundry Company. When these cars are delivered the company will have more than 400 cars of this type in operation on its lines.

Louisville (Ky.) Railway has placed an order for 33 pairs of trucks with the Baldwin Locomotive Works. The cars under which these trucks are to be used are being built by the St. Louis Car Company, as reported in the Electric Railway Journal of July 31, 1909.

Scioto Valley Traction Company, Columbus, Ohio, has purchased three additional freight cars from the Barney & Smith Car Company, Dayton, Ohio. They are 36 ft. long, of the box-car type with a few changes, and a capacity of 60,000 lb. Midvale rolled steel wheels are used. The company now has nine cars of this style operating over its lines.

Durham (N. C.) Traction Company has purchased two double-truck car bodies from the Southern Car Company. The cars have a body length of 21 ft. 9 in.; over vestibule, 31 ft. 9 in.; have wood bodies with wood and metal stringers, and are finished on the interior with mahogany. Hunter car signs, National Fare Register Company's fare boxes, Consolidated fenders, Electric Service Supplies Company's gongs, Brill E-39 trucks and two 101-B Westinghouse and two GE-67 motors were specified.

Buffalo & Lackawanna Traction Company, Buffalo, N. Y., has drawn up the following specifications for the 10 double-truck pay-as-you-enter cars ordered from the Cincinnati Car Company, as mentioned in the Electric Railway Journal of July 10, 1909:

Wheel base .....4 ft. 10 in.	Curtain material ..Pantasote
Length of body.....29 ft.	Hand brakes .....Peacock
Length over vest..41 ft. 8 in.	Heaters ..... Consolidated
Length over all.....43 ft.	Headlights ..... Dayton
Width over all....8 ft. 7 in.	Motors 2
Height sill to trol. base 9 ft.	Roofs ...Monitor deck type
Hght. top rail to sills 33¼ in.	Sanders ... Nichols-Lintern
Body ..... Composite	Sash fixtures ..... Dayton
Underframe ..... Composite	Seats .....Hale & Kilburn
Air brakes.....West., SME	Trolley retrievers...Knutson
Couplers .....Cinn. Radial	Track scrapers ..... Root
Curtain fix....Curtain S. Co.	

The interior will be finished in cherry and the side walls lined with Agosote.

TRADE NOTES

Grip Nut Company, Chicago, Ill., has changed its address from 1590 Old Colony Building to 575 Old Colony Building, Chicago.

Root Spring Scraper Company, Kalamazoo, Mich., has shipped 24 of its scrapers to the Grand Rapids (Mich.) Railway. When these scrapers are installed all of the cars operated by this company will be equipped with this type of scraper.

Hurley Track Laying Machine Company, Chicago, Ill., has leased one of its machines to the Manistee & North Eastern Railroad to lay the track on an extension in Michigan. With this machine and 28 laborers, one mile of track per day is being laid and quarter-spliced. At times the machine hauls the material train of 14 cars up a 6 per cent grade over a rough roadbed.

Electrical Securities Corporation, New York, N. Y., has changed its name to the Engineering Securities Corporation. This company has been in existence for some years, owning securities and occasionally participating in underwritings or other issues of securities. It now deals actively in high-grade securities of engineering enterprises. Robert T. Lozier has been appointed special representative of the company.

Western Electric Company, New York, states that its sales during the last seven months were at the rate of $46,000,000 per annum, and that those during June were 35 per cent larger than those of June a year ago. The greatest gain has been in the Middle West, and the Pacific Coast section shows the next greatest improvement. The export business has shown great activity and that in June was about twice that of June, 1908. The company has also recently received by cablegram an order to supply a complete common battery telephone plant to the City of Pekin. This order was received from the Chinese Government and the plant will be by far the largest of any of its kind in China. It amounts to $150,000 and will be installed under the supervision of one of the Western Electric engineers who will be sent to Pekin for that purpose.

McKeen Motor Car Company, Omaha, Neb., has under construction a gasoline motor car for the Rock Island Railroad and a gasoline motor car for the Hocking-Sunday Creek Traction Company, which is building a railway in Ohio. The company also has orders from the following lines for motor equipment: St. Joseph & Grand Island Railroad, Southern Pacific Railway, Union Pacific Railroad, Oregon Railway & Navigation Company, Salem, Falls City & Western Railroad. One of the company's 70-ft. motor cars is now en route on its own wheels, and under its own power to New York, where it will go in service on the Erie Railroad. This makes two cars designed by the McKeen Motor Car Company to be purchased by the Erie Railroad. In fact, 22 railroads are operating McKeen cars or have cars on order, and a total of 47 McKeen cars is in service in the United States, 23 being in use on the Pacific Coast.

ADVERTISING LITERATURE

Frank Ridlon Company, Boston, Mass., has issued its list of second-hand electrical machinery for August, 1909.

Edge Moor Iron Company, Edge Moor, Del., has just published a new edition of its catalog of water-tube boilers, which also contains a description of a new reinforced screwed pipe connection for inserting pipes in boiler or tank plates.

Berry Brothers, Ltd., Detroit, Mich., have published a unique children's book of illustrated verse describing a trip around the world in a "Berry Wagon," which bears the advertisements of this company's varnishes and architectural finishes.

Terry Steam Turbine Company, Hartford, Conn., has issued catalog No. 3, describing the construction and operation of Terry low-speed steam turbines. These prime movers are of the compound velocity stage, impulse type, and are made in sizes from 10 to 300 hp. The smallest units run at a normal speed of 3200 r.p.m. and the largest sizes at 1650 r.p.m.

J. P. Devine Company, Buffalo, N. Y., maker of vacuum drying and impregnating apparatus under the Emil Passburg patents, has issued a list of users of Passburg apparatus which shows more than 2000 installations in successful operation. Among the electric railway companies in the list are the Metropolitan Street Railway, New York; Cincinnati (Ohio) Traction Company; Indiana Union Traction Company, Anderson, Ind.; Philadelphia Rapid Transit Company; Public Service Railway; Twin City Rapid Transit Company, and the Berlin (Germany) Tramway.

Stone & Webster Engineering Corporation, Boston, Mass., gives an account of the method by which the Lincoln station, Harvard station and Charlestown station of the Boston Elevated Railway were enlarged under the supervision and direction of the Stone & Webster Engineering Corporation in a handsomely printed and illustrated pamphlet entitled "Came the Power with the Need." Briefly stated, the Boston Elevated Railway Company found in February, 1907, that it was in urgent need of 10,000-20,000 additional horse-power and called in the assistance of the Stone & Webster Engineering Corporation. Its contract with the railway company was on a cost-plus-a-percentage basis. This enabled it to commence work at once on the extensions to the existing stations required to house the new machinery and to place the necessary orders. By the middle of October, 1907, the first of the new 4200 hp engine-generators with their boilers and auxiliaries were in operation, and before Dec. 1 of the same year the entire installation of four of these equipments was under full load. The pamphlet describes the organization effected for carrying on this work and the technical details of each installation. It also presents views of the three different stations while in different stages of construction and also of the completed work.

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Advertising for Permanent Traffic

The summer season is always marked by the issue of handsome circulars intended to attract the attention of the pleasure-seeking tourist. The number of such circulars published this year by the electric lines is far greater than ever before, and undoubtedly in many, if not most, of the cases is money well spent, but the practice suggests the thought that if so much attention can profitably be given to increasing the riding during a few months of every year, is it not worth while to pay equal attention to advertising for permanent traffic. This need not necessarily take the form of the usual elaborate circular. Timetables, small folders, and even photographs of interesting points along the line, framed and hung in hotels and elsewhere, where they can be seen by strangers, can be, and have been, of great advantage. The practice in cities which are visited by many tourists often offers good suggestions. In one, posters are mounted in bulletin boards at the railroad station descriptive of the points which can be reached by trolley. In another, a small guide book is sold by conductors at a nominal price. The success of sight-seeing cars in many cities of the country indicates that people will pay well for a sight-seeing tour in a strange city, and patronize an electric railway car for this purpose if it offers the desired facilities.

City Planning and Congestion

The committee on congestion of population in New York has been actively endeavoring to secure a change in the building laws of the city, and thus to reduce the congestion of population not only in the lower east side, but in other parts of the city. A close relation has been found to exist between the population per acre and the death rate, as well as the morality and general welfare of the section concerned, as was shown by the exhibit made by the committee at the Twenty-second Regiment Armory last spring, and also in pamphlets published since that time under its auspices. The subject of city design is very closely allied with that of transportation, because one of the chief means of reducing congestion is the provision of cheap and adequate means of transit, and its problems are by no means confined to New York City. According to a report on the subject recently published by the secretary of the committee, scientific methods of city planning have been actively taken up in many American cities, including Boston, Philadelphia, St. Louis, Cleveland, Grand Rapids, Harrisburg, Hartford, as well as others. None, however, has gone into the subject as fully as most of the larger cities abroad, not only in England, but on the Continent. The modern reconstruction of Paris dates from the comprehensive plans executed by Napoleon III, but in practically all of the European municipalities there are provisions so that the city shall expand horizontally as well as vertically, and that sites for parks, playgrounds and school houses shall be reserved. Some of the other principal features guaranteed by their system of design are a proper supply of water and drainage, the suitable position and arrangement of the buildings so as to secure an adequate amount of sunshine in the rooms occupied, regulation of the width of the streets and sidewalks so as to be in accordance with the amount of traffic upon them, the use of the buildings in different sections of the city, limitation of the heights of the buildings to accord with the width of the streets, etc.

It is not claimed that good rapid transit facilities alone will insure the distribution of the population, because of the desire to secure the greatest return from land, but without them the other reforms would be hardly possible.

Inspecting Foreign Cars

The increasing number of through cars which are run over local systems from outside points requires that special attention shall be accorded to the inspection of the foreign rolling stock while it is in the hands of other companies than its owner. An obstacle to such inspection is the short time available for it, but it would seem that at least an effective external examination could be made by the receiving crew with the object of heading off the more patent causes of breakdowns and delays to traffic on the home system. Where a company maintains a starter at a system terminus that official may properly be charged with a cursory but skilful inventory of the condition of the arriving car, and much may be done to prevent the slight but trying failures which often tie up the service as badly as defects which are very expensive to repair. The kind of inspection which can be made in the few moments available must cover such points as the condition of air and hand brakes, the position and tightness of fenders, condition of the trolley and circuit breaker, readiness of the sand box for service, presence of any apparently loose brake shoes, condition of grab handles, steps, car floor and seats. These points can be ascertained very quickly by the crew of the home system, and the electrical tests can be omitted, unless some special reason leads the receiving crew and starter to believe that something is wrong. The point is that the more easily detected troubles should not be overlooked, since they may cause accidents or other casualties if neglected, and a suitable record should be kept and turned in by the men making the inspection, so that whenever a foreign car is received in poor condition the responsibility for the occurrence can be properly assigned, and any expenses for repairs paid for by the company to which they should belong.

Changing the Gear Ratio

The subject of gear ratio in relation to speed, acceleration and power consumption is a most important one, but usually it receives attention when some new motors are installed for the first time. The gear ratio then selected represents the balancing of a set of factors any one of which is liable to change within a few years after the decision has been made. In almost every case, whether city or interurban, the traffic grows and the number of stops increases accordingly. In consequence, acceleration tends to become more important than maximum speed. Finally a point is attained where an increase in the gear ratio would produce a considerable saving in power because the same schedule could be maintained by the increase in acceleration. The Brooklyn Rapid Transit Company is one of the railways which has undertaken to increase its gear ratios to meet changed conditions. In Brooklyn nearly all the lines converge toward either the Brooklyn or East River bridges so that a good part of every run is over crowded thoroughfares on which the original maximum speed is seldom attainable. The extension of the New York subway to the heart of Brooklyn's shopping center also introduces a large number of short-trip runs on which high schedule speeds are not essential. Further than this, the suburban territory, particularly that on the way to Coney Island, is being built up rapidly. It is clear that all of these conditions favored a decrease in maximum speed and an increase in acceleration. As the result of various increases in gear ratios, the company will secure an average saving of over 7.2 per cent in power consumption. This economy will not be offset by the cost of the change, as most of the alterations will be made on a maintenance basis. The action of the Brooklyn Rapid Transit Company is not necessarily an absolute criterion for others, but it emphasizes the wisdom of analyzing whether some departures from original practice would not be justifiable.

Boarding Cars with Platform Gates

An interesting decision was rendered early this summer by the New York Court of Appeals on the criminal effect of boarding a moving train of electric cars. The circumstances out of which the case arose were these: The plaintiff, a lawyer, intending to return from Coney Island on one of the defendant company's trains, boarded one of the cars while the train was moving slowly. Although the platform gate was closed, a guard opened it and allowed him to enter, after which he was arrested for getting on the train while in motion. He was taken to the station house, released on bail and, after a subsequent examination, discharged. He thereupon brought his action for false arrest and malicious prosecution. The judgment of the trial court, dismissing his complaint and declaring that he had no cause of action, was affirmed by the intermediate Appellate Court, whereupon the plaintiff appealed to the highest court in the State, by whom a decision has just been rendered.

The railway company claimed that under a section of the Penal Code his act was a crime. The section in point has the caption, "Riding on Freight Trains," and provides, among other things, that one "who gets on any car or train while in motion, for the purpose of obtaining transportation thereon as a passenger * * * is guilty of a misdemeanor." It was observed at the outset that if this contention was correct, then an act of such common occurrence as to be almost a characteristic trait of our human nature, without distinction of class or calling, is stamped with criminality. But the court took the position that the statute has no such meaning, that although the caption of the section is certainly not appropriate to all its subdivisions, the Legislature did not intend to change and to add to the law with a view to preventing accidents by making the common practice of getting on a train or car while in motion a misdemeanor. The argument of the court can hardly fail of conviction:

"Had the Legislature been moved to this enactment by the occurrence of accidents to the traveling public, its purpose would have been better and more completely expressed in prohibiting persons from getting off, as well as from getting on, a car while in motion."

In the unanimous opinion of the court the section should be construed as applicable to unauthorized and mischievous acts, such as stealing or getting a free ride by getting and standing upon some part of the train, and not to the inno-

cently impulsive acts of persons intending, in good faith, to become passengers. It was thought strange by the judges that if the section was entitled to the construction urged by the railway company's attorney, that he was unable to cite any case in which the courts have so held in the 30 years during which the law had been in effect. And, finally, the court was of the opinion that if the plaintiff, though intending to be a passenger upon the train, was defiant of the rules, or was disorderly or gave any justification for the treatment he received from the guard of the train, that those were matters for an affirmative defense by the company on the new trial which was ordered.

Of course, the court limited its duty to interpreting the existing law, and properly did not attempt additional legislation. It may be that the line of defense recommended by the court is sufficient, but if not, the statutes are clearly defective. To attempt to force one's way through the closed gate of an elevated or surface car is a very dangerous practice, and should be made a more serious offence than merely disorderly conduct.

The New Interurban Rules

The revisions of the new code of interurban rules prepared by the committee of the Transportation & Traffic Association, which were printed in tentative form in the Electric Railway Journal last week, should be carefully studied by the managements of all interurban electric railways before the Denver convention. We believe that the code, as it now stands, provides for safe, expeditious and altogether satisfactory operation of high-speed interurban electric cars on single-track roads, but, no doubt, the committee would be glad to receive from any one interested in the subject, criticisms and suggestions which might in any way improve the rules. The committee has given wide publicity to all of its deliberations in formulating the new code, and has urgently invited discussion. When the report is presented at Denver with any changes which the committee may decide to make in the meantime, sufficient study should have been given the rules that there will be little delay in adopting them in the form presented or in modifying them in any particular to meet the views of the majority of the members of the association present at the convention. It is quite probable that there are a few details in which the code might be improved, and, no doubt, there will be presented for consideration, either to the committee prior to the convention or on the floor of the convention, a number of suggestions for changes. The adoption of the code as a whole will necessarily require a compromise of opinion. The best recommendation of the new code is that it represents the consensus of experience and ideas of a number of conservative electric railway operating officers, and that, furthermore, in most of its essential details, it follows closely the procedure of the American Railway Association standard code, which is in general use by the steam railroads throughout the United States.

A casual study of the tentative revisions as printed last week reveals one or two points to which attention might be called Rule 258, which outlines the procedure of delivering a train order to an agent or operator at a station, assumes that only a "19" order is to be delivered in this manner. This rule might be made to specifically cover the procedure for delivering a "19" train order and also a "31" order just as the procedure is specifically laid down in revised Rule 256. There is a conflict between Rule 104 in the interurban code and the corresponding rule in the tentative code of city rules to be presented to the convention at the same time. These rules relate to audible signals and in the interurban code, two bells from the motorman to the conductor is an emergency signal to pull down the trolley to the roof while five bells is a signal to watch the trolley. In the city rules these indications are reversed, and two bells indicate watch the trolley, while five bells indicate pull down the trolley. The conditions of interurban service are such that when a motorman desires the trolley to be pulled down it is usually in an emergency, and the signal must be given with the least possible delay, whereas the signal to watch the trolley usually permits of giving a longer time in its transmission. In this particular case the conflict might perhaps be overcome by changing the code of city rules rather than the code of interurban rules, for in city service the speeds are not so high and the emergencies requiring the trolley to be pulled down are not so frequent.

The new code is designed essentially for single-truck operation. When the committee was appointed, more than a year ago, it took up the fundamental problem of formulating rules for single-track roads, not only because such a code of rules is the foundation on which rules for double-track roads could be framed, but also because the number of double-track interurban roads in operation is small compared with the mileage of single-track roads. The American Railway Association began in the same way many years ago by preparing a code of rules for single-track roads, and as the increased mileage of single-track was added, a separate code, based on that adopted for single-track operation, was formulated to cover the different situations encountered. Supplementary codes for three and four-track roads were subsequently adopted by that association and are in use to-day. The Transportation & Traffic Association might well assign to a committee next year the task of drawing up a companion code to cover the conditions on double-track interurban roads, following whenever possible the procedure of the single-track code prepared by this year's committee. This would be a much less difficult task than that which has devolved upon this year's committee. It would require the omission of such rules as Nos. 206 and 207, which are not applicable to double-track operation, and either the omission or modification of such rules as the revised rules 203A and 230, which might involve delays on a double-track road which are not called for by considerations of safety. The wording of a comparatively small number of the other rules would have to be changed somewhat, but for the most part the single-track rules could be adopted entire. For example, no change would be required in the rules covering the transmission of train orders nor in the general rules. With the formulation of these two codes the interurban electric railways, both single and double-track, would have for their guidance uniform and safe rules covering all general conditions of operation. The double-track code will, in the future, be a necessary supplement to the single track code.

ROLLING STOCK STANDARDIZATION IN BROOKLYN—ORGANIZATION AND PRACTICE OF THE MECHANICAL DEPARTMENT

In recent issues of the Electric Railway Journal seven articles have been published on the rolling stock standardization of the Brooklyn Rapid Transit System. In this, the concluding article of the series, some particulars will be given of the organization and office practice of the mechanical department, which is directly responsible for the results obtained and the methods by which they are accomplished.

This standardization of equipment, or it might be termed rehabilitation work, was started on a well-defined basis in January, 1904, and has therefore covered a period of five and one-half years, having been completed July 31, 1909. In round figures the total cost of this standardization and reconstruction work has been $4,000,000 and the total number of cars on which equipment was standardized was 3423. Of this number 627 were elevated cars and the remainder were surface cars.

ORGANIZATION OF MECHANICAL DEPARTMENT

From time to time some necessary changes have been made in the organization of the mechanical department for the purpose of increasing its efficiency. A diagram of the present organization is shown in Fig. 1.

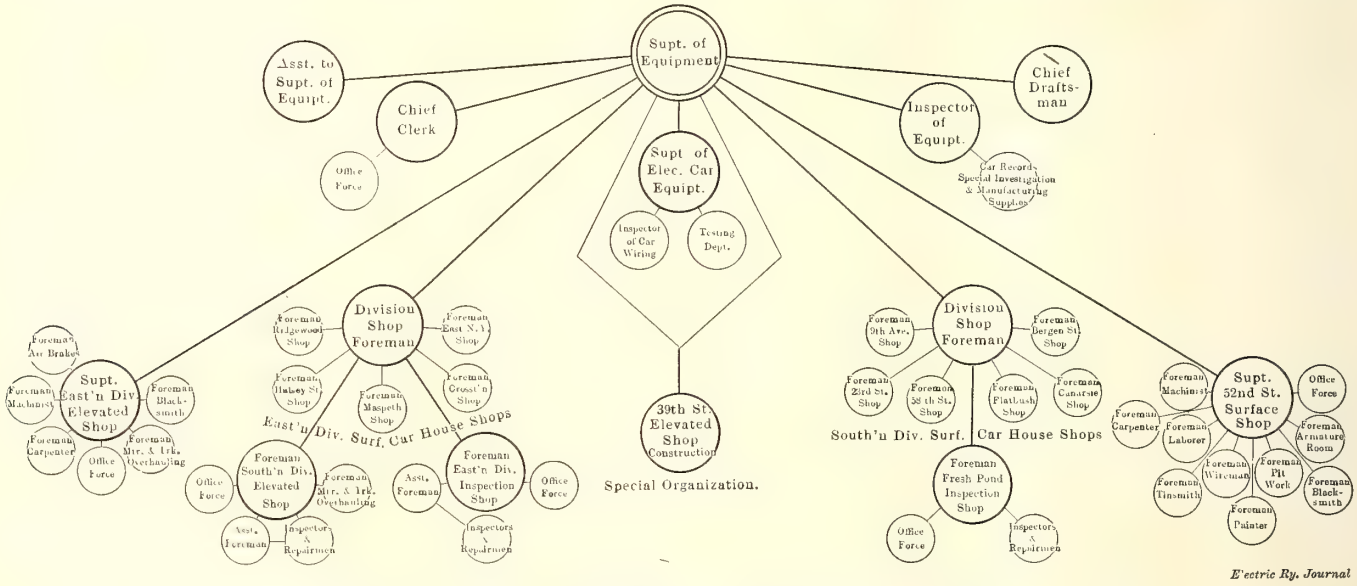


Fig. 1—Brooklyn Organization—Diagram of Organization of Mechanical Department

The office of the superintendent of equipment, who is the head of the mechanical department, is in the general office building of the Rapid Transit Company at 85 Clinton Street and all of the department work is supervised from that place. The superintendent of electric car equipment, chief draftsman, inspector of equipment and other assistants are also located in the same offices, so that all records and statistics necessary for use in connection with the proper maintenance of the equipment are readily obtainable. All work of a special maintenance character, as well as that relating to the reconstruction and standardization of the rolling stock, is planned and definite instructions forwarded from that office.

METHODS OF FILING DRAWINGS

When work of an extraordinary character is contemplated, such as special maintenance, reconstruction, construction of new cars, trucks or other equipment by builders and manufacturers, complete drawings are prepared in detail in the drafting room under the supervision of the chief draftsman and as directed by the superintendent of equipment. The tracings of such drawings are indexed and filed in a specially constructed cabinet, an illustration of which is shown in Fig. 2. It will be noticed that the cabinet is so arranged as to provide for the filing of all the various sizes of tracings and also has drawers for filing the card records of tracings, blue prints, pattern records and other details pertaining to the drafting room. In addition provisions are made to care for filing catalogs and storing various sample articles of which drawings are to be prepared.

In addition to the filing cabinet for tracings, which is located in the drafting room at the general office and is shown in Fig. 2, there is a filing cabinet consisting of drawers only at the Eastern Division Elevated shop. On the completion of each tracing a blue print is taken from it and is filed in the cabinet at East New York, where it is kept under bar and lock at all times purely for reproduction purposes in case of emergency. In this way the whole set of the tracings belonging to the mechanical department could be replaced from these prints should a fire or an accident occur to the tracings.

SHOP MANAGEMENT AND DATA

To properly maintain the cars on both the surface and elevated divisions in practically the same condition as when turned out of the construction shops as new or reconstructed, the Brooklyn Rapid Transit System has expended large amounts of money in building new shops and in reconstructing and re-equipping old ones; many of these shops have been described in articles of the Electric Railway Journal at various times in the past. There are four maintenance shops for the use of cars on the elevated division and 11 maintenance shops for use of the cars on the surface division which are equipped with tools. The shops used for inspection work only are supplied with a drill press, lathe, grindstone and emery wheel and a blacksmith's forge. The maintenance shops, however, at which overhauling work is done, are also equipped with cranes, some traveling and some jib, and other tools necessary for overhauling work.

On account of the large number of cars on the system, the extent of the territory over which they operate and large quantities and many types of equipment used, it was necessary to organize an elaborate system of records for following up the life and service of the equipment in a

thoroughly accurate manner. The work of caring for these detailed records comes under the charge of the inspector of equipment, and the detailed routine followed

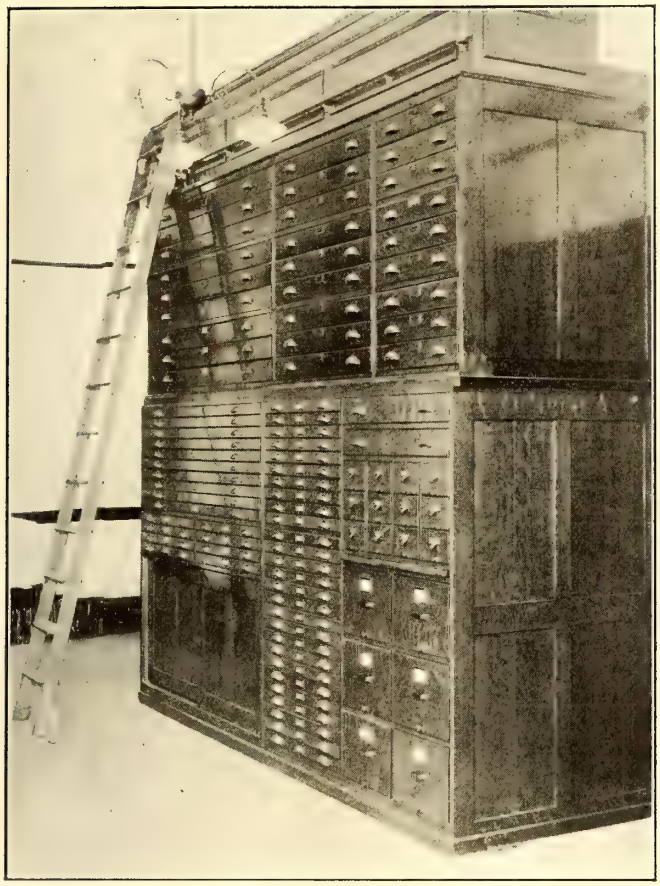


Fig. 2—Brooklyn Organization—Filing Case for Mechanical Department for Tracings, Records, Etc., in Drafting Room of Superintendent of Equipment's Office

was described in a recent issue of the ELECTRIC RAILWAY JOURNAL. An illustration of the cabinet, however, in which these records are kept is shown in Fig. 3. In connection

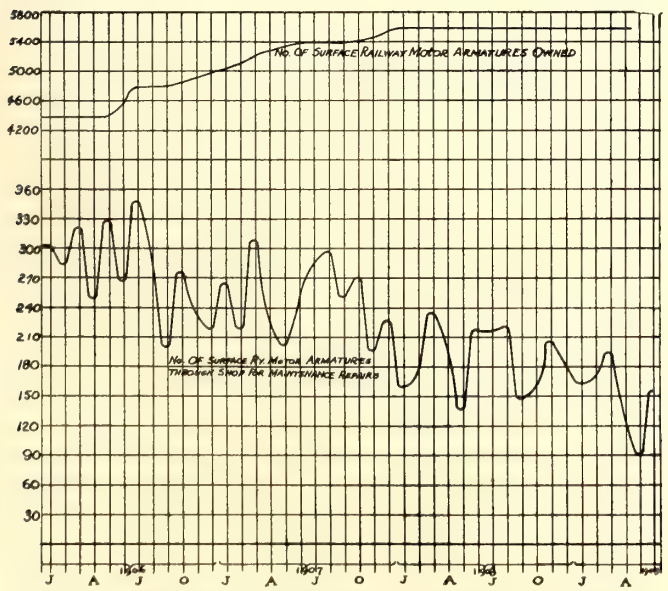


Fig. 5—Brooklyn Organization—Record of Surface Armature Repairs

with this system of records it should be stated that at the present time there are a number of owning companies in the Brooklyn Rapid Transit System and it is necessary to follow the records of all of the detailed equipment of each of these owning companies. This includes car-bodies, trucks, motors, controllers and other parts of the car equipment as well as the individual machine tools which form

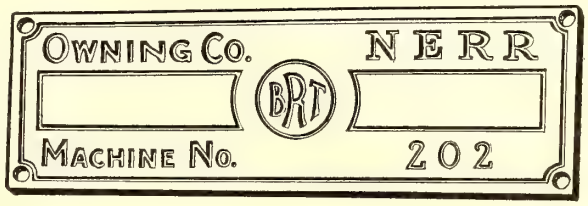


Fig. 4—Brooklyn Organization—Identification Plate

the tool equipment of each shop. The record of car equipment is handled by card record and by numbering the various parts in serial form. The machine-tool records are also kept on cards, but an identification plate, shown in Fig. 4, is attached by screws to each machine. This plate



Fig. 3—Brooklyn Organization—Filing Cabinet for Card Records of Car Equipment in Superintendent of Equipment's Office

shows the serial number of that machine as well as the name of the owning company.

OPERATING RECORDS

It is the policy of the mechanical department management to keep each of the shops supplied with all the de-

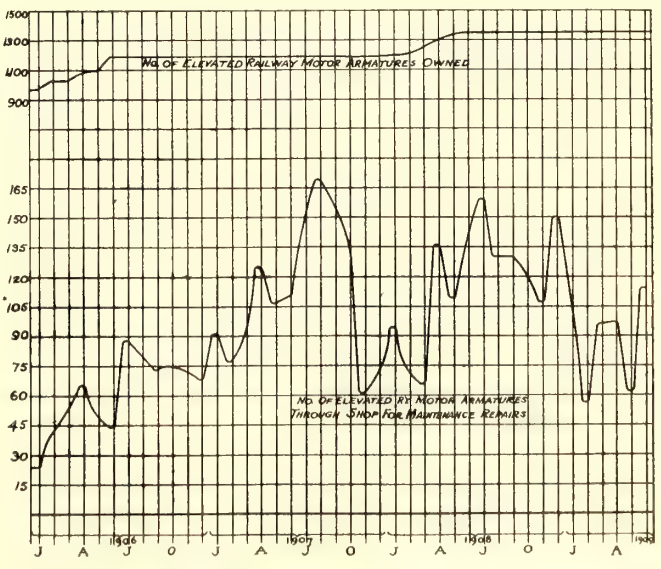


Fig. 6—Brooklyn Organization—Elevated Armature Repairs

tailed information possible concerning the equipment under their charge, as it is felt that they will be better able to get the best results out of the equipment if they have been acquainted with all the details connected with its con-

struction and performance. Consequently a series of monthly bulletins and curve sheets are issued to all the shops showing:

"Run-ins," i.e., cars removed from service.

Material costs on mileage basis for such material as brake shoes, babbitt, lubricants, trolley wheels, etc.

Troubles occurring in service, with particular reference to bridge operation and defects, even though they are not sufficient to cause cars to be removed from service.

Number of cars maintained and percentage of defects occurring as compared with cars maintained and operated.

Motor flashes, controller flashes, drawbar troubles, and other details which will give the local points information with which to measure their standing and condition.

The efficiency of the equipment is forcibly evinced in the curve sheet showing the number of armatures repaired each month together with the total number of armatures in service. The curve for surface armatures is shown in Fig. 5 and the curve for elevated armatures is shown in Fig. 6. A copy of one of the monthly comparative statements is given in Fig. 7.

Uniform practices and methods of maintaining the different types of equipment are used in all of the 11 surface maintenance shops as well as the four elevated maintenance shops. The methods to be employed are decided upon in the office of the superintendent of equipment and all instructions are issued in bulletin form from that office. All instructions and bulletin notices sent to the shops are printed on a multigraph machine and such bulletins as are of direct interest to shop employees are sent to the shops in sufficient quantities so that they can be posted on standard bulletin boards provided for that purpose. Suggestions and discussions as to improved methods or practices as well as improvement in design and method of care for equipment parts are encouraged and weekly meetings of all of the shop foremen are held in the office of the superintendent of equipment on alternate Thursdays for the surface and elevated foremen for the purpose of discussion and instruction. It is found that these meetings are productive of great good in the way of benefiting the various foremen in the handling of their work.

BROOKLYN RAPID TRANSIT SYSTEM—MECHANICAL DEPARTMENT.

STATEMENT SHOWING NUMBER OF PASSENGER CARS REMOVED FROM SERVICE (TERMED RUN-INS) ON ACCOUNT OF DEFECTS DURING THE MONTH OF JUNE, 1909, SURFACE AND ELEVATED DIVISIONS.

Bulletin No. 1058–*A.*

Definition of the Term "Run-In":—When it becomes necessary for any reason to replace any car in service, the car replaced shall be considered a "Run-in."

For the information and guidance of the Heads of Mechanical Departments of other Electric Railway Companies who may desire to compare their figures with those of the Brooklyn Rapid Transit System, it should be noted that on the Surface Division it is necessary to run-in practically all of the cars developing defects. This is due to the fact that there are no Mechanical Inspectors or Repair-men located outside of the Car House Maintenance Shops. On the Elevated Division, however, there are some Mechanical Inspectors located at or near the Brooklyn Bridge, and there is one inspector located at the terminal of each Elevated Line. These men care for minor defects, adjustments of control switches, etc. This point enables some Elevated Cars to remain in service which it might otherwise be necessary to run-in on account of slight disarrangements in adjustments.

The basis of regular thorough, general inspection on the Surface Division is mileage—600 miles for Hand Brake Cars and 800 miles for Air Brake Cars. The basis of general inspection on Elevated Equipment is time—twice each week.

							Number of Cars Run-In and Result of Examination				Mileage Basis, Total Number of Revenue Miles Made per Car Run-In				Percentage Basis No. of Cars Run-In Defective Mechanically or Electrically, Compared With	
Shop	Average number of cars maintained per day	Total number of cars maintained per month	Average number of cars operated per day	Total number of cars operated for month	Revenue mileage for the month	Average miles per car per day of cars maintained	Found defective mechanically or electrically	Found O. K. on examination	Due to causes not attributable to condition of equipment	Total all causes	Found defective mechanically or electrically	Found O. K. on examination	Due to causes not attributable to condition of equipment	Total all Run-Ins	Total cars maintained	Total cars operated
Surface—East Div.:																
Ridgewood	300	9,000	225	6,733	630,272	70	37	12	16	65	17,034	52,523	39,392	9,696	.4	.5
Halsey Street	64	1,920	57	1,715	142,216	74	15	3	2	20	9,481	47,405	71,108	7,111	.7	.8
Maspeth	99	2,970	70	2,108	228,134	77	14	1	1	16	16,295	228,134	228,134	14,258	.5	.7
Crosstown	165	4,950	151	4,529	367,540	74	31	5	11	47	11,856	73,508	33,413	7,820	.6	.7
East New York	308	9,240	210	6,299	622,296	67	69	10	12	91	9,019	62,229	51,858	6,838	.7	1.1
Total	936	28,080	713	21,384	1,990,458	71	166	31	42	239	11,991	64,208	47,392	8,328	.6	.8
South Division:																
Ninth Avenue	222	6,660	165	4,940	449,601	67	37	38	20	95	12,151	11,832	22,480	4,733	.6	.7
58th Street	205	6,150	171	5,132	495,024	80	32	17	16	65	15,407	29,119	30,939	7,616	.5	.6
Flatbush	192	5,760	124	3,725	386,648	67	20	5	7	32	19,332	77,330	55,235	12,083	.3	.5
Canarsie	121	3,630	106	3,191	307,558	85	46	11	10	67	6,686	27,960	30,756	4,590	1.3	1.4
Bergen Street	144	4,320	112	3,366	303,414	70	50	13	11	74	6,068	23,339	27,583	4,100	1.2	1.5
Total	884	26,520	678	20,354	1,942,245	73	185	84	64	333	10,499	21,931	30,348	5,833	.6	.9
Surface total	1,820	54,600	1,391	41,738	3,932,703	72	351	115	106	572	11,204	34,197	37,101	6,875	.6	.8
Elevated:																
Eastern	465	13,950	419	12,569	1,300,443	93	155	19	1	175	8,389	68,444	1,300,443	7,431	1.1	1.2
Southern	351	10,530	332	9,975	1,430,790	136	113	18	3	134	12,662	79,488	476,930	10,678	1.1	1.1
Fresh Pond	112	3,360	106	3,175	287,985	86	10	0	0	10	28,798	287,985	287,985	28,798	.3	.3
Elevated total	928	27,840	857	25,719	3,019,218	108	278	37	4	319	10,860	81,600	754,805	9,465	1.0	1.1

WM. G. GOVE, *Supt. of Equipment.*

Fig. 7—Brooklyn Organization—Monthly Comparative Statement of "Run-Ins"

ACCOUNTS

The accounting system prescribed by the Public Service Commission for the First District, State of New York, and subdivided as shown in schedule of operating expenses, Fig. 8, is strictly adhered to, and so that all who have anything to do with the entry of charge account numbers on time cards and storeroom orders may understand the

SCHEDULE OF OPERATING EXPENSES, BROOKLYN RAPID TRANSIT SYSTEM, EFFECTIVE JULY 1, 1909.

Schedule No.				MAINTENANCE OF WAY AND STRUCTURE
	Surf.	Elev.	Frt. Mail.	
				Superintendence of way and structure:
L. M.	201	501	1101	Track.
L. M.	202	502	1102	Electric line.
M.	203	503	1103	Ballast.
M.	204	504	1104	Ties.
M.	205	505	1105	Rails.
M.	206	506	1106	Rail fastenings and joints.
M.	207	507	1107	Special work.
M.	208			Underground construction (cable-way)
L.	209	509	1109	Roadway and track labor.
L. M.	210	510	1110	Paving.
L. M.	211	511	1111	Misc. roadway and track expenses.
L. M.	212	512	1112	Cleaning and sanding track.
L. M	213	513	1113	Removal of snow, ice and sand.
L. M.	214	514		Repairs of tunnels.
L. M.		515		Repairs of elevated structures and foundations.
L. M.	216	516	1116	Repairs of bridges, trestles and culverts.
L. M.	217	517	1117	Repairs of crossings, fences and signs.
L. M.	218	518	1118	Repairs of signal and interlocking systems.
L. M.	219	519	1119	Telephone and telegraph repairs.
L. M.	220	520	1120	Other miscellaneous way expenses.
L. M.	221	521	1121	Pole and fixture repairs.
L. M.	222	522	1122	Underground conduit repairs.
L. M.	223	523	1123	Transmission system repairs.
				Distribution system repairs:
L. M.	224	524	1124	Overhead feeders.
L. M.	225	525	1125	Underground feeders.
L. M.	226	526	1126	Track bonding.
L. M.	227	527	1127	Overhead trolley, etc.
L. M.		528	1128	Third rail.
				Miscellaneous electric line expenses:
L. M.	229	529	1129	Emergency crews.
L. M.	230	530	1130	Other expenses.
				Repairs of buildings and structures:
L. M.	231			Power plants.
L. M.	232			Sub-stations.
L. M.	233	533	1133	Car houses.
L. M.	234	534	1134	Shops.
L. M.	235	535	1135	General office buildings.
L. M.	236	536	1136	Stations, waiting rms and platforms
L. M.	237		1137	Docks and wharves.
L. M.	238	538	1138	Misc. buildings and structures
L. M.	239	539	1139	Other bldg. and struct. maint.
	240	540	1140	Joint way and structures—Dr.
	241	541	1141	Joint way and structures—Cr.
	242	542	1142	Depreciation of way and structures.
				MAINTENANCE OF EQUIPMENT
L. M.	243	543	1143	Superintendence of equipment.
				Repairs of furnaces, boilers and accessories:
L. M.	244			Boilers, furnaces, flues, etc.
L. M.	245			Piping, inc. feed pumps, heaters.
L. M.	246			Economizers.
L. M.	247			Stokers.
L. M.	248			Forced draught apparatus, air duct engines and blowers.
L. M.	249			Coal and ash handling machinery.
L. M.	250			Miscellaneous.
				Repairs of steam engines:
L. M.	251			Engines and turbines.
L. M.	252			Condensers, including circulating, dry pumps, etc.
L. M.	253			Miscellaneous.
				Repairs of power plant electric equip.:
L. M.	254			H. T. generators and exciters.
L. M.	255			Low tension generators.
L. M.	256			H. T. switchboards and cables.

Schedule No.				MAINTENANCE OF EQUIPMENT, (Continued)
	Surf.	Elev	Frt. Mail.	
				Repairs of power plant electric equipment, (continued):
L. M.	257			L. T. switchboards and cables.
L. M.	258			Boosters.
L. M.	259			Storage batteries.
L. M.	260			Miscellaneous.
L. M.	261			Repairs of misc. power plant equip.
				Repairs of cable plant equipment:
L. M.	262			Engines, boilers, shafting, etc.
L. M.	263			Leading wheels and bearings.
L. M.	264			Cables.
				Repairs of sub-station equipment:
L. M.	265			Rotary transformers.
L. M.	266			Static transformers and blowers.
L. M.	267			H. T. switchboards and cables.
L. M.	268			L. T. switchboards and cables.
				Repairs of pass. and comb. cars:
L. M.	269	569		Bodies.
L. M.	270	570		Painting and varnishing.
L. M.	271	571		Trucks, hand brakes and brake rig.
L. M.	272	572		Wheels and axles.
L. M.	273	573		Journal brasses.
L. M.	274	574		Brake shoes.
L.	275	575		Transfer of trucks for purposes other than repairs.
L. M.	276	576		Fenders.
L. M.	277	577		Fare registers.
L. M.	278			Grips and grip fixtures.
L.	279	579		Transferring cars for repairs.
				Repairs of freight, express and mail cars:
L. M.			1180	Bodies.
L. M.			1181	Painting and varnishing.
L. M.			1182	Trucks, hand brakes and brake rig.
L. M.			1183	Wheels and axles.
L. M.			1184	Journal brasses.
L. M.			1185	Brake shoes.
L.			1186	Transfer of trucks for purposes other than repairs.
L. M.			1187	Fenders.
L.			1188	Transferring cars for repairs.
				Repairs of locomotives:
L. M.		589	1189	Bodies.
L. M.		590	1190	Trucks.
				Repairs of service cars:
L. M.	291	591	1191	Plow, sweeper, sprinkler, brine cars.
L. M.	292	592	1192	Coal, supply and work cars.
				Repairs of electrical equipment of cars:
L. M.	293	593		Trolley stands, poles, contact shoes and beams.
L. M.	294	594		Car heaters, lights, switches, fuse blocks, wiring fuses and lightning arresters.
L. M.	295	595		Armatures.
L. M.	296	596		Commutators.
L. M.	297	597		Fields.
L. M.	298	598		Electrical car control.
L. M.	299	599		Gears, pinions and gear cases.
L. M.	300	600		Motor bearings.
L M	301	601		Brush holders.
L. M.	302	602		Motors, miscellaneous.
L.	303	603	1203	Transfer of motors and equipment for purposes other than repairs.
L. M.	304	604	1204	Air brakes, including pumps and governors.
L. M.			1205	Electrical equipment of freight, mail and express cars.
L. M.	306	606	1206	Electrical equipment of service cars and plows.
L. M.		607	1207	Repairs of electrical equipment of locomotives.
L. M.	308	608	1208	Repairs of shop machinery and tools.

Schedule No.				MAINTENANCE OF EQUIPMENT (Continued)
	Surf.	Elev	Frt. Mai.	
L.	309	609	1209	Shop expenses:
L. M.	310	610	1210	Foremen and clerks.
M.	311	611	1211	Fuel and light.
L.	312	612	1212	Supplies.
				Stationary engineers, watchmen and other labor.
L.	313	613	1213	Labor handl'g and deliver'g supplies
L. M.	314	614	1214	Miscellaneous.
				Repairs of vehicles:
L. M.	315	615	1215	Automobiles.
L. M.	316	616	1216	Trucks, emergency, repair, tower and other service wagons.
L. M.	317	617	1217	Other misc. equipment expenses.
	318	618	1218	Maintaining joint equipment—Dr.
	319	619	1219	Maintaining joint equipment—Cr.
	320	620	1220	Depreciation of equipment.
				TRAFFIC
				Traffic expenses:
L. M	321	621	1221	Superintendence and solicitation.
L. M	322	622		Advertising.
L. M.	323	623		Park and other attractions.
L. M.	324	624	1224	Miscellaneous traffic expenses.
				TRANSPORTATION EXPENSES.
				Superintendence of transportation:
L.	325	625	1225	Superintendence and clerks.
L.	326	626	1226	Depotmasters, trainmasters, train dispatchers and car starters.
L.	327	627	1227	Inspectors.
L. M.	328	628	1228	Other expenses.
				GROUP I—POWER SUPPLY.
				Power plant labor:
L.	329			Power plant superint'd'ce and care.
L.	330			Boiler room labor.
L.	331			Engine labor.
L.	332			Electric labor.
L.	333			Cable power plant labor.
L.	334			Substation labor.
M.	335			Fuel for power.
M.	336			Water for power.
M.	337			Lubricants for power.
L. M.	338			Misc. pwr. plant supplies and expenses
L. M.	339			Substation supplies and expenses.
M.	340	640	1240	Power purchased.
	341	641	1241	Jointly produced power—Dr.
	342	642	1242	Power exchanged—Balance.
	343	643	1243	Jointly produced power—Cr.
				GROUP 2—OPERATION OF CARS.
L.	344	644		Passenger motormen.
L.		645		Elevated conductors and guards.
L.	346			Passenger conductors (surface).
				Other passenger trainmen:
L.	347	647		Student motormen.
L.	348	648		Other trainmen.
L.			1249	Freight, mail and express motormen and trainmen.
				Miscellaneous car serv. employees:
L.		650	1250	Couplers.
L.	351	651	1251	Switchmen.
L.	352	652	1252	Flagmen.
L.	353	653		Register takers.
L.	354	654		Transfer agents.
L.	355	655	1255	Miscellaneous.

Schedule No.				TRANSPORTATION EXPENSES, (Continued)
	Surf.	Elev	Frt. Mail	
				Miscellaneous car service expenses:
M.	356	656	1256	Car supplies.
				Station employees:
L.	357	657		Ticket agents.
L.	358	658		Gatemen and platform men.
L.	359	659	1259	Station porters and watchmen.
L.			126c	Freight foremen, agents, etc.
L.			1261	Other freight employees.
				Station expenses:
L. M.	362	662		Pass. station supplies and expenses.
L. M.			1263	Frt. station supplies and expenses.
				Car house employees:
L.	364	664	1264	Foremen.
L.	365	665	1265	Car cleaners.
L.	366	666		Heater tenders.
L.	367	667	1267	Watchmen.
L.	368	668	1268	Yardmen.
L.	369	669	1269	Lampmen.
L.	370	670	127c	Car house men.
L.	371	671	1271	Other labor.
				Car house expenses:
L. M.	372	672	1272	Fuel, light, water, ice, etc.
				Operat'n, Sig. and Interlock. Systems:
L.	373	673		Tower, signal, lever and lampmen.
M.	374	674		Fuel, water, light, supplies, etc.
				Operation telephone and telegraph:
L.	375	675	1275	Telephone operators.
L.	376	676	1276	Telegraph operators.
M.	377	677	1277	Supplies and chemicals.
				Loss and damage:
L. M.			1278	Loss, damage, and destruction of frt.
				Other transportation expenses:
L. M.	379	679	1279	Wrecking expenses.
L. M.	380	680	128c	Other expenses.
	381	681		Joint operation of cars—Dr.
	382	682		Joint operation of cars—Cr.
General.				GENERAL & MISCELLANEOUS
	2001			Salaries and expenses, gen'l officers.
	2002			Salaries and expenses general office clerks.
	2003			General office supplies and expenses.
	2004			General law expenses.
	2005			Insurance.
	2006			Relief Department, pensions.
	2007			Miscellaneous general expenses.
	2008			General amortization.
	2009			Joint general expense—Dr.
	2010			Joint general expense—Cr.
				Accidents and damages:
	2011			Claim department expense.
	2012			Medical expenses.
	2013			Claims for injuries to employees.
	2014			Other injuries and damages.
	2015			Other expenses.
				Law expenses connection damages:
	2016			Salaries and expenses of attorneys.
	2017			Court costs and expenses.
	2018			Law printing.
	2019			General stationery and printing.
	2020			Store expenses.
	2021			Stable expenses.
	2022			Undistributed adjustments—Balance.

L = Labor. M = Material.

Approved: *HOWARD ABEL*, Comptroller

Fig. 8—Brooklyn Organization—Schedule of Operating Expense Accounts of Brooklyn Rapid Transit Company, Given to Each Department

TRANSIT DEVELOPMENT COMPANY.
MECHANICAL DEPARTMENT.

Shop. Date:

Mr. Wm. G. Gove,
Supt. of Equipment.

Dear Sir: The following cars have, this day, been received from the Maintenance Shop, as indicated, for repairs amounting to less than $25.00 in each instance. We estimate the cost to be as follows:

Car No.	From	Description of Damage, or Rprs Reqrd	Estmtd Cost
		.....	

Superintendent.

Authority is hereby given to make repairs as above required and charge cost to Straight Maintenance Accounts.

Yours truly,

.....
Supt. of Equipment.

DIRECTIONS: This form is to be issued each day when one or more damaged cars are received for repairs, and two copies should be sent to the Supt. of Equipment, who, after approval, will return the carbon copy to the Shop as authority to proceed with the work, and retain the original.

Fig. 9—Brooklyn Organization—Form MD, A. Authority to Repair Slight Damage. Original, 8½ in. x 11 in.

BROOKLYN RAPID TRANSIT SYSTEM
Mechanical Department
ORIGINAL
Shop Material Order No. .....

..... Shop .....190..

DESCRIPTION	CHARGE AUTH. NO.	CHARGE ACCT. NO.
.....		
.....		

Signed

..... To be done at .....Shop

.....

Approved

..... Order sent to Shop.....
Sup't of Equipment.

DIRECTIONS

This order is to cover repairs or renewals of material required for Maintenance of Equipment or authorized work other than standard material carried in stock, and for repairs to Shop Machinery and Tools.

A brief description of the work desired with sufficient information to enable one to promptly and properly fill the order should be given. All three copies are to be sent to the Superintendent of Equipment and, when approved by the Sup't of Equipment, the Triplicate will be returned with No. of Order thereon and Original sent to shop where work is to be done.

Fig. 10—Brooklyn Organization—Form NS, 834. Shop Material Order. Original Size, 8½ in. x 11 in.

TRIPLICATE

AUTHORIZATION TO PROCEED WITH WORK

This form to be made out to cover any work to be done of an extraordinary repair character or for additions or betterments, changes in Equipment, Track, Line, Buildings, etc., and for all new work of any description.

Dept. No..... Auth. No..... Appropriation No.....

Date, ..., 190

This request will be charged to Signed:

....

.....

..... Recommended:

Comptroller. .....

.....

Approved { *Vice-Pres't and Gen'l Mgr.* .....

.....

President. .....

Fig. 12—Brooklyn Organization—Form NS, 202. Vice-President and General Manager's Authorization. Original, 8½ in. x 11 in.

system thoroughly, copies of the schedule of operating expenses in lithographed form are framed and hung in the office of each shop foreman. A bulletin has also been issued containing a reproduction of the schedule of operating expenses, together with detailed instructions covering specific work to be charged to the accounts in which the mechanical department is directly interested.

All of the work in all of the shops of this department is on a day basis, with the exception of the electrical department of the Fifty-second Street surface shop, where the piecework system is in vogue with very good results.

MAINTENANCE OF ESPRIT DE CORPS

With the new and re-equipped shops not only has the standard of rolling stock maintenance been brought to a higher plane, but that of the shop equipment and the cleanliness and appearance of the shops themselves has been greatly improved, and, as an illustration of the policy of the management to improve the appearance of the shops

BROOKLYN RAPID TRANSIT SYSTEM
ORIGINAL
MACHINE SHOP ORDER NO. ....

.....19

This work should be completed by.....19

New Material
Repair At an estimated cost of $.....

.....

.....

.....

Signed: Charge to.....
....
Approved: Approved:
....
Head of Dept. Requiring Work Done. *Assistant General Manager*

Foregoing described work to be done at.....Shop
(Do not write in this space)
Order sent to Shop.....
Superintendent of Equipment
Sent to V. P. and G. M. for Approval.....
Sent to Comptroller for Approval.....

DIRECTIONS

This order must state whether New Material or Repairs are desired (mark out the wording not used) and should give sufficient description of the work to enable Shop to properly and promptly furnish what is required.

Order should be made in Quadruplicate and all four copies sent to Supt. of Equipment after approval of Head of Department requiring the work.

The Quadruplicate copy (pink) will be returned to the Department interested after the number and Shop to which work is assigned are noted thereon.

Material to be repaired should then be properly marked with order number on tag and sent to the Shop designated.

Fig. 11—Brooklyn Organization—Form NS, 188. Machine Shop Order. Original, 5¾ in. x 9 in.

and surroundings as much as possible, lawns and flower beds have been laid out and are maintained by the company in the immediate surroundings of the shops. It is plainly noticeable that this cleanliness and improvement in the appearance of the shops has had the desired effect of increasing the interest of the employees and making them feel proud of their work. This, in turn, has benefited the equipment through the closer and more interested attention which it has received.

REGULAR AND SPECIAL ORDERS

No work is done at any of the shops other than the regular maintenance work at the maintenance shops without specific instructions from the superintendent of equipment. All work of any character whatsoever, other than the straight maintenance work at the maintenance shops, is authorized on forms provided for the purpose, these forms being:

Form MD, A—Authority to repair slight damage.

Form NS 834—Shop material order.

Form NS 188—Machine shop order.
Form NS 202—Vice-president and general manager's authorization.

Copies of these forms are shown in Figs. 9, 10, 11 and 12, and proper accounts to be charged for doing the work as shown on these forms appear on them in each case.

The system for keeping all persons in the mechanical department fully informed as to all business transacted in which they are directly interested is accomplished by the superintendent of equipment referring all correspondence to them, with instructions as to the action which he desires should be taken.

INSPECTION AND OVERHAULING ON MILEAGE BASIS

All surface cars are being regularly inspected and overhauled on a mileage basis, and all elevated cars will be overhauled on a mileage basis, commencing Sept. 1, 1909. The inspection of the elevated equipment, however, is still continued on a time basis, but it is expected to be placed on a mileage basis on Jan. 1, 1910.

Under the methods outlined above the rolling stock equipment of the Brooklyn Rapid Transit system is beyond doubt now being maintained at a very high state of efficiency, as will be noted by the comparative statement of defects during the fiscal years of 1906-07, 1907-08 and 1908-09. These figures are given in bulletin No. 1080, of Aug. 9, 1909, shown in Fig. 13. After all that has been said the statement contained in bulletin No. 1080 shows most plainly to what extent the work of the past 5½ years in standardizing, systematizing, etc., has increased the efficiency of the equipment.

TRANSIT DEVELOPMENT COMPANY.
MECHANICAL DEPARTMENT.

Bulletin No. 1080. Aug. 9, 1909.

NOTICE TO:
SUPT. 52D ST. SURFACE SHOP.
SUPT. 39TH ST. ELEVATED SHOP.
FOREMAN SO. DIV. ELEVATED SHOP.
FOREMAN EA. DIV. ELEVATED SHOP.
FOREMAN EA. DIV. INSPECTN. SHOP.
FOREMAN FRSH. PD. INSPECTN. SHOP.
FOREMEN SURFACE CAR HOUSE SHOPS.

Gentlemen:

I wish to call your particular attention to the figures shown in the statement below as a striking example of the excellent results obtained in the past three years in reducing the number of "Run ins" and increasing the mileage made per defect; due to the STANDARDIZATION work recently completed and to more efficient maintenance of the cars at the various shops on the system:

COMPARISON OF EQUIPMENT DEFECTS, AS REPORTED IN OPERATION, ON MILEAGE BASIS.
For Fiscal Years, 1906-07, 1907-08, 1908-09.

	Defects			Total Mileage			Miles Made pr Defect			% of
Elev. Div.	1906-7	1907-8	1908-9	1906-07	1907-08	1908-9	1906-7	1907-8	1908-9	Incr. in
Car Body	8540	6128	4960				3295	5033	6389	Mileage
Truck	1199	1017	1462				23469	30324	21674	per
Control	4216	6060	5228				6675	5089	6061	Defect
Motor	2131	3896	3650	28139687.	30840295.	31687142.	13205	7911	8681	1908-09
Brakes, Air	4832	3737	3915				5824	8226	8093	over
Trly & C. Sh	4761	3441	1946				5910	8963	16286	1906-07.
Totals	25679	24279	21161				1096	1270	1497	37
Surf. Div										
Car Body	21933	17350	12598				1990	2645	3612	..
Truck	11329	6933	6445				3853	6619	7060	..
Control	4858	4555	3784				8982	10074	12026	..
Motor	6407	5549	4854				6813	8270	9375	..
Brakes, Air	1919	1315	941	43652964.	45888166.	45504794.	22747	34896	48358	..
Trolley	5945	4104	2978				7343	11181	15281	..
Totals	52391	39806	31600				833	1153	1440	73

The above must not be interpreted to indicate the mileage possible between defects causing interruptions to service, as this latter is clearly shown in the statement of "Run ins" sent you, reduced to a mileage basis, and which mileage is many times greater than shown in this statement. The above mileage figures simply illustrate the percentage of increase in the efficiency of the equipment.

Yours truly,
WILLIAM G. GOVE,
Supt. of Equipment.

Fig. 13—Brooklyn Organization—Bulletin No. 1080, Showing Comparison of Equipment Defects on Mileage Basis.

The electric tramway system of Adelaide, South Australia, was put in operation Sept. 29. This line has recently been equipped and there are 16 cars. The engineer and manager of the line is W. G. T. Goodman.

TRACKLESS TROLLEY CARS IN EUROPE

A short account was published in the ELECTRIC RAILWAY JOURNAL for May 29 of the report of a special committee from the city of Sheffield, England, on the subject of trackless trolley cars in Europe. According to W. C. Hamm, consul at Hull, the Leeds Council also sent a committee to the Continent recently to study this subject. The result of their observations is summarized as follows:

The three systems considered were the Mercedes-Stoll, which is in operation in various parts of Austria and was seen in Vienna; the Filovia, used on six or seven routes in north Italy and seen in Milan; and the Max Schiemann, which is employed in Germany, especially in the Rhine Valley.

The vehicles operated under each of these systems in general appearance do not differ greatly from the familiar single-deck motor omnibus, except that they have some means of collecting current and returning it to the two overhead lines. The principal difference among the various systems occurs in regard to the arrangement for keeping the two collectors on the two cables.

THE MERCEDES-STOLL SYSTEM

The length of the route inspected in Vienna is about 1½ miles, where the road—of a switch-back character, having at one stretch of about 100 yd. a gradient of 1 in 10—is macadamized. On this route there are two pairs of cables, one for going and one for returning cars, though elsewhere one pair is made to suffice, so that when two cars meet one has to stop and remove its connection with the wires until the other has passed. The vehicles carry 12 passengers seated, though when required an additional 12 are allowed to stand, even on the platforms, both front and back. The entrance is at the driver's end, and he attends to all the duties of a conductor as well as driver.

The committee was particularly struck with the smoothness and comfort of riding, the spring base of the truck being very well arranged. The brakes are ample, and spraggs are fitted to prevent running backward if the car is stopped on a hill. Satisfactory assurances were received as to the operation of the cars under the severest

winter conditions, though it is noticed that on this particular route the cars have been running only since last October. The motors, which are each 20 hp, form the hubs of the back wheels, and the current is collected from the supply cable by means of a pair of wheels running on the top of the wire—a similar pair of wheels transferring the current to the return. A weighted pendulum slung from a frame carrying these two pairs of wheels keeps them well pressed upon the wires, and the current is conveyed to the motors not by a trolley pole, but by a pair of cables which allow the car to pass to any part of the road in the avoidance of other traffic. The empty car weighs 2½ tons.

The cost of the chassis of the Mercedes-Stoll is about $2,750, without body. The cost of the overhead construction is about $8,500 per mile, and the working expenses per car-mile, the committee was informed, are: Current, $0.80; tires (total load, 4.2 tons), $2.66; wages (driver only employed), $2.40; depot expenses, $0.52; taxes, management, insurance, $1.60; repairs, renewals, painting cars and equipment, $1.06; total, $9.04.

THE FILOVIA SYSTEM IN NORTH ITALY

On the Filovia system the car will take 30 passengers. A framework carrying two pairs of wheels, one pair in contact with each overhead cable, is employed to maintain the circuit. It is very similar to that used in the Mercedes-Stoll system, except that it is pressed by a pole against the undersides of the cables. There are two direct-current motors of 10 to 12 hp each, and figures supplied by a route similar to that inspected show a working cost per car-mile as follows: Cost of energy used, $0.83; general expenses, $1.188; rubber tires, renewal, $4.32; wages and salaries, $2.80; maintenance of vehicles and line, $1.24; repairs of vehicles, $0.912; total, $11.29.

The route inspected, owned by a private company, is 4½ miles long, and the fare charged is 8 cents. The committee found the vehicles well able to reverse, turn around and maneuver without the trolley being removed, and to take heavy gradients over bad and muddy roads without difficulty, vibration or noise. The practicability of this type of railless traction considerably impressed the committee. The cost of overhead construction is estimated at only $3,756 per mile, but only wooden poles were used.

THE MAX SCHIEMANN SYSTEM

The Max Schiemann system was seen working at Mulhausen. Here the contact with the pair of cables is maintained by means of a pole carrying at its extremity a pair of sliding shoes. The overhead construction is similar to that of the systems previously described. The vehicle carries about 15 passengers seated, and only the front wheels have rubber tires, so that there is considerable vibration and noise. The single motor drives onto the front axle, so that the steering is comparatively heavy. The design of this type, however, is stated to be undergoing radical modification. The weight of the present empty car is 6280 lb.

It is stated concerning all of the three systems that very few hitches have been reported, and owing to the comparative lightness of the vehicle the surface of the road suffers less than in the case of a service of cars carrying their own petrol or other engines.

The committee was much impressed with the practicability of each of the various schemes, and considers that by avoiding the heavy expenditure required in the installation of ordinary tramway traction this method of conveyance offers considerable possibilities as general feeders in suburban and interurban districts to tramway systems, and is quite capable of supplying a sufficient service for thinly populated districts on a reasonably economic basis.

The Grosse Berliner Strassenbahn has an arrangement with the Berlin municipality whereby very liberal rates are made for the transportation of public school children to the city playgrounds in the suburbs. The company furnishes for 22.5 M. ($5.62) a motor car and two trailers for a round trip from any part of the city. These trains seat about 240 children. The excursions are given during the summer vacation season and at times when plenty of rolling stock is available.

BEARING FRICTION AND POWER CONSUMPTION

BY M. V. AYRES, ELECTRICAL ENGINEER, BOSTON & WORCESTER STREET RAILWAY

In an article published in the Electric Railway Journal Aug. 1, 1908, on the "Need for Lighter Cars," the present writer expressed the opinion that only slight improvements are possible in the following four directions:

1. Improving efficiency of motors, including starting device.
2. Reduction of bearing friction.
3. Reduction of track friction.
4. Reduction of wind friction.

Immediately after this was published I received some letters protesting against the conclusion that only slight savings can be effected by reduction of bearing friction. Since then there have been brought to my attention somewhat frequently claims of very large savings made by the use of ball or roller bearings.

The evidence in support of some of these claims seemed so circumstantial that I have been led to make a study of the question from theoretical grounds with a view to ascertaining the possibilities in this direction and have as a consequence considerably modified my opinion. I believe the results are sufficiently new and of enough interest to warrant consideration by the engineering world.

My opinion, as given in the former article, was intended to apply only to that class of traffic in which electric motive power is generally used; that is to say, "frequent-stop service." I never doubted that the elimination of bearing friction, if attainable, would result in great power saving in long-haul service.

In frequent-stop service the greater part of the power supplied to a car is used in acceleration and later dissipated in braking, and my idea was that the power used in overcoming bearing friction was so small a part of the whole as to be comparatively insignificant.

My first attempt to make a complete analysis of the power distribution in a typical run seemed to completely justify that idea. This will be clearly shown by a consideration of Fig. 1, which also serves well to illustrate the method pursued.

These curves are calculated from assumed data as follows:

Car weight, loaded, = 82,000 lb.
Equipment, four GE-73 motors.
Gear ratio, 19-56.
Wheels, 33 in. diameter.
Line voltage, 500.
Train resistance, that given by Mr. Armstrong's formula:

$$F = \frac{50}{\sqrt{W}} + .03S + \frac{.002aS^2}{W}$$

Where F = the resistance in pounds per ton, W = weight in tons, S = speed in miles per hour, a = area of car end in square feet. The first two terms of this formula are together supposed to represent bearing and track friction and the third term wind friction.

The straight-line acceleration is taken at the rate given by 163 amp per motor. This is a rate of acceleration of about 2.1 m.p.h.p.s. at 25 per cent above the rating of the motor. The power required for acceleration is assumed 7 per cent greater than indicated by the weight of the car to allow for the effect of revolving parts.

The heavy solid line is the speed-time curve, showing acceleration to 30 m.p.h. in 36 seconds, coasting to 65 sec-

onds and braking to standstill at 80 seconds. Braking is at a rate of 1.75 m.p.h.p.s. The area of the speed-time curve is, of course, proportional to the distance run, and in this curve represents a run of exactly one-half of a mile in 80 seconds. Allowing for a 10-second stop, this would represent a schedule speed of 20 m.p.h., with two stops per mile.

The cross-hatched areas represent power supplied and consumed, the vertical distances being proportional to the kilowatts, and the areas proportional to the watt-hours. Current is supplied at the rate of 163 kw for three seconds during series operation, followed by 326 kw for 4.7 seconds to the motor curve at full-speed position of the controller. The power then drops off rapidly to 90 kw at the end of 36 seconds, when coasting commences.

The energy thus supplied is used in various ways, as indicated by the cross-hatched areas:

Areas *A* show energy lost in rheostats.
Area *B* shows energy used in acceleration.
Area *C* shows energy lost in motors.
Area *D* shows energy lost in wind friction.

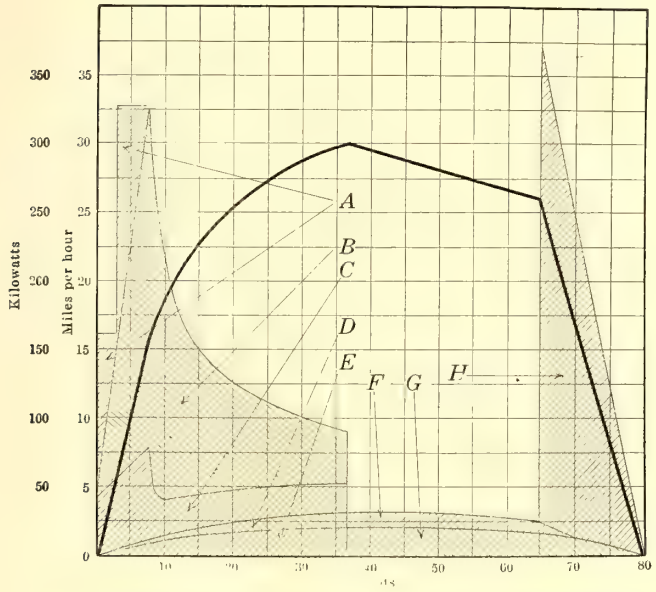


Fig. 1—Energy Consumption of 41-Ton Car, Including Track and Bearing Friction

Area *E* shows energy lost in track and bearing friction.

The values of these areas in watt-hours are given in Table I:

TABLE I.

	Watt-hours.	Per cent.
Rheostat losses	157	9.52
Motor losses	285	17.28
Track and bearing friction	158	9.55
Windage	57	3.45
Acceleration	993	60.20
	1,650	100.00

This shows that in the case assumed, track and bearing friction consume only 9.55 per cent of the power supplied. At first glance it would seem that any economies to be effected by reducing these losses would be limited to about 9.5 per cent as a maximum possible saving.

In order to test this supposition I worked out the corresponding curves for the same equipment, omitting the first two terms of the train resistance formula; that is to say, assuming wind friction to be the only resistance to the motion of the car.

The results are shown in Fig. 2. At starting current is supplied at the same rate, but acceleration is somewhat more rapid during the straight-line portion and considerably more rapid during the motor-curve portion of the run. The car reaches a speed of 27.5 m.p.h. at the end of 22.5 seconds; coasts to 64.5 seconds and brakes to standstill at 80 seconds. The time of coasting is so chosen that the distance traveled and time consumed are the same as in Fig. 1. The broken lines in Fig. 2 show the outlines of the principal curves of Fig. 1, and it is at once evident that the power consumption has been greatly reduced.

The track and bearing friction area has, of course, been eliminated, rheostat losses are slightly reduced due to quicker acceleration; motor losses and windage are both materially reduced on account of the shorter time which power is supplied at high speed, and power for acceleration is reduced most of all on account of the lower speed reached. This latter quantity is reduced as the square of the speed. The results are given in Table II, compared with the results from Fig. 1:

TABLE II.

	Watt-hours. Fig. 1.	Watt-hours. Fig. 2.	Reduction. Per cent.
Rheostat losses	157	136	13.3
Motor losses	285	195	31.6
Track and bearing friction	158	0	100.0
Windage	57	29	54.4
Acceleration	993	835	16.0
	1,650	1,195	27.6

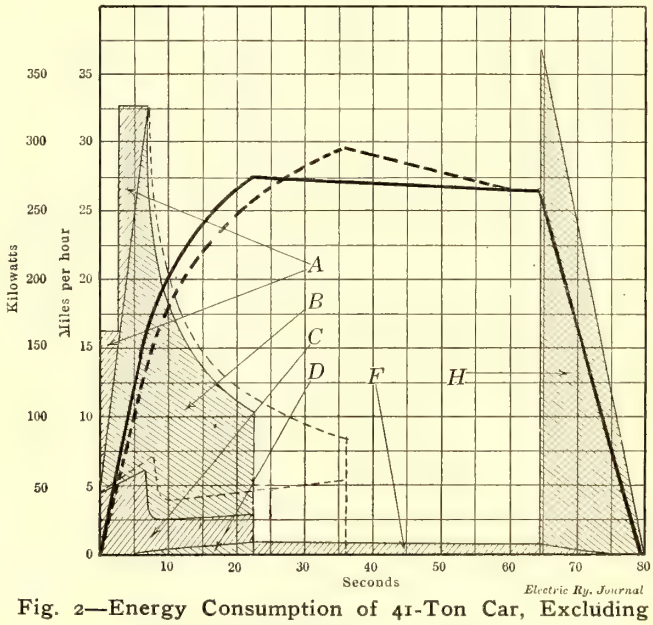


Fig. 2—Energy Consumption of 41-Ton Car, Excluding Track and Bearing Friction

It thus appears that by eliminating a friction consuming only 9.55 per cent of the power supplied we can effect a saving of 27.6 per cent in power required. This result is obtained in a case which was purposely chosen as representing an extreme case of frequent-stop service, in which the possible saving due to reducing bearing friction is the least.

A further study of the curves of Figs. 1 and 2 will explain the above apparently anomalous result.

In Fig. 1 the areas *F* and *G* show the energy expended in windage and track and bearing friction after power is shut off, and area *H* shows the energy dissipated in braking. It is interesting to observe that this latter reaches the formidable figure of 370 kw. The energy represented by the curves *F* and *G* has to be supplied from that stored up in the car during acceleration. This causes the slope of the speed-time curve during the coasting periods and the elimination of the track and bearing friction is responsible for the much less slope of the coasting part of the speed-time curve of Fig. 2.

In other words, windage and track and bearing friction are really a draught upon the power supply during the

whole of the run, and not merely during the time power is being used. The track and bearing friction resistance by the Armstrong formula for 25 m.p.h. is 350 lb., or 8.54 lb. per ton. To push 350 lb. 2640 ft. requires 924,000 ft.-lb., or 348 watt-hours.

Assuming that this was supplied to the car at a motor efficiency of 76.5 per cent, the power supplied for this purpose would be exactly 455 watt-hours, which is just the difference in power consumption indicated by the power curves of Figs. 1 and 2.

Of course, this is not an exact method of computing, because, first, the motor efficiency varies from 74.5 per cent to 86 per cent and must average higher than 76.5 per cent, and, second, that part of curve under the braking line is not saved by eliminating friction, as a correspondingly greater amount of power has to be absorbed by the brakes. That is, the saving effected, as shown by a comparison of the curves of Figs. 1 and 2, is slightly greater than would be expected even after we realize that we have to supply power to overcome the friction encountered during the whole run with the exception of the braking period, instead of only during the time power is supplied. This discrepancy is explained by the fact that the average efficiency of the motors throughout Fig. 2 is considerably higher than in Fig. 1 on account of the greater average load in the former case.

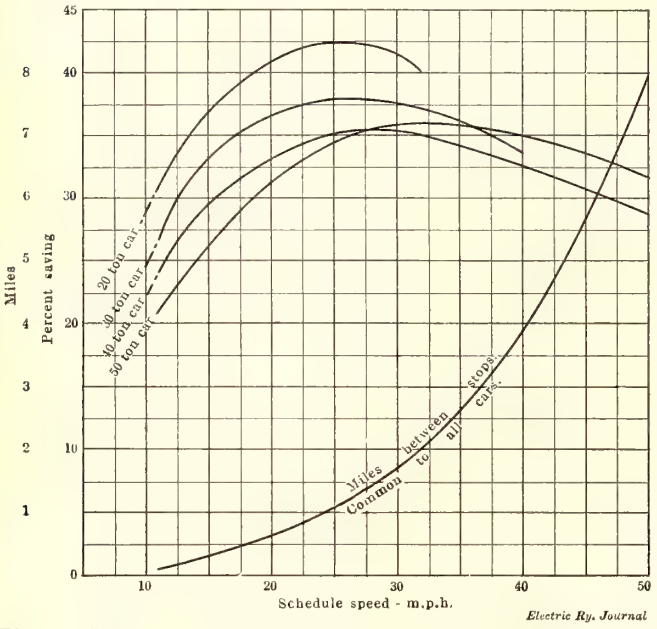


Fig. 3—Saving in Power by Eliminating Bearing Friction

I believe that a very close approximation to the actual saving that may be accomplished in any case by reducing bearing friction would be given by the following formula, obviously derived from the above results:

$$E = f \times \frac{5280}{2655} \times \frac{1}{.77} = 2.6f, \text{ nearly.}$$

When E = watt hours saved per ton mile, and f = pounds per ton reduction in train resistance effected by reducing friction.

This formula should hold approximately true, no matter what the rate of acceleration, frequency of stops or amount of coasting. It gives, however, only the absolute saving, not the percentage saving. The latter will increase as the total watt-hours per ton-mile become less.

It is unfortunate that we have no formula differentiating bearing friction from track friction. If we knew how much of the first two terms of the train resistance formula were due to bearing friction, and how much to track friction, we could tell more nearly how much saving to hope for in the use of roller or ball bearings. I believe track friction is but a small factor in the formula, and bearing friction about the whole of the first two terms. If so, nearly the whole of the saving indicated could be realized by the use of a ball or roller bearing, because such a bearing would undoubtedly almost eliminate bearing friction.

In order to get some idea of the variation of the power saving possible by eliminating friction I have calculated the percentage saving for some of the cars and schedules given in Chap. 13, Par. 126, of the Standard Handbook. These are cars of 20, 30, 40 and 60 tons, operating on schedules of ⅛, ¼, ½, 1, 2, 3, 4, 5, 6 and 7 stops per mile, and accelerating at .8, .9, 1.0, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7 miles per hour. The results are given in the curves of Fig. 3. The least saving indicated is 20.5 per cent and the greatest 42.5 per cent. These are all for conditions of frequent stop service, the speed being increased as the stops are less frequent, so that the power used in acceleration and braking is great in all cases.

For long runs at low speeds the saving due to eliminating bearing friction would approach 100 per cent of the power ordinarily required. For instance, if the 82,000-lb. car were to be run for a long distance over straight, level track, coasting from 30 m.p.h. to 25 m.p.h., then accelerating to 30 m.p.h., and coasting again, and so on, the power required by the full train resistance formula, including motor losses, would be 30 watt-hours per ton-mile. Omitting the first two terms of the formula, the power required would be 8.5 watt-hours per ton-mile, or a saving by eliminating friction of 72 per cent.

Of course, there are certain unavoidable sources of error in my calculations, of which the principal ones are the following:

Empirical nature of the train resistance formula.

Inability to separate track friction from bearing friction.

Assumption that gear losses and motor bearing losses are eliminated with other friction.

If it is possible to reduce bearing friction by means of ball bearings by an amount sufficient to reduce train resistance 8 lb. per ton, and I believe that this is a safe assumption for rapid transit work, this would produce a saving of 20.8 watt-hours per ton-mile. For a 25-ton car, running 200 miles per day, this would amount to 38,000 kw-hours per year, worth, at 1.5 cents per kw-hour, $570 per year.

I will not attempt to say much in this place as to the possibility of producing ball or roller bearings capable of standing up under conditions of railway service, beyond remarking that several manufacturers now claim to be ready to do it, and expressing the opinion that if such bearings are demanded they will shortly be supplied, even if not now on the market.

As stated above, I developed the method of analysis illustrated in Figs. 1 and 2 in the attempt to demonstrate whether or not the savings claimed to be made by the use of anti-friction bearings were theoretically possible. I have found the method, however, very useful in studying other problems in electric train performance. There have already been published two papers from my pen in which I made use of this form of diagram, calculated, however, in both cases from different data, and primarily intended to illustrate different concepts.

The first was a talk on "Transportation Efficiency," delivered before the Worcester branch of the A.I.E.E., and published in the *Election Traction Weekly* of May 22, 1909. The diagram used in that case was intended to furnish a visual representation of the fact that all the power supplied to an electric car from the power station is ultimately dissipated in heat, none of it being required for permanent conversion into any form of stored energy.

The second was a paper read before the Massachusetts Street Railway Association last June, on "Car Weights, as Affecting Operating Costs," and published in the Electric Railway Journal of June 19, 1909. The same general form of diagram was used, calculated for cars of different weights, to show how closely power consumption is proportional to car weights. At the latter meeting there was considerable discussion, not reported, on the question of bearing friction, which happened to be a matter of especial interest to some of those present.

Since that time several people have mentioned to me their desire for more information as to the importance of bearing friction, which leads me to hope that the present article may prove of interest as a contribution to that subject.

GASOLINE-ELECTRIC CAR IN CHICAGO

Considerable attention was attracted among railroad and electrical men in Chicago recently by a gasoline-electric passenger car of the latest type developed by the General Electric Company. This car was on exhibition at the passenger station of the Chicago, Rock Island & Pacific Railway Company in Chicago, where it was an object of much interest. It is 50 ft. long over all and is divided into four compartments—the main salon for passengers, a smoking room, a small baggage compartment and the engine room. The engine room is, of course, at the forward end of the car, which is wedge-shaped to lessen wind pressure. It contains a 125-hp, eight-cylinder gas engine, water-cooled, with radiators on top of the roof of the car and forming a rather conspicuous feature of the exterior. Direct connected to the gas engine is a d.c. 600-volt generator, which supplies electricity to two 100-hp standard railway motors mounted on the forward truck of the car. The control of the car is entirely electrical, the motorman using a controller similar to that used on ordinary electric cars. The car weighs, complete, 35 tons, and has seating capacity for 45 passengers. The entrance doors are at the side. The car is of steel construction.

This gasoline-electric car is supplied with a small storage battery for lighting and has an electric headlight and all the usual accessories. The maximum speed is from 45 to 50 m.p.h. The car on view in Chicago has seen actual service on the Southern Railway between Manassas and Strasburg, Va. These places are 63 miles apart, and for 20 days the car made a round trip daily. It is probable that the principal use of this type of car will be on branch lines of steam railroads where the service is infrequent. The car is entirely self-contained, and is operated by two men, so that it shows a great economy, even in comparison with a steam railroad train with an engine, baggage car and passenger coach. On the other hand, the overhead electrical construction of the electric railway is not needed.

The University of Illinois, Urbana, Ill., has published a circular of information of the College of Engineering which contains a description of the equipment and an announcement of courses for 1909 and 1910.

COMMUNICATIONS

THE NEW CORPORATION TAX

Milwaukee, Wis., Aug. 12, 1909.

To the Editors:

Attorney-General Wickersham, answering the criticisms of 12 certified public accountants of New York, as embodied in their letter, copy of which was sent to each member of Congress, under date of July 8, 1909, says, among other things, in his letter of July 17, 1909, to the accountants, as published in the Milwaukee *Sentinel* of July 18, 1909, the following:

The bill was purposely framed to deal with receipts and disbursements made within the year for which the tax was to be imposed. The theory of the framers of the bill in this respect differs from that which you advocate, that the proposed law does not impose a tax on "profits," but on "the entire net income" over and above $5,000 received from all sources during such year [meaning calendar year ending Dec. 31].

"The theory of the framers of the bill differs" not only from what is advocated by the 12 certified public accountants of New York, but from all accepted principles of sound accounting, with respect to determining what is either "net income" or "profits," and also differs in theory and practice from the accounting systems prescribed by the Interstate Commerce Commission, the American Street & Interurban Railway Association, the National Electric Light Association, American Gas Institute, Wisconsin Railroad Commission and New York Public Service Commissions, Districts Nos. One and Two, and in this respect the provisions of the bill are "absolutely impossible of application" for any corporation "which keeps just and true books of account."

A mercantile corporation, in determining its "net income received" for a given year, ending Dec. 31, based on "actual receipts and payments," would presumably treat as one of the sources of "actual receipts" payments received for account of sales of merchandise, which probably would be, and usually are, less than the sales of merchandise amount to during the year; therefore "net income received" could not be correctly determined on this basis.

A corporation in determining its "net income received" for a given year, ending Dec. 31, based on "actual receipts and payments," would presumably treat as one of the items of "actual payments," payments made for account of merchandise purchased and carried in stock, which probably would not be all sold; therefore "net income received" would not be correctly determined on this basis, nor could it be, without taking an inventory as of Dec. 31. This, outside of the question of the fiscal year not ending Dec. 31, would be absolutely impossible to do in the case of a corporation conducting a large department store, that month of the year (December) covering the Christmas shopping season, requiring the services of all of its employees and the use of all of its facilities to attend to the wants of its customers.

"Losses actually sustained," for example, uncollectible accounts written off the books, would not be "an actual payment" nor "an actual disbursement," therefore, presumably, would not be included as such in determining "net income received" of a corporation for a given year.

"Interest actually paid" in the case of a corporation issuing bonds dated Jan. 1, coupons payable July 1 and Jan. 1, in determining its "net income received," as per provisions of the corporation tax bill, would charge against its "actual receipts" the "payment" or "disbursement" of six

months' interest during its first year of business, namely, the coupons due and payable July 1, assuming they were all paid within six months, which is usually not the case.

C. N. Duffy.

NEW MOTOR CARS FOR THE NORTH EASTERN RAILWAY OF ENGLAND

The British Thomson-Houston Company, Ltd., of Rugby, England, has recently completed equipping six new passenger coaches for the North Eastern Railway for use on its Newcastle electrified division. The car bodies and trucks were built by the North Eastern Railway in its own shops situated at York, where the complete electrical equipment was installed by the British Thomson-Houston Company, Ltd.

These cars are similar to the original cars built for this line, but various improvements in details have been made by the railway company, and the installation of the electrical equipment is in accordance with the latest British Thomson-Houston practice.

The following table gives the leading dimensions of these cars:

Length over all	56 ft. 6¾ in.
Length over end sills	55 ft.
Center of trucks	40 ft.
Wheel base of each truck	7 ft.
Width over all	9 ft. 2½ in.
Height from rail to top of roof	12 ft. 5½ in.
Diameter of wheels (motor truck)	36 in.
Diameter of wheels (trailer truck)	35 in.
Diameter of motor journals	5½ in.
Passenger capacity (seated)	64

Each car is equipped with two GE-211 railway motors on the leading truck, the control being of the Sprague-Thomson-Houston multiple-unit type. A driving equipment is located at each end of the coach in the motorman's cab, consisting of a master controller with the necessary auxiliary switches, brake-valve instruments, etc. There is also a switchboard in each cab, accessible from the back, and



Motor Car for Electrified Newcastle Division of North Eastern Railway of England

the car body in the region of the switchboard is lined with Uralite as a protection from fire.

The motors are of the interpole type, and their armatures are so constructed that if the armature shaft at any time should become damaged it can be pressed out and replaced with a new one without disturbing or disconnecting in any way either the commutator or armature windings. These motors are also interchangeable as a whole with those on the original equipments. The master controllers are the same as on the original equipments. They are fitted with a "deadman's handle," and acceleration can be effected either automatically or by hand, as desired.

The contactors and reversers are attached to the underframe below the car floor, and are arranged in metal cases specially designed for easily examining the apparatus. The resistances are also attached to the underframe under the floor, and are of the grid type, and entirely insulated with mica.

Each end of the coach is fitted with couplers for control, main and pump-line circuits, and all cables are covered with fire-resisting material. The power and heater cables are laid in solid drawn steel conduit, all junctions being



Interior of Motor Car for North Eastern Railway of England

made in metal-connection boxes with special terminals; there are no joints in the cables.

A supply of air for the brakes is furnished by an electrically driven (type CP-22) air compressor. This compressor is hung from the underframe in a cradle, rubber blocks being inserted between the feet of the compressor and the supporting frame so as to minimize the vibration on the coach.

Both motor and trailer trucks of these new passenger cars are equipped with collector shoes for collecting current from the third-rail.

The lighting of the cars is effected by six circuits of six lights each in series, each lamp being of 32 cp at 100 volts.

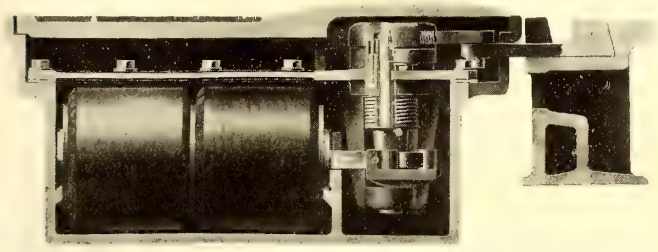
Four of these circuits are employed for lighting the passenger compartments. The lamps are wired on alternate circuits, so that in case of any circuit failing there will still be a light in each cluster, the clusters each having three lights. The clusters in the passenger compartments are arranged down the center of the upper deck, and the fittings are of heavy ornamental brass design, having circular globes of cut glass.

One circuit at each end is used for lighting the destination and signal lights, each of these circuits being in duplicate and governed by a two-way switch, so that there may always be a light in the destination indicator and signal lamps in the case of failure of one circuit. The cars are heated by electric heaters, there being 16 distributed throughout the car, all connected in series. Two heaters at each end are situated in the driver's cab.

The proportion of motor cars to trailers in trains is one to one. The weight of these motor cars in running order, but without passenger load, is 33¾ tons.

AUTOMATIC ELECTRIC SWITCH-THROWING MACHINE

The American Automatic Switch Company, New York, has recently developed a new and improved type of electric switch-throwing apparatus, the details of which are shown in the accompanying engravings. It is designed to overcome trouble from water getting into the switch box, wear on the moving parts due to the presence of dirt and grit and general wear and tear on the trolley contactor.



Electric Switch-Throwing Mechanism, Showing Mercury Stuffing Box

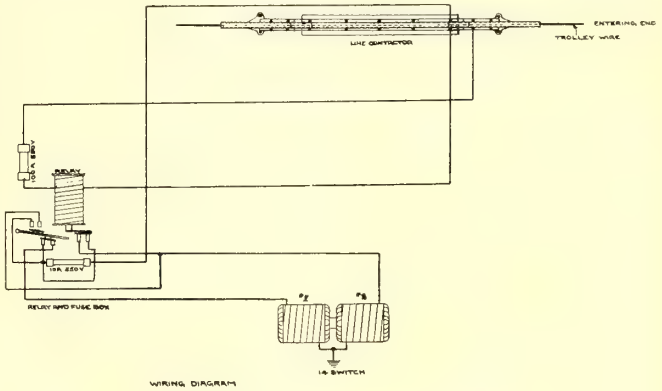
The switch-throwing mechanism consists of two powerful solenoids having a common plunger, a rotating vertical shaft, to which the solenoid plunger is attached at the lower end, and an adjustable link connecting the crank arm formed on the upper end of the rotating shaft with a lug cast or welded on the switch tongue. A semi-locking device is attached to the mechanism to prevent the switch from moving after it has been thrown. The coils and plunger are enclosed in an iron box having an inner cover put on with bolts and a gasket to make it watertight. The box is set in the street alongside the switch, with the outer cover flush with the surface of the paving. The rotating shaft projects through the inner cover and turns in a unique water and dust-proof stuffing box. This stuffing box consists essentially of a mercury seal, and the construction is clearly shown in the sectional engraving. It is impossible for dirt or water to pass through the mercury cellar and into the inner box, as to do so it would have to sink through the mercury seal and rise on the inside of the dividing wall. Mercury has a specific gravity of 14 as compared to water. As an additional precaution the coils are impregnated, and they can be entirely immersed in water without affecting their operation. The joints of the wires leading into the box and connecting to the solenoid leads are made water-tight.

The switch-throwing machine is spiked to two ties alongside of the switch. The box itself need never be dug up or removed from the street, as all of the interior parts can be inspected by lifting the outer cover and removing the bolted-on inner cover. The magnets, mercury stuffing box and all the moving parts can be taken out for repairs or replacements without difficulty. All the moving parts have case-hardened pins and bushings which can be removed and replaced easily and at small cost. The bearings are all separate from the box and therefore the box is not subject to wear and does not have to be dug up and replaced at intervals.

The controlling relay and fuses are mounted in a small waterproof cast-iron box fastened on the trolley pole nearest to the switch. The line contactor is simple, light and strong. In designing it care has been taken to keep the arc very small to prevent carbonizing of the wood insulating pieces. At the gap the metal contact pieces overhang the wood, and the wood is cut away for a distance of 1½ in. above the gap. The arc, which is broken when the trolley leaves the contactor, is less than 2 amp.

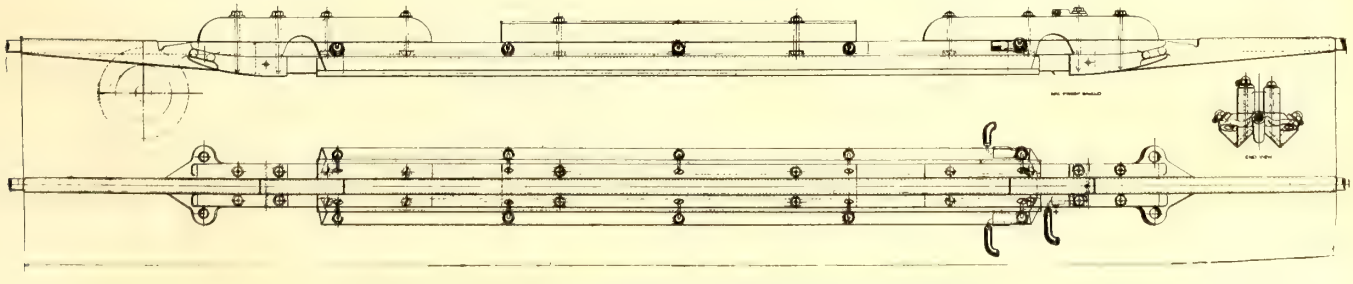
The operation of the device is illustrated by the wiring diagram. If the car is going to the left the motorman runs under the trolley contactor with the current off, and the switch will be thrown to the left if not already set in that position. If the car is going to the right the motorman runs under the contactor with the current on, which throws the switch to the right. It is not necessary for the motorman to see the switch point in order to know whether to keep the current on or off. The reverse result can be accomplished if desired by reversing the magnet connections in the relay.

The contactor is placed on the trolley wire so that the trolley wheel of a car passes under it when the front end



Wiring Diagram of Connections

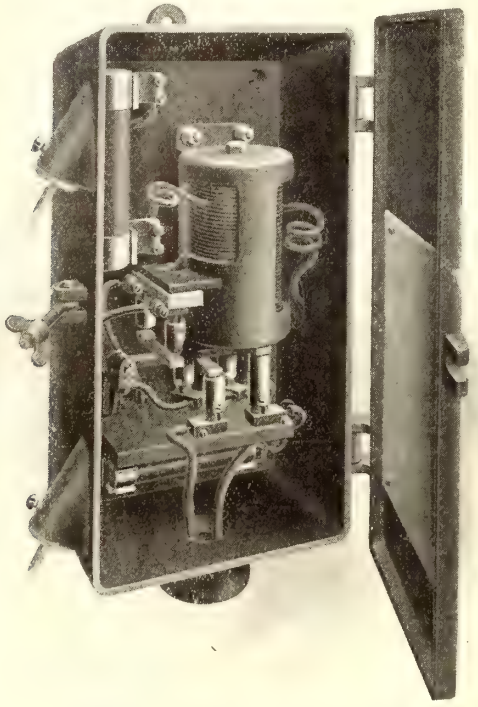
of the car is about 8 ft. from the switch point. If the current through the motors of the car is off while the wheel is passing under the contactor, a small amount of current will flow from the trolley wire through the large fuse, through the relay coil to one of the side strips of the contactor, through the trolley wheel to the other side strip (the side strips being insulated from the trolley wire and from each other), down through the small fuse, from which it passes momentarily through both magnet coils of the switch-throwing machine to the ground. The current flowing through the relay coil causes the armature to lift and break the contacts shown to the right in the wiring diagram. This cuts out the right-hand switch-throwing solenoid, but leaves the left-hand solenoid energized, thus causing the plunger to move to the left and throw the switch to the left. The small amount of current flowing



Trolley Contactor for Electric Switch-Throwing Machine

in the relay magnet coil is sufficient to break the right-hand contacts, but is not sufficient to lift the long latch shown to the left.

If current is on when the trolley wheel passes under the contactor, the same preliminary circuit is set up, but as all the current going through the car must also pass through the relay, both the long and the short latches are lifted. This breaks the bottom contact on the long latch and establishes a top contact which energizes the right-hand solenoid and cuts out the left-hand coil. The plunger then moves to the right and throws the switch point to the right. By adjusting the contacts which support the long latch either up or down the relay can be adjusted to care for any amount of current consumed by the heaters, lights or air compressors on the cars when running under the contactor with the motors cut off. No external resistances are used, and a car standing with the trolley wheel in contact with the contactor cannot injure any parts of the apparatus.



Relay and Fuses in Box on Pole

HEAVY ELECTRIC LOCOMOTIVES FOR SWITZERLAND

The Berner Alpenbahn Gesellschaft has placed an order with two German firms and the Oerlikon Company for three large motor cars and two large locomotives, to be employed on the new Spiez-Frutigen 15,000-volt single-phase line. A water-power plant near Spiez will furnish the current at 15 cycles. Catenary overhead construction and bow collectors are to be used. The motor cars will be equipped with four single-phase motors of a total capacity of 880 hp, will weigh (including passengers) 55 tons each, and each will be capable of hauling a trailing load of 250 tons over a grade of 1½ per cent at a speed of 45 km per hour.

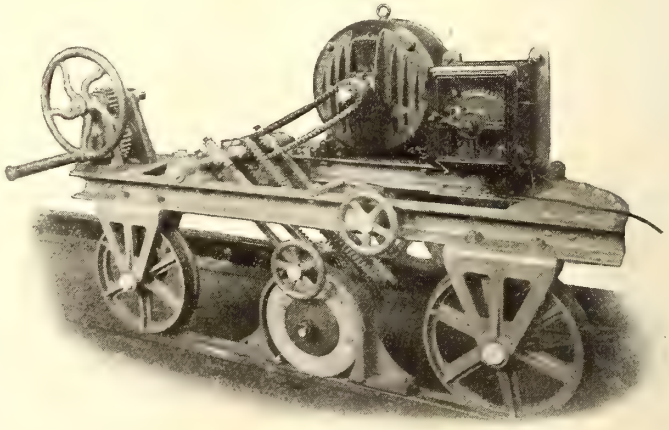
The locomotive of the Oerlikon Company will be one of the heaviest ever built, and will be equipped with two 1000-hp motors, said to be the largest single-phase motors in the world. The specifications of this locomotive required it to be capable of hauling a 420-ton train over a 1½ per cent grade at a speed of 42 km per hour. The cab rests on two six-wheel trucks, each carrying a motor. The total weight of the locomotive is estimated at 86 tons, all of which can be utilized for adhesion. The locomotive of the Allgemeine Elektricitäts Gesellschaft is similar to that of the Oerlikon Company, but the motors will be of slightly less capacity. Both motor cars and locomotives will carry transformers and be equipped with multiple control system. The maximal schedule speed will be 70 km per hour.

RAIL-GRINDING MACHINE FOR REMOVING CORRUGATIONS

The accompanying engraving, reproduced from *The Electrician,* London, shows a new type of machine for grinding corrugated rails, which has been designed and patented by Frank Ayton, chief engineer and manager of the Ipswich Corporation electric supply and tramways departments, and L. Crosta, managing director of the Railway & General Engineering Company, of Nottingham, England. It is made by the latter company. The new feature embodied in this machine lies in fixing the grinding wheel in a "skate" which is attached to the truck by two radius arms. The skate is able to move vertically, and also to some extent in a lateral direction, independently of the movement of the truck carrying the driving motor. A screw adjustment and guide are provided for feeding the grinding wheel down in the skate. As the skate slides along the rail on two perfectly flat faces, it is obvious that the crests of the corrugation waves will be ground off, and finally a perfectly flat and smooth surface reproduced on the rail head. The effect is really the same as that obtained by a carpenter truing up the wavy edge of a board with a plane.

The machine is also arranged so that it may be used to grind out the small grooves worn by the wheel flanges at the bottom of the grooves of switch point mates. These grooves cause bumping of the cars, and are also, no doubt, the cause of many broken axles. For this purpose the machine is provided with a second set of skate faces and a narrow grinding wheel is used.

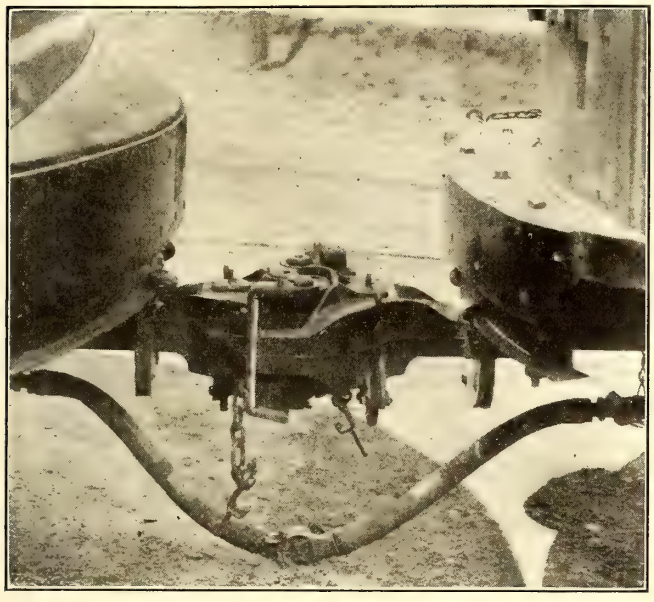
The power required is small. When the machine is running light—that is to say, with the grinding wheel not touching the rail—the motor of the machine shown in the engraving takes 1½ kw. When grinding corrugations, the average input is 3.75 kw, and the maximum about 5 kw. The motor is rated at 5 hp, and the drive is to a countershaft, and thence to the skate by means of two Renolds chain belts. Power is taken from the trolley. The slow traverse along the track of about 5 ft. to 8 ft. per minute is obtained by winding up a small steel rope on the winch seen at the left end of the machine. The other end of the rope is fixed to a stake driven between the paving blocks.



Rail Grinder for Removing Corrugations

AUTOMATIC COUPLERS FOR ELECTRIC CARS

The W. T. Van Dorn Company, Chicago, Ill., has recently perfected and placed on the market several new types of drawbars for electric railway cars, which are designed to meet the special conditions encountered and to perform extraordinary service. All of these new types are built along the same substantial lines as the older designs of couplers made by this company, which are the



No. 31 Couplers on Chicago & Southern Traction Company's Cars

standard on more than 400 street and interurban railways throughout the world and on practically all of the elevated and subway systems of the United States.

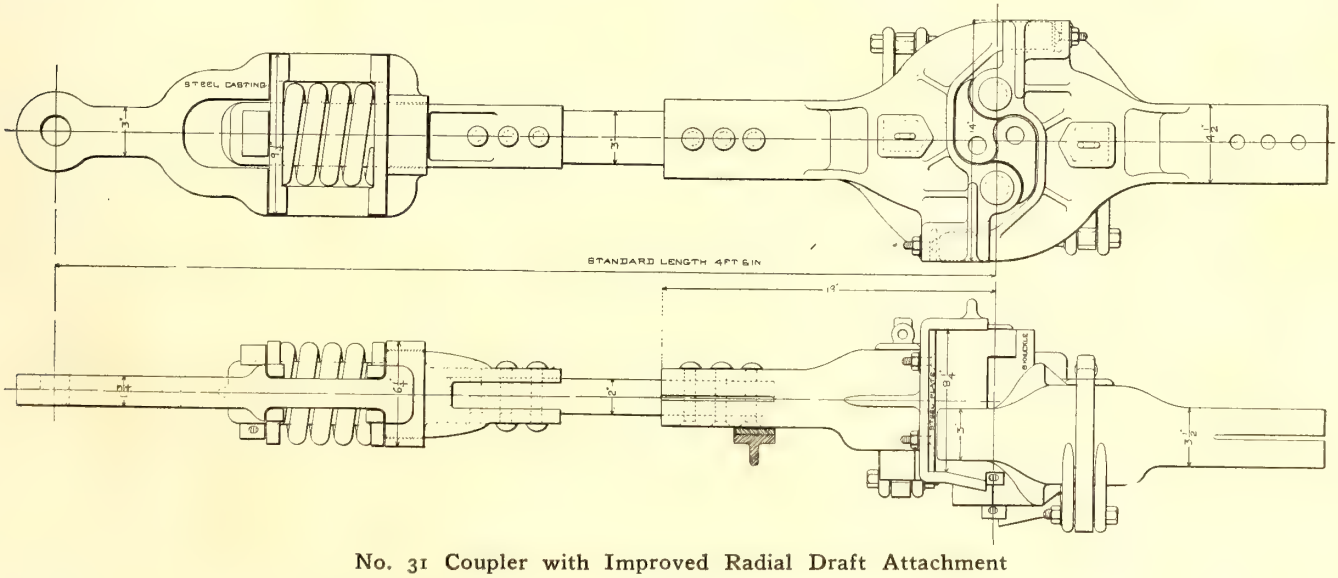
One of the illustrations is of the company's new No. 31 drawbar as installed on the cars of the Chicago & Southern Traction Company. The engraving shows two of these cars coupled together for train operation. The drawbars are built with heads about three-fourths the size of standard M.C.B. heads, but the manufacturer is in position to furnish drawbars of the same general design conforming to M.C.B. specifications if desired. This coupler is recommended by the company for use on city and interurban cars. The knuckles and face of the coupler are modified from the standard M.C.B. contour lines to furnish a more rigid coupling, and it is not intended to couple with M.C.B. standard types. It is built on lines which eliminate lost motion between the knuckles and give longer life to the parts.

The coupler attachment is of the radial type and the head was especially designed to overcome the buckling forces which had to be contended with in other types of couplers. On one side of each head a pocket or recess is cast. This pocket is formed back of the knuckle far enough to allow the guard arm that is cast on the opposite side of the head to slide around the knuckle and slip back into the pocket. The arm is of sufficient length to butt up against the steel wearing plate in the pocket when the two couplers are locked. This gives the couplers a butting surface not only against the knuckles, but also on each side of the head, thus giving a three-point contact and preventing the couplers from buckling. The steel wearing plate, which



No 31 Coupler with Improved Draft Attachment

is riveted or bolted to the back part of the pocket, is so constructed that after a long period of service all the lost motion can be taken up by a fillet plate inserted between the wall of the coupler and the wearing plate. One feature of this construction is that the guard arm that slides into the pocket when the couplers are brought together brings the heads of the two couplers into alignment and locks the knuckles for their entire width. By this arrangement a wearing surface which extends the full width and depth of the knuckle is provided. The knuckles are 8 in. deep. This drawbar is fitted with a very strong but simple automatic unlocking device. The pivot pins on which the knuckles turn are the same size as those used on standard M.C.B. couplers.

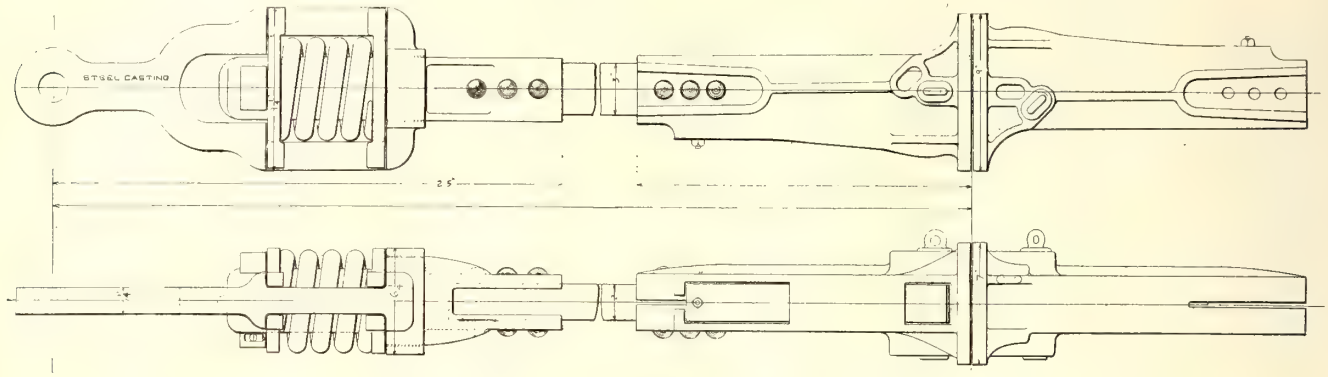


No. 31 Coupler with Improved Radial Draft Attachment

A new form of radial draft attachment, which was designed especially for this type of coupler, but it may be used on any of the various types of couplers made by the company. The attachment is composed of two steel castings which, when fitted together, form a strong straight-line draft rigging. They also form a substantial casing in which the draft spring is enclosed. This casing serves as

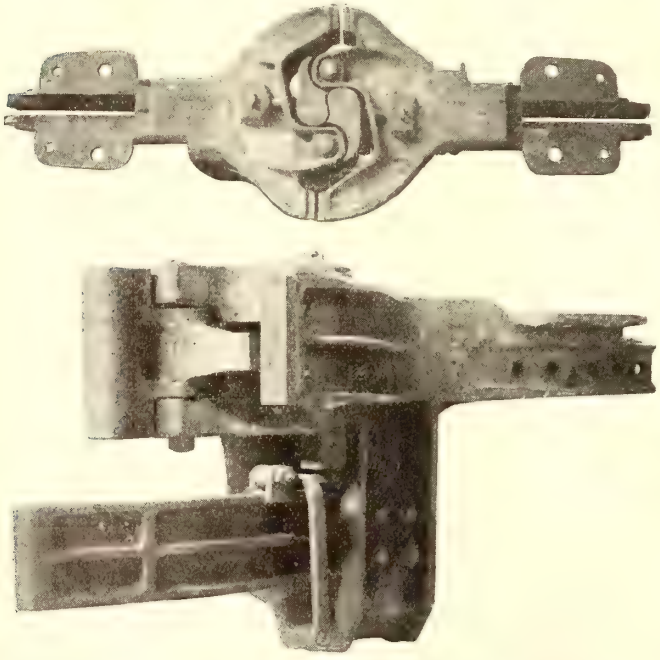
a guide for the spring, and, because of its simplicity, eliminates the necessity of having more than two supporting points for the drawbar. The standard drawbar of this type is 4 ft. 6 in. long, but this length can be changed to meet any special condition.

The Van Dorn No. 27 drawbar, which is also illustrated, is shown fitted with the company's new draft rigging. This type of coupler is built in sizes between the Van Dorn No. 5 and the Van Dorn No. 11 couplers, and couples automatically with either one of these types. It is built so substantially that it may be used for as heavy cars as the No. 11 or interurban type of coupler. This coupler will also couple automatically with the company's No. 5¾, No. 11½ and No. 21½ types, and is equipped with the same sized link and pin as these other couplers.



No. 27 Coupler with Improved Draft Attachment

All of the Hudson & Manhattan Railroad subway cars have been equipped with Van Dorn No. 20½ heavy type couplers, which are shown in the engravings. These couplers have the same form of pocket and extension guard arm as the No. 31 coupler described above, and in addition are fitted with an automatic unlocking device, by means of which the knuckles may be uncoupled without going between the cars. It also has the same form of double combination pin to couple and uncouple as is used in the company's older types.



No. 20 1/2 Couplers as Applied to Hudson Tunnel Cars

The W. T. Van Dorn Company will exhibit at the Denver convention in October samples of all of the new couplers which it has recently perfected.

WOODPECKERS ATTACK CEDAR POLES

Considerable damage is being reported to telephone, telegraph, electric light and electric railway poles by members of the woodpecker family. These birds originally built their homes in the dead or dying trunks or limbs of trees, but for some reason best known to themselves have come to the conclusion that the peeled pole offers better conditions for a home. Their activities spread over a wide portion of the United States, notably in the South, Southwest and Central West. Cedar poles seem to be the ones most frequently attacked. The birds bore into them at any height from the ground, and the holes which they make are often 2 or 3 in. in diameter and 4 or 5 in. deep. Such an amount of wood drilled from a stick of timber which is carrying a load of wires naturally weakens the strength of the line.

It would, of course, not be a difficult matter to exterminate these birds. However, this is not desirable, as they are among the most beneficial forms of bird life native to this country, and destroy large numbers of insects which are injurious to vegetation. It seems, therefore, that methods should be undertaken to compel the birds to revert to their former habit of boring rather than to exterminate them.

Frequent inquiries have been made by the Forest Service in this connection, but the only information to date which the Government has been able to obtain is that on a casual inspection of treated and untreated pole lines in Louisiana. In that region it was found that poles which had been impregnated with creosote oil were not attacked by the birds, whereas untreated poles under the same conditions were very severely injured. Whether or not creosote will prevent such attack is not definitely known, but the Service is investigating this problem, and should this oil prove a preventive, it will fulfill a twofold purpose—it will protect the poles from decay and from destruction from animal life. Employees of one of the electric railway companies in southern Indiana recently attempted to prevent further destruction of the poles on that line by filling the holes in the wood with stones. The birds, however, simply drilled around the stones and made the conditions much worse. This apparently does not seem to be a means of preventing their depredations.

TRAIL CARS FOR PHILADELPHIA

The Philadelphia Rapid Transit Company is now equipping at its shops 60 motor cars for operation with trailers, and they will be placed in service this fall. The lines on which these trains will be placed have not yet been determined.

ELECTRIC RAILWAY LEGAL DECISIONS

EJECTMENTS, ASSAULTS, ETC.

Maryland.—Carriers—Injuries to Passengers—Actions—Evidence — Instructions — "Passengers" — Licensees —Trespassers—Burden of Proof—Instructions.

Where, in an action against a carrier, the gist of the action was that plaintiff, while a passenger on a street car, had been assaulted by the conductor and ejected therefrom, and that if not a passenger he was entitled to protection from the violence of the employes of the company, and the theory of the company was that plaintiff boarded the car to sell newspapers, and that the conductor did not assault him, but that plaintiff contributed to his own injury by jumping from the car while in motion, an instruction that if the jury believed that plaintiff boarded the car for the purpose of riding as a passenger, and tendered his fare which the conductor without reason refused to receive, and forcibly and wantonly ejected him from the car, the verdict should be for plaintiff, while if he boarded the car to sell papers, the verdict should be for defendant, unless the injury was caused by the conductor wantonly ejecting him from the car, properly submitted the issue.

A street railway company is liable for an assault on a passenger committed by its conductor while executing the contract of transportation.

A newsboy, entering a street car for the purpose of selling papers, and without paying fare, is not a "passenger" but a mere licensee or trespasser, and the company owes him no duty, except to use ordinary care for his preservation after discovering his peril, and to refrain from inflicting willful, reckless, and wanton injury.

One suing a street railway company for injuries received while a passenger, in consequence of being assaulted by the conductor, has the burden of showing, by the weight of the evidence, that the injury was caused by the wrongful act of the conductor, or the verdict must be for the company.

Where, in an action for injuries to a passenger ejected from a street car, the court charged that if plaintiff boarded the car for the purpose of riding as a passenger, and tendered his fare, which the conductor, without excuse, refused to receive, and wantonly ejected plaintiff from the car, the verdict should be for him, and that if he was on the car for the purpose of selling newspapers, the verdict should be for defendant, unless the injury was caused wantonly, etc., an oral instruction that the court had refused instructions prepared by plaintiff, and had given, in lieu of them, its own instructions, which were read, and stating that at the instance of the parties it had granted prayers, which were read; that the object of the instructions was to present the theories of the case; that if the story told by plaintiff was believed, a verdict was authorized in his favor, while if defendant's story was believed the verdict should be for it, was erroneous as misleading the jury to the prejudice of plaintiff. (Rosenkovitz vs. United Railways & Electric Co. of Baltimore City, 70 Atl. Rep., 108.)

New Hampshire.—Carriers—Carriage of Passengers—Ejection of Person at Place Other Than Station—Action—Nature.

A carrier which ejected a person from a train for nonpayment of fare at a place other than a passenger station, in violation of Pub. St. 1901, c. 160, sec. 6, is not necessarily liable for the resulting damage, but it must appear that it occurred through its failure to perform the duty imposed by statute; and, to recover, the ejected person must prove the insufficiency of the station at the place of expulsion, his own care, and that the injury resulted from defendant's fault.

Where a person was ejected from a train five miles from his home, where there was no passenger station, and was in such good health and so well clothed that he could properly go home afoot, and there was no train that he could wait for, and it appeared that he would have walked home even if there had been a station, an illness contracted by him from the walk had no connection with his ejection, and he could not recover therefor. (Caher vs. Grand Trunk Ry. Co., 71 Atl. Rep., 225.)

New York.—Master and Servant—Injuries to Third Persons—Exemplary Damages—Liability of Employer—Grounds—Employer's Liability—Instructions—Damages.

In order to justify an award of punitive damages against an employer for a tort committed by his employee, the act of the servant must be wanton or malicious, and the employer must have participated in the act, or expressly or impliedly authorized or ratified it.

In an action against a master for false imprisonment by a servant an instruction that the right of freedom of the person is inviolate, and, if infringed, should be punished in an exemplary manner, and, if plaintiff was falsely imprisoned, the jury could award punitive damages in such degree as, in its discretion, was proper, was erroneous as omitting the requirement that the tort must have been wanton or malicious and participated in by the master, and as tending to require the award of punitive damages. (Lewine vs. Interborough Rapid Transit Co., 113 N. Y. Sup., 15.)

New York.—Master and Servant—Injuries to Third Persons—Punitive Damages—Damages—Grounds—Malice —Question for Jury.

In an action against a street railroad for an arrest by its employee, plaintiff could not recover punitive damages, unless the employee acted through malice in which defendant shared, and an instruction permitting the award of punitive damages if defendant ratified its employee's act and the jury thought it necessary to add something by way of punishment, was improper.

Malice may be proved, so as to justify the award of punitive damages against an employer for the act of his servant, by showing that the tort was committed to gratify some actual grudge or ill will, or that it was committed recklessly or wantonly, without regard to the rights of others.

In an action against an employer for the tort of a servant, whether malice existed, so as to justify the award of punitive damages, is for the jury, and, even if they find malice, the award of punitive damages is discretionary with them. (Magagnos vs. Brooklyn Heights R. Co., 112 N. Y. Sup., 637.)

New York.—Carriers—Carriage of Passengers—Actions—Admissibility of Evidence—Courts—Municipal Court—Jurisdiction—Malicious Prosecution.

In an action for breach of a carrier's contract to carry a passenger safely, testimony tending to show an assault and slanderous abuse of plaintiff while in the car was admissible in support of the action for breach of contract.

Under the direct provisions of Municipal Court Act, sec. 1, subd. 14 (Laws 1902, p. 1489, c. 580), that court has no jurisdiction of actions for malicious prosecution, so that it was error to admit evidence to support such an action which was joined with another action of which it had jurisdiction. (Telzer vs. Brooklyn Union Elevated R. Co., 113 N. Y. Sup., 18.)

New York.—Carriers—Stations—Swinging Doors—Personal Injury—Burden of Proof.

In a suit for injury to a passenger while necessarily passing through a corridor to his train caused by glass in a swinging door breaking when he pushed against it to open the door, which was locked, the burden was on the company to explain why the door was locked, where the passenger used no more force than he had previously used in passing through the doors, and where there was nothing to indicate that they would not easily respond to ordinary pressure. (McCormack vs. Interborough Rapid Transit Co., 113 N. Y. Sup., 1006.)

Rhode Island.—Carriers—Passengers—Personal Injuries—Actions—Sufficiency of Evidence—Damages—Excessive Damages—Personal Injuries.

In trespass for assault and battery by employees of a carrier upon one about to take passage on its car, evidence held to sustain a verdict for plaintiff.

In an action against a carrier for injuries caused by an assault of employees, resulting in contusions and bruises on the knee joint, which caused plaintiff's knee to be permanently stiff, a verdict for $2,000 was not excessive. (Wilcox vs. Rhode Island Co., 70 Atl. Rep., 913.)

LIABILITY FOR NEGLIGENCE

Texas.—Carriers—Street Railroads—Injuries to Passenger Alighting from Car—Contributory Negligence—Instructions—On Rehearing—Actions—Pleading—Trial—Assumption of Facts.

Where, in an action against a street railroad for injuries to a passenger while alighting from a moving car, defendant alleged that plaintiff alighted in a negligent manner, and there was evidence that plaintiff stepped off with her back the way the car was going, it was error to refuse an instruction that if plaintiff in alighting "did not follow the motion of the car" but stepped therefrom in a negligent manner, and that, if a person of ordinary care would not have so acted under similar circumstances, this would constitute contributory negligence.

In an action against a street railroad for injuries to a passenger alighting from a moving car, a plea that plaintiff was

negligent in the "manner" in which she alighted from the car was a specific allegation of negligence, and, in the absence of a special exception, was sufficient to admit evidence as to plaintiff's manner of alighting.

In an action against a street railroad for injuries to a passenger alighting from a moving car, an instruction that if plaintiff in alighting did not follow the motion of the car, but stepped therefrom in a negligent manner, and that if a person of ordinary care would not have so acted under similar circumstances, this would constitute contributory negligence, was not objectionable as assuming that, if plaintiff failed to step with the motion of the car, in alighting therefrom, she was guilty of negligence as a matter of law. (Dallas Consol. Electric St. Ry. Co. vs. Barnes, 119 S. W. Rep., 122.)

Texas.—Carriers—Injuries to Passengers—Actions—Evidence—Contributory Negligence—Intoxication.

Where, in an action by a passenger, the evidence was conflicting as to whether he was intoxicated when injured, he testifying that he had not been drunk for two years prior thereto, testimony was admissible that plaintiff had been intoxicated many times previous to the injury. (Lewis v. Houston Electric Co., 112 S. W. Rep., 593.)

Virginia.—Evidence—Res Gestæ—Declarations of Employe After the Event—Appeal and Error—Harmless Error—Non-expert Opinions — Trial — Instructions—Assumption of Fact—Injury to Passenger Boarding Car—Question for Jury.

Conversation between the motorman and a third person after a passenger, who, while attempting to board a street car, had been injured, by being thrown to the ground by the starting of the car, had arisen and got on the car, is no part of the res gestæ.

The declaration of the motorman, after a passenger had been injured while attempting to board the car, that he had no right to stop on the railroad track, and his failure to reply, when thereupon he was asked, "What did you stop for, then?" are inadmissible against the carrier; he not being in the performance of any duty within his employment in what he said or in his silence.

It being a material issue as to whether a street car was still or moving when a passenger attempted to board it with the result of being thrown by the car moving, and the evidence thereon being conflicting, the majority of witnesses testifying it was standing still, it was not harmless to admit evidence that, after the accident, the motorman said he had no right to stop on the railroad track, and made no reply when, thereupon he was asked, "What did you stop for, then?"

Non-experts, who were frequently with plaintiff after her alleged injury, and in a situation to know and speak of her condition as lay witnesses could speak, could testify that she did not appear to have such use of her shoulder as enabled her to work as seamstress, and that since the accident she had not been able to do anything with her arm.

The instruction that if the jury believe defendant, at the time of the alleged injury, was engaged in running street cars, it was bound to use the utmost care and diligence for the safety of its passengers, and is liable for injuries to its passengers occasioned by the slightest neglect against which human prudence and foresight might have guarded, has for its object merely the statement of the degree of care defendant owed to its passengers; and does not assume plaintiff was a passenger—a question submitted to the jury by other instructions.

Evidence in an action for injury to a person while attempting to board a street car held sufficient to authorize submission to the jury of the question of the car having been stopped at the point for the purpose of receiving passengers, and of its having been started suddenly and without notice while she was boarding it. (Blue Ridge Light & Power Co. vs. Price, 62 S. E. Rep., 938.)

Washington. — Carriers — Alighting Passengers — Carrier's Duty — Negligence — Contributory Negligence — Questions for Jury—Damages—Personal Injuries—Recovery Not Excessive.

A carrier must provide a safe place for its passengers to alight.

Though a street car passenger knew the unsafe condition of the street in which she was injured while alighting from a car at night, she had the right to expect that the company having the same knowledge, would perform its duty in so stopping the car as to provide her with a safe place for alighting.

In an action against a street car company for injury to a passenger, who stepped into an excavation while alighting, whether the company was negligent, and whether the passenger was guilty of contributory negligence, held, under the evidence, for the jury.

A personal injury verdict for $2,000 was not so excessive as to justify interference, where plaintiff incurred $150 medical expenses, sustained bruises on her right arm from the elbow to the shoulder, and also her right side, and had a severe pain in her head for almost a year. (Murray et ux. vs. Seattle Electric Co. et al., 97 Pac. Rep., 458.)

Washington.—Carriers—Passengers—Actions for Injuries—Question for Jury—Defect in Step—Instructions—Contributory Negligence—Care Required of Passengers.

In an action by a passenger for injuries received in alighting from a street car, where there was evidence to show that the car step sagged, permitting the heel of the person using it to be caught and held while she attempted to alight, the question of whether the step was defective was properly submitted to the jury.

In an action by a street car passenger for injuries while alighting, an instruction that the law does not require plaintiff in an action for personal injuries to be absolutely free from any neglect whatever, as such a requirement would impose on him the duty of exercising extraordinary care, while the law only required that plaintiff exercise ordinary care under the circumstances, which he may do, though guilty of some slight neglect, was proper, and made the exercise of ordinary care the measure of plaintiff's conduct. (McCormick vs. Seattle Electric Co., 96 Pac., Rep., 220.)

Wisconsin. — Carriers — Negligence — Starting Street Car While Passenger Is Alighting—Injury to Alighting Passenger—Sufficiency of Special Verdict—Trial—Instructions—Credibility of Witnesses—Instructions Not Applicable to Evidence.

A street car conductor, who starts his car at a time when he knows a passenger is alighting, is negligent as matter of law.

In an action against a street car company for injuries to an alighting passenger, where it was undisputed that the conductor was on the rear platform as plaintiff was alighting, and saw him in the act, and that the conductor rang the bell to start the car, a special verdict in favor of plaintiff, finding that he was injured while alighting from the car, that the car started while he was alighting, causing him to fall to the pavement, that the starting of the car was the proximate cause of his injury, and that he was not negligent, was sufficient, though it did not specifically find that defendant was negligent.

In an action against a carrier for injuries to an alighting passenger, where the conductor of the car had been examined before trial under St. 1898, Sec. 4096, providing for examination of parties before trial, and was cross-examined on the trial in relation thereto and forced to admit that he had made statements contradictory to those made on the trial, a charge that the jury should not consider the conductor's evidence given prior to the trial in so far only as to determine the credibility of his evidence given on the trial and the weight to be given to it, though inaccurately worded, sufficiently informed the jury that they could consider the conductor's prior testimony only on the question of credibility of and weight to be given his testimony on the trial.

In an action against a carrier for injuries to an alighting passenger, where the only contributory negligence claimed was that plaintiff attempted to alight while the car was in motion, and the court fully charged that if he did so, and by reason thereof he fell or was thrown from the car, he was negligent, it was not error to refuse a request that a slight want of ordinary care by plaintiff contributing to his injury would render him negligent.

In an action against a street car company for injuries to an alighting passenger, where undisputed evidence showed that the conductor was on the rear platform, and saw or should have seen, plaintiff when he was alighting, requests to charge that if the car was stopped for a period reasonably sufficient for plaintiff in the exercise of ordinary care to alight, and the car was then started by defendant's servants without their knowing or having reason to believe that plaintiff desired to alight or was in the act of alighting, then the starting of the car was not the proximate cause of the injury, and that if, when the car started, plaintiff was not in a position reasonably calculated to inform defendant's servants, had they exercised due care, that plaintiff would probably be injured by starting the car, then the starting of the car was not the proximate cause of the injury, were properly refused as not applicable to the evidence. (Jirachek vs. Milwaukee Electric Ry. & Light Co., 121 N. W., Rep., 326.)

CHARTERS, FRANCHISES AND ORDINANCES

New York.—Eminent Domain—Condemnation Proceedings—Orders—Appealability—Compensation — Deduction for Benefits—Intangible Property—Easements—Evidence—Value—Similarly Situated Property.

Under the condemnation provisions of the Code of Civil Procedure, an appeal lies from an order denying a motion to confirm the report of commissioners awarding damages for property taken and remitting the matter to new commissioners to assess damages.

Code Civ. Proc. § 3370, General Railway Law, Laws 1850, c. 140, p. 211, and Rapid Transit Act, Laws 1875, § 20, c. 606, p. 745, providing that in fixing the amount of compensation to be paid by the condemnor the commissioners shall not make "any allowance or deduction on account of any real or supposed benefits which the owners may derive from the public use for which the property is to be taken or the construction of any proposed improvement connected with such public use," apply to the taking of actual tangible property, and not to intangible property. Hence, where easements appurtenant to real property are condemned, benefits may be allowed as a set-off, as, the damages being consequential, the benefits are an element of the right taken.

In condemnation proceedings, it is a general rule that a party may not establish the value of his land by showing what was paid for another parcel similarly situated, subject to the exception that where the difficulty of otherwise proving value is very great, and the other property is so similar in kind and character to that to be acquired that the evidence is reasonably satisfactory, it may be admitted.

In proceedings by a railway company to condemn easements appurtenant to real property on the question of the damage to the owner of a particular estate in the property by the loss in value of such estate from deprivation of the easement, evidence of what the company paid to owners of other interests in the property to secure releases of their rights in the easements is inadmissible, where the estates affected are so dissimilar as not to afford a proper basis of comparison.—(Manhattan Ry. Company v. Stuyvesant et al., 111 N. Y. Sup., 222.)

Texas.—Mandamus—Street Railroads—Streets—Duty to Pave—Evidence.

Where a street railroad's franchise required it to pave the street between its rails and one foot on the outside thereof in the same manner and at the same time as the streets through which the track was laid should be paved by the city, a judgment in mandamus commanding the railway company to forthwith proceed to pave that portion of M. street occupied by its tracks and one foot outside the rails with the same kind of material and at the same time that the city does its part of the work was not objectionable for failure to sufficiently describe the material with which the work was to be done, or the manner and time of doing it.

Where a street railway's franchise required the railway to pave its portion of the street and one foot outside the rails in the same manner and at the same time the streets should be paved by the city, proof that the city was actually engaged in paving a street on which defendant's tracks were laid, and that defendant had refused to pave its portion of the street, not because of financial inability, warranted mandamus compelling the railway company to forthwith comply with its franchise obligation.—(Denison & S. Ry. Co. v. City of Denison, 112 S. W. Rep., 780.)

Virginia.—Street Railroads—Location—Power of City Council—Municipal Corporations—Discretion of City Council—Review—Eminent Domain—Additional Servitude—Streets—Abutting Owners—Rights of Abutting Property Owner—Damage to Abutting Property.

The power conferred by Bristol city charter on the city council to permit street car lines to be built, and to designate the route and grade thereof, is not limited by the present Const. 1902, art. 4, § 58, (Code 1904, p. ccxxii), providing that the Legislature shall not enact any law whereby private property shall be taken or damaged for public uses without just compensation, nor by Code 1904, § 1294i, authorizing the construction of street railroads, and providing that the tracks shall not unnecessarily interfere with the use of the street or public travel over the same, or damage property without compensation, so as to deprive the city council of the right to determine the location of such railroad within a street.

The city council of a city having charter authority to permit street railway lines to be built and to designate the route and grade thereof, the exercise of judgment by the council in directing that a street railway line should be laid east of the center of a street could not be interfered with by the courts, in the absence of a showing of a fraudulent or manifest abuse or oppressive exercise of power.

The rule that the location of a street railway line does not impose an additional servitude on the land occupied by the street so as to constitute an invasion of the property rights of abutting owners is not changed by Const. 1902, art. 4, § 58 (Code 1904, p. ccxxii), prohibiting the passage of any law whereby private property shall be taken or damaged for public uses without just compensation.

Where a city acquires title to the fee of a street by conveyance or condemnation, the abutting owner is presumed to have been compensated for all the servitudes to which the street was liable when the city acquired the land.

A city council, pursuant to charter authority, directed that a street railway company should lay its tracks east of the center of a certain street, on the east side of which complainant owned certain property. The track was to be located six feet from the east curb flush with the surface of the street, and maintained so as not to unreasonably impede travel or the passage of vehicles. Held, that such location did not impair any of complainant's rights in the street; and this, though a vehicle could not stand between the track and the curb while a car was passing.

Where by reason of the location of street railway tracks, east of the center of a street, there was not sufficient room for a vehicle to stand opposite the complainant's property between the track and the curb while a car was passing, complainant was entitled to occupy the street in front of his property for a reasonable time to take away or deliver persons or goods, as against the rights of the street railway company to use the street for passage.

An abutting property owner is not entitled to damages because the proposed location of a street railway track in the street in front of his property as authorized nearer to his property than the center of the street would make such property less desirable and less comfortable as a residence.—(Wagner v. Bristol Belt Line Ry. Co. et al., 62 S. E. Rep., 391.)

Washington.—Eminent Domain—Right of Way—Value of Property.

Under Const. art. 1, § 16, providing that no right of way shall be appropriated until full compensation thereof be made or ascertained, irrespective of any benefit from the improvement proposed, the value of the property taken for a right of way should be fixed as at the time of trial, rather than at the commencement of condemnation proceedings.—(Gray's Harbor & Puget Sound Ry. Co. v. Kauppinen et al., 101 Pac. Rep., 835.)

West Virginia.—Eminent Domain—Property Subject to Appropriation—Railroad Right of Way—Use by Another Company—Railroads—Right of Crossing Road of Another Company—West Virginia Statute.

Under the law of West Virginia, the right of way of a railroad company is its private property; the rights of the public therein being only in its use. After it has acquired and is using such right of way for its road, it cannot be wholly deprived thereof for any other public use, nor can it be subjected to the burden of a further easement thereon without compensation.

Code W. Va. 1906, § 2343, cl. 7, authorizes a railroad company "to cross at grade or to cross over or under * * * any other railroad * * * at any point on its route," and provides that, if the two corporations cannot agree upon the amount of compensation or the points and manner of such crossing and connections, the same shall be ascertained and determined by condemnation proceedings. Section 2216 provides that any railroad, canal, or pipe line company, etc., may cross any other railroad, canal, or pipe line at grade, "provided its work be so constructed as not to impede the passage or transportation of persons or property along the same;" that, "in case the parties interested fail to agree upon such crossing, * * * the company desiring it may bring its suit in equity, and in such suit the court may in a proper case decree that such or any proper crossing * * * may be made upon payment of damages," to be ascertained by proceedings under the condemnation statute. Held that, construing such provisions together and in the light of other provisions, a railroad company has not the absolute right to cross the road of another company at grade at any point it might select, but that, if the parties could not agree on the same, the point and manner of the crossing must first be determined by the court in a suit in equity, after which the crossing may be made on payment of compensation to be determined in condemnation proceedings.—(Elkins Electric Ry. Co. v. Western Maryland R. Co. et al., 163 Fed. Rep., 724.)

News of Electric Railways

Power of Ontario Board to Award Damages to be Decided by Courts

The city of Hamilton applied to the Ontario Railway & Municipal Board recently to recover $2,418.45 from the Hamilton (Ont.) Street Railway for repairs to the asphalt pavement on certain streets and for 2 ft. outside of the rails of the company's lines, claiming this amount in the nature of damages for breach by the company of its obligation to repair the streets named in the petition. The question arose as to whether or not the city could recover for damages through the intervention of the Railway & Municipal Board, involving the subject of the jurisdiction of the commission, a jurisdiction which, in this particular instance, the board did not want to assume unless it was clearly its duty to do so, as it might mean inroads by the board on the jurisdiction of the courts. The board finally decided to adjourn the hearing until after the Court of Appeals has determined the question of its jurisdiction. In filing its opinion the board quoted extensively from the act creating it, and concluded as follows:

"It is clear that this legislation gives the board jurisdiction where the company has violated or committed a breach of such agreement or where the municipality has violated or committed a breach of the agreement to compel the company or the municipality or both specifically to perform the agreement. To enable the board to enforce its order against a company it has power to enter upon, seize and take possession of the whole or part of the railway and its real and personal property. In case of default of a municipal corporation in obeying the order of the board, the board may direct the work to be done by some other person and the expense incurred may be recovered by such person from the municipal corporation in default as money paid and the certificate of the board shall be conclusive evidence.

"In all this legislation there is no inroad made upon the jurisdiction of the courts. The jurisdiction that the courts had before the creation of the board they have still. The jurisdiction conferred upon the board was entirely new and original. The board was established for the purpose of enforcing statutory enactments and agreements made by virtue of statutory power. It does not follow that because the board has power to hear and determine any application and to specifically enforce a statutory enactment or an agreement made by virtue of statutory power, that it has jurisdiction to award damages for their violation. The board has power to prevent their violation, but if either party permits the other to violate the statute or agreement without asking the intervention of the board, and damages accrue, we are of opinion that these damages must be recovered in the courts, which always were and still are wide open.

"The board has responsible and drastic powers delegated to it by the creative act. It will readily occur upon reflection that if the board were compelled to undertake to try the actions for damages, which will accrue to individuals throughout Ontario, based upon breaches of the Railway Act and on the contracts between the thirty odd railways under its jurisdiction and three times that number of municipalities, the board must soon, from mere accumulation of cases, find itself paralyzed and incapable of performing the prompt, direct and effective work contemplated by the act, which the public interest requires at its hands. It is the opinion of the board that the Legislature was fully sensible of this and intentionally omitted to give the board express jurisdiction to award damages.

"By subsection 3 of section 17 of the act creating the board, it is provided that the board shall have exclusive jurisdiction in all cases and in respect of all matters in which jurisdiction is conferred on it by that act or by the special act or by the Railway Act. If this board has jurisdiction, the courts have not, and the result will be that trial by jury in all cases arising out of the Railway Act will be abolished. It never could have been the intention of the Legislature to deprive the individual litigant againt the companies of the palladium of his rights. There should be no straining by the board for jurisdiction; neither does the board want to shirk its duty. Fortunately we are not the sole judges of our jurisdiction. It is not what we say but what the Court of Appeal determines that fixes our jurisdiction.

"During the argument we were asked by the city to construe sections 5 and 11 of By-Laws 624, for the reason that these sections were now being violated. It would be impossible to construe these sections without evidence of the nature and character of the alleged breaches. Before the board can say whether or not its powers can be invoked, it must hear the evidence. We therefore give the city leave to amend and give particulars and adjourn the further hearing of this application until after the determination of the question of the board's jurisdiction by the Court of Appeal."

Cleveland Traction Situation

After the defeat of the Schmidt ordinance, negotiations were reopened for a settlement of the street railway matter and at a special meeting called by Mayor Johnson the Council as a committee of the whole voted unanimously to use the Baker ordinance as a basis for negotiations with the Cleveland Railway. Horace E. Andrews, president of the Cleveland Railway, announced his willingness to negotiate with the Baker ordinance as a basis. The Baker ordinance and the Tayler plan are approximately the same, except for the maximum rate of fare and the length of time within which the city may nominate a purchaser of the lines. According to the Baker ordinance, should any clause in the franchise be found to be illegal the entire grant is invalidated.

Mayor Johnson announced that he desired Mr. Andrews to record his opinion at the next meeting of the Council regarding control of interurban service within the city, the method for fixing the valuation, whether the valuation should be fixed before or after passage of the ordinance, the allowance for payment valuations in case of purchase by the city, and the subject of the failure of the entire ordinance in case any of the clauses are found invalid. Councilman Haserodt desires to know whether Mr. Andrews will insist on a maximum fare of seven tickets for a quarter, a penny charge for a transfer and a five-cent cash fare, or whether he will accept the Baker maximum fare of four cents cash and seven tickets for a quarter without anv transfer charge.

Receiver Warren Bicknell, of the Cleveland Railway, has issued a statement of earnings of the company for July. Gross receipts were $574,223; operating expenses, $333,395; dividend, rental, interest and taxes, $137,722; surplus, $103,-105.

After a series of meetings of the Council the minor questions relating to a new franchise have been temporarily smoothed out. The only questions remaining to be settled are the two concerning public safeguards and the renewal of the Euclid Avenue franchise.

During a meeting of the Council on Aug. 13 it was suggested that the validity clauses be framed so as to effect an increase in fare only and not the life of the grant.

Under such an arrangement it was argued that the bondholders would be protected, because a grant would still belong to the company, worth more than enough to retire all the bondholders under any circumstances.

President Andrews, in stating his opinion of the matter, said that it was his belief that the safeguards must be protected and stated the difficulties facing the company when it came to disposing of bonds and selling stock. Unless bonds could be marketed, he explained, it would be impossible for the company to build a single foot of track or buy any more rolling stock or in any way better the road.

Mr. Andrews said that he had submitted to an expert the Baker ordinance, particularly the clause stating that if any safeguard was declared invalid the entire grant must fail. The report of the expert was to the effect that not one dollar's worth of bonds could be sold dependent upon such an uncertain contract.

An effort will be made by the lawyers on both sides to reduce the section enumerating the public safeguards to general terms. This will be done in the hope that a way may be discovered of lessening the chances of a successful attack on the ordinance with a view to making it an easier problem all around.

Federal Judge Tayler has been chosen to act as final arbitrator on the question of valuation, and when it was suggested that he also arbitrate the dispute over the maximum rate of fare Mayor Johnson declared that he would not agree to any arbitration on the fare question, and that in case of a dispute over the fare question it would be settled by the people at a referendum election.

There are now nine principal questions to be disposed of definitely, some having been temporarily settled. Seven of these are: The legal safeguards, suburban contracts, East

Cleveland contention, the licensee provision, passes for employees, the selection of arbitrators and the value of the pavements at the end of the grant.

After the determination of these questions the remaining two, namely, valuation and rate of fare, can be determined, valuation by immediate arbitration and the rate of fare by agreement after the determination of value.

John J. Stanley, vice-president of the Cleveland Railway, in an interview published in the Cleveland *Leader* of Aug. 16, said:

"From $3,000,000 to $4,000,000 should be spent at once upon extensions and betterments. New cars should be bought and a new powerhouse constructed.

"A crosstown line on the West Side should be built at once. It would run on W. Sixty-fifth Street, from Clark Avenue S. W. to Detroit Avenue N. W. A line should be built from Harvard Avenue S. E. and E. Seventy-first Street to the new Newburg plant of the American Steel & Wire Company, and that line might run through to Brooklyn. The Perkins Avenue line should be built up again. That was the route over which the Wade Park cars ran when they used to come down town on Prospect. And Euclid Avenue ought to have a car line from E Twenty-second Street to E. Fortieth Street."

Transit Affairs in New York

The Public Service Commission, First District, has issued a statement giving a summary of its plans for subway extension and of the proposals of the Interborough Rapid Transit Company and the Bradley-Gaffney-Steers syndicate. The engineers of the commission are now at work preparing the specifications for all the plans and the members of the legal staff are drawing up the forms of contract which must be advertised when bids are requested.

Commissioner Maltbie, of the Public Service Commission, First District, is investigating the operation of cars on the Williamsburg bridge. The subject came up on the application of the receivers of the Metropolitan Street Railway to purchase 500 shares of the Bridge Operating Company from the New York City Railway. The United States Circuit Court has already authorized the purchase, but in view of possible applications for authority to issue bonds in the future, the receivers wish to have the approval of the commission also. The Bridge Operating Company was incorporated in 1904 to undertake the operation of all trolley cars over the Williamsburg bridge. It has 1,000 shares (par $100) fully paid in, which were divided equally between the New York and Brooklyn companies. The New York City Railway, as the operating company in Manhattan, took 500 shares and the other 500 went to the Brooklyn Heights Railroad, the Brooklyn Rapid Transit Company and the Coney Island & Brooklyn Railroad. Subsequently the operation of all local cars over the bridge was turned over to the Brooklyn Heights company, which guaranteed a 6 per cent dividend. The dividend has been paid by the Bridge Operating Company and there has been a surplus, also, which has been divided among the companies owning the stock. The terms agreed on between the receivers of the Metropolitan and the New York city companies provide for the payment of $150,000 for the $50,000 stock, par value.

William M. Coleman, counsel for the Metropolitan receivers, informed Mr. Maltbie that he regarded this price as fair, owing to the profit that had been made and notwithstanding the fact that the companies' agreement with the city was for 10 years from Sept. 1, 1904. After that date it can be terminated at any time on one year's notice by the Bridge Commissioners. The operating company has never filed reports with the commission because it is a business corporation and not a railroad corporation. Commissioner Maltbie ordered that reports be filed. Under the agreement with the city, the Bridge Operating Company paid $10,000 a year and also 5 cents for each and every round trip of a car running over the bridge. The New York City Railway, having ceased to be an operating company, its only interest in the stock of the operating company is what it may derive from its sale for the benefit of its creditors, and hence the present application was made. The local service over the Williamsburg bridge is furnished on a fare of 3 cents, or two tickets for a nickel. The company owns its cars but has no power plant.

At a hearing before Commissioner Maltbie on Aug. 16 William M. Coleman, counsel for the Bridge Operating Company, asked to be relieved from showing the financial results of operation of the property. Mr. Coleman said: "Those figures would seem to show that the Bridge Operating Company is able to show large profits because it is able to purchase power at a low cost, and because its administration expenses are small. It is apparent to the officials of the Brooklyn and Manhattan companies that a great deal of money is being lost in the operation of through cars over the bridge. The Metropolitan receivers have gravely considered, on account of this expense, taking off the through cars now operated on the north tracks of the Williamsburg bridge. It is a question if the whole bridge operation does not mean that more money is being lost in the operation of the through cars than is being made by the local car service. Now, if the figures showing the profit on the local cars are made public, it will be half the truth at best."

The Interborough Rapid Transit Company announces its compliance with the order of the Public Service Commission instructing it to have six six-car, side-door express trains in operation in the subway by Aug. 15. The last of the trains was put into commission on Aug. 14. They will be run from West Farms to Atlantic Avenue, Brooklyn, with the side doors in operation during the rush hours and closed during the rest of the day. It was also announced that this equipment will be installed on the express service of the subway as rapidly as feasible.

Philadelphia Transit Talks

Transit Talk No. 7 of the Philadelphia (Pa.) Rapid Transit Company was dated Aug. 4, 1909. The subject was "Our Men." The talk follows:

Street railway companies expect a large proportion of their motormen and conductors to be "floaters." On most systems the average term of employment is less than two years.

We have more changes than we like, but less than most systems. Every year there are about 2000 changes; that is, one-third, approximately, of our total roster of motormen and conductors change every 12 months.

We get a lot of satisfaction, however, out of the fact that *we have 782 men who have been in our employ 10 years or more.* There are 337 conductors and 445 motormen on the 10-year roll.

So far as we have been able to find out, no other system can make such a showing as this.

Any corporation is fortunate that has 782 employees each with a record of 10 years' loyal service. Faithful and experienced workers spell EFFICIENCY in large letters.

Yes, we know there are others; some of our men don't satisfy us any better than they satisfy you. *But do you know of any body of 6425 public servants with whom you have so little trouble?*

The duties of motormen and conductors are very trying. Please remember this the next time one of them gives offense. And it is only fair to remember also the 99 rides when nothing unpleasant happened as well as the one ride when you were annoyed.

The company's bureau for the prevention of accidents is really a school. It endeavors not merely to teach the men how to do their work well; it also tries to instil a sense of responsibility toward the public and the company.

The success of this bureau (as well as what the men can do when they try) may be judged from the record of a number of barns against which not one collision was charged for several months.

With the co-operation in this work that we have the right to expect from employees, not only will accidents continue to decrease; service will be improved all 'round. That is what we are working for all the time and by all means available.

Transit Talk No. 8 was dated Aug. 10, 1909. The subject was "Trolley Riders Each Day Equal Whole Population of City." The talk follows:

Did it ever occur to you that day in and day out, taking the whole year through, *the average number of passengers daily transported by the Rapid Transit Company is equivalent to the entire population of the city of Philadelphia?* Such is the fact.

During the year ended June 30, 464,364,656 passengers were carried. That figures out nearly 1,275,000 a day. Take the previous year, which was one of more normal conditions, and the average number of riders on street cars in Philadelphia exceeded 1,400,000 a day.

Think what it means to transport that many people. Broad Street Station is a very busy place, yet only about 70,000 people a day are handled there. The Philadelphia Rapid Transit Company under ordinary conditions accommodates in one day about as many people as use the Pennsylvania's big terminal in three weeks.

It is no small task to transport each day as many people as live in Philadelphia—spread over an area of 129 square miles. But that is what the Rapid Transit Company is doing. And this work, *considering its magnitude,* is being accomplished with regularity, and, we think, with the minimum of discomfort and danger to the public.

Of course, there is crowding of cars at rush hours, but so there is everywhere that travel is dense. This is an unavoidable condition.

At the "high-load line" morning and evening we put on 475 *more cars* —seating 18,840 passengers—than we run at noon. This fact may surprise the editorial critic who said recently that the company made no effort to increase its facilities during the rush hours. That statement had no foundation; there may be as little ground for the next criticism you may happen to read.

Transit Talk No. 10, dated Aug. 17, 1909, was entitled "Twelve Riders for Six Car Lines," and said in part:

It is because we want the public to know the problems and perplexities of street transportation in this city that these Transit Talks are published.

Here is a phase of one problem that few people have ever thought of:

The territory west of Fifty-second Street furnishes only 6 per cent of all the Transit Company's passengers, yet this portion of the city gets exactly the same car service as the central portion. In other words, a part of the city furnishing six passengers gets as many cars per hour as the part that supplies a hundred riders.

This means that the Philadelphia Rapid Transit Company is operating at a loss in the new parts of the city.

Why, then, does the company not reduce the number of cars in these less populous districts and save money?

Because, for one out of many reasons, the Rapid Transit Company has incurred an obligation in opening up and developing these new districts, and in spite of loss must carry out an implied contract with dwellers in outlying sections.

Insurance Company Investments in Electric Railway Bonds

In a letter addressed to Charles C. Lemert, Superintendent of Insurance of Ohio, the following opinion is expressed by Attorney-General Denman of Ohio concerning investments in first mortgage bonds of electric railroads by insurance companies:

"Your communication is received in which you call attention to the following quotation from Section 3637 R. S.:

"'First mortgage bonds of railroads within this State upon which default in the payment of interest coupons has not been made within three years previous to the purchase thereof.'

"You inquire whether or not the word 'railroads' as above used may be so construed as to include first mortgage bonds of electric railroads.

"In reply I beg to say the courts of this State have held that the statutes governing and regulating the operation of railroads apply only to steam railroads. These decisions are based upon the fact, however, that legislation affecting steam railways and electric railways has been kept separate by the Legislature.

"Section 3637 Revised Statutes, however, refers to the manner in which the capital of insurance companies may be invested, and in the sixth item authorizes 'first mortgage bonds of railroads within this State upon which default in the payment of interest coupons has not been made within three years previous to the purchase thereof.' It is my judgment, in a proper construction of the word 'railroads' as here used, no distinction is required as between steam and electric railroads. It is only required that they be first mortgage bonds, that the railroads be within this State, and that default in the payment of the interest has not been made within three years previous to the purchase thereof.

"I am, therefore, of the opinion that insurance companies are authorized to invest their capital in first mortgage bonds of electric railroads, provided the other requirements of item six of said section are complied with."

Progress Toward Settlement of Wage Question by Chicago Surface Lines

During the week ending Aug. 14, the controversy between the street railway companies of Chicago and their employees was lessened materially. Conferences were held daily during the week between the presidents of the railway companies and the committees named by the employees. On Aug. 12, John M. Roach, president of the Chicago Railways, presented a scale of wages for consideration which at once appealed to the employees and furnished what it is said will prove to be the foundation for a definite agreement between his company and its employees. On the following day Thomas E. Mitten, president of the Chicago City Railway, presented a proposition amending that submitted by Mr. Roach to his employees. The amended proposition was of such a nature that the committee of employees, representing motormen and conductors, announced that the plan as outlined would be satisfactory with a few minor exceptions. Mr. Roach later endorsed the wage scale as amended.

The proposition as it now stands provides that the Chicago City Railway and the Chicago Railways and all of their subsidiary companies enter into an agreement with their trainmen whereby the labor question will be settled for the next three and a half years, or until Feb. 1, 1913, on the followig basis:

Men who have been receiving the old maximum wage of 27 cents an hour during the last year will receive salary per hour as follows:

	Hourly Wage
From Aug. 1, 1909, to Aug. 1, 1910	28 cents
From Aug. 2, 1910, to Aug. 1, 1911	29 cents
From Aug. 2, 1911, to Feb. 1, 1913	30 cents

For present employees who have served less than one year:

First six months of service	23 cents
Second six months of service	25 cents
Second year of service	27 cents
Remaining eighteen months of contract	30 cents

For men entering service following signing of proposed contract:

First six months	23 cents
Second six months	24 cents
Second year	25 cents
Third year	26 cents
Last six months of contract	27 cents

During the present week the employees' committees waited upon the presidents of the two railway companies in Chicago and negotiated for an increase in wages for the shop men and the attaches of the car houses. While there were still a few minor details to agree upon before final agreements are signed and the negotiations completed, the officers of the railway companies and the committees representing the employees have issued statements that the entire wage question will be settled amicably in a few days.

Syracuse Agreement Approved.—The New York Public Service Commission, Second District, has approved an agreement between the Syracuse Rapid Transit Railway and the Syracuse & Suburban Railway for the use of a portion of each other's lines in the city of Syracuse.

Opening of New Line Advertised in Boston.—The Boston Elevated Railway advertises in the daily newspapers of Boston that its new line to Middlesex Fells is now in use and is accessible by the cars of the company in the 12 cities and towns in which the company operates.

Seven-Car Train Operated Between South Bend and Michigan City, Ind.—The Chicago, Lake Shore & South Bend Railway operated a seven-car train between South Bend and Michigan City, Ind., on Aug. 9. The train was made up in South Bend in two sections, and after passing the city limits the sections were coupled together.

Three-Car Trains for Lake Shore Electric Railway.—Beginning with the summer season next year, the Lake Shore Electric Railway will operate three-car trains between Cleveland and Toledo, according to the statement of F. W. Coen, general manager. The decision was made after a test with a two-car train between Cleveland and Sandusky on Aug. 8, which gave satisfaction to the passengers and the officials. A chair car and a buffet car will also be added.

Legislative Committee Considers Extension of Public Service Commissions' Powers.—The committee of the New York Legislature appointed at the last session to consider whether the Public Service Commissions law should be amended so as to give the commissioners jurisdiction over telephone and telegraph companies began its work at the Murray Hill Hotel, New York, on Aug. 17. The members of the committee are Senator George A. Davis of Buffalo, chairman; Senators John Kissel of Kings, and J. J. Frawley of New York, Assemblyman Edwin A. Merritt, Jr., of St. Lawrence, who framed the Public Service Commission law, and Assemblymen John Yale of Putnam, Artemus Ward, Jr., of New York, J. H. Walters of Onondaga, and Thomas J. Geoghegan of Kings. Ephriam J. Page, of King, Walters & Page, of Syracuse, was selected as counsel for the committee. An adjournment was ten taken until Sept. 6. After the meeting Senator Davis declared that the reports printed in up-State newspapers and elsewhere, in which it had been declared the committee would enter upon an investigation of the Public Service Commissions was erroneous. "This committee has no such authority under the resolution which created it," said Senator Davis. "We can investigate the Public Service Commissons only to an extent sufficient to determine whether those bodies should be burdened with the supervision of telephone and telegraph companies in addition to their present duties."

Announcement of Alabama Light & Traction Association Convention.—Lloyd Lyon, secretary of the Alabama Light & Traction Association, has issued the following announcement of the 1909 convention: "The annual convention of the Alabama Light & Traction Association will be held at Birmingham on Monday and Tuesday, Nov. 15 and 16, 1909. President Ford, without nominating his home city, found that the members of the executive committee were unanimously in favor of Birmingham. The dates have been made to follow those set for the convention of the American Street & Interurban Railway Association, so that those who contemplate attending the national association's convention can do so and return in time for this meeting the following month. Montgomery and Mobile have entertained your association, and the third meeting will be held in the 'Magic City,' whose growth and development have given high rank to Alabama in recent business and industrial progress. As a convention city for this association Birmingham is ideal. President Ford's company, the Birmingham Railway, Light & Power Company, operates in gas, electric lighting and power, steam heating, and is also one of the leading city and interurban railways of the entire South. There will be opportunities offered, during the convention, of inspecting this property's plants and equipment, which should benefit every member in attendance. At a later date the program for the convention will be arranged, and as soon as this has been completed it will be published and distributed to the members. The first meeting at Montgomery surprised all by the enthusiasm and interest shown. Later at Mobile the convention meeting made even a deeper impression on those in attendance. So there is every reason to assume, and none to doubt, that the Birmingham convention will be the most successful of all."

Financial and Corporate

New York Stock and Money Market

August 17, 1909.

Within the last few days a slight pause has occurred in the persistent upward trend of the Wall Street market. It is hardly more than that, for even during the periods when stocks were selling off the sentiment in the market was bullish and traders were enthusiastic over prospects. It is but natural that under conditions when such a large portion of the trading is that of professionals profit-taking should succeed each sharp advance. The upward movement has been led by Union Pacific, which reached 219 during the week, with Reading and Steel common almost equally prominent. Traction stocks have been less active.

Bonds continue to be in good demand, and the money market is beginning to show the effect of trade expansion. More loans are being made, and rates have advanced. Quotations to-day for money were: Call, 2¼ to 2½ per cent; 90 days, 3½ per cent.

Other Markets

Rapid Transit has continued to be the traction feature of the Philadelphia market. Even this has not been as active as a few weeks ago. Price changes have been unimportant. There has been but little trading in Union Traction and Philadelphia Traction.

Within the last few days Massachusetts Electric has developed considerable activity in the Boston market. Both the preferred and common have been bought in considerable quantities and prices have advanced about 2 points.

There has been practically no dealing in traction stocks in the Chicago market within the week. A few odd lots of Chicago Railways, Series 2, have been sold, but there was no interest in the market. Subway has been less active and declined several points.

In Baltimore, United Railways bonds continue to be active, with fractional price changes. There has also been some trading in the stock at about 14⅜.

Quotations of various traction securities as compared with last week follow:

	Aug. 10.	Aug. 17.
American Railways Company	40	a46½
Aurora, Elgin & Chicago Railroad (common)	*41½	a49¾
Aurora, Elgin & Chicago Railroad (preferred)	*86½	a95
Boston Elevated Railway	127⅝	128⅜
Boston & Suburban Electric Companies	*17½	*17
Boston & Suburban Electric Companies (preferred)	*70	*17
Boston & Worcester Electric Companies (common)	a13	10
Boston & Worcester Electric Companies (preferred)	54½	52½
Brooklyn Rapid Transit Company	80⅜	79½
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	87½	86½
Capital Traction Company, Washington	a142	141
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*3	*3
Chicago & Oak Park Elevated Railroad (preferred)	*12	*12
Chicago Railways, ptcptg, ctf. 1	a112	a112
Chicago Railways, ptcptg, ctf. 2	a39	a38
Chicago Railways, ptcptg, ctf. 3	a25	a24½
Chicago Railways, ptcptg, ctf. 4s	a10	*10
Cleveland Railway	*78	*78
Consolidated Traction Company of New ersey	a78	a77½
Consolidated Traction of N. J., 5 per cent bonds	a106½	a106½
Detroit United Railway	a70	71
General Electric Company	171⅜	169½
Georgia Railway & Electric Company (common)	*94	a93
Georgia Railway & Electric Company (preferred)	*88	a87
Interborough-Metropolitan Company (common)	12½	14½
Interborough-Metropolitan Company (preferred)	48⅝	47½
Interborough-Metropolitan Company (4½s)	83¼	82¾
Kansas City Railway & Light Company (common)	a50	a50
Kansas City Railway & Light Company (preferred)	83⅛	*89⅜
Manhattan Railway	144½	a145
Massachusetts Electric Companies (common)	12⅞	14½
Massachusetts Electric Companies (preferred)	73½	75
Metropolitan West Side, Chicago (common)	15⅛	a18
Metropolitan West Side, Chicago (preferred)	48½	a50
Metropolitan Street Railway	a23	a23
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	85	83¼
Northwestern Elevated Railroad (common)	a21	a20
Northwestern Elevated Railroad (preferred)	a70	a70
Philadelphia Company, Pittsburg (common)	44	48
Philadelphia Company, Pittsburg (preferred)	44½	45
Philadelphia Rapid Transit Company	31	31⅛
Philadelphia Traction Company	a91¼	91
Public Service Corporation, 5 per cent col. notes	a100½	a100¼
Public Service Corporation, ctfs.	a92½	a93½
Seattle Electric Company (common)	112½	116
Seattle Electric Company (preferred)	*105	*106
South Side Elevated Railroad, Chicago	a58	a56
Toledo Railways & Light Company	10½	10
Third Avenue Railroad, New York	19¼	18¾
Twin City Rapid Transit, Minneapolis (common)	103¾	110
Union Traction Company, Philadelphia	55¼	55
United Railways & Electric Company, Baltimore	14	14⅜
United Railways Inv. Co., San Francisco (common)	a38½	37⅛
United Railways Inv. Co., San Francisco (preferred)	54	a56¼
Washington Railway & Electric Company (common)	a47	47½
Washington Railway & Electric Company (preferred)	a92½	92
West End Street Railway, Boston (common)	96½	95½
West End Street Railway, Boston (preferred)	*105	106¼
Westinghouse Electric & Manufacturing Company	88	85⅞
Westinghouse Elec. & Mfg. Company, (1st pref.)	120	125

aAsked. *Last sale.

Asheville (N. C.) Electric Company.—This company has filed a mortgage to the Old Colony Trust Company, Boston, as trustee, to secure not exceeding $3,500,000 of 5 per cent bonds, due July 1, 1939. Of this issue, $750,000 bonds will be reserved to retire an equal amount of first mortgage 5s, due in 1941.

Berkshire (Mass.) Street Railway.—The Board of Railroad Commissioners of Massachusetts has authorized this company to issue not exceeding $190,000 of 20-year 5 per cent debenture bonds.

Columbia Power, Light & Railway Company, Bloomsburg, Pa.—This company, incorporated in Delaware with $1,250,000 capital stock, has purchased the stock of the Danville & Bloomsburg Street Railway and of companies owning the electric lighting and gas properties of Danville, Bloomsburg and Berwick, Pa.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—With the appointment of Eli M. West, Columbus, as receiver of the Columbus, Delaware & Marion Railway, by Judge E. B. Kinkead, of the Franklin County Common Pleas Court, the company passed into the control of two receivers, Judge B. S. Young, Marion, having previously appointed George W. Whysall, general manager of the company, receiver. The appointment of the first receiver was made on the application of N. J. Catrow, Miamisburg, who is treasurer of the company, because notes held by him for $372,381.81 remain unpaid. Immediately upon the appointment of Mr. Whysall the question of court jurisdiction arose and it was insisted that the receivership should have been granted in Franklin County. It finally was agreed that the receivers should work jointly.

Des Moines (Ia.) Railway & Light Company.—This company has been incorporated in Maine with $100,000 capital stock.

Gainesville Railway & Power Company, Gainesville, Ga.—The Gainesville Railway & Power Company, which was formed recently to acquire the property of the Gainesville Electric Railway, which was sold under foreclosure, has been permanently organized with the following officers and directors: A. G. Sharp, Atlanta, president; W. A. Carlisle, vice-president; W. H. Slack, secretary-treasurer; C. M. Merrick, W. R. Pomerene, F. M. Marriott and J. E. Redwine, Jr.

General Electric Railway, Dover, Del.—The property and franchise of the Delaware General Electric Railway, which proposed to build an electric railway in Kent County, were offered for sale recently. R. R. Kenney, attorney for the receiver, offered the property as a whole and it was finally sold to James Lord, Dover, Del., with the exception of portion of land containing five acres 2½ miles from Dover, which had been purchased for the purpose of building a power house. This was sold for $170. It was generally understood that Mr. Lord represented Leo Belmont, Philadelphia, who was interested in the original proposal to build the electric railway.

Georgia Railway & Electric Company, Atlanta.—Of the $20,000,000 authorized "refunding and improvement mortgage bonds," dated Jan. 1, 1909, and due Jan. 1, 1949, but subject to prior redemption at 105 and interest, $1,250,000 are issuable forthwith, including the $1,000,000 sold recently, and $11,230,000 are reserved to retire underlying liens. The remainder may be issued from time to time to an amount not exceeding 75 per cent of the actual and fair cost of extensions, improvements and additions (including bonds and shares of stock of other corporations), provided that no bonds shall be issued unless the net earnings after operating expenses and taxes for the 12 months next preceding shall have been equal to at least 1½ times the interest on all outstanding bonded debt, including the bonds proposed to be issued.

New Orleans Railway & Light Company.—Bertron, Griscom & Jenks, of New York and Philadelphia, have purchased $2,580,900 of 40-year 5 per cent bonds, dated Nov. 1, 1909, and have also acquired an interest in both the preferred and the common stocks. This firm will have two representatives on the board of directors. The bankers have sold this block of bonds to a French syndicate headed by the French Finance Corporation. The new mortgage will secure an authorized issue of $50,000,000 of 5 per cent 40-year bonds, of which $30,000,000 will be reserved to retire the general mortgage 4½ per cent bonds now outstanding. The new issue will be a first lien on all property now owned or hereafter acquired, subject to the existing general mortgage 4½ per cent issue. Of the balance, $1,580,900 will be used to retire on Nov. 1, 1909, an issue of outstanding 6 per cent notes. The remaining bonds can be issued: (1) For improvements and betterments to the properties of the railway company at 75 per cent of the cost thereof; (2) for the acquisition, dollar for dollar, of additional shares of stocks, bonds and obligations of subsidiary companies now

owned or controlled or hereafter acquired or controlled by the railway company and which shall have been issued by such companies for betterments and improvements, not in excess of 75 per cent of the cost thereof; and (3) for the acquisition of additional shares of stock, bonds and obligations of the subsidiary companies now owned or controlled or hereafter acquired or controlled by the railway company at 75 per cent of the par value thereof, such shares of stock, bonds or obligations to be paid for at par by the railway company.

New York, New Haven & Hartford Railroad.—The New York Public Service Commission, Second District, has denied the application of the Central New England Railway for consent to execute a mortgage for $20,000,000 upon its property and for authorization to issue bonds upon the security thereof to the amount of $12,910,000. The application submitted was the financial organization plan of the New York, New Haven & Hartford Railroad for this property.

Northern Texas Electric Company, Ft. Worth, Tex.—An initial dividend of 2 per cent has been declared on the $2,500,000 common stock, payable on Sept. 1.

Oneonta & Mohawk Valley Railroad.—The receivership has been terminated and the company reorganized under the title of the Otsego & Herkimer Railroad. W. Boardman Reed is president; Herbert T. Jennings, vice-president and general counsel; Miss L. M. Wilson, treasurer; Joseph K. Choate, general manager, Hartwick, N. Y.

Philadelphia Rapid Transit Company.—During the first 12 days in August the gross earnings of the company increased $33,000, as compared with the corresponding period of the previous year. The increase in gross revenue in July, as compared with July, 1908, was $139,000.

Seattle (Wash.) Electric Company.—A quarterly dividend of 1¾ per cent has been declared on the common stock, payable on Oct. 15.

Toledo, Bowling Green & Southern Traction Company, Toledo, Ohio.—In the Electric Railway Journal of July 10, 1909, page 91, it was announced that a meeting of the stockholders of the company would be held on Aug. 6, 1909, to ratify an increase of $750,000 in the capital stock of the company to provide funds for lifting the receivership of the Toledo Urban & Interurban Railway and taking over the property of that company. The plan was approved at the meeting and the Toledo, Bowling Green & Southern Traction Company will take over the Toledo Urban & Interurban Railway just as soon as the formalities can be arranged.

United Railways Investment Company, New York.—The Railroads & Power Development Company, incorporated recently in Maine, is designed to be the holding company for the Stanislaus Power Development Company and the San Francisco Electric Railways and will own $10,000,000 out of $18,800,000 common stock of the United Railroads of San Francisco.

York (Pa.) Railways.—This company has had listed on the Philadelphia Stock Exchange $3,400,000 of first mortgage bonds, $1,600,000 of preferred stock and $2,500,000 of common stock.

Samuel B. McLenegan, general manager of the Central California Traction Company, Stockton, Cal., has submitted a letter to the newspapers of Stockton in relation to the settlement of the differences between the company and its motormen and conductors. Mr. McLenegan says in part: "As we have already stated, there were no serious differences between the company and its employees which could not be adjusted by cool-headed men. The signed agreements cover one for the Stockton city lines and one for the interurban division, to fit the working conditions of each, but seniority from the former to the latter was not considered. The company insists upon careful and competent men on each, but it is wholly immaterial what politics, religion or other beliefs our men adhere to, and has absolutely no interest in any other consideration. To obtain promotion a man must be thoroughly competent to do the work entrusted to him, and there is no reason why the conductor or motorman of to-day may not become the dispatcher, trainmaster or superintendent of to-morrow, if he will but demonstrate his ability, his honesty of purpose and trustworthiness to fill the higher position. To consider for a moment the question of placing the sloven, the shiftless workman, on a par with his fellow man who is active, energetic and full of ambition, and to determine their promotion by seniority of service is contrary to every sense of right and justice. The conclusions reached and precedents established by this agreement are not of local interest only, but are far reaching in effect, being of vital interest wherever electric railways are in operation."

Traffic and Transportation

Ruling by Washington Commission on Request for Modification of Its Orders

Four requests of the Washington Railway & Electric Company, Washington, D. C., to the Interstate Commerce Commission for a modification of certain regulations recently adopted, together with the action taken by the District Electric Railway Commission upon them at its last meeting, have been made public by the District Electric Railway Commission and follow:

To the request that the headway required on all east and northbound cars operated between Fifteenth and G Streets northwest and North Capitol Street and T Street be increased to 3 minutes instead of 3¾ minutes, as required by the regulation and 2½ minutes as now operated by the company, the District Commission recommends that a 2½ minute headway be required.

In this connection Secretary Eddy stated that if the patrons of that line would patronize the small cars instead of crowding as a rule into the large Brookland cars the service would be materially improved.

As to a request for a modification of the regulation requiring fuse boxes and circuit breakers with covers, the commission recommends that the railway company be informed that any "inclosed" type of circuit breaker will be considered as complying with the regulation, and that its request for a modification of the regulations that covers be required only "where live contacts are in reach of passengers or pedestrians" shall not be adopted.

The request of the company that the regulation as to pickup fenders and wheelguards be made to apply to those cars only which are acquired after July 1 was denied, Secretary Eddy, after investigation, reporting that it is generally accepted among street railway men that a properly operated fender which can be dropped to the pavement is much more likely to prevent fatal or serious injury than one maintained in a fixed position several inches above the track.

The request for a modification of the headway schedules for the Anacostia and the Eleventh Street lines has been granted until Oct. 1, as follows: Between Ninth and F and Eleventh and Monroe Streets, between the hours of 4:40 p. m. and 5:20 p. m., the headway shall be 2½ minutes instead of three minutes; between Anacostia and Ninth and G Streets northwest, between 7:30 a. m. and 8 a. m., the headway shall be four minutes instead of 3¾ minutes, and between Ninth and F Streets and the Anacostia bridge, between 6 p. m. and 6:30 p. m., the headway shall be three minutes instead of four minutes. This concession is made because of the falling off in the traffic during the months of July, August and September.

The request for the revocation of the regulation requiring an additional safety hanger for brake beams was denied for the reason that the device is believed to be a safety precaution and a large number of the cars are already supplied with them, while all the new cars have them.

Hearing on Coney Island Fares

A hearing on the application of Jonas Monheimer to compel the Coney Island & Brooklyn Railroad, Brooklyn, N. Y., to charge a 5-cent fare to Coney Island on weekdays was held before the Public Service Commission of the First District of New York on Aug. 11. Mr. Monheimer originally complained against the company for charging a 10-cent fare to Coney Island on Saturdays, Sundays and holidays, but the commission, after carefully considering the evidence, sustained the company in exacting this rate of fare, as stated in the Electric Railway Journal of July 10, 1909, page 75. When Mr. Monheimer's first case was begun the company was charging only 5 cents on weekdays, but it subsequently made the rate a flat one of 10 cents for every day. The decision of the commission, in the original complaint, covered, of course, only the Saturday, Sunday and holiday rate. Mr. Monheimer then filed a complaint against the 10-cent charge on weekdays.

Owen J. Finnerty appeared as counsel for Mr. Monheimer, and O. F. Kuhn appeared as counsel for the Coney Island & Brooklyn Railroad. S. W. Huff, president of the Coney Island & Brooklyn Railroad, was also in attendance at the hearing. Mr. Finnerty's witnesses were introduced to show that the low fare adopted by the company on weekdays had induced people to move to Coney Island, but that many of these people had found the double fare burdensome and had left Coney Island to reside within the 5-cent zone. As a result small tradepeople had suffered

considerable financial loss and the owners of flats and dwellings had recently been compelled materially to reduce rents in order to retain their tenants.

Henry Floy, a consulting engineer in the employ of the commission, introduced as evidence a summary of the property of the company. He did not submit any figures as to value, however, it being stated that these figures would not be ready for several weeks. A. H. Walker, as counsel for the commission, introduced considerable documentary evidence bearing upon the history, franchise rights, operating expenses, indebtedness and ability of the company to carry passengers for the 5-cent fare, which had been put in evidence in the former proceedings.

Mr. Kuhn, for the company, asserted that the complainants had failed to make out a case against the company and moved the complaint be dismissed. He contended that the company is empowered to charge a 5-cent fare to Prospect Park, and that at the rate of 3 cents a mile for the remaining six miles to Coney Island the 10-cent fare is neither excessive nor illegal. Commissioner Bassett, before whom the hearing was held, adjourned the hearing until Aug. 25.

Service on Surface Lines in New York

The Public Service Commission of the First District of New York has issued the following table, which, it says, shows the effect of orders issued by it regarding service on the surface lines in New York:

Line.	Direction.	Before: Average seats per car.	Before: Average passengers per car.	Before: Average loading (per cent).	After: Average seats per car.	After: Average passengers per car.	After: Average loading (per cent).	After: Per cent of improvement.
Fourth & Madison Avenue	North	36	59	163	36	41	113	31
	South	36	45.5	126	36	40	112	11
Grand Street Crosstown	West	28	52	185	31	36	116	37
	East	28	43	153	30	34	114	25
Third and Amsterdam Avenue	North	35	57	163	53	44	82	50
	South	35	36	103	54.5	33	61	41
Lexington Avenue	South	32	39	121	47	48	102	16
	North	33	40	122	45	42	94	23
Kingsbridge Line	North	28	27	97	28	29	103	6
	South	28	16	56	28	12	44	22
Eighth Street Crosstown to Brooklyn	West	28	46	164	28	29	103	37
	East	28	57	203	28	24	87	57
Christopher & East Tenth Street Ferry	East	28	35	124	28	19	66	47
	West	28	34	121	28	24	87	28
Fourteenth Street Crosstown to Brooklyn	East	35	69	198	36	41	113	43
	West	34.4	54	157	36	47	130	17

Additional Transfer Points in Philadelphia.—The Philadelphia Rapid Transit Company will grant 36 additional transfer points to South Philadelphia.

Wages Increased by Chicago, Lake Shore & South Bend Railway.—The Chicago, Lake Shore & South Bend Railway Company, South Bend, Ind., has increased the wages of its motormen and conductors from 23½ to 27 cents an hour.

Council of Marquette, Mich., Grants Fare Increase.—The Common Council of Marquette, Mich., has amended the franchise of the Marquette City & Presque Isle Railway, so as to permit a straight 5-cent fare to be charged in lieu of six tickets for 25 cents. The company showed that the property was operated at a loss.

Increase in Wages in Portland, Ore.—The Portland (Ore.) Electric Railway has increased the wages of its motormen and conductors from 30 cents to 33 cents. For the first year, however, the men will continue to get 30 cents. The Oregon Electric Railway is a high-speed line, and its employees make from 156 to 200 miles per day, that is 10 to 11½ hours, according to layovers. The increase went into effect on July 18.

Complaint Against Excess Fare on New York Line.—The New York Public Service Commission, Second District, has received a complaint from James Morris, of Albion, against the Buffalo, Lockport & Rochester Railway, asking the commission to order the company not to charge the excess fare of 5 cents between any of its stations on this line where the fare is paid on the car instead of procuring a ticket at the station.

Smoking on Rear Seats in Rochester.—The New York State Railways, Rochester lines, has returned to the practice of permitting passengers who occupy the three rear seats of open cars to smoke. Some time ago the company changed its original order to this effect so as to make it apply only to passengers standing on the back platform, but there were so many who desired to smoke that entrance to the cars was made very difficult at times.

Interurban Competition Causes Changes in Steam Road Schedule.—The Lake Erie & Western Railroad, a steam line, will make the third attempt to overcome interurban competition by running five trains into Indianapolis every morning and evening, beginning on Aug. 16. The round-trip fare will be identical with that charged by the interurban lines between Peru and Indianapolis and Portland and Indianapolis. The trains will consist of two and three coaches and will make many stops. The tariff sheets have been filed with the Railroad Commission.

Appeal to Interstate Commerce Commission.—A complaint of discrimination was filed with the Interstate Commerce Commission at Washington, D. C., on Aug. 16, based on the refusal of the San Pedro, Los Angeles & Salt Lake Railroad to make through routes and joint rates with the Pacific Electric Railway of Los Angeles, Cal. The complaint was made by the Southern California Sugar Company. By reason of the defendants' refusal to make such routes and rates the sugar company alleges it is forced to pay excessive rates for the transportation of its products.

Selectmen Petition for Lower Fare.—The Selectmen of Westwood, Mass., have filed a petition in the Supreme Judicial Court for Norfolk County in equity asking that the Dedham & Franklin Street Railway be forced to comply with the terms of its location and the rights of fare. The issuance of a mandatory order or injunction is asked that the rate of fare shall not exceed 5 cents for any distance in one continuous trip within the town limits or for a continuous trip from any point along the line of the road in Westwood to its respective termini in Medfield and Dedham. The petitioners in their bill allege that the Dedham & Franklin Street Railway compels the payment of 10 cents for continuous trips from points in Westwood to the termini mentioned.

Lehigh Valley Transit Advertises Attractions.—The Lehigh Valley Transit Company, Allentown, Pa., is advertising its Liberty Bell route in the daily papers. The company carried in a recent Sunday issue of the Philadelphia *Ledger* an advertisement 15½ in. wide by 11 in. long, telling about the unique trip and giving the time of starting cars. The route is from Chestnut Hill, Philadelphia, to Allentown, Bethlehem and Nazareth, and thence over connecting roads to Mauch Chunk or Portland, which is within a few miles of the Delaware Water Gap. The trips are personally conducted, a competent tourist agent and lecturer accompanying each car. The fare to the Water Gap is $1.32, to Allentown 60 cents and to Bethlehem 70 cents. The company has also recently carried in the Philadelphia daily papers an advertisement about this service 6½ in. wide by 2½ in. long.

Twin City Company Burns Boat and Increases Business.—The Twin City Rapid Transit Company, Minneapolis, Minn., on Aug. 12 burned the *Excelsior*, one of the oldest boats, off Big Island Park on Lake Minnetonka. The boat was formerly used by the company as a part of the system of express boats running on the lake. The event was advertised in the newspapers and special cars were brought into service to accommodate the people from Minneapolis who went to see the spectacle. The spectators were first treated to a display of fireworks from the boat, after which the boat was burned. The *Excelsior* was recently condemned so that the company decided to burn it in order to attract some additional business for Lake Minnetonka. It is said that the result was perfectly satisfactory, and it proved to be one of the gala evenings of the summer at Lake Minnetonka.

South Shore Route Folder.—The Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has issued through A. F. Faber, traffic manager, a traffic circular illustrating and describing its line between Chicago and South Bend, skirting Lake Michigan. Hudson Lake, one of the principal pleasure resorts along the line, receives considerable attention. The location of the resort and the amusements there are described and information is given regarding the hotels and the camping grounds. The general information contained in the circular covers such subjects as how to reach Chicago, how to travel from Chicago, tickets, special cars, baggage, lost articles and the arrangement that can be made with the Wells-Fargo Express Company for handling express matter. A double page of the circular is devoted to time tables of week-day trains westbound between South Bend and Chicago and eastbound trains between Chicago and South Bend, and a double page is also devoted to a similar summary of trains for Sundays. A map of Chicago shows the Randolph and the Van Buren Street stations and the principal business houses in the loop district of Chicago.

Personal Mention

Mr. W. Scott Libbey, Lewiston, Maine, has been elected treasurer of the Portland, Gray & Lewiston Electric Railroad, with headquarters at Lewiston.

Mr. Matthew C. Brush has resigned as vice-president and general manager of the Boston Suburban Electric Companies to become general manager of the Buffalo & Lake Erie Traction Company.

Mr. William N. Patten, engineering manager of the Stone & Webster Engineering Corporation, has become associated with the construction department of the company and Mr. Frederic N. Bushnell has succeeded him as engineering manager.

Mr. Herbert S. Whiton has resigned as local manager of the Ponce Railway & Light Company, Ponce, P. R., to become superintendent of power of the Minneapolis General Electric Company, Minneapolis, Minn. Mr. Whiton was succeeded by Mr. Edward T. Steel.

Mr. A. G. Jillson, formerly connected with the Houston (Tex.) Electric Company and with the Boston office of Stone & Webster, has been appointed assistant treasurer of the Pensacola (Fla.) Electric Company to succeed Mr. R. G. Carroll, who has been transferred to the Boston office of Stone & Webster.

Mr. T. B. Gay has resigned his position as secretary and purchasing agent of the Norfolk & Portsmouth Traction Company, Norfolk, Va., effective Aug. 15. He will enter the law firm of Messrs. Munford, Hunton, Williams & Anderson, Richmond, on Oct. 1, as an associate member. Mr. Gray was graduated from the Law School of the University of Virginia and was admitted to the Virginia bar several years ago.

Mr. W. S. Dimmock has been elected general manager of the Pacific Traction Company, Tacoma, Wash., the property of which has been purchased by the Stone & Webster interests. The personnel of the newly elected officers is as follows: Mr. F. A. Boutelle, superintendent; Mr. A. W. I. Birtwell, assistant treasurer; Col. W. R. Woodward, superintendent of construction; Mr. W. F. Bosworth, chief engineer; Mr. D. G. Dewey, master mechanic; Mr. G. O. Snyder, purchasing agent; Mr. K. C. Schluss, superintendent of power, and Mr. A. H. McMay, traffic agent.

Mr. R. D. Miller, who was recently appointed general manager of the Sapulpa & Interurban Railway Company, Sapulpa, Okla., has heretofore been connected with steam railroads. Mr. Miller spent over 15 years in steam railroad work as trainmaster, superintendent of terminals and division superintendent on the Kansas City, Memphis & Birmingham Railroad and the St. Louis & San Francisco Railroad. He was connected with the latter road as division superintendent, with headquarters at Sapulpa, until July 1, 1907, when he resigned his position to engage in the oil business.

Mr. Frederic N. Bushnell, who has been appointed engineering manager of the Stone & Webster Engineering Corporation to succeed Mr. William N. Patten, joined the staff of Stone & Webster in February, 1907, taking charge of the construction of the Lincoln, Harvard and Charlestown power stations of the Boston Elevated Railway. This work consisted in substantially enlarging the structures of the three original stations and installing 20,000 hp of new generating capacity with boilers and all other auxiliaries. It was carried out in the exceptionally short period of 10 months. Previously Mr. Bushnell was chief engineer of the Rhode Island Company, in charge of design and construction of power stations, substations, car houses, bridges, tracks, and also of operation of power stations. In connection with a large station designed and built under his supervision at Providence, there was conducted a service test which lasted an entire year and established a record for economical operation that has rarely, if ever, been equalled in this country. In the engineering field Mr. Bushnell is regarded as an authority on the design and operation of power stations.

OBITUARY

Howard F. Grant, who has been prominently identified for some years with the Stone & Webster interests of Boston, died at the home of his sister, Mrs. John G. Parsons, Portsmouth, N. H., on Aug. 15. Mr. Grant was born on Oct. 24, 1858. His first railroad connection was as watchman for the Eastern Railroad at Portsmouth, N. H., when he was 19 years of age. Later he was placed in charge of the kyanizing plant of the company at Portsmouth. One year later he was made a clerk in the maintenance of way department and afterward promoted to the position of chief clerk. After the consolidation of the Eastern Railroad with the Boston & Maine Railroad, Mr. Grant became chief clerk in the department of engineering and maintenance of way for the system. Mr. Grant resigned from the Boston & Maine road in 1893 to become secretary to Charles S. Sergeant, vice-president and general manager of the West End Street Railway, Boston. He remained in this position for 10 years, extending into the period of the operation of the West End Street Railway by the Boston Elevated Railway. Mr. Grant resigned this position on Jan. 10, 1903, to accept the office of general manager of the Seattle (Wash.) Electric Company. Three years later there were added to his duties in this position those of district manager for all the Stone & Webster properties in the Puget Sound territory. Later Mr. Grant withdrew from the office of general manager of the Seattle Electric Company and devoted his time entirely to the work of district manager. About a year ago Mr. Grant left Seattle and returned to the Boston office of Stone & Webster.



Howard F. Grant

A Suggestive Time Table

The time table of local and limited trains on the Pittsburgh, Butler, Harmony & New Castle Railway, Pittsburgh, Pa., between Evans City, Butler, Harmony, Zelanople, Ellwood City and New Castle contains advice and instructions to patrons that may prove of value as suggestions for officers of the traffic transportation departments of other railways to whom is entrusted the work of preparing time tables and traffic circulars. The Pittsburgh, Harmony, Butler & New Castle Railway is a 1200-volt d. c. road and consists of 75 miles of line built according to the latest interurban standards. A complete time table is given between Pittsburgh and New Castle and between New Castle and Pittsburgh; also between Pittsburgh and Butler and Butler & Pittsburgh, and New Castle and Butler and Butler and New Castle. The tables are so divided that limited and local trains are entirely separate. Among other things the circular says:

"Ordinary, every day trolleying has its advantages, but the 'trolley traveler' who uses this service in an intelligent manner reaps the greatest harvest. Tired nature demands relaxation from the daily grind and nothing so fully meets this demand as a change of scene. Of course, everyone uses the electric cars for what might be termed business purposes. It's a convenient, quick way for reaching places of business, for shopping or calls, or for reaching any point where there is some special reason for making the trip—but that isn't 'trolleying.'

"What we want to get at is this. Intelligent trolley riding will furnish more real, genuine pleasure than any similar investment. Coupled with the pleasure, there is health and the added educational advantages to be derived from seeing the historic points of interest that surround the vicinity in which one lives; seeing the bounteous gifts of nature along the route; seeing the many manufacturing and other industrial enterprises; and how other people live and work.

"Special effort is made by the company to select tried and true men who know their business; men who can be trusted not only to operate cars, but who will do their utmost to care for the comfort of passengers. It is the only way to travel in parties.

"The Pittsburgh, Harmony, Butler & New Castle Railway through its realty department is prepared to give valuable and timely information to those seeking residential, manufacturing, farming, outing resort and bungalow sites, along its route, that will enable them to avoid possible error and costly mistakes. The policy of the company is to work for the upbuilding of its territory.

"It is the desire of the company that all patrons receive courteous and intelligent attention at the hands of their employees, and prompt investigation will follow any complaints received for such violation or neglect. At the same time the public is requested to make its wants known to the conductor in a clear and explicit manner and to kindly bear in mind that the demands upon his time are invariably pressing and often of a nature calculated to irritate the most affable."

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Iowa Light & Traction Company, Eldora, Ia.—Incorporated in South Dakota to build an electric railway from Boone to Ogden, Ia., with branches to Ames, Story City, Eldora, Des Moines, Webster City and Perry, Ia. Capital stock, $500,000. Headquarters, 153 LaSalle Street, Chicago, Ill., and Eldora, Ia. Incorporators and officers: Henry S. Osborne, chairman of board; Andrew Stevenson, president and general manager, Chicago; E. E. Hughes, Boone, Ia., vice-president and treasurer; J. H. McBride, Philadelphia, Pa., second vice-president, and J. F. Hardin, Eldora, Ia., secretary. [E. R. J., July 24, '09.]

***Oklahoma City & Suburban Railway, Oklahoma City, Okla.**—Incorporated for the purpose of constructing four interurban railways, the main route to extend from Britton to Edmond and Oklahoma City to Moore, 32 miles in length. The main terminus will be at Thirteenth Street and Santa Fé Avenue, Oklahoma City. From this point one branch will extend east 2 miles and northwesterly 2 miles; another branch will extend from Main and Pennsylvania Avenues northwesterly for 3 miles. Branch offices will be located at Pittsburgh, Pa., and New York, N. Y. Capital stock, $250,000. Incorporators: Charles W. Ford, superintendent of the Oklahoma Railway; J. J. Johnson, Fred S. Combs, W. A. Haller and Richard Durrett, all of Oklahoma City.

Baker Interurban Railway, Baker City, Ore.—Incorporated to build electric railways in the vicinity of Baker City. Capital stock, $50,000. Incorporators: Thos. B. Neuhausen, Anthony Mohr and A. K. Bentley. [E. R. J., July 31, '09.]

***Utah & Idaho Railroad, Salt Lake City, Utah.**—Incorporated in Utah to construct a railway, to be operated either by steam or electricity, from a point on the Ogden & Lucin Railroad at or near Salina, northerly through Kelton Pass to the State line and then to connect with the Minidoka & Southwestern Railroad near Burley, Idaho, a total distance of 150 miles. Surveys are being made so that construction can begin within six months. Capital stock, $160,000. Headquarters, Salt Lake City. Officers: W. H. Bancroft, president; D. E. Burley, vice-president; C. H. Jenkinson, treasurer, and G. K. Smith, secretary. Incorporators: W. H. Bancroft, J. M. Davis, P. S. Williams and F. H. Knickerbocker.

FRANCHISES

Selma, Ala.—The Selma Street & Suburban Railway has been granted a franchise by the City Council to extend its street railway on Water Street.

Vacaville, Cal.—T. T. C. Gregory, president of the Vallejo & Northern Electric Railway, has applied to the Board of Trustees for a renewal of a franchise granted to the railway, and which expired about a year ago. [E. R. J., Oct., 31, '08.]

Wilmington, Del.—The People's Railway has applied for a franchise to the Street and Sewer Directors to extend its tracks on King Street from Front Street to the terminal of the New Jersey & Wilmington Ferry Company.

Kokomo, Ind.—The County Commissioners have granted a franchise to C. C. McFann, president and general manager of the Kokomo Western Traction Company, to construct a railway from Kokomo west to Young America. The railway will extend later to Burlington and Flora, a total distance of 15½ miles. The company expects to handle passengers and freight. It is stated that gasoline is being considered as motive power. [E. R. J. Dec. 19, '08.]

Michigan City, Ind.—The City Council has granted to the Chicago, Lake Shore & South Bend Railway an extension of its franchise until September, 1910, in which to complete its proposed branch into Michigan City.

Edna, Kan.—The City Council has granted a franchise to the Kansas Union Traction Company to build its proposed electric railway through Edna. The company expects to begin construction on the two routes this fall, connecting Cherryvale and Columbus, and Parsons and Coffeyville, all in Kansas. Barney McDaniel, Altamont, secretary, and Archer & Rollins, Kansas City, Mo., contractors. [E. R. J., April 10, '09.]

Juarez, Mexico.—H. S. Potter, general manager of the El Paso (Tex.) Electric Railway, has applied to the State government for a concession to extend the electric railway in Juarez to the racetrack projected by Col. M. J. Winn. Louisville, Ky.

***Sidney, N. Y.**—E. C. Bennett, Pulaski, N. Y., a contractor, has applied to the Board of Trustees for a franchise to build an electric railway from Sidney to Treadwell. The proposed railway is to connect Sidney and Franklin.

Utica, N. Y.—The Public Service Commission of the Second District has granted its approval and given permission to the Utica & Mohawk Valley Railway to exercise franchises granted it by the City Council on Whitesboro Street in Utica.

Portland, Ore.—The Oregon Electric Railway has applied to the County Court for a 50-year franchise to use parts of certain county highways, over which it is operating its interurban electric railway.

Bentleyville, Pa.—The Bentleyville Council has granted a franchise to the Pittsburgh, Monongahela & Washington Railways to build a street railway in that town. The railway is to connect Monongahela and Washington, 32 miles. Phil & Miller, Pittsburgh, contractors, and J. W. Bridge, general manager. [E. R. J., July 24, '09.]

Humboldt, Tenn.—The Missouri, Tennessee & Georgia Railroad has applied for a 45-year franchise to the Board of Aldermen to operate its proposed electric railway over Main, Osborne, Mitchell, Stillwell, Webster, Dickson, Shane, Summie and Green Streets. The company proposes to build the railway from Humboldt to Dyersburg via Crockett Mills, Friendship and Bonicord, 35 miles distant. I. H. Dungan, president and general manager. [E. R. J., April 17, '09.]

***Greenville, Tex.**—J. W. Crotty and L. A. Miller, Dallas, have applied to the City Council for a franchise to build an electric railway in Greenville.

Monroe, Wash.—The Everett & Cherry Valley Traction Company has applied to the Town Council for permission to build a temporary track over certain streets of Monroe to connect the Snoqualmie Valley Railway with the main line of the Great Northern Railroad.

Wheeling, W. Va.—The Pan Handle Traction Company has applied to the Board of County Commissioners of Ohio County for a franchise granting the right to double-track about 4 miles of its electric railway. G. O. Nagle, general manager.

Waukesha, Wis.—The City Council has granted a franchise to the Milwaukee Western Electric Railway to extend its railway into Waukesha via North Street. [E. R. J., Aug. 7, '09.]

TRACK AND ROADWAY

Northern Electric Railway, Chico, Cal.—This company has opened its street railway extension in Yuba City, which is operated in conjunction with its Marysville line and its interurban system. [E. R. J., July 10, '09.]

Oakland & Antioch Railway, Oakland, Cal.—The surveys of this electric railway, which is to connect Oakland and Bay Point, in Contra Costa County, a distance of 30 miles, are being made on each side of the Contra Costa County range. A. W. Maltby and Joseph Napthaly are interested. [E. R. J., June 19, '09.]

Visalia (Cal.) Electric Railroad.—The grading on the extension of the Visalia Electric Railroad, from Lemon Cove to Woodlake, a distance of 12 miles, is practically completed. The company, it is said, has plans for another extension from Exeter to Lindsay and Portersville. [E. R. J., May 1, '09.]

Tampa-Sulphur Springs Traction Company, Tampa, Fla.—It is reported that this company will extend its street railway along Eighth Avenue to Thirty-sixth Street and on Fifth Avenue to Thirty-second Street. L. Brill, general manager.

Dublin, Ga.—P. L. Wade, Dublin, advises that a company has not yet been organized to build the proposed street railway in Dublin. It is the intention to operate gasoline motor cars. [E. R. J., Aug. 14, '09.]

Danville, Kankakee & Crescent Traction Company, Crescent City, Ill.—This company has completed the survey of its interurban railway, which will be operated by gasoline motor cars, and is securing right of way between Kankakee, Danville and Crescent City. J. P. Sterrenberg, Crescent City, is interested. [E. R. J., July 31, '09.]

Elgin & Sycamore Railway, Elgin, Ill.—It is stated that surveys for this electric railway between Elgin and Sycamore have been completed. Capital stock, $100,000. Directors: B. C. Payne, F. N. Rogers, E. S. Bailey, F. J. Hohling and F. W. Merrick, all of Elgin. [E. R. J., April 10, '09.]

Indiana Union Traction Company, Anderson, Ind.—It is reported that this company will build new steel bridges

over the White River at Anderson, and over Buck Creek at Yorktown, on the Indianapolis-Muncie division of its system.

Covington & Southwestern Railway, Kingman, Ind.—M. A. Peoples, secretary and general superintendent of J. J. Burns & Company, Chicago, Ill., who have the contract to build the first 50 miles for the Covington & Southwestern Railway, advises that a few miles of the track are already laid, and that it is expected to build 25 miles this year. The railway will have two routes, one being from Kingman to Crawfordsville and the other from Kingman to Covington. Officers: William C. Ruhl, president; B. E. Jones, secretary, and Harmon W. Campbell, treasurer. [E. R. J., July 10, '09.]

Southern Traction Company of Illinois, East St. Louis, Ill.—This company has recently filed a mortgage to the Union Trust & Savings Bank of East St. Louis, as trustee, to secure an issue of $1,500,000 bonds. The company proposes to build an electric railway from East St. Louis via Centerville to Belleville and Murphysboro, and possibly to Cairo, Ill. F. P. Ernest, East St. Louis, president.

Old Colony Street Railway, Boston, Mass.—It is stated that this company has begun relaying the tracks on Main Street, Brockton, with new rails, which will involve an expenditure of $40,000.

***St. Louis & Kansas City Electric Railway, St. Louis, Mo.**—Announcement is made of the organization of this company, which plans to build a double-track, high-speed electric railway from St. Louis to Kansas City, a distance of 250 miles. Articles of incorporation will be filed within a few days. According to plans under consideration the grade will be less than one-tenth of 1 per cent over 80 per cent of the distance, and less than 1 per cent over the remaining 20 per cent of the proposed line. It is the intention to install the multi-phase system. Among those said to be interested in the project are W. D. Nevin, Denver, Col.; W. H. Chase, B. F. Gray, Edgar R. Talton, St. Louis, and Daniel F. Miller. Capital stock will be $15,000.000.

Bozeman (Mont.) Street Railway.—It is reported that this company will extend its railway to the Inter-State fair grounds.

New York, Westchester & Boston Railway, New York, N. Y.—At a hearing in New York on Aug. 16 before the Public Service Commission of the Second District, the New York, Westchester & Boston Railway asked permission to make an increase of $20,000,000 in its capital stock. The company's present capital is $4,000,000. It recently acquired all the property of the New York & Port Chester Railroad, and asked for permission to consolidate the two properties, the same to be operated under the name of the New York, Westchester & Boston Railway, which is building a four-track electric railway from the Lenox Avenue terminal of the subway to Port Chester, with a double-track branch running from Mount Vernon to White Plains. With the consolidation of the two companies, the New York, Westchester & Boston Railway will ask permission to abandon portions of the respective routes, using only those parts which are advantageous to a direct line. The company also asks permission to abandon that part of its proposed route running from White Plains to Elmsford. L. S. Miller, president of the company, stated that so far the right of way had cost the company about $240,000 a mile, and that the prospective business did not warrant a 3-mile extension from White Plains to Elmsford. A decision will be rendered by the commission at a later date. [E. R. J., July 24, '09.]

Third Avenue Bridge Company, New York, N. Y.—This company, which is a subsidiary company to the Third Avenue Railroad, has applied to the Public Service Commission for a certificate of public convenience and necessity to cross the Queensboro Bridge with a line into Queens. The company desires to build a line from Fifty-seventh Street and Third Avenue east to Second Avenue and thence north to the bridge and over it to Jackson Avenue, Queens. [E. R. J., June 12, '09.]

Lebanon & Franklin Traction Company, Lebanon, Ohio.—It is reported that this company is planning to extend its railway to Springboro, a distance of 4 miles. Two surveys have been made, one following Clearcreek from Franklin directly to Springboro, and the other along the Upper Springboro Highway. Robert E. Kline, Callahan Bank Building, Dayton, general manager.

Woodward (Okla.) Interurban Railway.—It is reported that the survey for this proposed electric railway, 140 miles in length, connecting Mutual, Richmond, Canton, Okla., with Buffalo and Englewood, Kan., has been started under the direction of A. J. Innis. Among those interested are Homer Wilcox and Frank Tucker, Woodward. [E. R. J., Feb. 13, '09.]

Berlin & Waterloo Street Railway, Berlin, Ont.—The ratepayers have approved a by-law to raise $19,000 for double-tracking a section of this street railway between Berlin and Waterloo.

***Hartland, Ont.**—It is reported that an electric railway will be constructed to connect Hartland, Foreston, Rockland, Windsor and Knowlesville. John E. Stewart and A. B. Downworth are interested.

Farmers' Railway & Navigation Company, Pendleton, Ore.—Chas. A. Hill, president, announces that construction on this proposed railway will begin about Nov. 15. The motive power has not yet been decided upon. The route will be from Umatilla, through Holdman, Helix, Hermiston, Echo and into Pendleton. Headquarters, Pendleton. Officers: Chas. A. Hill, president; A. A. Cole, secretary, treasurer, and purchasing agent, Pendleton, and E. T. Erickson, Hermiston, chief engineer. [E. R. J., Aug. 14, '09.]

Umatilla Railway & Electric Power Company, Pendleton, Ore.—A. R. Turner, secretary, writes that the purpose of this company is to build an electric railway with the Columbia River as its northern terminus and with Grant County as its southern terminus. The railway, which is to be approximately 100 miles in length, will extend from Pendleton south through Pilot Rock, Nye, Alba, Ukiah and into Dale. The company proposes to erect a hydro-electric plant on the John Day's River. Capital stock, $100,000. Officers and directors: Hon. Douglas Belts, Pilot Rock, president; Geo. A. Brown, vice-president and general manager; A. R. Turner, secretary and treasurer; C. J. Smith and Hon. Stephen A. Lowell. [E. R. J., July 31, '09.]

Central Pennsylvania Traction Company, Harrisburg, Pa.—The board of directors of this company has determined to build extensions to the following routes: Double-track Second Street route from Moclay Street to Division Street; the Third Street and Fourth Street tracks from Moclay Street to Seneca Street with an extension on Seneca Street. The company will also rebuild the Third Street track from North Avenue to Delaware Avenue and the Fourth Street and Sixth Street tracks from Market Street to Reily Street, using the 92-lb girder rails.

***Scotland, S. D.**—It is stated that L. F. Phillips is making surveys between Scotland, Olivet and Wittenberg for the construction of an electric railway.

San Antonio & Vernon Railway, Amarillo, Tex.—R. O. Whyman of the Whyman Construction Company, Amarillo, writes that this railway, in which his company is interested, is to be a steam road and not an electric railway, as reported in a recent issue. [E. R. J., Aug. 7, '09.]

El Paso & Fort Hancock Railway, El Paso, Tex.—Thomas O'Keeffe, El Paso, secretary, advises that this company expects to begin construction on its electric railway from El Paso to Ysleta, a distance of 10 miles, in October. Bids for the ties and rails for the 10 miles of track have been received and will be opened Sept. 1. The repair shops will probably be located at Ysleta. It is probable that McKeen motor cars will be installed. Capital stock, authorized, $100,000; subscribed, $70,000. Officers: C. N. Bassett, president; Felix Martinez, vice-president, and W. Cooley, treasurer, all of El Paso. [E. R. J., Aug. 7, '09.]

Port Arthur (Tex.) Street Railway.—H. J. Myers advises that the contract for the construction of this new 6-mile electric railway in Port Arthur has been let to H. E. Talbott & Company, Reibold Building, Dayton, Ohio. Financial arrangements have been completed and surveys will be started at once. The line will be owned and operated by Dayton, Ohio, capitalists. The company expects to apply for a charter within a few days and the title will be changed to the Port Arthur Traction Company. The present headquarters will be 503 Reibold Building, Dayton, Ohio, where all communications should be addressed. [E. R. J., April 3, '09.]

San Angelo (Tex.) Street Railway.—This company has been organized to build an electric railway from San Angelo to Carlsbad and Sterling City. Capital stock authorized, $100,000. Directors: W. H. Shaffer, A. H. Shaffer, and J. J. Lanin, New Hampton, Ia., manager, to whom all communications should be addressed. [E. R. J., July 24, '09.]

Salt Lake & Ogden Railroad, Salt Lake City, Utah.—This company has completed the design of three large bridges and is now calling for bids for the fabrication and delivery of the required steel for these structures. The bridges were designed by the Falkenau Electrical Construction Company, Chicago, Ill., which company will also erect the bridges, which are to be of the following types: One double-track through girder type of bridge, for overhead crossing for Wall Avenue, in Ogden; one double-track composite bridge, consisting of a combination of pony truss, steel tower and deck girder; one double-track concrete bridge, consisting of two spans of 80 ft. each with a rise

of 26 ft. These bridges are each to be of the heaviest type of construction and designed on the basis of Cooper E-45 rating, to carry 100,000-lb. cars.

Everett & Cherry Valley Traction Company, Everett, Wash.—Work on this electric railway has commenced at several different points between Monroe and Tolt, the general contractors, Caughren, Winters, Smith & Company, having sublet contracts for the grading and bridge and trestle building. [E. R. J., July 24, '09.]

Clarke County Suburban Railway, Vancouver, Wash.—It is reported that grading on this proposed electric railway to extend from Vancouver to a point two miles east of Orchards has been started. Plans and specifications for the bridge across Burnt Bridge Creek have been completed, and bids are now being advertised for its erection. It will be a piling bridge, 800 ft. in length and 600 ft. to the cutoff. This company is said to be a subsidiary company of the Vancouver Traction Company, which operates the street railway in Vancouver. Bert Yates, J. W. Sifton and O. C. Spencer are the incorporators. [E. R. J., July 24, '09.]

Cincinnati Construction Company, Janesville, Wis.—It is stated that this company has completed all surveys and financial arrangements on the electric railway which it proposes to build from Janesville to Madison. Howard H. Ziegler, Columbus, Ohio, president. [E. R. J., Jan. 9, '09.]

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—This company expects to erect a station in Pasadena at the corner of Mission Street and Fair Oaks Avenue.

San Diego (Cal.) Electric Railway.—This company is having plans and specifications prepared by Andrew Evast, engineer, for a car house to be erected on the site which was recently purchased on M Street, Fifteenth Street and L Street. The property is 195 ft. x 300 ft. and the car house will be 195 ft. x 270 ft.. The building will be constructed of reinforced concrete, and it will be equipped with an automatic sprinkler system. All tracks will run into the building from M Street. There will be 15 tracks in the building, having a storage capacity of approximately 100 cars. Two tracks will be used for wash pits. A space 12 ft. x 100 ft. along the Fifteenth Street wall will be utilized for work benches and other equipment. Locker rooms will also be provided for the employees. The structure, it is estimated, will cost $100,000. [E. R. J., June 19, '09.]

Tri-City Railway, Davenport, Ia.—This company expects to erect a new car house on East River Street, to cost $5,000.

Central Pennsylvania Traction Company, Harrisburg, Pa.—This company is building a car house at Cameron and Forster Streets which is to be 75 ft. x 360 ft. with six tracks, capable of accommodating 60 cars. The building will be of reinforced concrete, one story high, and will have 12 windows and 35 skylights, each 10 ft. x 12 ft. The cost of the car house will approximate $35,000. Mason D. Pratt is the designer.

POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway, Vancouver, B. C.—This company is reported to have awarded to Malcolm & Dinsdale the contract for an addition to its power plant on Store Street, Victoria. The cost of the work is estimated at $50,000.

Covington & Southwestern Railway, Kingman, Ind.—This company, which is building an electric railway from Kingman to Crawfordsville and Covington, has completed its power station, and has equipped it with the following apparatus: a 500-hp Bates-Corliss engine, a 300-kw Ridgway generator and boilers from the Springfield (Ill.) Boiler & Manufacturing Company. B. E. Jones, secretary. [E. R. J., July 10, '09.]

Hagerstown (Md.) Railway.—This company expects to purchase immediately a 1000-hp condenser for its power house at Hagerstown. H. C. Alvey, chief engineer.

Toledo & Indiana Railway, Toledo, Ohio.—This company has purchased from the Allis-Chalmers Company, Milwaukee, Wis., a 400-kw rotary converter, 500-r.p.m., 25-cycle, 3-phase, 600-volts d.c., with three 150 kva. O. F. S. C. transformers, 3200 volt to 375 volt, with switchboard.

Portland Railway, Light & Power Company, Portland, Ore.—This company has purchased from the Allis-Chalmers Company, Milwaukee, Wis., a 500-kw vertical direct-current, 600-v generator with switchboard.

Milwaukee & Fox River Valley Railway, Fond Du Lac, Wis.—This company has purchased from the Allis-Chalmers Company, Milwaukee, a 200 kw, 2300-v. 60-cycle synchronous motor. W. H. Phillips, vice-president. [E. R. J., July 24, '09.]

Manufactures & Supplies

ROLLING STOCK

Peoria (Ill.) Railway Terminal Company is in the market for five interurban cars.

Adrian (Mich.) Street Railway has purchased two 28-ft. closed city cars from W. R. Kerschner, Allentown, Pa.

Toledo & Western Railroad, Sylvania, Ohio, is in the market for one second-hand combination steam coach.

Chicago (Ill.) City Railway has placed an order for two funeral cars with the G. C. Kuhlman Car Company, Cleveland.

Toledo Railway & Light Company, Toledo, Ohio, is asking for bids on 10 city cars, through Ford, Bacon & Davis, New York.

British Columbia Electric Railway, Vancouver, B. C., is reported to be planning to build 25 cars of the pay-as-you-enter type in its own shops at Vancouver.

Interborough Rapid Transit Company, New York, N. Y., placed an order with the American Locomotive Company, New York, for 100 trailer trucks for subway service.

Public Service Railway, Newark, N. J., is building eight cars of the pay-as-you-enter type in its own shops and is having 228 cars remodeled for pay-as-you-enter service by the John Stephenson Company.

Kansas City Railway & Light Company, Kansas City, Mo., has placed an order for 25 closed single-truck trail cars 26 ft. long with the McGuire-Cummings Mfg. Company, Chicago. Mention of this contemplated purchase was made in the Electric Railway Journal of July 31, 1909.

Vincennes Traction & Light Company, Vincennes, Ind., has purchased one 20-ft. motor car mounted on Brill 21-E trucks and equipped with Westinghouse 12-A motors, from the Dorner Railway Equipment Company.

Illinois Traction System, Champaign, Ill., has drawn the following specifications for the 10 pay-as-you-enter cars ordered for Peoria (Ill.) city lines and three of the cars ordered for the Champaign (Ill.) city lines:

Length of body.....22 ft.	Curtain fix....Curtain S. Co.
Length over vestibule..32 ft.	Curtain material...Pantasote
Width over sills..... 7 ft.	Curtain rollers....Hartshorn
Width over posts at belt .....7 ft. 8 in.	Fare boxes.....Brill
	Hand brakes....Brill ratchet
Sill to top of roof.9 ft. 5/8 in.	Registers ...Sterling-Meaker
Body .....Wood	Sanders .....Brill
Interior trim.....Cherry	Seating material.....Plush
Underframe .....Composite	Trucks, type..Brill No. 21-E

Chicago & Oak Park Elevated Railroad, Chicago, Ill., has decided on the following details for the 20 combination motor and trail cars ordered from The J. G. Brill Company, as mentioned in the Electric Railway Journal of Aug. 7, 1909: Body length over end plates, 47 ft. 4¾ in.; width over sills, 8 ft. 6 in.; over posts at belt, 8 ft. 8¼ in. The interior trim will be of Mexican mahogany and the headlinings will either be of Agosote or three-ply maple veneer, steel underframes. Other details are:

Air brakes.....West. A. M.	Heaters .....Consolidated
Curtain fix....Curtain S. Co.	Seats...Walkover No. 199A
Curtain material...Pantasote	Slack adjuster.Am. Brake Co.
Destination signs.....Hunter	Step treads....Carborundum
Door hangers, McCabe ball-bearing	Varnish. Murphy No. 127 body

Northern Texas Traction Company, Fort Worth, Tex., has specified the following details for the 12 double-truck cars recently ordered from the Cincinnati Car Company through Stone & Webster:

Length of body.....28 ft.	Destination signs....Hunter
Length over vestibule..41 ft.	Hand brakes.....Sterling
Width over sills....8 ft. 6 in.	Heating system.Consolidated
Sill to trolley base..9 ft. 6 in.	Headlights ...Crouse-Hinds
Body .....Composite	Motors.....Four GE-81
Interior.Honduras mahogany	Registers .....International
Underframe .....Composite	Roofs .....Monitor
Air brakes.West. Straight-Air	Seats, style.Heywood 54-AC
Control system.....K-28-B	Seating material.....Rattan
Couplers.....C. C. Co.	Step treads.....Universal
Curtain fix....Curtain S. Co.	Trucks, type..Standard 0-50
Curtain material...Pantasote	

The cars will be constructed under the license of the Pay-As-You-Enter Car Corporation.

The one vestibuled semi-convertible car ordered from the Cincinnati Car Company at the same time will be of the pay-as-you-enter type also, differing only in details as follows: Length of body, 21 ft.; over vestibule, 33 ft.; width over sills, 8 ft., and being 9 ft. 4 in. from sill to trolley base. K-10 controllers, two GE-54 motors, Brill 21-E trucks with

7 ft. 6 in. wheel base, and Agosote ceilings being ordered. No destination signs to be used. This company has ordered heaters from the Consolidated Car Heating Company for 58 cars.

Houston (Tex.) Electric Company, mentioned in the Electric Railway Journal of June 19, 1909, as having purchased 15 single-end and five double-end single-truck cars from the Cincinnati Car Company through Stone & Webster, has ordered these to be of the pay-as-you-enter type with the following details:

Length of body.....21 ft.	Headlinings .....Agosote
Length over vestibule..31 ft.	Headlights ....Crouse-Hinds
Width over sills..... 8 ft.	Journal boxes....Symington
Sill to trolley base..9 ft. 4 in.	Motors.....Two GE-80
Body .....Composite	Registers .....International
Interior trim.....Mahogany	Sash fixtures.....Dayton
Underframe .....Composite	Seats.....Heywood 11-S-C
Couplers .....Cincinnati	Step treads.....Universal
Curtain fix....Curtain S. Co.	Trolley retrievers....Wilson
Curtain material...Pantasote	Trolley base.....U. S. No. 6
Destination signs....Hunter	Trolley wheels.....Standard
Hand brakes.....Sterling	Trucks .....Standard

Dallas (Tex.) Consolidated Electric Railway has drawn the following details for the two double-truck cars reported in the Electric Railway Journal of June 19, 1909, as being built by the Cincinnati Car Company. The cars will be of the pay-as-you-enter type.

Length of body.....28 ft.	Destination signs....Hunter
Length over vestibule..41 ft.	Fenders ..... Parmenter
Length over all....42 ft. 6 in.	Gongs
Sill to trolley base..9 ft. 6 in.	One 14-in. on each platform
Body ..... Composite	Hand brakes..Sterling Giant
Underframe ..... Composite	Heaters
Air brakes....West. straight	Consolidated Electric
Axles 4½ in.	Headlights....United States
Hammered steel	Journal boxes
Bolsters, body, built-up steel	A. S. & I. R. Standard
Brakes	Registers .... International
A. S. & I. R. Standard	Roofs....Monitor deck type
Brakeshoes	Sash Fixtures
A. S. & I. R. Standard	Dayton Mfg. Co.
Car trimmings..Solid bronze	Seats.....Heywood 54-AC
Center bearings..Symington	Step treads.....Universal
Couplers...Cincinnati Radial	Trolley retrievers
Curtain fixtures	Wilson No. 2
Curtain S. Co.	Trucks ..... Brill
Curtain material...Pantasote	

TRADE NOTES

Pullman Company, Chicago, Ill., announces that Ralph W. Benson, who was heretofore employed as an engineer at the Pullman car works, has been appointed assistant manager of sales, vice A. Twyman, retired.

H. W. Johns-Manville Company, New York, N. Y., has removed its Cleveland office from 1525 Columbus Road to 813 Superior Avenue, N. W., and its Los Angeles office from 203 E. Fifth Street to 224 North Los Angeles Street.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, New York, closed its shops for Saturday, Aug. 14, in order to allow all of its employees to attend the company's fourth annual picnic, which was held at Manitou Beach on Lake Ontario.

Walpole Rubber Company of Canada, Ltd., Granby, Quebec, has been formed to produce in Canada the same materials as the Massachusetts Chemical Company produces at Walpole, Mass., under whose management the company is being conducted.

Grip Nut Company, Chicago, Ill., has received orders for universal window fixtures and universal deck sash ratchets to be used on the 50 new passenger cars to be built by the American Car & Foundry Company and the Barney & Smith Car Company for the Baltimore & Ohio Railroad.

McGuire-Cummings Manufacturing Company, Chicago, Ill., announces that Wendell MacDuffie Company, 50 Church Street, New York, have been appointed its general Eastern agents and will handle its general line of steam and electric cars, trucks, sweepers, sprinklers and snow plows.

Standard Steel Works Company, Philadelphia, Pa., announces that it has established a branch office in Pittsburgh.

Westinghouse Machine Company, Pittsburgh, Pa., announces that F. C. Armstead, who has been supervising engineer of the stoker department of the company for a number of years with offices at East Pittsburgh, Pa., has moved his headquarters to the Westinghouse Works, Attica, N. Y., where the stokers are manufactured.

Engineering & Electrical Securities Corporation, New York, N. Y., has changed its name to the Engineering Securities Corporation. Through a typographical error by which the two first words of the company's former title were omitted, it was erroneously stated in this column last week that the Electrical Securities Corporation had changed its title to the Engineering Securities Corporation. The two corporations are separate and distinct organizations, with no connection whatever.

Ball & Wood Company, Elizabethport, N. J., has received an order from the United Electric Company, Chambersburg, Pa., for two 750-kw Rateau-Smoot high-pressure turbines and 60-cycle three-phase generators, to be installed in its plant at Lemoyne. The United Electric Company is owned by the Cumberland Valley Railroad and the latter is, in turn, controlled by the Pennsylvania Railroad. The specifications for the units just contracted for were issued by the motive power department of the Pennsylvania Railroad.

Crocker-Wheeler Company, Ampere, N. J., has recently booked several large orders for direct-current apparatus. One of these from the Indiana Steel Company calls for 70 mill motors, totaling about 2400 hp. This order is an addition to the 11,000 hp of Crocker-Wheeler motors employed at the present time by this company. The King Bridge Company, Cleveland, Ohio, has recently placed an order for one 150-kw, compound wound, 250-volt generator, to be used for supplying light and power. The Bethlehem Steel Company has recently added to its 8800 hp of Crocker-Wheeler motors by an order for a 225-hp, compound wound motor, to be installed at its Saucon plant.

Manufacturers' Publicity Corporation, New York, has been organized by Benjamin R. Western and W. Hull Western, formerly proprietor and manager, respectively, of the Manufacturers' Advertising Bureau, 237 Broadway, New York, and Walter Mueller and W. H. Denney, formerly president and treasurer of the Banning Company, 225 Fifth avenue, New York. The officers of the corporation are Benjamin R. Western, president; Walter Mueller, vice-president and general manager; W. H. Denney, treasurer, and W. Hull Western, secretary. The offices are located at the Hudson Terminal Building, 30 Church Street, New York. The advertising interests of the clients of both the merged companies will be handled by the new company.

Westinghouse Storage Battery Company, Boonton, N. J., which was incorporated on July 12, 1909, has acquired all of the plant, patents and equipment of the storage battery department of the Westinghouse Machine Company and of the General Storage Battery Company, and will manufacture, at Boonton, N. J., both the Westinghouse and Bijur types of storage battery for those classes of service in which each has proved superior. The Westinghouse Storage Battery Company enters the field with greatly increased manufacturing facilities, and will maintain thoroughly equipped testing and commercial laboratories, insuring uniformity of both materials and product. The general offices of the company will be located at Boonton, with sales offices in the principal cities of the country.

Wheeler Condenser & Engineering Company, Carteret, N. J., at a recent meeting of the stockholders elected J. J. Brown vice-president and general manager. In 1894 Mr. Brown was appointed as Southwestern manager for the Henry R. Worthington Company, and later became general sales manager for that company. After the formation of the International Steam Pump Company he became its general Western sales manager, with headquarters at Chicago, and resigned that position to take up his present work. The company's plant at Carteret, N. J., is being enlarged and improved. Among these improvements is a new power house, which will be equipped with several different systems of condensers for exhibition purposes, as well as for supplying the electrical energy which will be used throughout the shops.

ADVERTISING LITERATURE

Niagara Forged Steel Company, Buffalo, N. Y., has issued an illustrated leaflet describing the merits of its Niagara forged steel rail braces, Niagara combination tie plate and rail brace, Niagara base joint plate and the Niagara forged steel tie plate.

United Electric Car Company, Ltd., Preston, Lancashire, Eng., has issued a booklet in which its new Preston semi-convertible car is described. The company has just received an order from the West Ham Corporation for six top-bench cars, with lower windows, on the principle of the Preston car.

Electrical Alloy Company, Morristown, N. J., has issued a 34-page pamphlet setting forth the merits and variety of its goods, which shows the company is manufacturing resistance materials in every variety of wire, sheet and ribbon, including nickel steel alloys, nickel copper alloys, ferro-nickel alloys, nickel chromium alloys and german silver alloys.

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Interurban Express Service

The paper of John H. Crall, Terre Haute, Indianapolis & Eastern Traction Company, read this week before the meeting of the Central Electric Railway Association at Detroit, contains some interesting figures in relation to the express business handled directly by this company. Although this railway, like many of the other interurban properties in the Central West and other parts of the country, has made a contract with an old-line express company, it continues to conduct its own express business on exactly the same plan that was followed before the contract was made. That is, it carries shipments in the vestibules of passenger cars on certain trains, without giving a wagon pick-up or delivery service. Mr. Crall has calculated that in the month of May, 1909, the space used in the cars for the express transported in this way was 6.36 per cent of the total space in the cars. In the same month the revenue from the interurban express business amounted to 6.14 per cent of the gross passenger earnings. Mr. Crall says later in his paper, in speaking of the increase in the revenue derived from the interurban express, that this revenue has amounted to 4.01 per cent of the gross earnings from all sources in 1909. Whether this statement refers to the fiscal year ended June 30, 1909, or to the record indicated so far for the calendar year, it is evident that average results, although not equal to the favorable earnings from this part of the traffic in May, are sufficiently impressive to justify careful attention to the business in the territory served by the line with which Mr. Crall is identified. If interline business of this character is developed, as Mr. Crall recommends, it should have the effect of stimulating traffic of a character that can be handled with some of the existing cars and without great additional expense.

Question of Legal Advice in the Promotion of Railways

Experience among those who have gone through repeated promotions of electric railways is a guide to those who contemplate the formation of an organization with the object of building a railroad. It is a grave error to utilize the services of a lawyer who is not personally acquainted by virtue of continuous practice with the State railroad and railway acts and with the judicial interpretations of these acts. In every community there are attorneys at law who are highly regarded, locally, both as men and as successful legal practitioners. To employ one of such as counselor in a proposed enterprise having as its object the construction of a railroad, unless he is also an "electric railway lawyer," will invariably delay the promoters and likely lead them into grave error. Loss of time at the early promotion stage is often of vital importance, and while the attorney unversed in this particular department of the law is trying to set the promoters right on the various questions that develop from time to time, important advantage may be lost in not only securing the financial interest of local people, but may result in the loss of a strategic position relative to the moves of a possible rival corporation. The practice of railroad and railway law is as much of a specialty among lawyers as any one of the many departments of engineering is a specialty of the broad-termed engineer. Therefore, the members of a newly formed railway syndicate should carefully consider the question and obtain specialized legal advice. Where it is impossible to secure experienced rail-

road attorneys in the home community it is not merely convenient but actually necessary to retain a railroad attorney at the State capital. His experience will save a syndicate many times the cost. Such a one can be an associate counsel of the local lawyer, who would appreciate the necessity, but seldom suggest it.

Accounting in the Repair Shop

A department which produces no direct revenue is always at a disadvantage in the operation of a public service corporation. A non-technical board of directors will appropriate money much more quickly for a department immediately concerned with the company's income than for a branch of the organization which is simply a spender of revenue. Hence the importance of doing all that is possible to set a money value upon such work as the shop performs; to know closely the cost of repairs from month to month, and to be able to show, at least by conservative estimates, how the shops are saving money as well as expending it. To obtain a fairly accurate idea of these savings, the company must keep simple but complete records of the cost of performing standard operations; it must know where its material goes; where material can be saved from old apparatus with economy, and what the expenditure of money for labor has brought the road in specific instances. The time required for routine work should be standardized. Then when improvements are made—and few shops are not progressing in the way they handle work—when the amount of labor, time and material needed for regular operation is reduced, a reasonable value can be set upon the benefit gained. Such facts set forth in a request for appropriation or covered in a routine report are certain to be impressive and generally effective in securing the equipment or labor desired. Show the director where money has been saved in the shop administration, and he will be more disposed to grant funds for betterments than in cases where he never sees anything but the expense accounts.

Electrical Insulation of Steel Street Cars

The protection of passengers from stray currents and short-circuits is an important consideration in the design and construction of all-steel street cars. In the new cars of the Chicago Railways Company, which are described elsewhere in this issue, this feature of electrical insulation of all parts with which a passenger or trainman might come in contact has been given special attention. Except in case of very heavy discharges of current which might seek isolated paths there is comparatively small danger of serious shocks to passengers within the car coming in contact with the inside lining, seat frames or door posts, as these parts are all commonly connected and grounded through the body framing and the truck center plates. The platform grab handles and steps are sources of particular danger, however, as even a slight shock received from contact with these parts while in the act of boarding or alighting with one or both feet on the ground might cause a serious accident by its suddenness rather than its severity. It will be noted in the article describing these cars that these two points of greatest danger to passengers have been thoroughly insulated from the remainder of the car body. Presumably, it was not believed to be entirely safe to rely on the efficiency of the ground connection formed between the body and the trucks by the center plates and side bearings. A coating of oil or grease on the center plates might introduce sufficient resistance to create a small, nevertheless dangerous, difference of potential between the car body and the earth if any heavy leakage of current was taking place from the trolley or other wiring circuits. The corner grab handles are insulated at the attachment of the brackets, and the platform partition pipe running up from floor to roof, which is also commonly used as a grab handle, is protected in a similar manner. The steps, although of wood, are insulated with fiber sheets at the point of attachment of the step brackets to the platform sills.

In wooden cars, the roof is sufficiently insulated from the ground by the intervening wood, and on a dry day a trainman standing on the upper deck may handle the trolley pole with impunity in his bare hands. With steel cars, however, the roof is part of a direct path to ground and special precaution must be taken to insulate the trolley completely, and also to protect the roof against accidental dropping of any part of the overhead line. The use of a specially prepared roofing canvas on the Chicago cars seems to have done away with this latter danger and at the same time made it reasonably safe for a trainman to handle the trolley pole from the roof.

Extension of Kansas City Franchise

One of the letters to the public issued by Bernard Corrigan, president of the Metropolitan Street Railway of Kansas City, in relation to the proposed extension of franchise of the company, states that the most common objection advanced regarding the ordinance is that it extends a measure having still 16 years of life. The corollary argument of the critics of the ordinance is that action should be deferred until two years or so before expiration of the existing rights of the company. To many people who have not been familiar by practical experience with the long and unwholesome contests resulting from expiring franchises in other cities, the common criticism of the ordinance, which Mr. Corrigan recognizes and answers, appears to be a plausible one. The railway system is giving reasonable satisfaction to the majority of its riders and so long as they have a service which fairly meets their convenience, the critics ask what advantage can be found in a consideration thus early of the question of renewal of franchises that hold good for some years to come. This is a short-sighted and specious argument. The answer of Mr. Corrigan is that the policy of delay until just before expiration of the franchises was followed in other cities and proved disastrous both "to the city and the company, for the reason that no person will loan money on a short-time franchise, consequently the company could not keep up with the growth of the city in extensions and rolling stock."

Of those that are interested in the successful operation of a street railway, the class that is most seriously affected comprises persons who are entirely dependent upon the service for daily transportation between their homes and places of work. What these people want is a service that will be safe, prompt and regular, enabling them to ride in reasonable comfort twice a day. They are not concerned

very much about the security of the investment in the railway or about the salaries and wages of the employees of the system.

The limited franchise is iniquitous if it permits a street railway earning not more than a reasonable return to reach a point where, its rights being in danger of annulment and its property threatened with confiscation, receivership and the protection of the courts become inevitable. If the theory of a limited franchise should be applied properly, it would mean the establishment of rates of fare sufficiently large to meet all rightful expenses and taxes and a fair return on the investment plus enough to meet periodically the requirements of an amortization fund so drawn as to assure the reservation of sufficient funds to make possible, with the addition of the scrap value of the property, the return to all the security holders of the paid-in value of their stocks and bonds. Such rates of fare do not appear to be practicable; they would necessarily be so much greater than the existing fares to which the public has become accustomed that riding would be affected. The revenues would decline, service would be curtailed, the investment would be larger than traffic under the new conditions would justify, the values of outlying property would diminish and every large city would face in more serious degree than ever before the problem of increasing congestion in the crowded quarters.

The laws in most States provide for contracts, limited as to time and other features, between the municipality and the public service corporations, instead of the surrender of control to State authority and commission rule. In every developing large city in the country additional lines or equipment must be provided annually. As new capital is raised to meet the expense of these improvements the bankers who advance it, taking securities in lieu thereof, ascertain the financial and operating conditions of the property, and the length of its contract right to continue to operate. If its franchise grant is such as to jeopardize the safety of the securities there is abundant evidence that the company will be unable to borrow satisfactorily. Security of the investment encourages the construction of improvements, whereas insecurity causes investment funds to be withheld, leads to a dispirited organization and may cause eventually a street railway service that will be a reproach to a municipality.

Operating Power Plants Efficiently at Night

In electric railway systems where the traffic imposes a load curve upon the generating equipment, with two pronounced peaks at the morning rush and in the late afternoon, the efficient all-day operation of the power-plant machinery is often a difficult end to attain. If the trolley lines are kept alive throughout the night efficient operation at the station is still harder to secure during those hours when the load is but a small percentage of the average. To obtain the best results during these light hours every condition must be understood, and the system as a whole handled with special reference to the most economical service.

Fortunately, the range of schedules and routes of cars possible at night is, in general, much more flexible than during the day; and if these are adjusted to some degree with the effect upon the power plant in mind, if the feeder circuits are handled so as to throw the loads upon the generating units to the best advantage, and if the apparatus in the station service is kept as fully loaded as the total outside conditions will permit, much will be gained over the old haphazard way of running the system with each part independent of every other.

The opportunities for economical service at the station end of the system occur more often upon roads where several plants are required to handle the service than in cases where only one station is needed to supply the necessary current for the car movements. It is most desirable on systems of considerable size that so far as possible the number of stations in operation during the small hours of the night shall be cut down to the fewest consistent with reliability. In many instances one plant will meet the conditions, or one substation, on a system where the power supply is secured from a central alternating plant with the orthodox methods of transmission, conversion and local distribution. Usually the reduction of the number of stations in this way means a large cut in the cost of labor and fuel.

When all the night service load is thrown upon one of a group of plants it will pay to make sure that the feeder connections are such as to insure the best possible voltage conditions on the outlying parts of the system, even if certain changes in the switches at different section boxes have to be made during the next day. It is surprising how far a single power station can feed a few cars with good economy over a system of overhead lines having a large excess of capacity, so far as the demands of the night service are considered.

If the voltage and load conditions can be made better, and one or more plants or substations cut out of service by introducing certain feeder ties during the night that would not be satisfactory during the day, the trouble required to manipulate the switches will be well expended. It should not be forgotten that the possibilities of widely extended trouble resulting from a ground or short circuit on one feeder section are not formidable during the night, when only a relatively small number of cars are on the lines. A large system can be tied together at night without fear of interrupting hundreds of cars by a defect on a localized portion of the overhead network.

While the schedules in force at night must be determined by the traffic rather than by the power-station requirements, something can be done on large systems to arrange the starting times of the cars from common points so that the most violent peaks can be avoided. If all the night cars of a city, for instance, start at the same time from a central square for runs to the outlying districts, neglecting the inbound service, and if this is repeated each hour, more station capacity will need to be turning over under steam than where a little spacing is practised in the starting out of the night service. Back at the power station the requirement of operating the fewest number of machines possible and loading those in service as fully as can be done is the desideratum no less by night than during the daylight hours. Special care to keep down the number of units in service will be worth all that it costs in watchfulness.

STEEL CARS FOR CHICAGO RAILWAYS COMPANY

The Chicago Railways Company is just putting into service 50 all-steel surface cars of the pay-as-you-enter type. These cars were built by the Pressed Steel Car Company, Pittsburg, and include in their design many new and interesting features.

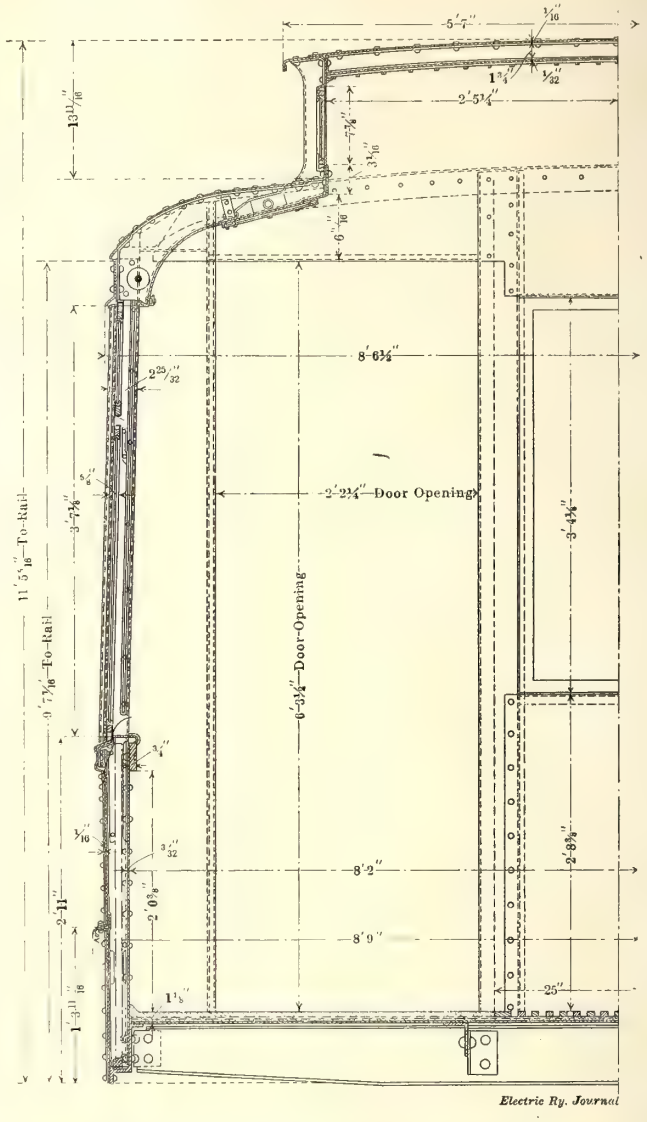
The following are the principal dimensions of this type of car:

Length over bumpers	49 ft. 2 in.
Length over end panels	32 ft. 5 in.
Truck center distance	20 ft. 1 in.
Length truck center to platform ends	14 ft. 6½ in.
Width over drip rails	8 ft. 6½ in.
Width over belt rail	8 ft. 8 in.
Width over guard rail	8 ft. 9 in.
Height, top of rail to top of trolley board	11 ft. 8 in.
Window post spacing	2 ft. 8 in.
Height, bottom of sill to rail	2 ft. 9⅝ in.
Diameter of wheels, cast iron	33 in.
Diameter of wheels, steel	34 in.
Seating capacity	40 persons

The accompanying engravings illustrate the general appearance of these cars and some of the many unique details of construction. In general the design of the steel cars differs little from that of the 600 wooden cars built for the same company by the Pullman Company and described in the Electric Railway Journal for Nov. 7, 1908. The principal difference in the car bodies, other than in the material used in their construction, is that the steel cars have drop sash. This arrangement of windows was used so that the weight of the framing might be kept low. This window arrangement is not so objectionable in steel cars as it would be in wooden cars. By the use of steel sash and steel window posts any water leaking into a drop window pocket will not cause the sash to warp or bind, as would be the case with wooden sash arranged to drop in pockets.

The principal reasons favoring the choice of steel cars were the following: With the possibility of subways for surface traffic in the downtown district of Chicago, it was thought desirable to design a type of car suited for underground service; also the steel car was thought to be more sanitary, to have an increased life over wooden cars, and to eliminate the fire risk and possibly lower the maintenance cost. The prospect that all-steel cars may eventually become standard on city railway systems was also considered. The design for the body of this car has been so carefully studied that the new cars weigh practically the same as the wooden pay-as-you-enter cars of the same company previously mentioned. The estimated weights of the new cars are 52,700 lb. summer and 53,000 lb. winter. The approximate weights of the parts are: Body, complete with equipment for summer, 26,420 lb.; body alone, 19,800 lb.; trucks, with 575-lb. cast-iron wheels, 14,800 lb.

The entire car structure, with the exception of trolley boards, doors, steps and floor mats, is of metal, comprising largely structural and pressed-steel shapes. The specifica-

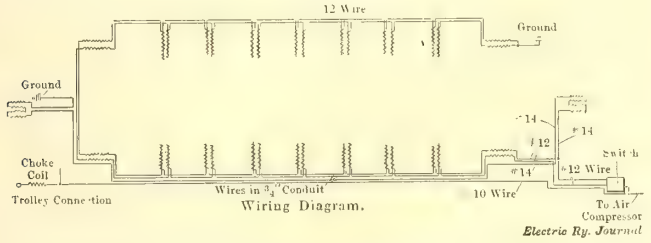


Chicago Steel Cars—Half Cross Section



Chicago Steel Cars—Exterior View

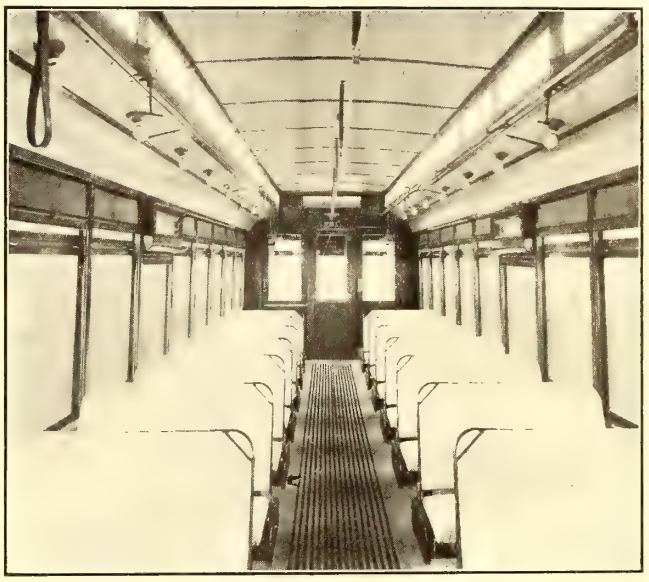
tions for these cars stated that "structural steel shall have an ultimate strength between 60,000 lb. and 70,000 lb. per square inch, elastic limit not less than one-half of the ultimate strength, elongation 22 per cent, bending test 180 deg. to a diameter equal to the thickness of piece tested, without cracks or fracture on outside of bent portion." The steel plates were made of open-hearth mild steel. The body framing, consisting of rolled and pressed shapes, was so designed that the stress in any section would not exceed 12,500 lb. per square inch with the maximum loading of the car. The outside panels are flat steel plates 1/16 in. thick, sloping in in a straight line from just below the window rail to the bottom of the side sill. This slope is approximately 1 in 44. The posts are arranged so that the lower side sashes drop into pockets provided between the outside panels and the inside lining of the car. These pockets are provided with hinged caps, and rubber stops are placed at each corner of each sash pocket.



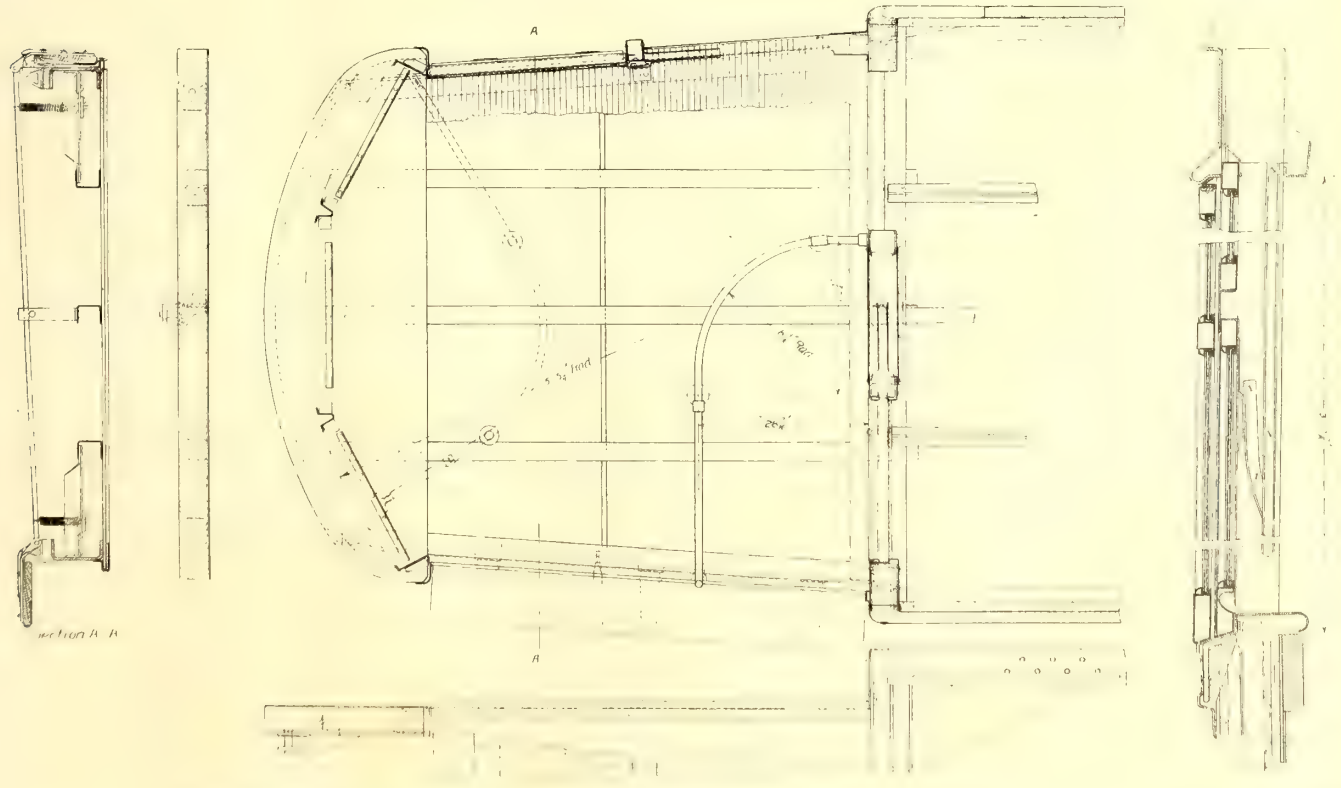
Chicago Steel Cars—Wiring Diagram of Heater Circuits

The underframing consists of two 5-in. Z-section side sills weighing 11.6 lb. per foot, cross-connected with pressed-steel sections having the shape of the letter U laid on its side. Intermediate sills are so disposed as to best support the heavy parts of the electrical equipment. The body bolsters are made of two pressed-steel channels, placed back to back and tied together with top and bottom cover plates. The two side platform knees are U-sections 10 in. deep, tapered at the ends and supported so that there is a drop of 10 in. between the top of the knees and the top of the body framing.

The monitor deck extends from end to end of the car body and is supported by steel carlines at each post. The upper deck is covered with 1/16-in. steel plates and the lower deck with 3/64-in. steel plates riveted to the roof framing with 3/16-in. tinned steel rivets. All seams and rivets are soldered to make the steel roof watertight. Trolley boards of yellow pine rest on ash saddles fastened to the roof with rubber cushions under each bracket. The insulation of the trolley boards from the steel roof was the subject of special attention by the division of car design of the Board of Supervising Engineers and by the mechanical department of the Chicago Railways Company.



Chicago Steel Cars—Interior View



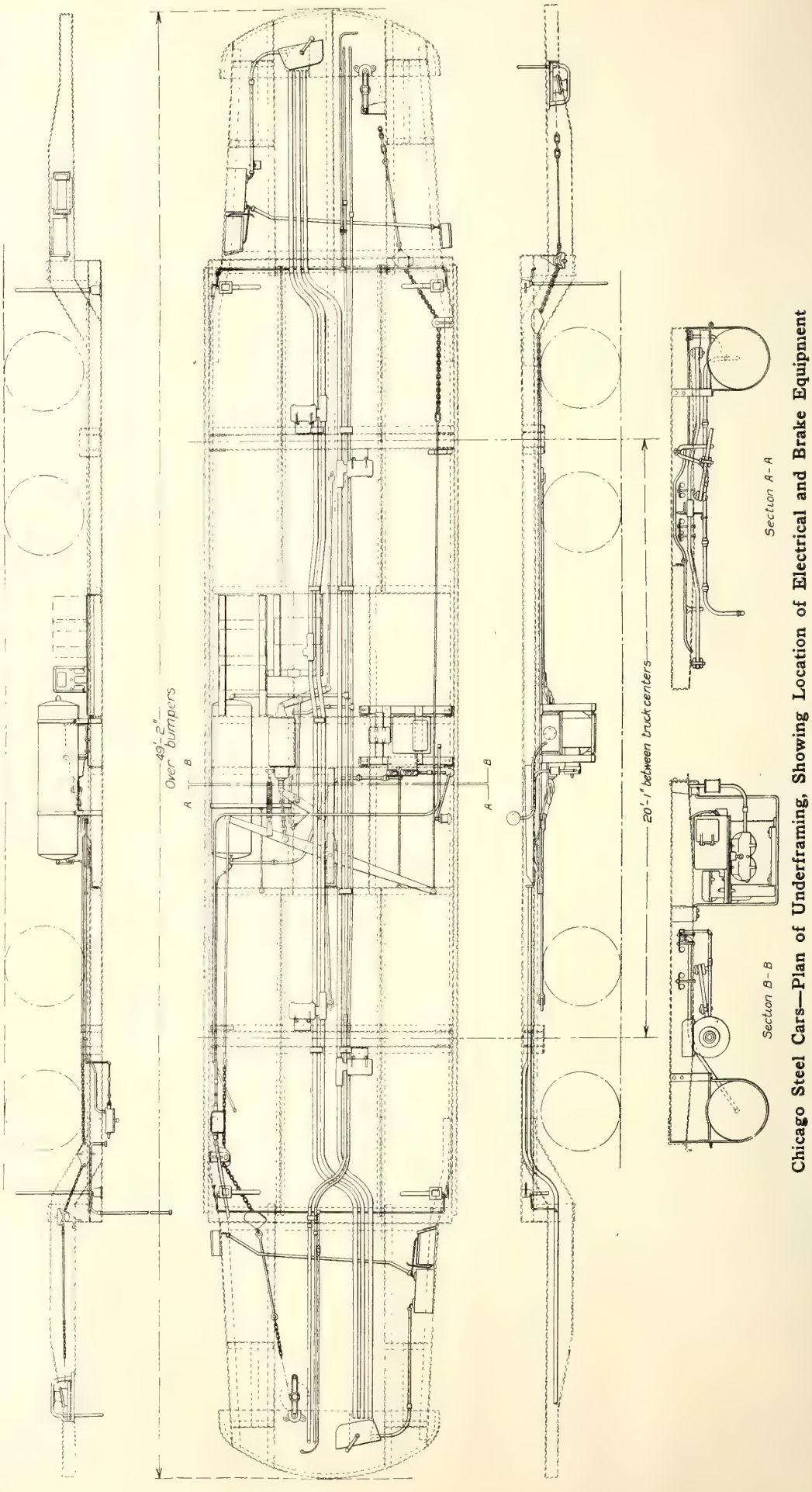
Chicago Steel Cars—Details of Platform Framing and Partition Railings

Section Through Side Window

With a view to preventing short-circuits between the trolley fittings and the steel roof the trolley board saddles of ash were boiled for two hours in paraffin before being placed over the roofing canvas. Between these saddles and the roofing canvas is a length of ⅛-in. rubber belting, covered on both sides with insulating paint. The trolley board, 1¼ in. thick, which rests on the saddles, also is protected with insulating paint, and all bolt heads are countersunk and covered with compound to further protect the car from short-circuits.

In order to protect the steel roof against short-circuits from broken trolley or span wires it is entirely covered with National prepared roofing canvas. Preliminary experiments were made with ordinary canvas, but this did not fulfill the requirements, because it lacked insulating quality. The experimental conditions were arranged to be nearly similar to those of actual service. A grounded steel plate used in the different tests was covered with the various kinds of canvas and the canvas-covered side was struck with a copper rod connected to the trolley circuit through a 2000-amp circuit breaker. It was found that while the ordinary canvas as applied to the steel plates possessed very little insulating quality, the prepared roofing canvas could be subjected to severe pounding with the copper rod without causing short-circuits.

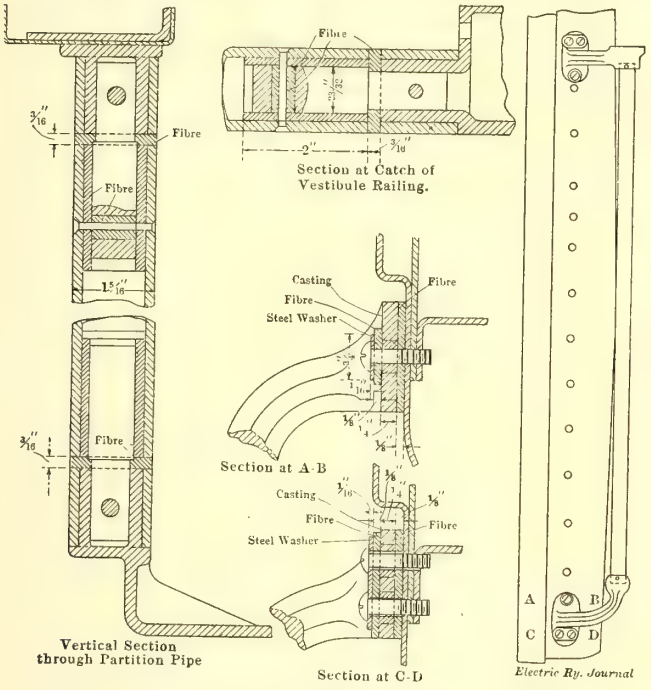
To fully protect the car against short-circuits there will be placed on the car roof, in addition to the MA13 fuse boxes on the platform sills, two enclosed Noark fuses, one near each trolley base. In the event of a heavy short-circuit these fuses, which are rated at 450 amp, will protect the entire conduit system which encloses the electrical wir-



Chicago Steel Cars—Plan of Underframing, Showing Location of Electrical and Brake Equipment

ing. The platform circuit breakers are arranged normally to open on ordinary surges.

These cars have a "carbolith" composition flooring in the body and platforms, supported on Ferroinclave steel sheets riveted to the underframing. The monolithic floor is 5/8 in. deep above the metal, except at the sides of the car, where it is brought up an inch above the floor level to provide drainage away from the steel car lining. Maple floor-

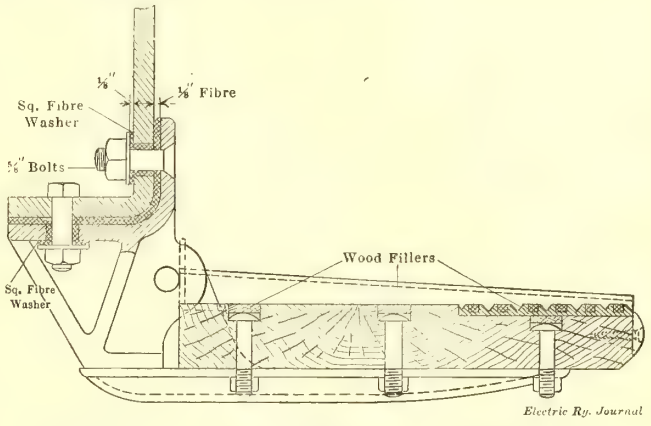


Chicago Steel Cars—Insulation of Grab Handles and Partition Pipe

mat strips 5/8 in. deep and spaced 1/2 in. apart are secured in the aisle so that they can be renewed readily. Wooden doors are used in these cars, because they are lighter and cheaper than steel doors and because the possibility of using the cars in subway service is rather remote at present. The vestibule folding and sliding doors are solid cherry.

As earlier stated, the car bodies are arranged for collecting fares according to the system of the Pay-as-You-Enter Car Corporation. The arrangement of platform railings is the same as that described for the wooden cars of the Chicago Railways Company, and the doors in the bulkheads also are arranged one to swing and the other to slide, as in the standard design. The pay-as-you-enter division rail and stanchion are insulated from the steel framework of the car. The folding steps are to be covered with wood treads, and all grabhandles and metallic parts will be insulated with fiber washers and bushings for the protection of passengers whenever the car becomes insulated from the rail. An abrasive top dressing will be inserted in the carbolith floor at the top of the steps.

The car body has five sets of windows on each side, with two upper sash and two lower sash in each set; the lower sash is arranged to drop into pockets, as earlier described. The window openings are 30 in. high. Storm sash are provided for all side windows, and these sash conform in material and finish to the permanent sash. All window sash are made of steel and were supplied by the Hale & Kilburn Manufacturing Company.



Chicago Steel Cars—Insulation of Platform Steps

The seating plan for the new steel cars is the same as that for the 600 wooden cars earlier mentioned. It includes longitudinal seats at the ends of the cars and cross seats in the center. The seat and cushion frames are of pressed steel. The metal trimmings inside the cars are cast bronze held in place by oval-headed screws.

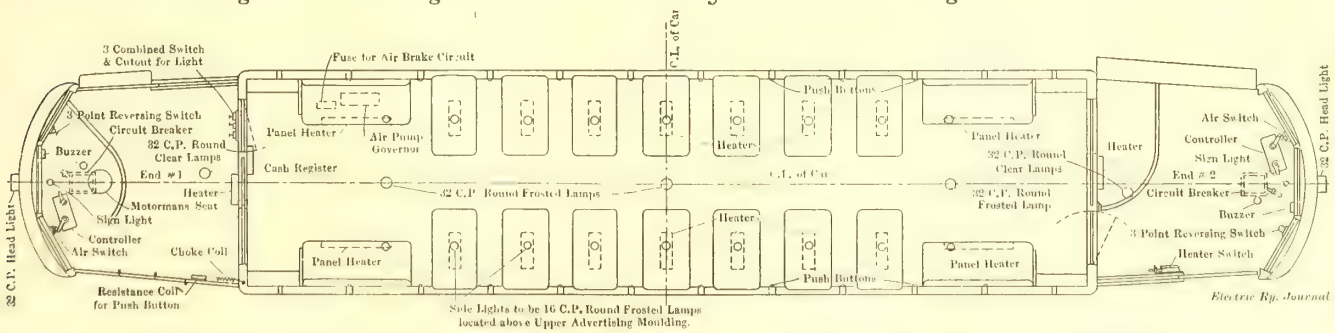
These new all-steel car bodies will be mounted on Pullman No. 150 trucks, and will carry the same electrical and braking equipment as that described in an earlier issue for the 600 wooden cars.

The following is an abstract of the specifications for painting these steel cars:

Material: All color used in the painting of these cars shall be of the Moser-Valentine, Sherwin-Williams make, or equal. Varnish shall be of Beckwith-Chandler, or equally good and approved guaranteed paint or varnish.

All exposed, rough, unfinished steel requiring a smooth surface, such as side sills, etc., to be painted as follows:

1. To be thoroughly cleaned.
2. Primed with special steel primer.
3. Puttied and plastered where necessary.
4. One coat of lead color.
5. Three coats of rough stuff.



Chicago Steel Cars—Floor Plan, Showing Location of Lights, Heaters and Other Equipment

6. Rub smooth with pumice.
7. Three coats of color.
8. Ornamented, lettered and striped.
9. One coat of rubbing varnish to be rubbed.
10. Two coats of heavy body wearing varnish.

All exposed smooth steel, such as side panels and end panels, letter boards, etc., to be painted as follows:

1. Thoroughly cleaned with emery and washed with benzine.

2. One coat of steel primer.
3. All defects to be puttied.
4. Two coats of surfacer.
5. Rubbed down.
6. Three coats of color.
7. Ornamented, lettered, numbered, striped, etc.
8. One coat of rubbing varnish, to be rubbed.
9. Two coats of heavy body wearing varnish.

Interior painting and varnish: Doors and sash to be painted and varnished on outside same as steam railway practice.

All inside finish, including inside of doors and sash, to be finished imitation cherry, dull finish.

1. Primed with special steel primer.
2. All defects to be puttied.
3. Two coats of color, grained or tinted.
4. Two coats inside finishing varnish.
5. Rubbed dead, or what is known as oil finish. No shellac to be used.

Ceiling:

1. To be painted with one coat of light primer.
2. All defects to be puttied.
3. Two coats of ceiling color, flat.
4. One coat of color and varnish.
5. Ornamented and striped.
6. One coat of varnish rubbed dead.

Underframe:

1. One coat of red lead.
2. Finished with one coat of varnish and mineral mixed.

Miscellaneous: All joints to be red leaded before assembled. All framework and furring to be well painted with red lead. Back of steel headlinings to be well painted before same is put up. Outside color and style of lettering, numbering and striping to be as selected by the railway company. Roof to have three coats of paint mixed with linseed oil and varnished. Not less than 24 hours between each coat of paint, and not less than 48 hours between each coat of varnish.

SPECIAL TRIPS TO DENVER

A brief account was published in the Electric Railway Journal for July 17 of the special train organized by Charles S. Clark, secretary of the Massachusetts Street Railway Association, to go to the Denver convention and afterward visit the Pacific Coast and return to Boston. The complete itinerary of this special train has just been made public and indicates that it will be even more extensive and attractive than outlined in the preliminary plan. As now arranged, the party will leave Boston by the Boston & Maine Railroad at 1 p. m. Thursday, Sept. 30, and will pass on to the New York Central lines at Rotterdam Junction. Passengers from New York intending to take the train will join it at Utica by leaving New York at 2:50 p. m., Sept. 30. The train will go to Chicago on the New York Central and the Lake Shore & Michigan Southern railroads, and from Chicago to Denver over the Northwestern Railroad, reaching Denver at either 9:40 p. m. Saturday, Oct. 2, or about 8 a. m. Sunday, Oct. 3, as desired. It will be parked in Denver, so that the passengers can use the sleeping cars instead of going to a hotel, if they wish.

On Saturday, Oct. 9, at the close of the convention, the train will leave Denver over the Denver & Rio Grande Railroad at 2 a. m., passing through the Royal Gorge by daylight; will reach Salt Lake City Oct. 10, at 10 a. m., and will spend a day there. The party will then travel by the Oregon Short Line, the Great Northern Railway, the Alberta Railway & Irrigation line and the Canadian Pacific Railway to Calgary and Banff, where a stop will be made from 5 p. m., Oct. 12 to 12 noon, Oct. 13. On Thursday, Oct. 14, the train will arrive at Seattle by the Northern Pacific Railway. Oct. 15, 16 and 17 will be spent in Seattle, where the train will again be parked, so that passengers may use the sleeping cars if desired. On Sunday evening, Oct. 17, the train will leave Seattle by the Southern Pacific Railway for Portland, where Monday morning will be spent, and will arrive in San Francisco at 6 p. m. Tuesday evening. Wednesday and Thursday, Oct. 20 and 21, will be spent in San Francisco. Leaving there Thursday evening and traveling by the Southern Pacific Railway, the train will go to Santa Barbara, where a stay of five hours is scheduled, and thence to Los Angeles, where Friday and Saturday, Oct. 22 and 23, will be spent. The train will leave Los Angeles by the Southern Pacific Railway 10 a. m. Sunday, Oct. 24, and will arrive at El Paso Monday, Oct. 25, where a stay of eight hours has been arranged. Three hours will be spent at San Antonio on Oct. 26; then the train will run through Houston to New Orleans, where a stay of 16 hours will be made. The return trip will be by way of Memphis, Louisville, Cincinnati, Cleveland and Buffalo.

The cost for the New England party, as announced by Mr. Clark, will be: tickets, $136.75; berth in sleeping car, $69.75; cost of meals in dining car, $45.25, making a total of $251.75. In addition, a charge of 5 per cent, or $12.60, will be made for incidental expenses to constitute a fund to care for parking of train and other items which cannot be foreseen. If there is any residue from this fund after the bills are paid it will be refunded pro rata. This will make the charge of one person, with berth, $264.35. If a stateroom accommodating two persons is taken instead of a berth, the charge will be $150, instead of $69.75 each. A drawing-room, accommodating three persons, will cost $225. Henry L. Wilson, treasurer of the Boston Elevated Railway, has consented to act as treasurer for the party. Persons desiring accommodations should make application to Charles S. Clark, 70 Kilby Street, Boston, accompanied by check of $50, payable to Mr. Wilson's order.

It is important to add that the Southern Pacific Company, which owns the New York-New Orleans Steamship lines, has announced that those of the party who desire to go to New York via water instead of by rail will have the privilege of doing so without extra charge. The Southern Pacific Company has also made the announcement that any persons who are not in the party, but who desire to visit Seattle, San Francisco, Los Angeles and New Orleans, can have the benefit of the special round trip rates quoted above until Nov. 4. Those who wish to take advantage of this offer should ask the lines from whom they secure their Denver tickets to extend these tickets to Seattle, and see that their coupons read by way of the Union Pacific, Oregon Short Line, Oregon Railroad & Navigation Company and Southern Pacific. The fare for the round trip from New York going via the New York Central lines and returning via steamer from New Orleans is $105; returning by all rail from New Orleans is $107.25. The fare going by the Pennsylvania Railroad and returning via all rail is $107.25. Tickets reading via Southern Pacific steamer, New Orleans to New York, include meals and staterooms on the steamer.

CHANGE IN SCHEDULE OF PENNSYLVANIA SPECIAL

A change has been made in the schedule announced for the special train over the Pennsylvania Railroad. This was formerly to leave New York at 3:55 p. m on Friday, Oct. 1. Instead, the train will leave New York at 9:55 a. m. on Friday, Oct. 1, and will reach Denver six hours earlier than originally planned. The routing of the train after leaving Chicago will be over the Northwestern Railroad and Union Pacific Railroad.

RECENT REPORT ON RAIL CORRUGATION IN EUROPE

The theory that rail corrugation develops from defects which exist in the rails before they are put into service and is caused by rolling the rails when they are too cool has recently been made the subject of an exhaustive study by Mr. Peterson, manager of the municipal tramways of Dortmund, Germany. Mr. Peterson suggested this explanation at the last meeting of the Street Railway Association of the Rhine Provinces, held at Munster, Westphalia, and his report on the subject has just been issued in pamphlet form by the International Street & Interurban Railway Association.

Mr. Peterson states that this theory has been advanced in the past, especially in the report on rail corrugation presented at the eleventh annual meeting of the German Street & Interurban Railway Association, at Mannheim, in 1907,* and in a report on the same subject at the Münich convention of the International Street & Interurban Railway Association in September, 1908.† In the latter, the speaker, Mr. Busse, said that he had been able to locate by means of light filing the existence of corrugations 500 mm to 700 mm apart in new rails, and believed that these corrugations were produced in the final passes of rolling the rails. Mr. Busse also stated that one of the principal inherent causes of corrugation was the structure of the metal in the rail, and called attention to the necessity of using the greatest amount of care in rail manufacture, especially in finishing the rail. Mr. Peterson also referred to the studies on the subject conducted by Messrs. Fell, of London, and Perroud, of Paris, both of whom were quoted as saying that rails in general have a rough or slightly corrugated surface immediately after leaving the mill.

Fig. 1 shows an apparatus designed by Mr. Peterson to measure the smoothness of the surface of the head of a rail. With it the corrugations of two adjoining rails in a track, welded at the joints, were measured, and it was found that while each rail was corrugated, the corrugations were of different lengths and depths, showing that the direction of movement of the cars did not influence the formation of the waves. Mr. Peterson then took several rails at random from an electric railway track in process of construction and had their heads slightly planed. They were then measured by the apparatus and found to contain a series of slight but very characteristic corrugations, although

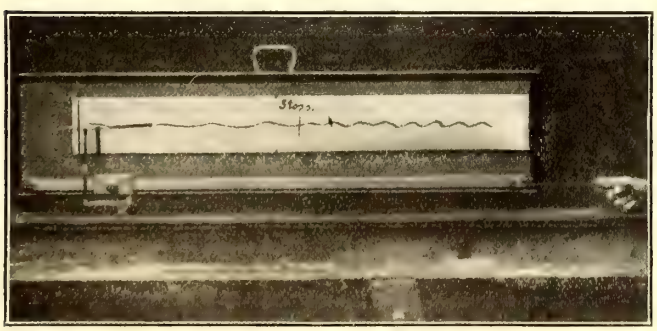
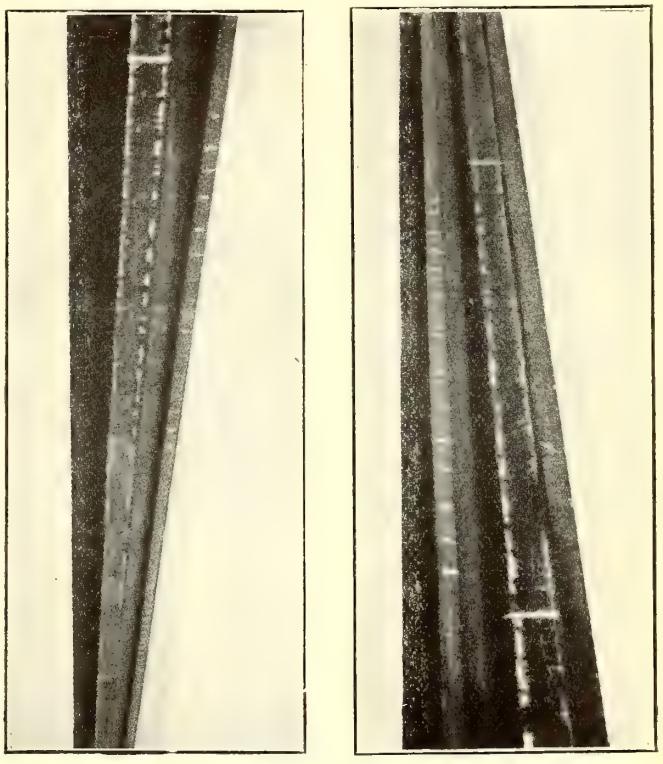


Fig. 1—Rail Corrugation—Apparatus for Measuring Waves

none of the rails had been in contact with a car wheel. These rails had a tensile strength of 75 kg per square millimeter, with an elongation of 10 per cent. It was found, moreover, that at the rail ends which had last left the rolls in the mills the corrugations were much shorter and more marked than at the other end of the rails. These rails are shown in Figs. 2 and 3, and the white spots indicate the crests of the corrugations. A nick was made on the lips of the rails directly opposite each crest, and they were put in service. The period which has since elapsed was too short to permit Mr. Peterson to draw conclusions which were absolutely definite, but it was apparent that corrugations were in process of being formed at the points which he had previously marked.

Mr. Peterson then discussed the process of rolling



Figs. 2 and 3—Rail Corrugation—New Rails with Corrugations Marked

grooved rails, which he said was so complicated that only a few mills had been able to do it successfully. He explained that the relation between the energy consumed by the rolls in a mill and the temperature of the ingot rolled has recently been made the subject of a careful investigation by Mr. Puppe. (See *Stahl und Eisen*, Vol. 1909, Nos. 1 and 5.) According to this authority, a bloom in passing through the rolls does not advance at a speed uniform with the speed of the periphery of the rolls, but its movement is a series of irregular advances and halts, each of which produces a characteristic mark on the surface. The higher the temperature, and hence the greater the plasticity of the metal, the more nearly constant is the rate of advance of the bloom. As the temperature falls, the resistance to passage through the rolls increases, while the frictional force tending to pull the bloom forward remains nearly constant. Hence the advance of the bloom lags materially behind the periphery of the rolls, and the characteristic marks which later develop into corrugations are close together.

The diagram, Fig. 4, taken from *Stahl und Eisen*, 1909, No. 1, shows the relation between energy and temperature, mentioned above. The ordinates indicate the number of cubic millimeters of metal in the bar displaced by the expenditure of 1 kg meter of energy in the rolling. That is S_1 is the original section in square millimeters, S_2 is the reduced section in square millimeters, and L is the original length in millimeters. The three lines on the diagram

*See Street Railway Journal for November 9, 1907, page 948.
†See Electric Railway Journal for November 7, 1908, page 1323.

refer to three ingots of soft basic steel of about 40 kg per square millimeter tensile strength, which were rolled into flat plates. The diagram shows that the energy required to roll these ingots at 1220 deg. C. was about double that at 1320 deg. C., and that the malleability of the metal decreased rapidly with its temperature. Although the diagram, Fig. 4, was obtained in rolling a rolled plate, the same conditions apply very closely in rolling grooved girder rails.

Owing to the usual requirements of electric railway companies regarding tensile strength and elongation in the

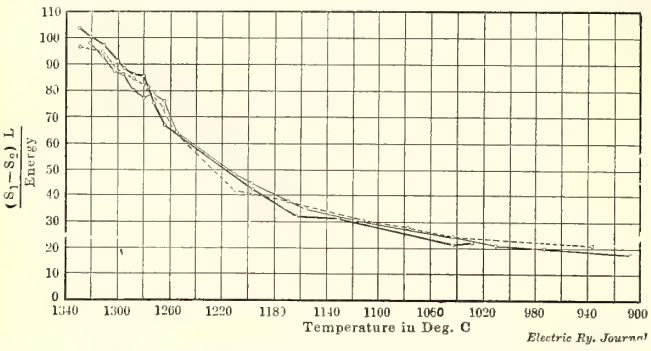


Fig. 4—Rail Corrugation—Diagram Showing Relation Between Temperature and Energy Required in Rolling

rails purchased by them, the average temperature at which these rails are rolled rarely exceeds 1140 deg. C., and in European mills they are generally given 12 passes through the rolls. At each pass the section, of course, approaches more closely that finally required, and during the last two passes the groove is rolled in the head, which, up to that time, has been flat (see Fig. 5). By this time the rail has lost a considerable amount of its initial heat, and when the groove is rolled the molecules in the ingot offer great resistance to the forces required to displace them. To balance the pressure which has to be exerted on one side of the head during these two final passes, it is customary in European mills to enlarge the base of the rail directly below the tread, as shown in Fig. 5, on the eleventh pass, and at the twelfth or last pass to restore the base to its original section.

If the accuracy of this theory of rail corrugation is admitted, Mr. Peterson believes that it is not difficult to explain all of the peculiar characteristics which have been observed in regard to it. For example:

(1) The corrugations always commence on the side of the tread next to the groove.

The tremendous power exerted in rolling the groove in

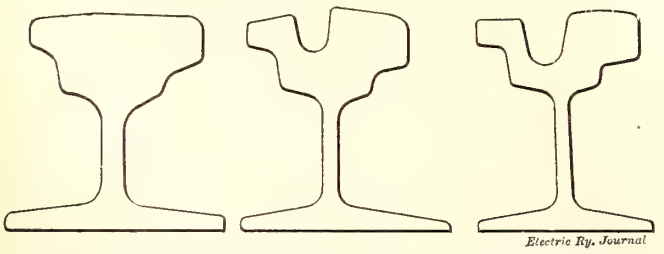


Fig. 5—Rail Corrugation—Sections at Ends of Tenth, Eleventh and Twelfth Passes

the head of the rail breaks down the structure of the metal. It is not surprising, therefore, that the first trace of corrugation should appear in this part of the head.

(2) The crests disappear after a certain period of time.

The breakdown in the structure of the metal is largely on the surface, and penetrates only to a certain depth in the head of the rail.

(3) The reappearance of the same corrugations after their temporary removal by grinding.

The grinding is not carried below the original surface far enough to reach homogeneous and unharmed metal.

(4) The reappearance of corrugations of other lengths at points where corrugation had previously been observed.

During the eleventh pass the rolls produce internal disturbances in the metal tending to produce corrugation; but these disturbances are situated in the head of the rail at a greater depth than the strains set up during the last pass, which produce the initial corrugations.

(5) The disappearance of corrugation after welding a strip of soft iron on the head of the rail.

The operation of welding by an electric arc heats the rail head to a very high temperature, and in cooling down the structure of the molecules, which was broken down by the rolling, is allowed to re-establish a certain equilibrium equivalent to annealing.

(6) The appearance of corrugations only at certain points of the same rail.

The metal while being rolled did not possess at all points a uniform temperature, or else some parts of the rail presented greater resistance during the work of rolling.

(7) T or Vignole rails are less subject to corrugation than girder rails.

The rolling of these rail sections is a more simple operation than the rolling of grooved rails.

To explain the development of the incipient corrugation existing in the rail into that noticed after the rail has been

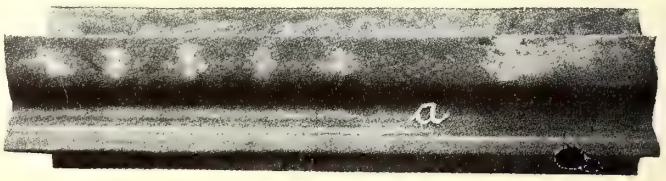


Fig. 6—Rail Corrugation—Head of Rail, Showing Corrugations and Bridging Spots

in service for some time, Mr. Peterson quoted the following remarks on rail wear contained in an address of Dr. C. B. Dudley in 1880 before the American Institute of Mining Engineers:

No two surfaces ever have been made, or can be made, that are absolutely smooth. At the very best, the smoothest surfaces are made up of elevations and depressions, very minute, it is true—perhaps almost infinitesimal and entirely incapable of measurement—but nevertheless real elevations and depressions. When these elevations and depressions are tangible, we call the surface rough; when they are infinitesimal, we call it smooth. If, now, this reasoning is correct, the surface of the head of the rail, as well as that of the circumference of the wheel above it, are made up of elevations and depressions, which, when the two surfaces are in contact, must more or less fit into one another. And it is this fitting in of the minute elevations and depressions of the two surfaces that gives rise to friction. If the two surfaces were absolutely smooth there would be no friction, and consequently no tractive power in the locomotives, nor would the wheels under the cars turn around. Friction of this kind we are accustomed to call rolling friction. In reality, then, a rail and the wheel which rolls above it may be regarded as a rack and pinion with infinitesimal teeth, lacking, of course, the element of regularity as to the position of the teeth which characterizes a rack and pinion. * * * If we are right in regard to the nature of the surfaces involved in wear and the strains produced, wear is simply the breaking or pulling off of the infinitesimal teeth by the strains to which they are subjected.

This theory of rail wear could be applied to explain corrugation in a rail whose molecules had been compressed at different regular points by the rolls by assuming the

molecules on the head of the rail to represent the alternate elevations and depressions described by Dr. Dudley. It is then evident that at the points where the molecules are farther apart there are fewer elevations to withstand the tractive effort exerted on them. Consequently the rail surface breaks off more quickly at these points than at the points where the molecules are compressed. The result is that under the effects of wheel wear valleys and crests are created and corrugation appears.

After having thus considered the causes of corrugation, Mr. Peterson took up methods of overcoming it. One was to carry out the work of the last pass of the rolling at a high temperature either by reheating the rail after the first few passes or else by heating the ingot to a higher initial temperature. The latter plan incurs the danger of a sacrifice of tensile strength, a quality for which the railroad companies have been increasing their demands. Mr. Peterson thought, however, that all reasonable requirements of tensile strength could be secured, and referred to the advantages of softer rails as given in Mr. Busse's Münich report, and to the conclusions of Dr. Dudley's report to the Railway Congress in Paris in 1900. This latter report stated that in rails with a double head or with a very simple profile the tensile strength could, without inconvenience, be carried to 85 kg per square millimeter, while for rails with a large base the tensile strength if possible ought not to exceed 75 kg per square millimeter, on account of the rapid cooling of the flanges, a cooling which creates great interior tension and increases the danger of breakage.

Another method is to use steel made in the electric furnace, as this steel seems to possess much more homogeneity of structure than that obtained by the basic converter process. Open-hearth steel, in which the period of mixing requires several hours, ought also to be valuable in the manufacture of tramway rails.

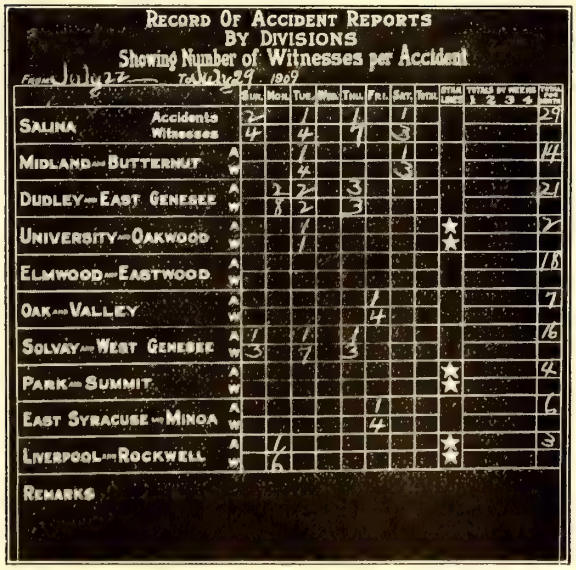
Finally, Mr. Peterson gave some results obtained by filing a piece of corrugated rail. He found that the rail could be much more easily filed in the valleys than in the crests of the corrugations. When the filing was carried more deeply into the crests, small and excessively hard grains were found, forming the backbone of the crests. An attempt was made to analyze chemically several of these grains, but the operation was difficult, for they were extremely hard, and it was difficult to obtain enough grains to make a chemical analysis. These chemical analyses had not been terminated at the time of the presentation of the paper by Mr. Peterson. Fig. 6 shows the rail which was examined; the hard points are marked in white.

Mr. Peterson terminated his remarks by stating that the section of the rail shown in Fig. 6 possessed five corrugations perfectly marked. There was, however, a somewhat remarkable bridging of one of the valleys. In place of concentrating at a crest, there was a collection of hard points spaced uniformly between two crests, as shown at the point *a* in Fig. 6, and the metal on the head of the rail at this point was at the same height as at the crests. Mr. Peterson did not have time before the meeting to investigate the cause of this singular condition, nor to examine the rail at this point further in detail.

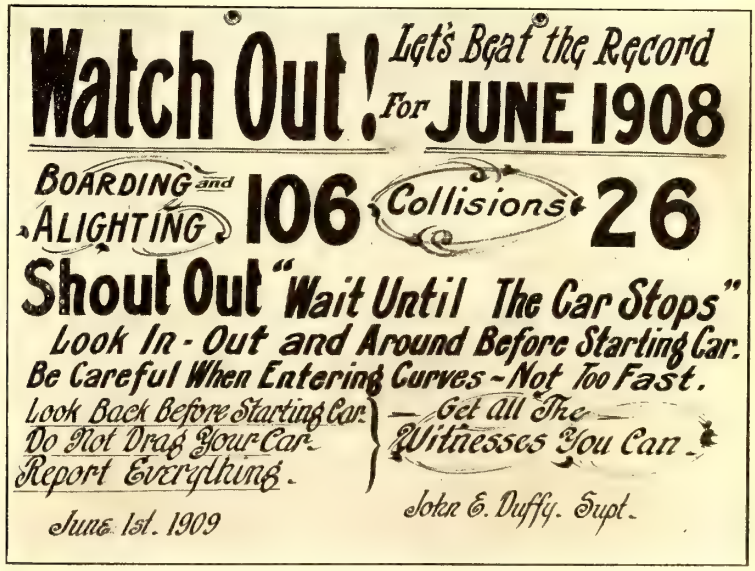
PREVENTING ACCIDENTS IN SYRACUSE

The Syracuse Rapid Transit Company, of Syracuse, N. Y., has been carrying on a school of instruction for motormen and conductors for the past three years with satisfactory results. Elaborating upon the work of this school, the company has lately tried the experiment of conducting special classes for employees of the transportation department, devoted primarily to giving the men instructions relative to the things that can be done by the motormen and conductors to prevent accidents and the manner of taking care of accidents after they occur. The idea is to hold two main classes each year. One is conducted in the spring, just before the open cars are put into service, and one in the autumn before the leaves begin to fall, and trouble may be expected from slippery tracks. The classes are conducted under the general supervision of J. E. Duffy, superintendent, and the lectures or talks are given by W. F. Weh, claim agent, and Dr. Francis J. Ryan, the company's surgeon. At different periods during the year other than the time at which the two regular classes are held, the men are called together and further instruction given them. It usually takes four or six sessions, held at different hours of the day and night, to cover the entire force of employees.

In addition to the courses of instruction on the prevention of accidents, the thought has been to enhance the results by creating and stimulating a spirit of rivalry and



Accident Record Bulletin Board



Warning Placard Displayed in Lecture Room

competition among the different divisions for the credit of having the fewest accidents at the end of each week. At each operating station there is a large bulletin board the features of which will be understood from the photograph reproduction. On this blackboard are entered with chalk the number of accidents and the number of witnesses reported per accident on each division for each day, for the week, and for the month. A golden star is placed after the divisions having the fewest accidents for the month, and these are known as the "star lines."

The spirit of rivalry and the interest of the men are kept alive by issuing weekly bulletins, letting the men know the status with respect to the number of accidents for the current periods compared with previous years. The opportunity of congratulating the men for work well done is always welcomed. It is believed these bulletins are an added stimulus to the employees to keep up the good work, and especially so to those who are earnestly striving to improve the accident situation.

For use in the lecture room and also for display at the different operating stations, large placards or banners were printed, a few of which are also shown. These show the numbers and classes of accidents for the corresponding month of the previous year. They also contain short, trite phrases on the subject of avoiding accidents, such as, "Shout out, Wait until the car stops!" "Look in, out and around before starting car," etc.

Along the line of encouraging and stimulating the men to continued efforts in the prevention of accidents, cards measuring 3¼ in. x 6 in., are issued once a month giving suggestions, reminders, lists of "don'ts," etc. The subject matter of the cards is changed each month, with the idea of sustaining the interest in them. The cards are distributed at each station on the first of the month by the carhouse foremen. The text matter of the cards for July and August is printed below; the two first are for July, the other two for August. All bear the printed signature of J. E. Duffy, superintendent.

A FEW DON'TS FOR MOTORMEN

1. Don't think you own the street.
2. Don't hit the rig if it stays on the track all day.
3. Don't be careless at cross streets, schools or engine houses.
4. Don't drag your car. Either stop or go ahead.
5. Don't get too near the car ahead.
6. Don't start your car with a jerk or take curves too quickly.
7. Don't start your car until you have looked back for the safety of your passengers.
8. Don't take chances with anything or anybody. Be sure you are right before going ahead.
9. Don't forget your duty at railroad crossings.
10. Don't pay attention to passengers on the front seat.
11. Don't lose your head after the accident happens. Get busy and help the conductor.
12. Don't talk about your car being late or about any accident to any person except an official of this company.

JULY RESOLUTIONS FOR CONDUCTORS.

1. I will look in, out and around before giving two bells.
2. I will make sure that people are on or off the car before giving two bells.
3. I will get as many witnesses as possible.
4. I will do the best I can for the company's interest.
5. I will not talk unnecessarily long with any passenger
6. I will make sure of everything and everybody.
7. I will do my whole duty at railroad crossings.
8. I will not let any passenger off in an unsafe place.
9. I will look around before giving four bells.
10. I will not have an accident during July.
11. I will not talk about my car being late or about any accident to any person excepting an official of this company.

AUGUST RESOLUTIONS FOR MOTORMEN.

1. I will do my best to prevent accidents on my car during this month.
2. I will be especially careful at railroad crossings.
3. I will have my car under perfect control before entering curves.
4. I will keep the chain hooked on the front part of my car.
5. I will avoid unnecessary conversation with passengers.
6. I will prevent collisions of all kinds by being on the safe side, taking no chances and keeping car under absolute control when approaching cars and vehicles of all kinds.
7. I will not start my car with a sudden jerk or stop it so abruptly that an accident may occur.
8. I will not drag my car, but will either stop or go ahead.
9. I will leave the end of the road on time.
10. I will assist the conductor in every way possible after an accident has happened.
11. I will be especially careful when passing standing cars.
12. I will not discuss accidents with strangers or others who are not officials of this company.
13. I will do my best so that no passengers on my car can alight in an unsafe place.
14. I will look around before starting my car to see that everything is safe.

AUGUST QUESTION BOX FOR CONDUCTORS.

1. Why don't you report everything that happens on or near your car?
2. Why don't you make your best effort to get as many witnesses as possible?
3. Why don't you keep your hand off the bell rope until you are ready to give the signal?
4. Why don't you look around before giving four bells?
5. Why don't you make sure that old people and passenbers carrying babies are in a safe place before giving two bells?
6. Why don't you keep the chains hooked on your car?
7. Why don't you stop lengthy conversations with passengers.
8. Why don't you stop talking about accidents to strangers?
9. Why don't you keep passengers off the running board and steps of your car?
10. Why don't you "shout out" in a loud voice, "Wait until the car stops"?
11. Why don't you change signs and fix guard rails at the end of the line when your car is standing?
12. Why don't you try your best to prevent accidents?

When a new issue of the cards appears the contents are reproduced in the local newspapers in order to let the public know that the company is keenly alive to the importance of reducing the number of accidents and is doing all in its power to instruct its employees and the public in avoiding mishaps.

A point is made of dividing street railway accidents into two classes, those chargeable to the carelessness of employees, and those for which the public is usually responsible. Most mishaps incident to getting off and on cars are due to the carelessness of passengers, and every effort is made to instruct the public to remain seated until the car stops, as to the right and wrong method of getting on and off cars, the necessity of refraining from touching the grab handle while the car is in motion when boarding a car, etc. Accidents such as collisions of cars are usually due to the carelessness of employees, and every effort is being made to instruct the men how to avoid the things that lead to collisions and other accidents.

The management of the Syracuse Rapid Transit Company believes that its effort to secure the co-operation of employees and public in the matter of reducing accidents is having a very appreciable effect, as the number and seriousness of accidents this year show a material reduction as compared with the records of previous years.

NEW YORK TO CHICAGO BY ELECTRIC RAILWAY

BY J. S. MOULTON, ASSISTANT ATTORNEY, INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK

As far as I am able to learn from many inquiries this is the first trip made from New York to Chicago over electric lines for so large a part of the way. To be exact, the trip started from Hudson, N. Y., because the electric street railway service from New York City extends at present only as far as Tarrytown and the time lost in going to that town and then taking a train of the New York Central & Hudson River Railroad to Hudson would add nothing of value to the journey.

Leaving New York City at 12:30 a. m. by the New York Central road, I arrived at Hudson at 4:47 a. m., which gave me a full hour before taking the car of the Albany & Hudson Traction Company at 6 o'clock. I had breakfast at Electric Park on the line of this road and shortly after leaving there A. P. Deeds, general freight and passenger agent of the company, joined me and traveled as far as Albany. I took there the car of the Schenectady Railway at 8 a. m. and arrived at Schenectady, a distance of 16 miles, at 8:45. I had a few minutes at Schenectady and went to the offices of the company and called on James F. Hamilton, superintendent of transportation. At 9 o'clock I took the car of the Fonda, Johnstown & Gloversville Railroad for Amsterdam and I was sorry to have missed R. M. Colt, general passenger agent of this road, because he gave me so many suggestions before I left New York regarding travel through this part of the country. Arriving at Amsterdam at 9:41 a. m., it is possible to go to Fonda by electric line, but the distance gained is so small that I took the New York Central road to Little Falls, a distance of 39 miles, reaching there at 12:25 p. m. It took two hours to cover the 39 miles between Amsterdam and Little Falls. Leaving Little Falls at 12:30 p. m. on the Utica & Mohawk Valley Railway, the entire route of 23 miles to Utica was a trip that was made beautiful by the scenery. This trip was made in an hour. I remained in Utica, where Albert Eastman, general passenger agent, took me to the offices of the company and I met Mr. Gowen, assistant to the vice-president. At 2:05 p. m. I took the limited car for Syracuse, a distance of 49 miles, which we traveled in one hour and 28 minutes. The country is fully as interesting as that between Little Falls and Utica. I cannot refer to this portion of my trip without thanking Mr. Frankel, the manager of the Stearn Advertising Company, of Syracuse. I called on Mr. Clark, of the Auburn & Northern Electric Railroad and the Auburn & Syracuse Electric Railroad. At 4:30 p. m. I took the car of the Auburn & Syracuse road for Auburn, 26 miles away, and a wait of 30 minutes gave me time for supper and to see a little of the city.

I left Auburn at 6:30 p. m., taking the Auburn & Northern road and the Rochester, Syracuse & Eastern Railroad, by way of Port Byron for Rochester, a distance of 66 miles. The train was on time at Rochester and, getting there at 9:45 p. m., I found I had traveled 387 miles, of which 233 miles were on electric roads. I was not fatigued in the least and, after going to the hotel, went out and walked about the city for an hour. Remaining at Rochester all night, I started at 9:50 o'clock the next morning, taking a local car to the city line, where the car of the Buffalo, Lockport & Rochester Railway started for Lockport at 10:20 a. m. J. M. Campbell, general manager of this road, met me at the Rochester end of the line and went with me to Lockport, a distance of 56 miles, and made my ride very enjoyable by explaining the signal system and the interesting points of the country through which we passed. Riding in the motorman's cab gives a much better view of the country. I arrived at Lockport at 12:18 p. m. within a few steps of the car of the International Railway, which leaves there at 12:20 p. m. for Buffalo, 25 miles distant. I reached the latter city at 1:25 p. m. It was remarkable to find that the electric lines, with their long runs and many stops in the different cities and villages, made almost exact schedule time. At Buffalo I called on J. C. Calisch, of the Buffalo & Lake Erie Traction Company. Mr. Calisch said he was glad to meet a man brave enough to undertake so unique a trip. He was wrong in suggesting that bravery was needed, because the trip affords pleasure all the time. At Buffalo I went through the city on a local car to the city line, now called Lackawanna City, where the Buffalo & Lake Erie Traction Company has its terminal. In this trip of 88 miles on the lines of this road to Erie, Pa., the cars pass through a great grape belt. At Fredonia, on this line, I had to wait a few minutes and met Charles G. Lohman, formerly with the Chicago, South Bend & Northern Indiana Railroad. After a beautiful ride of six hours, I reached Erie at 9 p. m., where I remained all night, having covered that day 169 miles entirely on electric roads.

TRIP ON OHIO LINES

At 7 o'clock the following morning I started over the road of the Conneaut & Erie Traction Company for Conneaut, a distance of 33 miles, arriving there at 8:55 a. m. On this part of the trip I had with me R. W. Palmer, superintendent of the company. A wait of 30 minutes gave me time to set back my watch one hour, as I was traveling then on western time. Leaving Conneaut at 9:30 a. m. on the Pennsylvania & Ohio Railway, I traveled to Ashtabula and there took a car of the Cleveland, Painesville & Eastern Railroad via Painesville, for Cleveland. The distance from Conneaut to Cleveland is 73 miles. Cleveland was reached at 12:50 p. m. and after lunch I left at 1:30 p. m. on a limited car of the Lake Shore Electric Railway for Toledo, a distance of 120 miles, via Sandusky, which was made in four hours and 20 minutes without change. After supper at Toledo I went to the terminal of the Ohio Electric Railway and took the 8 p. m. car of that company for Fort Wayne, Ind., via Lima, Ohio. As I did not leave Toledo until so late, I did not stay on the car until Fort Wayne was reached, but thought it better to stop at Lima, where I arrived at 10:55 p. m. and was met by F. A. Burkhardt, district passenger and freight agent.

On the following morning Mr. Burkhardt met me at the hotel and we went to the offices of the company and met Mr. Dicke and they took the 10:15 a. m. car with me on their line a distance of 60 miles to Fort Wayne, which was reached at 12:10 a. m. At Van Wert, Ohio, the Manhattan limited of the Pennsylvania Railroad, which parallels the electric line at this point, came up, but we passed the steam train and kept ahead of it. At Fort Wayne I had dinner with Mr. Burkhardt, Mr. Dicke and F. I. Hardy, superintendent of transportation of the Fort Wayne & Wabash Valley Traction Company. After supper we took one of the cars of the Fort Wayne & Wabash Valley road to Wabash. Mr. Hardy left me at his home at Huntington. I remained at Wabash that night and started for Warsaw at 8:55 a. m. on the Cleveland, Cincinnati, Chicago & St. Louis steam road. After traveling a distance of 33 miles between these points I reached Warsaw at 11:36 a. m. 30 minutes late. By this fall the road will be from Fort

Wayne to Peru, Ind., on the Fort Wayne & Wabash Valley Traction Company road and thence to Warsaw by electric line, as the road now under construction will make the electric line route complete at that point, and therefore complete in the west.

I left Warsaw at 1:30 p. m. for South Bend, Ind., over the lines of the Winona Interurban Railway and the Chicago, South Bend & Northern Indiana Railway, reaching South Bend at 3:40 p. m. I remained there until 5:30 p. m., taking a limited car on the Chicago, Lake Shore & South Bend Railway for Chicago, a distance of 90 miles, passing through the industrial settlements of Michigan City, Gary and Hammond and reaching Pullman at 8:15 p. m. I took the suburban line of the Illinois Central Railroad to the central district of Chicago.

It took me three full days and 21 hours from the time I left New York City to get to the central district of Chicago. The actual running time was 45 hours and 24 minutes. I traveled 1143 miles, 956 miles on electric cars and 187 miles on steam roads. In one day of a little over 15 hours I traveled 298 miles on electric lines and the best of it all was that I saw the country pretty generally as well as the cities, towns and villages. These places are not seen by the traveler on steam roads. The electric lines pierce these places, the steam roads skirt them. About a year ago I made the trip by electric line to Philadelphia from New York, a distance of a little over 90 miles, and I thought I did well to cover it in nine hours.

The actual traveling time could be reduced several hours and as soon as I finished the trip and returned home I made a careful calculation and found that the actual traveling time could be reduced to 31 hours and 10 minutes. I had a fine and comfortable trip and shall certainly repeat it at the earliest practicable time.

The fare, including all steam fare from New York to Chicago was $19.67 and the other expenses, including those for four nights at hotels, were $12.

ROADS, FARES AND SCHEDULE

The roads on which I traveled, the time, distance and fare were as follows:

From New York City to Hudson, New York Central road, 115 miles, fare $2.30, leaving 12:30 a. m., arriving 4:47 a. m.

From Hudson to Albany, Albany & Hudson Traction Company, 38 miles, fare 60 cents, leaving 6 a. m., arriving 8 a. m.

From Albany to Schenectady, Schenectady Railway, 16 miles, fare 25 cents, leaving 8 a. m., arriving 8:45 a. m.

From Schenectady to Amsterdam, Fonda, Johnstown & Gloversville Railroad, 15 miles, fare 25 cents, leaving 9 a. m., arriving 9:41 a. m.

From Amsterdam to Little Falls, New York Central road, 39 miles, fare 82 cents, leaving 10:26 a. m., arriving 12:03 p. m.

From Little Falls to Utica, Utica & Mohawk Valley Railway, 23 miles, fare 35 cents, leaving 12:30 p. m., arriving 1:30 p. m.

From Utica to Syracuse, Oneida Railway, 49 miles, fare 85 cents, leaving 2:05 p. m., arriving 3:33 p. m.

From Syracuse to Auburn, Auburn & Syracuse Electric Railroad, 26 miles, fare 40 cents, leaving 4:30 p. m., arriving 6 p. m.

From Auburn to Rochester, Auburn & Northern Railroad and Rochester, Syracuse & Eastern Railroad, 66 miles, fare $1.20, leaving 6:30 p. m., arriving 9:40 p. m.

From Rochester to Lockport, Buffalo, Lockport & Rochester Railway, 56 miles, fare $1.10, leaving 10.20 a. m., arriving 12:18 p. m.

From Lockport to Buffalo, International Railway, 25 miles, fare 40 cents, leaving 12:20 p. m., arriving 1:25 p. m.

From Buffalo to Erie, Pa., Buffalo & Lake Erie Traction Company, 88 miles, fare $1.75, leaving 3 p. m., arriving 9 p. m.

From Erie to Conneaut,, Ohio, Conneaut & Erie Traction Company, 33 miles, fare 55 cents, leaving 7:05 a. m., arriving 8:55 a. m.

From Conneaut to Cleveland, Pennsylvania & Ohio Railway and Cleveland, Painesville & Eastern Railroad, 73 miles, fare $1.25, leaving 9:30 a. m., arriving 12:50 p. m.

From Cleveland to Toledo, Lake Shore Electric Railway, 120 miles, fare $1.50 ticket or $2.10 cash, leaving 1:30 p. m., arriving 5:50 p. m.

From Toledo to Fort Wayne, Ind., via Lima, Ohio, Ohio Electric Railway, 137 miles, fare $2.10, leaving 8 p. m., arriving in Lima at 10:55, spending the night there and starting at 10:15 a. m. and arriving at Fort Wayne at 12:10 p. m.

From Fort Wayne to Wabash, Fort Wayne & Wabash Valley Traction Company, 45 miles, fare 80 cents, leaving 5:40 p. m., arriving 7:08 p. m.

From Wabash to Warsaw, Big Four Railroad (steam), 33 miles, fare 70 cents, leaving 9:55 a. m., arriving 11:06 a. m.

From Warsaw to South Bend, Winona Interurban Railway and Chicago, South Bend & Northern Indiana Railway, 56 miles, fare $1, leaving 1:30 p. m., arriving 3:40 p. m.

From South Bend to Chicago via Pullman, Ill., Chicago, Lake Shore & South Bend Railway and Illinois Central suburban service Pullman to Chicago, 90 miles, fare $1.50, leaving 5:30 p. m., arriving 9:00 p. m.

THE WORK OF THE ELECTRIC RAILWAY STOREKEEPER

BY G. E. STOCKWELL, GENERAL STOREKEEPER, LOS ANGELES-PACIFIC COMPANY

As a rule, the work of the storekeeper on an electric railroad is not appreciated to anything like the same extent as that of the man occupying the same position on a steam road. The latter has been engaged for a number of years upon plans for systematizing his stock books and standards so as to keep his stock down to a minimum. This work has begun to bear fruit and has made the storekeeper an efficient and important factor in the steam railroad business. The Railway Storekeepers' Association has brought these men together and has enabled them to get results not otherwise obtainable. Many electric railway storekeepers have joined this organization, but though the main object of the storekeeper on the electric road is the same as on the steam road, the materials are different.

Possibly the reason for the lack of appreciation of the importance of the office of storekeeper on the electric road is that the electric roads are younger and many managers consider the storekeeper as a sort of necessary evil. They think that any one can run a storeroom. I know of cases where a clerk has been taken out of an office and made storekeeper. One man whom I have in mind absolutely did not know a lock-nut from a commutator.

The position of storekeeper on the average electric road requires more special knowledge than that on the steam road, because a man has under his charge not only most of the material used on the steam road, but all that used in the electrical equipment. When one considers that about 50 per cent of the operating expenses of a road are for material, it seems obvious that this material should be in charge of a good man. I do not think a road would make any mistake if it required its general storekeeper to be a competent engineer and made him responsible to the general manager alone. He would then be able, from his knowledge of the materials in his charge and the extent of their use, to keep the supply down to the minimum actu-

ally required. If this duty devolves upon the purchasing agent, serious errors of judgment may be made in regard to the rapidity with which material will be required, unless the purchasing agent is also an engineer and is acquainted with the relative demand for the different articles in store.

A storekeeper may consider that after material has been issued he has no further interest in it, but he should be always on the lookout for leaks and then try to remedy them. To secure this, the following rules are in force in the storeroom of the Los Angeles-Pacific Railway Company and every new man is required to memorize them:

(1) Do not issue a new lamp unless a burned-out lamp or butt is turned in with the requisition for new ones.

(2) Do not issue a trainmen's lantern without getting an old one for it.

(3) Do not issue new finished brass goods, such as journal brasses, motor bearings, brush holders, trolley wheels, etc., without getting a scrap or second-hand piece for it.

(4) When filling requisitions be sure to get all information as given on the bin tag—that is, the proper name and catalog number, if any.

The first rule saves lamps from being stolen from the shops and cars because it makes the foreman responsible, and if an old lamp or butt is not turned in with the requisition, the foreman must give an explanation. If it is a new installation, the requisition is forwarded to the electrical engineer for his approval.

The second rule is based upon a similar reason. On the road with which the writer is connected the trainmaster signs requisitions for the trainmen's supplies, and if an old lantern is not handed in to the storeroom, the signature of the general superintendent is required before a new one is given out. An account is kept of all lanterns by number and this account shows to whom the lanterns are charged, and when an old lantern is turned in the man is given credit for it and an entry is made of the date of return.

The desirability of the third rule is obvious. Commutators are handled in the same manner as lamps and trainmen's supplies, and the brass and copper scrap that disappears is necessarily very small. If no scrap or second-hand material is presented for exchange an explanation is required and the requisition is sent to the general superintendent for approval.

The fourth rule is important to the accounting department. The bin tag contains the data given on the invoice, and if the stock clerk is careful to get all the information on his requisition before it leaves his hands, the price clerk has no trouble in finding either the proper name or price. Under this system practically no requisitions have to be returned to the storeroom for more data.

RATES TO DENVER FROM THE SOUTH AND WEST

The following table shows the one-way Pullman and round-trip railroad fares which have been granted on account of the Denver Convention from the principal cities in Texas and California to Denver:

	Pullman Rates (One Way)			Railroad Fare.
From.	Berth.	Compt.	Drawing Room.	Rd. Trip.
Fresno, Cal.	$9.50	$27.00	$34.00	$55.00
Los Angeles, Cal.	9.50	27.00	34.00	55.00
Sacramento, Cal.	9.50	27.00	34.00	55.00
San Bernardino, Cal.	9.50	27.00	34.00	55.00
San Diego, Cal.	9.50	27.00	34.00	55.00
San Francisco, Cal.	9.50	27.00	34.06	55.00
San José, Cal.	9.50	27.00	34.00	55.00
Austin, Tex.	6.50	18.50	23.00	35.30
Dallas, Tex.	5.00	14.00	18.00	28.70
El Paso, Tex.	5.50	15.50	20.00	35.00
Ft. Worth, Tex.	5.00	14.00	18.00	27.40
Galveston, Tex.	7.00	20.00	25.00	39.75
Houston, Tex.	7.00	20.00	25.00	37.75
Laredo, Tex.	9.50	27.00	34.00	44.55
San Antonio, Tex.	7.00	20.00	25.00	38.40

CO-OPERATIVE BUILDING ASSOCIATION OF THE BERLIN STREET RAILWAY EMPLOYEES

Several large manufacturing organizations in this country have established building and loan associations to assist their employees in owning homes, but as yet no street railway companies, so far as is known, have undertaken that work here. This, however, is not the condition abroad, where many companies, particularly in Germany, not only assist in maintaining benevolent associations to pay sick and death benefits and pensions, but also those to erect suitable dwellings for employees in the neighborhood of their work. A typical organization of the latter kind is the "Baugenossenschaft," or building fraternity, of the Grosse Berliner Strassenbahn. This was formed in 1901 as a branch of the general employees' association in consequence of the difficulty which was then experienced in finding suitable living rooms. Berlin is pre-eminently a city of apartment houses, owing to the high cost of land. The rents in turn are also very high, and at that time were almost prohibitive, owing to the fact that the population was growing faster than the building accommodations.



Homes Built for Berlin Railway Men—Courtyard at Tempelhof

The building club now has 1639 members, or about 25 per cent of the total number of members in the general organization. A share of 300 marks ($75) is obtained through monthly payments of one mark ($0.25). Shareholders have the privilege of drawing lots for apartments as they become vacant, and up to the present have also received an average dividend of 4 per cent on the money paid in. The association now owns five buildings, located in proximity to as many car depots. The first house was completed in August, 1903, and the last in March, 1906. Since then no additional buildings have been erected for the reason that hard times made plenty of private houses available and new construction unprofitable. During 1908, however, a plot was purchased for a sixth house, which will be erected when further construction appears profitable.

When the building club was inaugurated the railway management loaned it 1,500,000 marks ($375,000) at 3 per cent. Part of this money was secured by mortgages on the properties. Later on, 500,000 marks ($125,000) was furnished by the pension fund at 3½ per cent. In 1905 the latter loan was taken over at 3 per cent by the Grosse Berliner Strassenbahn, and the directors also presented

41,000 marks ($10,250) to the emergency fund. At the end of 1908 the liabilities of the association were $500,000 and its assets approximately $600,000. The buildings have been ably managed, and for several years past neither a store nor apartment has remained unoccupied. In a few cases non-members of the society have been accepted as tenants when the members themselves made no application for rooms.

The total number of tenants in the five houses, including storekeepers, is 297. There are 286 apartments of one, two or three rooms; 232 of these apartments are provided with baths. It might be well to explain that the terms "house" and "room" do not mean exactly the same thing in Berlin and in New York. For example, many American flats are built on plots 25 ft. x 100 ft and house six to eight families, or two per floor. The Berlin apartment house is also four to five stories high, but always occupies a considerably wider lot. It is frequently built in the form of a hollow square along a courtyard, say, 65 ft. x 35 ft., which is large enough to afford ample light for every room.

A typical house of this kind was built by the association on Eylauer Street, in the fashionable suburb of Wilmersdorf. The yard is laid out as a garden with paved walks. In the center is a neat wooden shed, where the tenants beat their carpets and do other dry cleaning, since nothing of the kind may be done in the hallways or from the windows. Every apartment is provided with a loggia or balcony, which serves for growing flowers, and is large enough to place a hammock or several chairs outdoors. The exteriors of the buildings, which are always of stone, are very artistically designed. In fact, they are characteristic expressions of the general desire in Berlin for beautiful buildings.

The interior equipment of the houses is of the most sanitary character. The individual rooms also differ materially from those in the cheaper American flats. They are much larger, some being fully 19 ft. x 13 ft. in size. The kitchen, including the pantry equipment, does not count as a room. A three-room apartment includes a private corridor, dining room, bedroom and visitor's room. The latter, as in the two-room flats, is often used as a bedroom. Each apartment also has a clothing closet, which is 4 ft. wide and 12 ft. to 13 ft. long. When such closets are fitted with baths the tenant pays an extra monthly charge of about 43 cents. Unlike the cheaper American flats, there are no private tubs for laundry purposes. Hence no room is taken for that purpose, and all washing is done with the common laundry equipment in the attic. Every tenant also has free cellar space for storage of fuel, etc.

The rentals, of course, were fixed upon a strict investment basis, but they are rather attractive compared with the charges made by other landlords for the same facilities. The following monthly rental figures are very reasonable for the accommodations offered, bearing in mind the character of the buildings and their proximity to the tenants' working place: For two rooms and kitchen, average of $9.50 in the part facing the street and $7.50 in the part facing the courtyard; for a single room and kitchen facing in the street, $6.50; facing the courtyard, $4.50.



Homes Built for Berlin Railway Men—Front House on Eylauer Street



Homes Built for Berlin Railway Men—Courtyard of House in Tegel

THE APPLICATION OF INTEGRATING WATTMETERS TO ELECTRIC CARS*

BY THOMAS W. HINKLE, ELECTRIC SERVICE SUPPLIES COMPANY

Electric railway companies are spending large sums of money in building modern power plants and equipping them with efficient machinery, but after the power goes out to the line no record is kept of it, and the motorman uses it either wastefully or economically, depending upon his intelligence and care. There is a great difference in motormen in the use of power, and it is my belief that if wattmeters were installed they would pay for themselves in a short while. Where integrating meters have been installed on various cars some very valuable information as to the relative efficiency of different men in handling the cars have been obtained.

With wattmeters installed on every car on a particular line or system, the total kilowatt-hours used would thus check against the station output, the difference between the totals being in transmission loss, leakage, etc. This is analogous to the comparison obtained between the total readings of the consumers' meters in electric lighting service with the station output meters, and it has been found in such service that this comparison often affords the most accurate, and really the only, method of picking out and hunting down undue losses in transmission, etc. Even with a few meters, shifted at intervals of a week or so from one car to another of a line, a series of readings could be obtained during the course of a few months, which would give a fairly good check of total car consumption against station output. This method might be practically as satisfactory, and considerably less expensive, to a railway company desiring to investigate the matter, as installing meters on all cars.

Under the present methods of inspection of equipment, motor troubles, bad brake adjustment, condition of bearings, gears and pinions, etc., are quite readily found if the road employs careful inspectors. All of these troubles, and many others which are hard for inspectors to locate, will cause undue friction and necessarily cause the car to consume too much current, but by the use of wattmeters any excessive current consumption will readily be found. That car can then be taken to the barn and the trouble eliminated, whereas without the meters the car would run indefinitely before the trouble was found.

Another use of wattmeters is in checking the relative efficiency of different equipment operating on the same line under the same condition, and comparing energy consumption on different lines of the same system.

There are also now on the market integrating ampere-hour meters, which show ampere-hours of current consumption in any circuit, entirely irrespective of voltage, differing in this respect from integrating wattmeters.

Some interesting tests have been made within the past year by different operating companies on transmission and line efficiency by using both ampere-hour and watt-hour meters on cars. Such a combination is, of course, only recommended for special tests, as it would be unnecessary and undesirable to install ampere-hour meters on cars as a general thing. The special test referred to is based on the idea that if the ampere-hour consumption of a particular car on a certain line, or section of line, is multiplied by the average station voltage during the period of a test the watt-hours thus obtained will be the station output required for that particular car, operating over the section of line during which readings have been taken. If, in the same car, a suitable integrating wattmeter is installed, its readings will show the true watt-hours consumption of the car, and the difference between the volt-ampere-hour reading and the watt-hour reading on the car will be the loss in transmission from the station for that particular car and section of the line. By taking a series of such observations with two or three different cars on various sections of line at different conditions of traffic, it has been found possible to obtain valuable data as to conditions of transmission line efficiency, of substations, feeders, etc., for different lines and sections of lines.

Until about three years ago there was no integrating wattmeter suitable for this purpose—that is, which would withstand the severe conditions under which a meter on a car has to operate. Later, special wattmeters were brought out for this work, but owing to certain inherent and unavoidable features of their construction their use was principally confined to special test cars, or on cars where precautions were taken to eliminate as far as possible the effect of vibration and jar on the meter. On account of the special care required in the use of the meters and their expense, their application in electric railway work was very limited until during the last few years, when meters have been brought out which are so constructed as to withstand without any injury whatever the most severe conditions of street railway operation.

The mercury type meter has proven the most successful and accurate, I believe, for this class of work. I will give a brief description of it.

In general, a mercury meter consists essentially of a cylinder or disk-like motor element partly or entirely submerged in mercury, so that current can be led in and out from this element by the mercury through fixed metallic contacts set in the walls of the chamber containing the mercury and disk. The reaction of current passing radially or diametrically across the armature—that is, the metallic rotating element—with a magnetic field properly set with respect to the armature, will cause rotation, and this rotation will be proportional to the amount of current passing through the armature.

When operated on direct current, the main current passing to the load, or a proportional part of it, passes directly through the armature or the motor element. The poles of the field magnet are located in close proximity to the armature disk, and the field set up in this magnet by the shunt coil is proportional to the voltage of the circuit. The current passing through the armature, therefore, is acted upon by this field. As the current through the armature is the load current, or a fractional part of it, the torque or rotative effect produced upon this current by the field is proportional to the power or watts, and the rate of rotation of the armature becomes a measure of the power passing through the metering device at any instant. In fact, this meter is nothing more or less than a small and delicate d.c. motor, having an armature equivalent to a single turn—that is, the current passes once across the disk—and having a field with two air-gaps, similar to an ordinary bipolar motor. The mercury at the edges of the armature carrying current to and from the contact, corresponds in a sense to a commutator of the usual motor.

The armature, or rotating element, is made with a central dome or float, so that the total displacement when emersed in mercury is sufficient to buoy up the entire rotating system, including a damping disk outside of the mercury chamber, so that the difference between the true weight of the rotating system and this buoyancy effect is only about 1/10 ounce. This, then, is the effective weight or pressure upward against the top bearing jewel. This weight or pressure upon the jewel is less than one-fifth that in any other type of meter, and as the armature is completely emersed in mercury, any jar, vibration or shock upon the meter is absorbed by the mercury, so that there can be no sudden motion of the armature vertically. Therefore, the pounding and jarring of a car cannot injure the jewel in this meter, thereby impairing its accuracy.

Another good point in favor of meters of this type is that lightning has less effect on it, as the enormous choking effect of the shunt coil on its iron core protects the meter against any alternating or oscillating discharge like lightning.

Another very important and convenient feature of this type of meter is the fact that it can be operated by a shunt, allowing only a portion of the load current to pass through the meter. This enables the meters to be made smaller and more compact, and they can be located at any convenient, out-of-the-way place on a car, and connected to the shunt by small leads. Since the introduction of meters of this type their use has become quite general by a number of large operating companies in the cities and by a few of the large interurban companies, but as yet the majority of railways have not realized the valuable information which can be obtained by a proper and intelligent use of integrating wattmeters on cars.

*Abstract of paper presented at meeting of Central Electric Railway Association, Detroit, Aug. 26.

DEVELOPMENT OF EXPRESS BUSINESS ON INTERBURBAN RAILROADS*

BY J. H. CRALL, GENERAL PASSENGER AND FREIGHT AGENT, TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

Interurban express or dispatch freight is one feature of the traction business that has been the subject of more or less controversy from the time this branch of traffic has been carried on by interurban railroads, both as to the handling of this business and as to whether it cauld be an important revenue producer.

That the express consignments transported on passenger cars are valuable adjuncts to the carrier will be admitted by all lines carrying on this branch of business; whether this is of enough importance to demand the careful consideration which is given to the passenger and freight traffic I find has been a matter of conjecture. Did the end justify the means? I will answer this by saying that any branch of interurban traffic that is sure to result in a substantial revenue demands at least careful consideration.

There has been a difference of opinion as to the best method of handling this branch of interurban trade. When the express business was first introduced on account of the necessary outlay of capital required to make a pick-up and delivery of shipments the traction lines carried on this business by accepting shipments when delivered at their stations, transporting them and making station delivery only. That this method has been found to be universally satisfactory is evidenced by the decided increase in the amount of express matter carried by interurban roads adopting this plan. It was the same old story of the demand creating the business. Here was an opportunity for merchants to create new trade by being able to secure a guaranty of a quick delivery. This was especially true as to produce dealers and commission merchants handling perishable commodities; the country customer sends in his order by telephone and an hour later the goods are at his place of business. This, naturally, caused the carrier to realize that here was an opportunity to establish a branch of traffic that was sure to result in a satisfactory revenue, very little extra labor and no extra equipment being required; the cars had their scheduled runs to make, and, naturally, the question with the carrier was, Why not fill up the vestibules with express shipments? The cars on the lines which I represent are all provided with baggage compartments of sufficient size to transport satisfactorily both express and baggage; I am inclined to believe that this alone is a good advertisement for the interurban express business. If the shipper knows that you have the facilities for handling his goods and he has the goods to ship you can get his business with very little solicitation. Show the people that you can give them the service and you will get the business; this will apply whether it is express, passenger or freight traffic. A little judicious advertising, just enough to show the people that you have something they need and want, will do this.

I am an advocate of large express and baggage compartments in passenger cars; it is possible to solicit and materially increase the express shipments successfully only by being able to transport the consignments satisfactorily.

On the lines with which I am connected the revenue from interurban express in May, 1909, was 6.14 per cent of the passenger earnings and the space used in the cars for the express transported was 6.36 per cent of the total space in the cars. You will note that the per cent of space used in the cars for the express shipments is practically in the same ratio to the passenger space, as the express revenue is to the passenger revenue; in other words, we are earning as much from the space used for express as we are from the space used for passengers, with the chances for a material increase of this on a profitable basis. This statement shows the per cent between the express and passenger revenue only.

On these lines the revenue derived from interurban express as compared with the gross earnings increased from ¾ of 1 per cent in 1906 to 4.01 per cent in 1909.

Several months ago a contract was made between a number of the leading interurban roads in Indiana and Ohio and one of the old line express companies. The revenue derived by this express company, according to the contract, was to be divided on an agreed per cent of the gross receipts with a minimum amount guaranteed the traction lines making this contract. Some of the roads that were parties to this contract have practically turned over the handling of all express matter, I understand, to the old line express company. Speaking for the Terre Haute, Indianapolis & Eastern Traction Company, I will say that we relinquished none of our former methods of handling this interurban express by entering into this contract. We conduct our express business on exactly the same plan and according to the same tariffs as we did before this contract was made. We carry shipments for this express company in the vestibule of passenger cars on a certain number of trains, agreeing to give the company space in additional cars of our regular trains as the business may require.

We have experienced no decrease in our interurban express business on account of this contract, although it has not been in effect for sufficient time to determine fully the result; but, judging from the amount of consignments handled, I am inclined to believe that the result will be gratifying not only to the express company making this contract, but will also show a decided increase in the interurban express receipts. This only goes to show that there are plenty of opportunities to increase the interurban express traffic. Business secured by the old line express company and transported on interurban roads is largely new traffic; this business it secures mainly on account of the pick-up and delivery service. Much of this comes from foreign lines, being transported both to and from junction points on both steam and electric railroads.

The tariffs universally adopted by traction lines naming express rates on merchandise when carried on passenger cars are local and interdivision tariffs, and the rates are usually based on one and one-half times the first-class freight rates between points of shipment. Exceptions are made, however, where the Central Freight Association scale is in effect, in which case two times the first-class freight rate is made.

On the lines which I represent, however, we have a minimum of 20 cents per hundredweight and no package is handled for less than 25 cents; these rates are lower than the old-established express company rates. However, no provision is made for a pick-up and delivery to consignee of interurban express and the difference in charges will, in most cases, offset the cost of delivery of packages to consignee.

It has been found advisable to make exceptions on some commodities, namely, bread, ice cream, glassware, newspapers, etc., and instead a commodity tariff or flat rate is made effective.

I would advocate making effective joint express tariffs naming interline rates. I believe this would be the means of securing a surprising amount of express traffic and open up trade between connecting roads that would doubtless prove mutually profitable. Such a tariff has been made effective between Indianapolis and Dayton, Ohio, and it is the universal opinion of the traffic officials that this should be adopted between all connecting lines—billing shipments through on interline dispatch freight way-bills the same as adopted for through shipments of freight.

With interline express tariffs effective between connecting lines and equipment suitably provided to transport properly both local and interline shipments, the traction lines will find that it will open up a trade in interurban express that will surpass our expectations.

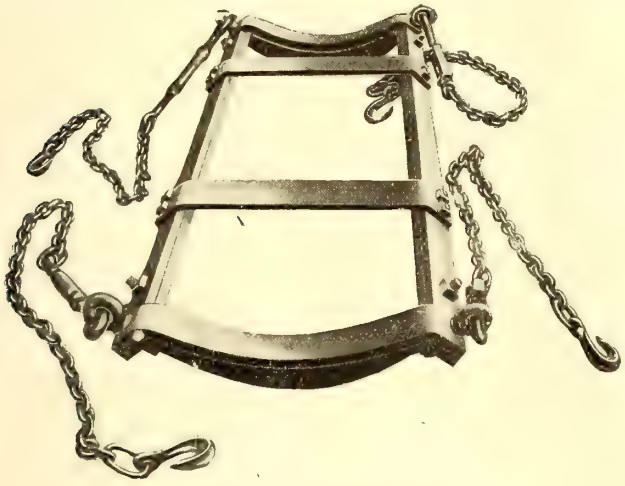
We must get away from the idea that interurban express or dispatch freight is of no importance or that it is carried on as a matter of mere accommodation; this business is not only a means of substantial revenue, but the possibilities for increasing it are more than flattering, and traction lines will without question be materially benefited by boosting the interurban express traffic.

*Abstract of paper read before the Central Electric Railway Association, Detroit, Aug. 26.

Representatives of the steam railroads and a number of Government officials have joined in a co-operative plan to conduct an inquiry into the physical properties and methods of manufacture of steel rails to ascertain what can be done to improve the rails now purchased.

CAR SKID WRECKING DEVICE

The accompanying engraving illustrates the Bradshaw car skid, which is designed to enable a car with a broken wheel or axle or damaged truck to be quickly and easily run in under its own power or pulled in to the shop. It consists of a rectangular steel frame and two separable shoes which slide on the track rails. At each corner of the frame is attached a stout chain, with turnbuckle and hook, by means of which the skid is securely fastened to the truck after it is slid under the wheels. The skid is of such shape that it may be slid under the truck and either the wheels or motors allowed to rest on it. The wheels are



Car Skid Wrecking Device

raised but 3 in. above the track when the skid is in place. It is adjustable to fit any single or double electric or steam railroad truck.

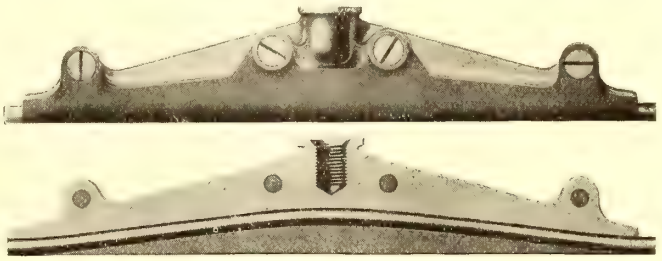
The shoes are made of a special composition of metal, having a low co-efficient of friction, and do not require to be lubricated, nor do they cut or wear the rails. The shoes weigh 45 lb. apiece, and when the skid is used under one end of a 28-ton car the shoes will last for from 50 to 75 miles. The frame is not subject to wear, and will last indefinitely. Crippled cars have been run around curves of 40-ft radius with one truck carried on a skid. The device is made and sold by the Lord Electric Company, New York.

COUPLERS FOR HUDSON TUNNEL CARS

In the description of the new types of Van Dorn couplers published in the Electric Railway Journal of last week, page 293, illustrations were presented of an M.C.B. type of coupler, which is in use on the cars of the Hudson & Manhattan Railroad, and was referred to in the article as the 20½ coupler. The illustrations were, in fact, views of a coupler which has been tried experimentally by the Hudson & Manhattan Railroad, but has not been put into actual service as yet on that, or any, railway. The type No. 20½ coupler is shown in the accompanying engraving, from which it will be seen that it is an extra heavy pattern of the well-known Van Dorn horizontal plane type coupler. It is built to withstand the most severe service and to give a long life. The pins used are round, with a diameter of 1⅝ in. The coupler faces are 16 in. and are slightly beveled at the top and bottom to allow for vertical variations in the track.

IMPROVED TYPE OF TROLLEY EAR

As the result of extended experience in trolley line construction, the Westinghouse Electric and Manufacturing Company has recently designed a new type of trolley ear, with a special view to giving long service. As shown by the accompanying engraving, this ear provides a straight and smooth run for the trolley wheel, and at the same time

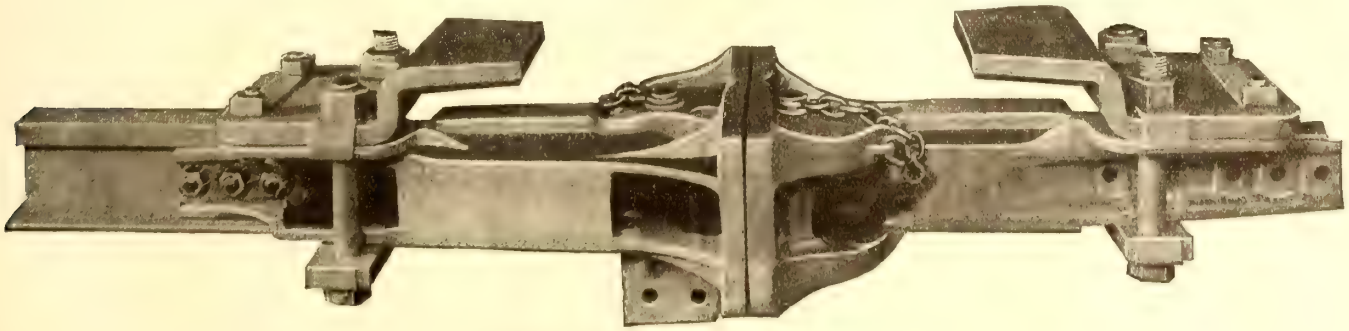


Improved Trolley Ear

the wheel is prevented from wearing the wire on account of the great depth of the bronze runner. It is therefore impossible for the conductor to become loosened or break out of the suspension. The curve given to the trolley wire when clamped in the ear prevents slipping. It is claimed this new type "R" trolley ear will last five to six times as long as any clinch ear, and its wearing part is renewable at small cost. The malleable iron yoke is attached permanently to the stud of the suspension, while the bronze runner is readily removable, to be reversed or renewed.

OFFICIAL TRAMWAY GUIDE TO LONDON

The London County Councils Tramways, which operates about 123 miles of street railways in London, England, has issued what is probably the most comprehensive guide of its kind published by a street railway system. The guide, which is divided in two parts, includes 132 pages (5½ in. x 8½ in.) of text, with numerous maps and illustrations. The balance of the publication is made up of advertising pages, the income from which permits the guide to be issued for the nominal price of one penny.



Couplers for Hudson Tunnel Cars

The first page of the guide contains an alphabetical list of places of interest in London, such as the museums, ex

hibitions, theaters, concert and music halls, buildings, bridges, parks, hospitals, monuments, etc. In most cases the reader is advised as to the best route for reaching the place described. Where one of the Council's cars is available this information is given in the form of a reference to numbered routes. These routes, singly and in combination, are mapped out in the second part of the guide in connection with data concerning the fares and schedules. The maps of each route carry numbers to indicate the principal objects of interest on the way. The maps and particulars of fare and service were supplied by A. L. C. Fell, general manager.

THERMO-DYNAMIC FEATURES OF A. E. G. TURBINES

An ingenious method of illustrating the thermo-dynamic losses in steam turbines has recently been used by H. Treitel to analyze the losses in the various types of steam turbines made by the Allgemeine Elektricitäts-Gesellschaft, of Berlin. A few of the drawings are reproduced herewith.

Fig. 1 shows the heat balance of a standard high-pressure condensing 1,000-kw a.c. turbo-generator. In this diagram the conditions assumed are a steam pressure of 170.4 lb. per. sq. in. (12 kg per sq. cm) above the atmosphere, a temperature of 300 deg. C. and a vacuum equivalent to 95 per cent of the height of the local barometer. It is assumed that the machine has been guaranteed to consume no more than 15,880 lb. (7200 kg) of steam per hour operating at full load. The output of 1000 kw-hours corresponds to 858,580 calories. As the total heat in the steam is 729.5 calories for each 1 kg (or 2.204 lb.) of steam, the total number of calories in the steam is 5,252,240. Since only 858,580 are utilized, the remainder, or 83.5 per cent, is lost.

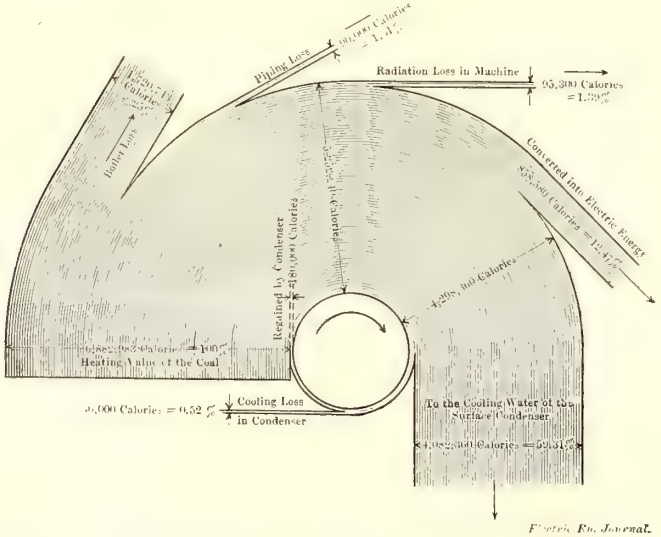


Fig. 1—Heat Balance of 1000-Kw High-Pressure Turbo-Generator Operated with Surface Condenser

The following is a summary of the total losses under the conditions assumed.

	Calories.	Percentage.
Boiler loss	1,720,743	25
Piping loss	90,000	1.31
Machine radiation	95,300	1.39
Converted into electrical energy	858,580	12.47
Condenser run-off	4,082,360	59.31
Condenser cooling losses	36,000	.52
Heat content of coal	....	....
	6,882,983	100.00

In a similar manner Fig. 2 shows the losses in an exhaust steam turbine. In this case the starting point is not the heat value of the coal but of the exhaust. Conditions vary so greatly that no definite figures of losses are given on this diagram, but with a working pressure of the 15.6 lb. per sq. in. (1.1 kg per sq. cm) absolute, and an exhaust pressure 0.7 lb. per sq. in. (.05 kg per sq. cm), a steam consumption of 31.8 lb. (14 kg) per kw-hour can be expected. This corresponds to a transformation of about 8.5 per cent of the heat in the exhaust steam into electrical energy.

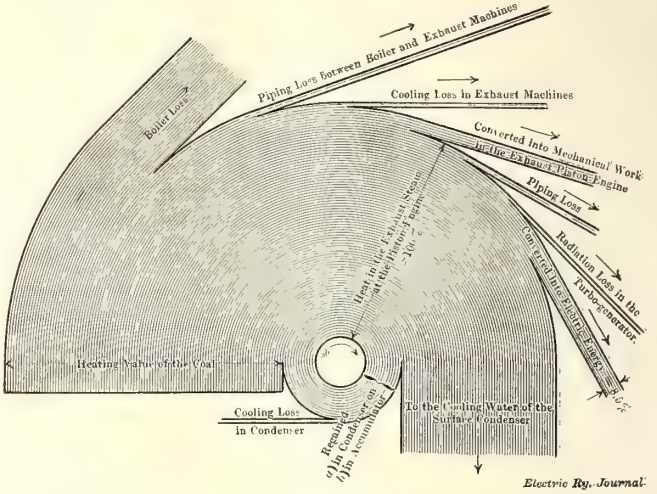


Fig. 2—Heat Balance of Exhaust Steam Turbo-Generator

In addition, the company has designed turbines for high pressure only, for use in connection with heating plants. These turbines can be of two kinds, namely, one in which the back pressure is constant; that is, in which all the exhaust steam can be utilized for heating and, second, that in which the low-pressure steam for heating is required at irregular intervals and independently of power conditions. For the latter purpose the company builds what is called a "tap" turbine. This machine operates as an ordinary condensing machine when no steam is tapped for heating, but when steam required for heating is at its maximum the turbine assumes the characteristics of a non-condensing machine. At such time a small amount of steam is still allowed to pass through the low-pressure stage to the condenser, first, to carry off the frictional heat of the rotating low-pressure element and, second, to prevent the condenser pump from running dry. In the tap turbine heat balance diagram (Fig. 3) the quantities $a_2 + b_1$ and

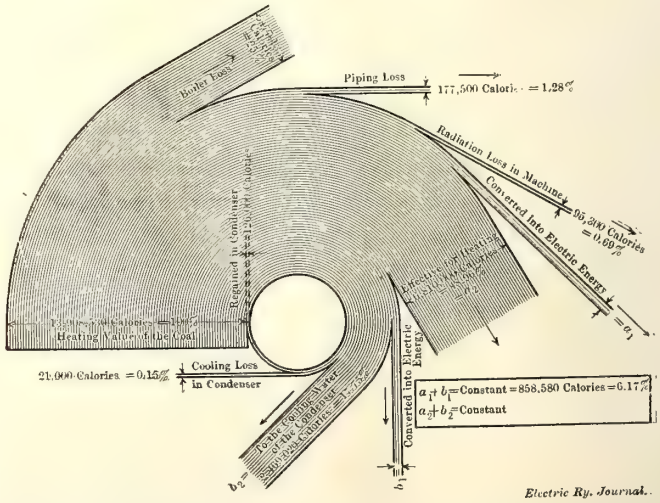
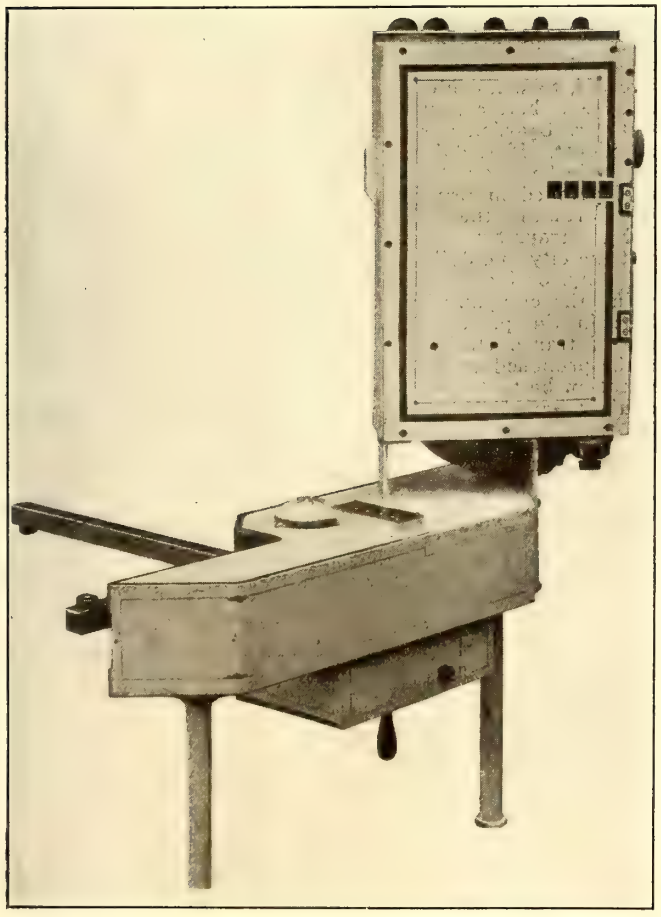


Fig. 3—Heat Balance of 1000-Kw "Tap" Turbo-Generator

$a_2 + b_2$ are generally constants, though both b_1 and b_2 may drop to zero when the amount of steam required for heating reaches a maximum.

AUTOMATIC FARE REGISTER AND MONEY CHANGER

The accompanying illustrations show a novel type of fare register and money-changer designed for prepayment cars and manufactured by H. R. Langslow, of Rochester, N. Y. As will be seen, the machine contains at the top a series of five slots, in which a passenger may deposit a 5-cent, 10-cent, 25-cent, 50-cent or $1 coin. The falling coin registers a fare and also operates the change-making mechanism so that if more than 5 cents is deposited the proper amount of change falls into a change cup located under the machine. At the same time the lock of the turnstile is automatically released, leaving it free to revolve so that the passenger can pass through. As he does so he picks up his change from the cup. An important feature of the action of the change-making mechanism is that the coins do not fall immediately into and become lost in the pile of other coins of the same denomination in the case. Instead, the last coin deposited is always upheld before the glass in the circular aperture under each slot, so that it may be seen from the front of the machine. It remains there until another coin of the same denomination is put in the slot.



Side and Front Views of Fare Register and Money Changer

To permit passengers with transfers to pass through the turnstile the machine is fitted with a lever at the bottom of the turnstile case by which the conductor can allow transfer passengers and other non-cash fares to pass through the stile and register them. The turnstile registers the number of passengers who pass through while the fare-box register records those who pay their fare.

All money deposited in the fare box is available for change. If any compartment in the fare box becomes filled to its capacity with coin the surplus overflows into a surplus cash box which is accessible only to a person having a key to the door which is at the side of the case.

If a coin is deposited in the wrong slot by mistake or design, it is ejected from the case and falls into the change cup to be replaced by the passenger in the proper slot, but the passage of the coin through the machine has no effect on either the change-making mechanism or on the registration.

If any person tenders paper money for his fare the conductor supplies him with change so that he can deposit his fare in the fare box. Under this plan the conductor must, of course, turn in at the office at night the same amount of money with which he has been supplied in the morning.

With the present machine if a passenger wishes to pay the fares of two or more people, he does so by dropping the fares individually in the box, but the manufacturers control patents whereby a passenger can pay for as many persons as he desires and the change will be returned to him and the turnstile released for the corresponding number of passengers.

The turnstile is of very ingenious construction. The interior of the case has a track curved at both top and bottom. The two reciprocating arms travel one above the other through an axial case bearing upon rollers on all four faces. At each extremity of each arm there is a roller which engages its respective track. As an arm is revolved the roller comes into contact with the track and the curve is such as to make the arm which was before at its extreme length recede. At the same time the other arm is forced forward by its track to its proper full-length position. The roller bearings in the case reduce the friction of this movement to such an extent as to make it negligible.

The machine has been tested for speed and has been found to be capable of 100 to 120 operations per minute.

News of Electric Railways

Answer of Mr. Corrigan to Criticism of Proposed Kansas City Ordinance

Bernard Corrigan, president of the Metropolitan Street Railway of Kansas City, Mo., in a letter published in the Kansas City *Journal* of Aug. 14, answers a criticism of the proposed new ordinance made by Henry M. Beardsley, former Mayor. Mr. Corrigan says in part:

"Mr. Beardsley's first statement in his interview is that electricity had come to stay when the present contract was made in 1895, and that any changes that have taken place were to the advantage of the company. Mr. Beardsley is in error in his statement. The changes that have taken place are to the disadvantage of the company, for the reason that the company has expended large sums of money in replacing the cable system (which could have been operated for many years) with an electric system, which increased the fixed charges of the company. This change was precipitated by the demands of the public for the most up-to-date system; the cost of everything connected with the street car business has increased since that time except the car fares, which have diminished on account of the increased average haul caused by the expansion of the city and the universal transfer system. The price of copper, which enters largely into field construction, as well as machinery, has increased in price. The wages of our men have been raised several times since 1895, and will have to be raised again if the cost of living keeps up. The difference in the scale of wages paid in 1895 and now would amount to $500 per day, or about $180,000 per year. When you add to this the increase in price of everything the company buys (except cement), you have a yearly increase in cost of construction of operation of at least a quarter million dollars per year.

"If Mr. Beardsley is sincere, and I take it for granted he is, I have authority to make the following proposition to him: If he can secure a contract from a responsible banking house to take the renewal bonds of the Metropolitan as the old ones come due in the next four or five years, bearing 5 per cent interest, and maturing in 14 or 15 years from now, we will allow a reasonable discount on the bonds for the benefit of his banker, and we will pay Mr. Beardsley an attorney fee of $25,000 for obtaining that kind of a contract, and, further, will withdraw the ordinance from before the public when such a contract is obtained, for the necessity will not exist then for an extension of our franchise which now exists.

"Again Mr. Beardsley says: 'According to Arthur Young & Co.'s report the company will make enough money to meet the maturing bonds.' This statement of Mr. Beardsley's is technically correct, for if you will stop the expenditure of money in the expansion of the property, and operate the property as it now exists, applying the whole earnings to the payment of maturing bonds, there would be no necessity of renewing the bonds; but would the public tolerate this? Who would prefer checking the progress of the street car system, and, incidentally, the progress of the city, to issuing renewal bonds for which the city in no way becomes responsible? Wouldn't 99 men out of every 100 in Kansas City prefer that the company keep up with the progress and growth of the city and renew its bonds, than to stop the expansion of the property and apply all its earnings to paying off the original capital that went into the property, a thing that has never been done by any growing utility corporation, for the experience of nearly all thrifty cities is that it takes all the money they can spare to keep up with the growth of the city, which necessitates the investment of large sums from the earnings or added to capital? I do not know of a case on record where the original investment of the property has been paid off from the earnings.

"Again Mr. Beardsley says: 'If the company can prove to financiers that it can make $30,000,000 profits in 16 years, and at that time be the owners of a system of street railway adequate to the needs of Kansas City, it can't have any trouble in caring for its bonded debt of $25,000,000.' What difference would it make to financiers what the property would be worth in 16 years from now if the company has no title to it, and relying on the liberality of your Beardsleys and Browns, who advocate partial confiscation now? The value of the property would add very little to the credit of the company when its franchise has expired, and it must be clear to every thinking man that Mr. Beardsley is proceeding on the theory that the company would be borrowing money on a fee simple title, whereas, as a matter of fact, it is borrowing on a leasehold. Certainly no expired lease would be taken by any financier as security for his money, and the voluntary statement of Mr. Beardsley that he would be in favor of dealing liberally with the company in 16 years from now would not cash in for much with the banks.

"The whole gist of Mr. Beardsley's interview is based on one theory—that money expended in the consolidation of the numerous small street car companies which existed in Kansas City in early days, and which, if continued, would mean the payment of at least three fares to go across the city, should not be allowed; that even the mistakes of the company's engineer in construction, etc., should be deducted from the value of the property, and all cost of consolidation of those properties should be ignored; that the money invested in cable construction by men like Smith and Keating, who invested their private fortunes in an enterprise which contributed largely to the building up of Kansas City and made it possible for men of the Beardsley type to land here and remain here, should be also ignored, although they never received 6 per cent on their investment.

"Mr. Beardsley and all other Christian gentlemen preach the universally accepted doctrine of 'Do unto others as you would have others do unto you.' Mr. Beardsley should practice this as well as preach it, and I want to ask him a question—why Smith and Keating, or any other investors in the Metropolitan, who put their money into what was known as the best means of transportation at the time it was invested, to wit, cable construction, should lose their money because a better system was invented. I cannot believe that Mr. Beardsley would take that position if they were his clients. If he did he would not be faithful to them.

"Again he says: 'New inventions from time to time may be developed in transportation.' Concede this to be true, who is running the risk of new inventions being discovered? Did the transformation of the cable property to electricity cost the city one dollar? Is not the risk being taken by the company, or by those who loan the company money, providing the company keeps up with, in the future as it has done in the past, and adopts the most approved methods of transportation—a condition which is provided for in the proposed ordinance—what menace then would a new invention be to the city? It might be to the company, for it might have in an event of that kind to do what it did in the transformation of the cable. Nobody runs any risk except the investor. To illustrate, it may become necessary in time, for the convenient handling of the people of this city, that a certain amount of elevated road or subway should be built. There is nothing in the proposed ordinance which would prohibit the city from granting such rights to any company that desires to build them, in the event that the old company did not keep up with the necessities of the city."

Hearing on Valuation of Third Avenue Property

At a hearing before the Public Service Commission, First District, on Aug. 23, in the inquiry as to the "character, extent, location and value of structures, facilities and properties" of the Third Avenue Railroad, additional blueprints in relation to various parts of the property were submitted on behalf of the receiver of the company and of the receivers of the Metropolitan Street Railway. Oliver C. Semple, of counsel for the commission, stated that questions had been submitted by the law department to the two receivers relating to various stretches of track in different parts of Manhattan, about 40 in number, which are used jointly by the Third Avenue and the Metropolitan systems. Some of these stretches of track are insignificant in length, but are of the greatest importance as furnishing connecting links, without which a few routes could not be operated; for instance, the stretch in Broadway from Forty-second to Forty-fifth Street, and between Sixty-fifth and Seventieth Streets. The questions put by Mr. Semple related, first, to the company which owned the franchise; second, the company which did the work; third, what companies provided the money; and, finally, what proportion of expense and work did each company bear.

Herbert J. Bickford, counsel for the Third Avenue Railroad, described the difficulty in answering these questions as due in large part to the lack of complete records. In many cases, he said, it had been impossible to find either vouchers or time slips showing when the roads were electrified, and it was not possible, therefore, to determine which company had paid the money.

Mr. Bickford said that it would take many weeks to fix

up the records definitely, or as well as could be done, and he suggested an adjournment until October. Commissioner Maltbie would not consent to allow so long an adjournment, and the next hearing was put down for Sept. 2.

Cleveland Traction Situation

The Cleveland Council committee of the whole did not answer at its meeting on Aug. 23 the communication of the Cleveland Railway accepting the proposal of the city that Judge Lawrence and S. H. Tolles be selected to draft the safeguard clause, with Judge Tayler as the third arbitrator.

Horace E. Andrews, president of the company, said in the letter:

"In answer to your communication of Aug. 20 and referring to the question of the city's right to name a purchaser, we find on reading over the record that Mayor Johnson objects to the plan proposed by Judge Tayler, under which a would-be purchaser may bid for the property. We see no reason why this company should not have an opportunity to meet the bid of any proposed purchaser, nor any reason why, if the company is willing to meet it, it should not retain possession of the property. This question is of vital importance and is not a minor question.

"Our position as to the question of arbitration under the ordinance we have endeavored to make plain all through the negotiations, and it is to the effect that we believe arbitration should be by disinterested persons, to the extent, at least, that no arbitrator shall be a stockholder, officer or employee of the company, or an officer or employee of the city.

"We regret your unwillingness to seek the advice of Judge Tayler on disputed questions. We are unable to understand how this would involve the shirking of responsibility, on your part, in view of the explicit statement by us that, while we would accept in advance his decision, you might reserve the right either to accept or reject it. If Judge Tayler is qualified to pass on the important question of valuation—and both parties concede that he is—we do not understand why his advice would not be desirable on other questions.

"With reference to that portion of your letter stating that we have not answered the suggestion of your chairman concerning operation in the event of failure of any safeguard of the ordinance, we would say that we attempted to answer this in our communication of the 16th inst., in which we stated, in substance, that we were willing to have a provision inserted in the ordinance that if any of the safeguards were declared invalid, the entire ordinance should be invalid except the bare right to operate, in which event the Council would have the right to fix the terms and conditions of operation. This would give the Council the right to fix the rate of fare at less than the initial rate, if it were found to be possible to give good service at such lower rate and permit the payment of 6 per cent per annum upon the capital value as fixed by the ordinance. We submit that this is a better provision for the city than the one suggested concerning the initial rate of fare, as it places it within the immediate power of the Council to get good service at cost, notwithstanding the ordinance might be held to be invalid.

"We are willing to refer the drafting of an invalidity clause to Mr. Tolles and Judge Lawrence, in conjunction with Judge Tayler, and to accept such provision as they may write on the subject."

The Cleveland Railway filed a statement with the city clerk on Aug. 16, declining to make concessions on the right of the city to nominate a purchaser. It said:

"The company believes the provision should be altogether eliminated from the ordinance, but Judge Tayler fixed the date at Jan. 1, 1919, and the company has accepted that and is still willing to abide by it.

"The only reason that has been suggested why the Council should have the right to nominate a purchaser is that the current interest rate may fall below 6 per cent. It is altogether improbable that this will happen prior to Jan. 1, 1919, and we think that the provision in the Baker ordinance would interfere with the financing of the property and the stability of the securities which are important to the city, for such matters bear direct relation to the cost of operation and the necessary rate of fare."

The company also holds its original position on the question of arbitration, saying: "Arbitration without disinterested arbitrators would not inspire the confidence or respect of either the city, the company or the general public."

The company suggests changes in the clause safeguarding the city. In the event that its proposition is not acceptable to the city the company proposed to leave its determination to Federal Judge Tayler, Solicitor Baker and Attorney S. H. Tolles as a board of arbitrators. In making this proposal the company agreed to abide absolutely by any agreement as to safeguards the three arbitrators may reach.

With regard to valuation the company said:

"We agree to Judge Tayler as sole arbitrator. We have no objection to an itemized valuation, but we think Judge Tayler should be free to determine the true and just value of the property without limitations imposed by either party.

"We concede the provision of the Baker ordinance which provides for immediate arbitration after the passage and acceptance of the ordinance. As we have conceded the provision of the Baker ordinance which provides for the fixing of the valuation after the passage of the ordinance and before the referendum election, the fare must of necessity be fixed before the valuation.

"If the Council and the company are unable to agree upon the maximum rate of fare, we suggest the reference of the question to Judge Tayler at once. In other words, we feel that all questions should finally be passed upon by the Council and accepted by the company before the valuation, and should be filed with the Council before the referendum election."

The proposal of the company, of which an abstract is published in the foregoing, was flatly rejected by the Council committee of the whole on Aug. 17.

Mayor Johnson has left Cleveland for a vacation, saying that his physician prescribed immediate rest and change.

Subway Rowdies Punished.—As a result of the combined efforts of the regular police force of New York and the uniformed police of the Interborough Rapid Transit Company, more than 125 men and boys were arrested in the subway on Sunday, Aug. 22. Of this number 28 were sentenced to 5 and 10 days in the workhouse on Blackwell's Island by Magistrate Krotel of the night court, and many others were fined. Most of the arrests were made after 5 p. m., when the offenders boarded trains returning from a day's outing at the end of the Broadway subway line or in Bronx Park.

Outing of New England Club.—The New England Street Railway Club had its annual outing at Canobie Lake Park, Haverhill, Mass., on Aug. 12. The members of the club and their guests traveled in three special cars over the Boston & Northern Street Railway and the New Hampshire Electric Railways. The park was decorated in honor of the visitors and a special performance was presented at the theater, and dinner was served in the large dining hall. After seeing all the interesting sights of the park and lake, special cars were taken to Haverhill, where a special train was waiting to convey the party to Boston.

United Railways & Electric Company of Baltimore Provides for Lecture Room and Recreation Facilities.—The new car house of the United Railways & Electric Company, Baltimore, Md., which is now in course of construction, will contain besides the usual accommodations for its cars, offices, etc., a number of features for the benefit of its employees. A lecture room, 100 ft. x 45 ft. is provided for on the second floor of the structure. At one end there will be a platform for entertainments. This hall will be turned over to the employees at any time for whatever gatherings they desire to hold. There will also be a large reading-room, pool room and a number of bowling alleys. Another feature of the building will be an instruction room. Each man will also be provided with an individual locker, two rooms being set aside for that purpose. The building is located at Druid Avenue, Fulton Avenue and Florence Street and will be 422 ft. x 191 ft. x 433 ft. in size.

Central Rating Committee Plan Defeated in Boston.—At a meeting of the New England Insurance Exchange, held in Boston Aug. 21, the plan of authorizing the establishment of a central rating bureau for electric traction and lighting risks was discussed. The attendance was the largest in the history of the exchange. At the previous meeting, as described in the ELECTRIC RAILWAY JOURNAL for June 5, page 1056, the vote on the same subject had resulted in a tie. At the meeting last week a majority of the executive committee recommended the establishment of the central rating bureau as originally proposed. A substitute report, recommending that the electrical engineer of the exchange co-operate with the central committee, but insisting on the preservation of its jurisdiction on rates, rules and forms, was voted down in committee. There was an extended discussion, in which an appeal was taken from the ruling of the chairman that the measure was constitutional. The vote was 73 to 70 against upholding this ruling, and hence against the measure.

Date for Meeting of Railway Commissioners.—The date of the convention of the National Association of Railway Commissioners has been postponed from Oct. 12 to Nov. 16, 1909. The meeting will be in Washington, D. C.

Financial and Corporate

New York Stock and Money Market

August 24, 1909.

After waiting, in more or less agitation, for several days to discover the exact condition of Mr. Harriman's health upon his return, the Wall Street traders find, now that he is at home, that they know as little as they did before. The market to-day was unsettled and nervous, with rather dull trading. Although the leading issues fluctuated to a considerable extent, they stood at the close about where they were at the opening. During the last week the decline has been persistent, although the half-dozen active stocks have been the only securities that suffered seriously. The tractions were notably steady, and Third Avenue during the period of decline actually advanced 5 points.

The money market is practically unchanged from a week ago. Call money is quoted at 2¼ to 2½ per cent, 90 days, 3¼ to 3½ per cent.

Other Markets

Rapid Transit and Union Traction continue to be the interesting features in the Philadelphia market. Other tractions are changed only slightly.

In Chicago, nothing has been done in traction shares. Even Chicago Subway has almost disappeared out of the market and the little trading has been at slightly reduced prices.

In the Boston market, Suburban issues, both common and preferred, have been traded in to some extent during the last week. The former has advanced to 18 and the latter has been selling about 70. Other tractions have been quiet.

United Railways stock has been fairly active during the week in the Baltimore market, selling around 13¾.

At the weekly auction of securities in New York the following tractions were sold: $1,000 Brooklyn Rapid Transit 4 per cent refunding bond, at 85½; $1,000 Slate Belt Electric Street Railway (Pen Argyl, Pa.) second mortgage 4 per cent bond, at 48, and one share stock of the same road, par $100, $4.

Quotations of various traction securities as compared with last week follow:

	Aug. 17.	Aug. 24.
American Railways Company	a46½	46¾
Aurora, Elgin & Chicago Railroad (common)	a49¾	*49¾
Aurora, Elgin & Chicago Railroad (preferred)	a95	*95
Boston Elevated Railway	128⅜	128½
Boston & Suburban Electric Companies	*17	18
Boston & Suburban Electric Companies (preferred)	*70	*70
Boston & Worcester Electric Companies (common)	10	a13
Boston & Worcester Electric Companies (preferred)	52½	a53
Brooklyn Rapid Transit Company	79½	80¾
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	86½	87½
Capital Traction Company, Washington	141	*141
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*3	*3
Chicago & Oak Park Elevated Railroad (preferred)	*12	*12
Chicago Railways, ptcptg, ctf. 1	a112	a112
Chicago Railways, ptcptg, ctf. 2	a38	a38½
Chicago Railways, ptcptg, ctf. 3	a24½	a25
Chicago Railways, ptcptg, ctf. 4s	*10	a9½
Cleveland Railway	*78	*78
Consolidated Traction Company of New Jersey	a77½	*77½
Consolidated Traction of N. J., 5 per cent bonds	a106½	a106½
Detroit United Railway	71	a70
General Electric Company	169½	169
Georgia Railway & Electric Company (common)	a93	a95
Georgia Railway & Electric Company (preferred)	a87	a87
Interborough-Metropolitan Company (common)	14½	15⅛
Interborough-Metropolitan Company (preferred)	47½	47½
Interborough-Metropolitan Company (4½s)	82¾	83⅜
Kansas City Railway & Light Company (common)	a50	a49
Kansas City Railway & Light Company (preferred)	a89⅜	a83½
Manhattan Railway	a145	142
Massachusetts Electric Companies (common)	14½	a14
Massachusetts Electric Companies (preferred)	75	74
Metropolitan West Side, Chicago (common)	a18	a18
Metropolitan West Side, Chicago (preferred)	a50	a50
Metropolitan Street Railway	a23	a24
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	83¼	84⅛
Northwestern Elevated Railroad (common)	a20	a20
Northwestern Elevated Railroad (preferred)	a70	a71
Philadelphia Company, Pittsburg (common)	48	48¼
Philadelphia Company, Pittsburg (preferred)	45	a45
Philadelphia Rapid Transit Company	31⅛	30⅛
Philadelphia Traction Company	91	*91
Public Service Corporation, 5 per cent. col. notes	a100¼	*100¼
Public Service Corporation, ctfs.	a93½	*93½
Seattle Electric Company (common)	116	116½
Seattle Electric Company (preferred)	*106	*106¼
South Side Elevated Railroad, Chicago	a56	a56
Toledo Railways & Light Company	10	a10½
Third Avenue Railroad, New York	18¾	23⅞
Twin City Rapid Transit, Minneapolis (common)	110	109
Union Traction Company, Philadelphia	55	54
United Railways & Electric Company, Baltimore	14⅜	a14
United Railways Inv. Co., San Francisco (common)	37⅞	a39½
United Railways Inv. Co., San Francisco (preferred)	a56¼	58
Washington Railway & Electric Company (common)	47½	*47
Washington Railway & Electric Company (preferred)	92	*92
West End Street Railway, Boston (common)	95½	a98
West End Street Railway, Boston (preferred)	106½	106¾
Westinghouse Electric & Manufacturing Company	85⅞	87
Westinghouse Elec. & Mfg. Company (1st pref.)	125	a132½

aAsked. *Last sale.

Purchase of Bridge Operating Company Stock by Metropolitan Receivers Approved

Without passing upon the reasonableness of the price of $300 a share, which the Metropolitan Street Railway receivers offered to pay the New York City Railway for 500 shares of stock of the Bridge Operating Company, of which the par value is $100 a share, the Public Service Commission, First District, has granted its approval of the proposed transfer of the Bridge Operating stock from the New York City receiver to the Metropolitan receivers.

The commission, at the same time, ordered that an investigation under Order No. 615 be started at once to ascertain the condition of the Bridge Operating Company which, on the plea that it is a business corporation and not a railroad company, has failed to file reports with the commission. Commissioner Maltbie was designated to conduct the investigation.

It was on Commissioner Maltbie's opinion that the commission approved the proposed transfer of the stock. As the transfer had been authorized by the United States Circuit Court, which appointed the Metropolitan receivers, the commission saw no reason for withholding its approval of the stock transfer.

In recommending the approval of the transfer of 500 shares of stock in the Bridge Operating Company from the receiver of the New York City Railway to the receivers of the Metropolitan Street Railway, Commissioner Maltbie notes that the original application made by the Metropolitan receivers was for permission to purchase this stock, and that a supplemental petition had been filed asking the commission's approval of the transfer of rights and privileges under the contracts made May 21, 1904, and June 21, 1907. The two applications were considered together in one proceeding.

In his opinion, the commissioner gives the history of the Bridge Operating Company. The earlier contract is dated May 21, 1904, and signed by the Brooklyn Rapid Transit Company and the New York City Railway, which agreed to procure the formation of a corporation under the Business Corporations Law, to be known as the Bridge Operating Company with a capital stock of $100,000 in 1000 shares of $100 each. Each of the contracting parties agreeing to take 500 shares and pay for it in cash.

The Bridge Operating Company was formed and the certificate of incorporation filed July 29, 1904, and the purposes of the corporation were to enter into a contract for operating any portion of the Williamsburg Bridge, to operate the same and to acquire and use equipment necessary for such operation. The previous agreement was carried out and half the stock placed in the name of the Brooklyn Rapid Transit Company and half in the name of the New York City Railway.

The second contract bears the same date, namely, May 21, 1904. Although this antedates the incorporation of the Bridge Operating Company by more than two months, this contract was entered into between the city of New York by the Commissioner of Bridges, the Brooklyn Heights Railroad, the Coney Island & Brooklyn Railroad, the New York City Railway and the Bridge Operating Company for the operation of surface cars on the Williamsburg Bridge. All these companies except the Bridge Operating Company signed this agreement, and the Bridge Operating Company finally signed on Sept. 1, 1904.

The commissioner gives the terms of this agreement, which provided for the joint operation of the surface car tracks by the Brooklyn and New York companies and the operation of shuttle service by the Bridge Operating Company for a 3-cent fare.

"The above contracts," writes Commissioner Maltbie, "apparently give these companies exclusive rights to operate cars over the tracks mentioned, although there are no words expressly to this effect. We are informed that the companies so interpret the agreements, and the fact that the Manhattan company may allow other railroads in this borough to operate cars over the pair of tracks allotted to the New York City company and that similar rights are given to the two Brooklyn companies seems to indicate that such was clearly the intention of the contracting parties. An arrangement entered into over a year ago between the receivers of the Dry Dock, East Broadway & Battery Railroad and of the New York City Railway supports this contention. Prior to that time the Dry Dock, East Broadway & Battery company was not operating cars over the Williamsburg Bridge, but obtained the right to do so upon agreeing to pay to the New York City Railway the sum of 10 cents per car for each car making a round trip over the Williamsburg Bridge; 'that is to say, 5 cents for the amount of the toll payable to the Bridge Commissioner and in addition thereto 5 cents for the right to

use the bridge under the contract of the New York City Railway.'"

The third agreement dated May 21, 1904, relates to operation and accounts and purports to include the New York City Railway, the Brooklyn Heights Railroad, the Coney Island & Brooklyn Railroad and the Bridge Operating Company, but the Coney Island & Brooklyn company has never signed the agreement. It is binding, therefore, only on the other three companies. Under this agreement, the operation of local cars by the Bridge Operating Company was to be apportioned between the north and south pair of tracks, used respectively by the New York company and the Brooklyn companies and the expense of maintaining tracks and equipment on the north pair of tracks was to be divided between the Bridge Operating Company and the New York City Railway in proportion to the number of cars operated by the two companies on these tracks. The expense for the south pair of tracks was to be apportioned in like manner by the Bridge Operating Company, the Brooklyn Heights Railroad and the Coney Island & Brooklyn Railroad in proportion to the number of cars respectively operated.

On June 21, 1907, two other agreements were signed to which the New York City Railway was a party. After three years the Bridge Operating Company was relieved of its obligation to operate the cars by an agreement between it, the Brooklyn Heights company and the New York City company; the two latter companies agreeing to assume the obligations imposed by contract on the Bridge Operating Company and to operate the Bridge Company's cars and plant. The two railroad companies agreed to pay all taxes and other charges at the beginning of each fiscal year and to pay to the stockholders of the Bridge Company a 6 per cent dividend on their stock.

By another agreement of June 21, 1907, between the New York City Railway and the Brooklyn Heights Railroad, these two companies assumed responsibility in equal amounts for all expenses, losses and liability incidental to the performance of their contract with the Bridge Operating Company and agreed that all profits resulting from this contract should be divided equally between them. This contract is terminable by either party on three months' written notice.

Commissioner Maltbie says: "I do not consider that an approval of the application involves an approval of the terms of the various agreements entered into by the New York City Railway with other railroad companies and with the city of New York. The question is merely whether the transfer of the rights and privileges under these contracts and of the ownership of the stock to the receivers of the Metropolitan Street Railway will be advantageous.

"The compensation for the transfer of the stock and of the rights and privileges is stated to be $150,000, which is equivalent to $300 for each $100 of investment, the stock having been fully paid for. Approval of the application should not be construed as an expression of opinion upon the reasonableness or adequacy of the compensation. It was stated by the representative of the applicants that the price has been approved by the United States Circuit Court and that the issuance of a formal order to this effect has been delayed pending action by the commission. It is also true that our approval does not bind us in any way to recognize the amount paid as a proper capital charge, or as a basis upon which the receivers of the Metropolitan Street Railway are entitled to a fair return. These matters are wholly outside of the present proceeding and are not passed upon directly or indirectly in connection with this application."

Large Stockholders of Boston Elevated Railway

The Boston Elevated Railway had approximately 3850 shareholders on May 1, 1909, as compared with 3500 one year before. The average holding was 34 shares per stockholder. Some of the largest shareholders, with comparisons with previous years, were as follows:

	1909.	1908.	1907.
J. J. Bright	2,400	2,400	2,400
W. B. Thomas	2,000	2,000	2,000
W. R. Evans, trustee	1,500	1,500	1,500
C. G. Weld, trustee	1,054	800	775
Boston Insurance Company	1,000	500	....
G. S. Bowdoin	1,000	....	....
G. A. Draper	1,000	1,000	1,000
E. D. Chamberlin	1,000	1,000	1,000
C. G. Weld	1,000	1,000	1,000
F. S. Moseley	500	300	300
Kidder, Peabody & Company	471	1,067	482
State Mutual Life Insurance Company	433	433	433
Hornblower & Weeks	401	964	677
National Shawmut Bank	400	400	400
R. L. Day & Company	410	1	....
J. P. Morgan	350	350	350
J. P. Morgan & Company	....	1,000	1,000
Old Colony Insurance Company	300	200	....

Albany & Hudson Railroad, Hudson, N. Y.—Notice is given that the time for deposit of the bonds and preferred and common stock with the Trust Company of America, New York, under the reorganization agreement of June 30, 1909, has been limited to Aug. 31, 1909, after which no deposits will be received except at the discretion of the committee and upon such terms as it may prescribe.

Columbia Power, Light & Railways, Bloomsburg, Pa.—This company, incorporated in Delaware with $1,250,000 capital stock, has purchased the stock of the Danville & Bloomsburg Street Railway and of companies owning the electric lighting and gas properties of Danville, Bloomsburg and Berwick.

Grand Rapids (Mich.) Railway.—A. G. Hodenpyl, of Hodenpyl, Walbridge & Company, New York, says that the published report that a merger is being effected between the Saginaw-Bay City Light Company, the Kalamazoo, Jackson and Pontiac gas properties, the Grand Rapids Railway, the Flint and Cadillac gas properties, and the water power rights on the Sabule River is premature. All of these properties are controlled by the Hodenpyl firm and E. W. Clark & Company, of Philadelphia. Mr. Hodenpyl says that some investigation as to the practicability of placing these properties under one management has been made, but that the matter is still in an embryonic shape, and probably will not be taken up for some months to come.

Hudson & Manhattan Railroad, New York, N. Y.—Pliny Fisk has been elected a director.

Long Island Railroad, New York, N. Y.—Application has been made to the Public Service Commission, Second District, for permission to issue not to exceed $16,500,000 debentures. The proceeds of the bonds are to be used in part to repay the Pennsylvania Railroad $6,032,951, loaned by that company and expended for various improvements. The company states that it will require within the next three years additional capital for construction work and for equipment necessary to continue the improvements which have been commenced and on which large sums of money have been expended, to provide adequate and proper facilities and accommodations for continuing its business economically. Among the larger items of work which the company has planned are: Main line improvement between Woodside and Jamaica, $2,000,000; Jamaica terminal, $1,000,000; North Side improvement, double track and electrification, $1,000,000; Bay Ridge improvement, elimination of grade crossings, $1,000,000; 150 new motor cars, $2,700,000; various freight delivery yards, passenger stations, sidings, double track, grade crossings, etc., $912,662; electric equipment of tracks and substations, $800,000; Glendale cut-off, $309,382; advances to subsidiary companies for extensions, $327,600; Montauk freight cut-off, $287,400; completion of Atlantic Avenue improvement, $100,000. It is stated that the Pennsylvania Railroad is willing to make further loans, in addition to its existing indebtedness of $6,032,951, of $10,500,000, the loans to be secured by the issue of 10-year, 4 per cent debentures, and in such years that interest thereon cannot be paid by petitioner out of earnings authority is asked for permission to issue non-interest-bearing debenture script convertible into debentures to be issued therefor; such debentures to be payable in cash or redeemed by the issue of some more permanent form of security when the financial condition of the company and its increased earnings justify an application for authority to issue such permanent securities.

Metropolitan Street Railway Company, New York, N. Y.—Reports published in the daily newspapers state that a partnership arrangement between the Metropolitan Street Railway and the city of New York has been suggested to the bondholders' committee by Stone & Webster, of Boston, who made recently an engineering study of the New York surface situation. This report is not available for publication. John W. Castles, president of the Union Trust Company and the chairman of the bondholders' committee, is now in Europe and the complete report will be considered by the committee as soon as he returns. Stone & Webster are said to have pointed out the advantages in a city partnership arrangement, suggesting that traffic regulations could be enforced with greater ease, making better operation possible.

New York, New Haven & Hartford Railroad, New Haven, Conn.—The report of the New York, New Haven & Hartford Railroad Company for the three months ended June 30, 1909, shows gross earnings of $14,281,504, an increase of $1,641,985, as compared with the corresponding quarter of 1908. The operating expenses were $8,665,302, a decrease of $257,373. The net earnings from operation were $5,616,202, an increase of $1,899,358. Income from other sources than operation increased $1,931,700. Interest, rentals and taxes increased $1,448,776. The surplus for the quarter this year was $4,587,448, against a surplus of $2,205,166 for the same quarter of 1908; an increase of $2,382,282.

New York, Westchester & Boston Railway, New York, N. Y.—The Public Service Commission, First District, has passed a resolution calling upon the New York, Westchester & Boston Railway, and the New York & Portchester Railroad to submit their reports regularly to the Commission for the First District as well as to the Commission for the Second District.

Salina Street & Interurban Railway, Salina, Kan.—H. J. Smithers, president of the Trades' State Bank of Salina, has purchased the interest of E. J. Hinely, of Colorado Springs, Col., in this property.

Staten Island Midland Railway, New York.—A hearing was held on Aug. 16 before Commissioner Bassett of the Public Service Commission, First District, on the application of the Staten Island Midland Railway for approval to transfer 227 shares of its capital stock to the Baltimore & Ohio Railroad. It was explained that the Baltimore & Ohio Railroad plans by a further stock purchase to increase its control of the Staten Island Midland Company, which is one of the constitutent properties of the Staten Island Rapid Transit Company. The Baltimore & Ohio Railroad already controls 13,558 of the 14,000 shares of the road, amounting to $1,050,000, or 96.84 per cent, and the additional 227 shares would give that company 2 per cent more of the stock holdings. J. P. Cotton, of counsel for the Baltimore & Ohio Railroad, stated that the company had no "base designs," but wanted the outstanding shares on general principles. The stock has not received dividends for some time, owing to the large deficit in evidence, and he claimed it would not immediately. The hearing was closed and decision reserved.

Seattle (Wash.) Electric Company.—It is stated that the stockholders of the Seattle Electric Company will be given the right to subscribe for $1,150,000 common stock at a price to show substantial rights. The Seattle Electric Company has an authorized issue of $7,500,000 common stock, of which $5,000,000 is now outstanding, while $1,350,000 is reserved to retire convertible bonds. This common stock will be offered for subscriptions as early as possible after Sept. 15 next, to stockholders of record that date, and in the ratio of one share of new common for each 10 shares of common and preferred outstanding. Holders of convertible bonds who convert into common stock will be given the right to participate in the new issue. The proceeds realized from the sale of this stock will be used to finance new construction in and about Seattle.

Tidewater Power Company, Wilmington, N. C.—Baker, Ayling & Co., Boston, have offered for sale at 95 and interest, $200,000 first mortgage 5 per cent sinking fund bonds, dated Jan. 1, 1908. A letter from A. B. Skelding, general manager of the company, says: "The proceeds of the $200,000 bonds are to reimburse the Tidewater Power Company for cash already expended for new trackage and equipment, and to provide steam turbines, car barn and shops, motor and trail cars, and extensions to and enlarging gas mains. The replacement value of the properties (exclusive of its franchises, which are of great value) is more than $1,650,000, against which there is outstanding (including the bonds purchased) $766,800 of bonds, the balance being represented by stock investment."

Philadelphia Transit Talks

Transit Talk No. 11 of the Philadelphia Rapid Transit Company, dated Aug. 19, 1909, was entitled "Ten Thousand Cars a Day Pass Three Corners." It said:

We have made a count of the cars passing three street corners in a day.

We knew, of course, how many cars per hour are operated on all our lines.

But it was a surprise to find that 3740 cars pass the intersection of Eighth and Market Streets in 24 hours.

This is an average of 156 cars every hour, or more than two cars a minute. In the rush hours there are many more cars than this—one every 10 seconds.

At Eighth and Walnut Streets, two squares away, 3223 cars (134 an hour) were counted in 24 hours.

Over 2765 cars counted at Eighth and Chestnut Streets make a total of nearly 10,000 cars passing these three corners every day.

In this count we do not include 1496 subway cars that pass Eighth and Market Streets, but the enumerators at Walnut and Chestnut Streets necessarily included the northbound cars also counted at Market Street.

We print these figures to show any one who thinks that we do not run as many cars as we might that our rails in the center of the city are, in fact, crowded.

And it is to and from the central section that we are called upon to transport a large majority of our passengers.

You may have assumed that there are too few cars running between your home district and the center of town, and that it would be a very simple matter for us to increase the service. But it is not.

For example, the 12 Sixty-third and Vine street cars per hour, upon arriving in the central district, become 12 of the 732 cars operated every hour on the shopping section of Market Street. As this section is already burdened with traffic to the point of congestion, any increase in the service of even one of the lines would make frequent tie-ups inevitable.

Increase of service upon any particular line is a matter involving other considerations than the mere addition of a few cars.

Traffic and Transportation

New Transfer System In Richmond, Va.

The Virginia Railway & Power Company placed in effect on the lines in Richmond, Va., on Aug. 15 a new transfer system which is designed to afford the transfer privilege without permitting undue advantage to be taken. The transfer situation in Richmond has been somewhat complicated on account of the difference in the franchises of the Richmond Passenger & Power Company and the Richmond Traction Company, which operate over the same tracks in the city. The Virginia Railway & Power Company having purchased the lines of both companies, under foreclosure, has agreed to try a consolidated transfer system in place of the exchange transfer between the two companies and the transfer issued by the Traction Company to Traction lines and that issued by the Passenger & Power Company to lines of its company. The lines of Richmond, however, are not laid out at right angles and frequently loop and run over the same tracks—which prohibits a universal transfer system unless the privilege is restricted. Otherwise, there is no limit to the number of rides, or the length of rides, that a person might secure with the universal transfer system in effect, issuing transfers on transfers, as required by one of the franchises.

The notice to the public issued by the company before the system was placed in effect, states:

"In view of the general discussion of the subject of a universal transfer on the street railway lines in this city and the misunderstanding in the minds of many people as to the facts governing these transfers, the Virginia Railway & Power Company desires to make the following statement:

"The lines in Richmond are operated under two separate franchises, one granted to the Richmond Traction Company and the other to the Richmond Passenger and Power Company. While both these franchises, as well as the properties covered by same, have been acquired by the Virginia Railway & Power Company under sale by the United States Court, the franchises are still separate, and the rights of the company as to the different lines are distinct. These several franchises have contained different provisions as to transfers; for instance, the Richmond Traction Company franchise requires the company to give a transfer on a transfer, while this is not required by the Richmond Passenger & Power Company franchise as to transfers given in exchange between the two companies.

"These conditions have necessarily resulted in great confusion and embarrassment to the public as well as the companies. It has been the intention of this company, as soon as practicable after taking control of all the properties, to take up with the proper authorities of the city and, if possible, arrange an intelligent anad logical transfer system, universal in its application, which would give to the people of the community served the most convenient and extensive transfer facilities consistent with proper regulations for the protection of the company against fraudulent and improper use of transfers.

"Prior to the sale of the property, the City Council passed an ordinance requiring, in effect, that transfers should be given at transfer points to the next car passing in the direction in which the transfer was desired, without regard to the company operating such car, and suit was brought by the Central Trust Company, trustee in one of the mortgages of the Richmond Passenger & Power Company, to enjoin the enforcement of this ordinance, on the ground that it was a violation of the franchise contract. A temporary injunction was granted, but the United States Court has recently decided that the franchise was valid; from which decision an appeal has been noted pending the final and logical adjustment of this whole question.

"The company fully recognizes the inconvenience and annoyance of the existing conditions, but the varying provisions of the several franchises, as well as numerous other conditions surrounding the operation of the lines in Richmond, make it very difficult for the company to give an intelligent transfer system which will not open the door to the fraudulent use of transfers, to the great injury of the company and the public.

"Owing to the great amount of work which has been thrown upon the officers of the company incident to its organization and taking over the properties, it will not be practicable to take this matter up for final adjustment until the early fall. Pending such adjustment, however, it is the purpose of the company to put into effect a transfer system which will provide for transfers to the next passing car at transfer points, without regard to the franchise under which such car is operated, which will practically give to the people the universal transfer system which they desire.

This arrangement will be tentative and experimental, with a view of satisfying the demands of the people as far as practicable, even at some loss to the company, until the subject can be taken up with the proper authorities of the city and an intelligent adjustment made; which it is hoped can be accomplished early in the fall, when a permanent and, as far as practicable, universal system of transfers will be put into effect.

"The company makes this announcement in order that the public may understand that it is its purpose to do everything in its power to promote the convenience and comfort of passengers upon its lines and meet the demand with respect to the transfer system. It desires, however, that the public may also realize the difficulties confronting the officers of the company and the danger of serious injury to its income through the improper use of transfers, and would ask the patience of the public and the co-operation of the people of this community in the efforts which will be made to remedy these conditions."

C. B. Buchanan, general superintendent of railways of the company, states that the transfer system has not been in effect a sufficient time to permit a conclusion to be formed concerning the result of the consolidated transfer on the revenues.

Transportation of Dogs Prohibited on Syracuse Railway

A representative of the New York State Commissioner of Agriculture in charge of quarantine has served an order on the Syracuse Rapid Transit Railway prohibiting the transportation of dogs in Syracuse and Solvay, an adjoining village, as follows:

"Take notice that a quarantine for the suppression and prevention of the spread of the disease rabies has been laid upon the city of Syracuse and village of Solvay, and by such order you are forbidden to accept for transportation any dog or dogs, except upon written order from the department authorizing such removal from the district quarantined. Information regarding this quarantine from the undersigned at the office of the sheriff of Onondaga County.

"CHARLES M. A. SMITH, in Charge of Quarantine."

As the company operates in several towns adjoining the city of Syracuse, it was impossible to differentiate between them, and a general order was issued by J. E. Duffy, superintendent, as follows, directing conductors not to transport dogs:

"Note the attached order served upon the Syracuse Rapid Transit Railway Company on Monday, Aug. 16, in relation to transportation of dogs. You will note we are ordered not to accept for transportation any dogs upon the cars of this company. Kindly see that this order is enforced."

Negotiations for Settlement of Wage Question in Chicago

The negotiations which were under way for a peaceful settlement of the wage controversy between the surface railway companies of Chicago and their employees came to an abrupt ending on Aug. 20, when the verbal agreement between the Chicago Railways Company and the committee of its employees was repudiated by a vote of the employees. On Monday, Aug. 23, similar action was taken by the employees of the Chicago City Railway and the entire question of increased wages was thus thrown open again for readjustment.

Although the officials of the railway companies had presented a schedule of wages that was considered a marked increase over the old salary scale, the employees took the stand that a sliding scale of wages, which allowed the maximum wage only to the older employees, was undesirable. This, they claimed, might prove to be a boomerang which would place a premium on the services of new men and might result in the discharge of the old-time men. The employees also objected to the length of the proposed contract, three and one-half years, which would mean expiration in February, 1913, at the coldest time of the year. They thought this might handicap them in making a new contract at that time.

Representatives of the railway companies have stated that they have granted all the concessions they can afford, but each of the presidents has announced a willingness to open the controversy again to listen to what the employees may care to suggest. It has been announced that the railway companies will now urge that the whole subject of wages be placed in the hands of a board of arbitration.

The situation became so threatening during the early part of this week that the chief of police of Chicago called in members of his force who were away on furloughs so as to be able to provide adequate police protection in case peace negotiations failed. The State Board of Arbitration has gone to Chicago to lend its aid in bringing about an amicable settlement, and the Chicago City Traction legal representative, Walter L. Fisher, is doing what he can in the interest of the city to bring about a peaceable arrangement.

Changes in Kansas City Wages

The Metropolitan Street Railway of Kansas City posted in its car houses on Aug. 14 notice of a change in the wage schedule of trainmen, effective on Sept. 1:

"In September, 1907, the general manager of this company made a proposition to the trainmen concerning a division of certain savings in operating expenses that might be made during the following year by extra care and caution in avoiding accidents, coupled with a plan by which the trainmen were to be beneficiaries of any increase in the company's earnings per car-mile. This anticipated saving has not been realized. On the contrary, there has been a large increase in operating expenses. Such a result has not been satisfactory either to the men or to the company. In view of this fact and as a recognition of faithful service on the part of our trainmen, the company determined to abolish this former plan, and in lieu thereof to adopt a new wage scale to go into effect Sept. 1, 1909. Commencing with that date all trainmen who have been in the service of the company for less than one year will be considered as apprentices, who are learning the business and who are fitting themselves to enter the ranks as regular employees. At the end of one year's probationary service all apprentices with good records who have demonstrated their fitness will be accepted as regular employees of this company. On and after Sept. 1, 1909, the new wage scale will be as follows:

"For apprentices less than one year, 18 cents per hour. For regular employees, first to second year, 19 cents. For regular employees, second to third year, 20 cents. For regular employees, third to fifth year, 22 cents.. For regular employees, fifth to sixth year, 23 cents. For regular employees, sixth to tenth year, 24 cents. For regular employees, 10 full years or over, 25 cents.

"W. W. WHEATLEY, General Manager.

"BERNARD CORRIGAN, President."

The two scales of wages compare as follows:

	New scale, per hour.	Old scale, per hour.
First year	18c.	18c.
First to second year	19c.	19c.
Second to third year	20c.	20c.
Third to fourth year	22c.	21c.
Fourth to fifth year	22c.	21c.
Sixth to seventh year	24c.	21c.
Seventh to eighth year	24c.	21c.
Eighth to ninth year	24c.	23c.
Ninth to tenth year	24c.	23c.
Tenth to eleventh year and thereafter	25c.	23c.

In the circular of September, 1907, to which reference is made in the foregoing, it was stated that for the three-year period ending May 31, 1907, the wages of trainmen had been 20.47 per cent of the gross receipts of the company. It was suggested that if the business should continue to increase the percentage could be lowered, and the promise was made that if it were lowered the company would give whatever was saved to the men in lump sums on May 31, 1908, each man to receive his share according to the time he had worked. As a means of encouraging greater care among the men in avoiding accidents, it was also promised that if they would reduce the expense to the company growing out of accidents the men should have half the savings from this source.

Fare Collection System in Cedar Rapids, Ia.—The Cedar Rapids & Marion City Railway, Cedar Rapids, Ia., put the Rooke system of fare collection into use on all of its cars on Aug. 18. This system, which employs a portable coin collector and register, has been adopted in Des Moines, Sioux City, Waterloo and Oskaloosa, Ia.

Protection at Crossing of Track Used Jointly by Traction and Railroad Company.—The Public Service Commission, Second District, has authorized the Dexter & Northern Railroad to cross at grade two streets in the village of Dexter, Jefferson County. Further protection is secured by requiring three signal boxes to be located so that upon the entrance of a train or street car of the Black River Traction Company upon a portion of track which shall be jointly used, access to such portion of track is regulated by these signals.

Decision of Arbitrators in La Crosse, Wis.—An increase of two cents an hour for motormen and conductors of the La Crosse City Railway is approved in the decision of the board of arbitration chosen to adjust the wage question. The sliding scale will be retained until at the end of one

year's service the men will receive the highest amount of wages. The minimum wage will be 19 cents an hour, as compared with 17 cents, the prevailing rate, and the oldest men on the road will receive 23 cents per hour instead of 22, as at present.

Counterfeit Transfers in Chicago.—Conductors on the lines of the Chicago City Railways have discovered counterfeit transfer tickets, and hundreds have been collected. The tickets are similar to those used by the company, except that they do not have a serial number and letter. A notice has been posted in the car barns warning the conductors to be on the alert. In case any of the tickets are found to be in the possession of a passenger the conductor is asked to secure the name and address of the person, but not to cause an arrest.

Arrest of Accident Claimant in Oakland, Cal.—John Ferrin, claim adjuster of the Oakland (Cal.) Traction Company, arrested in Oakland on Aug. 4 Mrs. Maude Johnson, alias Edith Strong, Grace Payton, Maria Johnson, N. L. Harrelson, May Thomas and Francis B. Raster. Mrs. Johnson secured help from the exalted ruler of the Oakland Elks and then sent for him to say that she had been injured in an accident on a car and to ask that suit be entered against the Oakland Traction Company for $200,000. At this time Mrs. Johnson asked Mr. Reed to write her will disposing of her share in an estate in Nevada, Mo.

Washington, Baltimore & Annapolis Road Makes Contract with Express Company.—A contract has been made by the Washington, Baltimore & Annapolis Electric Railway with the Electric Express Company whereby the latter will inaugurate an express and freight service on the line of the railway on Sept. 1. The express company has been incorporated in Maryland with $100,000 capital. Following are the officers and directors: T. H. Pickford, Washington, president; E. W. McCormick, Washington, secretary and treasurer; William E. Slaughter, Baltimore, vice-president and general manager; J. W. Trautwein, Annapolis; E. J. Codd, Baltimore, and W. S. Cosby, Washington.

Steel Strikers Cause Discontinuance of Traffic on Lines in McKee's Rocks, Pa.—J. D. Callery, president of the Pittsburgh (Pa.) Railways, announces that the company has suspended service on the Neville Island line and Schoenville line, each of which passes through the territory in which the workers of the Pressed Steel Car Company are now on strike. The railway company states that it is, and has been for some time, unable to protect its passengers from the strikers. It cites as instances the killing of Deputy Sheriff Harry Exler on Aug. 22 while a passenger on a car and the killing of three other passengers who were chased from a car before being killed. Mr. Callery declares that the service will not be resumed until the trouble is over or the authorities protect the company's property and its patrons.

Steam Line Must Stop at Highway Crossing.—The Public Service Commission, Second District, has ordered the Newark & Marion Railway Company to stop all its passenger trains on signal at its crossing of the highway known as Mill Street, in the village of Marion, and provide such facilities for the embarking and alighting of passengers at that point as safety requires. The petition of residents asking for a shelter at that crossing is denied. It was shown at the hearing on this matter that such a stop was formerly made commencing with the operation of the road and discontinued only a year ago. The company was incorporated as a street railroad, and although it now operates by steam the commission holds that it must be assumed to be operating a street railroad. The nearest stop now made is at Buffalo Street, Marion, nearly a ½ mile from the Mill Street crossing.

District Electric Railway Commission of Washington Issues New Order.—The District Electric Railway Commission of Washington, D. C., has announced a new regulation governing the stopping of street cars in the District to take on or let off passengers. The order reads as follows: "No motorman or conductor shall refuse to stop to take up a passenger at any street crossing or other regular stopping place unless all the seats in the car or train are occupied, nor shall any motorman or conductor refuse to stop to let off a passenger at any street crossing or other regular stopping places; provided that, after a blockade, motormen or conductors need not necessarily stop for passengers at every crossing adjacent to the point of said blockade. Trainmen must notice what particular streets have been skipped by the car or train in front of them so that all cars or trains shall not run past the same crossing. Cars or trains must not be run past passengers on account of being behind their schedule time unless another car or train is following within two blocks. In every case where a car or train is run past intending passengers motormen must request such persons to take the following car or train."

Personal Mention

Mr. Harry J. Gibson has been elected vice-president of the Toledo, Bowling Green & Southern Traction Company.

Mr. John Kilgour has been elected president of the Toledo, Bowling Green & Southern Traction Company to succeed Mr. G. B. Kerper.

Mr. C. G. Young, formerly chief engineer of J. G. White & Company, has just returned from a trip around the world occupying about nine months. Mr. Young made a special study of traction properties while away.

Mr. Justin W. Lester, formerly treasurer of the Worcester (Mass.) Consolidated Street Railway, has been elected general auditor of the Tampa Northern Railroad and its allied concern, the Arizona Lumber Company, with headquarters at Tampa, Fla.

Mr. S. K. Holland has resigned as division traffic manager of the Illinois Traction System, Peoria, Ill. It is stated that Mr. Holland will accept a position with the Peoria & Galesburg Railway, Peoria, Ill., which is building an electric railway from Peoria to Galesburg and Canton.

Mr. E. D. Rasmussen has resigned as master mechanic of the Choctaw Railway & Lighting Company, McAlester, Okla., to join the Allis-Chalmers Company, Milwaukee, Wis. Mr. Rasmussen was formerly electrical engineer and superintendent of the power plant of the El Paso Southwestern System, El Paso, Tex.

Mr. Elton G. Dunlap, the present assistant treasurer of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been employed by this company and its predecessors for the last six years, serving in almost every capacity through the accounting and treasury departments, and for the last two years as assistant chief clerk. Mr. Dunlap has received practically all of his business experience with this company or its affiliated properties.

Mr. S. L. Prenter has been appointed assistant to Mr. F. R. Glover, assistant general manager of the British Columbia Electric Railway at Vancouver, B. C., and will have special charge of the Chilliwack division of the system. Mr. Prenter was connected with the Canadian Pacific Railway for 24 years, during which time he acted in various capacities. He was chief clerk for Mr. H. E. Beasley, formerly superintendent of the Pacific division of the Canadian Pacific Railway, with headquarters in Vancouver.

Mr. C. H. McMillan, assistant superintendent of the line and superintendent of the car houses of the Chicago, Ottawa & Peoria Railway, at La Salle, Ill., has been transferred to Streator, Ill., to become superintendent of the new Ottawa-Streator division of the company. Mr. Henry Jensen, of Bureau, has been promoted to roadmaster of the Princeton-Seneca division of the line. For more than a year the Princeton-Seneca division has been divided, Mr. Jensen being the roadmaster at the west end and Mr. Joseph Williams of the east end. Mr. Williams has been transferred to Morris, where he will superintend the construction of the extension from Seneca east.

Mr. S. C. Rogers, who has held the position of both treasurer and auditor of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, since the incorporation of the company on July 1, 1905, has relinquished the title and duties of auditor to give his entire attention to the work of treasurer and direction of the financial department. It was on the recommendation of Mr. Rogers that the positions of treasurer and auditor were made independent of each other, and Mr. Emmet D. Gault and Mr. Elton G. Dunlap, who received practically all of their education in railway accounting with the present company or its predecessors, were elected to the positions of auditor and assistant treasurer, respectively.

Mr. Emmet D. Gault, the present auditor of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been associated with these properties for nearly 12 years, and has risen from the rank of junior clerk and stenographer to his present position. In February, 1901, Mr. Gault was stenographer for the general manager of the Youngstown Consolidated Gas & Electric Company, now one of the underlying companies of the present consolidated system. Subsequently he took the position of general bookkeeper; then, as the company increased in size, he became chief clerk, a position which he held until this year, when he was elected one of the general officers of the company with the title of auditor, and Mr. Glen R. Drury was appointed chief clerk under Mr. Gault.

Mr. J. H. Hartford, general foreman of the shops of the Hartford lines of the Connecticut Company at Hartford,

Conn., was presented with a gold watch by his associates and employees on Aug. 17. Mr. Hartford left Hartford to take charge of the Bridgeport shops of the Connecticut Company as master mechanic. About 75 of the foremen, heads of departments, employees and friends were present. Mr. A. Blanchard, superintendent of shops, made the presentation, referring to Mr. Hartford's connection with the Hartford lines since he went there three years ago. Those who presented the watch were members of the electrical and mchanical departments of the Hartford, Manchester and Rockville divisions; also the storeroom, line and power house men. Before going to Hartford, three years ago, Mr. Hartford was connected with the Coney Island & Brooklyn Railroad, Brooklyn, N. Y., for 14 years in an important capacity. Mr. Hartford took charge as master mechanic at Bridgeport on Aug. 18.

Mr. F. W. Whitridge, receiver of the Third Avenue Railroad of New York, has been mentioned as a desirable candidate for Mayor of New York City if he could be induced to enter the campaign. In a recent article the New York *Evening Sun* spoke of Mr. Whitridge, who had "upset all the traditions of receiverships by actually 'running the road' instead of letting things take care of themselves until it is time to show up at the end with a demand for a big fee, is being prominently mentioned as a fusion candidate for Mayor. It is thought by his friends that he could win votes on account of his splendid record in having brought order out of the chaos in the rehabilitation of the surface railway system of which he was appointed receiver by Judge Lacombe of the United States Circuit Court last year. As receiver of the Third Avenue Railroad System, Mr. Whitridge has given some hard jolts to the bondholders of the road; to the Public Service Commissioners who, he believes, have been trying to hamper him in his determination to improve the service and make the road pay expenses so as not to destroy the equities of the stockholders, and even to some conductors and passengers who forgot to pay up. He put up temporarily the 'Thou Shalt Not Steal' signs in the cars as a gentle and Biblical reminder to careless passengers and dishonest conductors not to rob the stockholders of the company. But as soon as possible he introduced the 'pay-as-you-enter-cars,' which relieve both passengers and conductors of suspicion, thus abolishing the old-fashioned loose way of handling fares. The results have been highly satisfactory to every honest passenger and conductor, and even the Public Service Commission is beginning to recognize the genius of Mr. Whitridge in eliminating graft from the operation of a street railway system.

OBITUARY

Capt. Herman P. Schuyler, assistant treasurer of the General Electric Company and one of the best-known credit men in the country, died on Aug. 14 at his home in Albany, N. Y., aged 67 years.

J. B. Stetson, president of the California Street Cable Railroad of San Francisco, died on Aug. 21 at his home in San Francisco. Mr. Stetson was prominent in commercial and railroad affairs.

L. S. Storrs, president of the New England Investment & Security Company, after communicating with F. W. Rane, State Forester of Massachusetts, has issued a letter to the general managers of the street railways controlled by the company, which is designed to enlist their help in preventing forest fires. Mr. Storrs states in his letter:

"Inasmuch as our various country lines depend in a large measure for their attractions upon the forests through which they run, it is very essential that we cooperate to the fullest extent with the State authorities in their endeavor to suppress the forest fires.

"I wish that you would see that each of your division superintendents is supplied with a copy of this book (State Forester's Report on Forest Fires), together with instructions that they personally meet the forest warden in each town through which their jurisdiction extends, to ascertain their telephone numbers, in each case where they have telephone connections at their residences or places of business, and if not, the quickest way they can communicate with the warden.

"Will you then see that notices are posted in all car barns requiring the crews to report to the superintendent or despatcher, at the first company telephone, any fires which they may observe, with exact location and condition of the fires?

"You will then require your superintendent or despatcher to communicate this information immediately to the forest warden, who will, of course, follow instructions laid down for him by the State Forester."

The State Forester sent a letter, together with copies of the communication from Mr. Stores on the subject, to the various railways in Massachusetts.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Kankakee & Urbana Traction Company, Kankakee, Ill.**—Incorporated to build an electric railway from Kankakee via Urbana to Charleston, and from Champaign to Piper City. Principal office, Kankakee. Capital stock, $200,000. Incorporators: R. F. Cummings, Geo. M. Bennett, Ira N. Palmer, W. J. West, Upton Schaub, C. E. Thrasher, F. J. Hennessy, W. J. Brock and W. D. Moore, Jr.

***Baltimore & Eastern Shore Railway, Baltimore, Md.**—Incorporated to build an electric railway from Baltimore to Cambridge, with a ferry connecting Bay Shore and Kent County. Capital stock, $50,000. Incorporators: William H. Fehsenfeld, president of the Travelers & Merchants' Association; Charles H. Knapp, E. A. Davis, E. T. Jones, A. F. Saunders, R. A. McCormick, A. H. McDannald, C. W. Perkins, D. M. Fulton and G. P. Neilson, all of Baltimore.

Eugene-Pacific Western Railroad, Eugene, Ore.—Incorporated to take over the property, franchises and rights of the Eugene-Pacific Electric Railway, which proposed to build an electric railway from Eugene to Florence, a distance of about 40 miles. Surveys are being made. Incorporators: F. J. Bergot, Joseph Fellman and F. A. Anderson, all of Eugene. [E. R. J., May 8, '09.]

Missouri, Tennessee & Georgia Railroad, Humboldt, Tenn.—This company has applied for a charter to construct an electric street railway from Humboldt to Dyersburg, via Crockett Mills, Friendship and Bonicord, a distance of 35 miles. Capital stock, $1,000,000. Incorporators: C. H. Ferrell, Dr. J. H. Thomas, C. T. Jarrell, G. D. Ferrell, C. W. Rooks, J. D. Senter, W. W. Baird, O. C. Sharp, J. M. Senter and A. R. Dodson. [E. R. J., Aug. 21, '09.]

Port Arthur (Tex.) Traction Company.—Incorporated to build a 6-mile electric railway system in Port Arthur. Capital stock, $200,000. Headquarters, 503 Reibold Building, Dayton, Ohio. Incorporators: H. J. Myers, A. H. Reeder, Dayton, Ohio; A. L. Davis, Harris County. [E. R. J., Aug. 21, '09.]

San Angelo (Tex.) Street Railway.—Incorporated to operate a street railway system in San Angelo for the transportation of freight and passengers. This company has been organized to take over the property of the Angelo Power & Traction Company, which was sold at receiver's sale to Samuel Crowther, San Angelo, for $38,000. About 4 miles of track were formerly operated and it is proposed to resume operation at once and add 4 miles of track to the line the first year. Capital stock, $100,000. Incorporators: Samuel Crowther, Charles W. Hobbs, C. A. Broone, L. L. Farra, A. M. Hicks, F. W. Walker and John W. Harris. [E. R. J., June 19, '09.]

Wichita Falls (Tex.) Traction Company.—Incorporated to build an electric railway from Wichita Falls to Lake Wichita, a distance of 5 miles. This company has recently purchased the Wichita Falls Water & Light Company. Capital stock, $150,000. Incorporators: J. A. Kemp, Frank Krell, Chas. C. Huff and F. P. St. Clair. [E. R. J., March 13, '09.]

Spokane, Walla Walla & Western Railway, Walla Walla, Wash.—Incorporated to take over the holdings of the Columbia & Walla Walla Traction Company, which proposed to build an electric railway from Dayton to Wallula, a distance of 60 miles. Capital stock, $1,000,000. Incorporators: E. M. Symonds, M. S. Parker, G. S. Haynes, A. H. Hoffman and E. C. Maxon, Spokane; H. M. Hanger, Dayton, and W. L. Russell, Walla Walla. [E. R. J., July 3, '09.]

FRANCHISES

***Anniston, Ala.**—Col. William H. Zinn has applied to the City Council for a franchise to build a street railway system in Anniston.

***Globe, Ariz.**—A. H. Sterns, local representative of Los Angeles, Cal., capitalists, headed by John Denear, has applied to the City Council for a franchise to operate a street railway in Globe. Electric or gasoline motor power is specified as the mode of operation for the system.

Globe, Ariz.—F. C. Jacobs, attorney for George W. Hunt, has filed an amended franchise with the City Clerk for the construction of an electric railway in Globe. Mr. Hart agrees to construct a $12,000 bridge across Pinal Creek. [E. R. J., Jan. 2, '09.]

San Diego, Cal.—The City Council has granted a franchise to the San Diego Electric Railway to build a street railway from D Street to Smith Street and Congress Street.

***San Bernardino, Cal.**—Fred Durham, Redlands, has applied to the City Council for a franchise to build an electric railway to extend from Third Street and E Street north to Sixth Street, west to Mount Vernon Street and north to Base Line.

Joliet, Ill.—The Highway Commissioners have granted a 20-year franchise to the Chicago & Joliet Electric Railway to operate its system on Cass Street and Collins Street.

Waterville, Maine.—The Board of Municipal Officers has granted permission to the Lewiston, Augusta & Waterville Street Railway to cross the Kennebec River on a concrete bridge to be built on the south side of the present Ticonic Bridge and to join its tracks to those of the Waterville & Fairfield Railway & Light Company, and to use the latter company's tracks on Main Street. H. B. Ivers, general manager.

Kalamazoo, Mich.—J. P. Clarke, vice-president of the Michigan United Railways, has applied to the City Council for a franchise to build a line on South Rose Street from Main Street to South Street and on South Street to Portage Street. This route has also been selected by the Michigan & Chicago Westbound Railway, which is promoting an interurban railway to Grand Rapids.

East Aurora, N. Y.—The Buffalo Southern Railway, Gardenville, has applied to the Village Board for a franchise to operate its electric railway on Main Street.

Cadiz, Ohio.—The Wheeling, Cadiz & Tuscarawas Traction Company has applied to the City Council for a franchise to construct an electric railway over certain streets and avenues of Cadiz. A. E. Townsend, Cadiz, president and general manager. [E. R. J., Aug. 7, '09.]

Dayton, Ohio.—The County Commissioners have granted a 25-year franchise to Thos. A. Ferneding, of the Dayton & Xenia Transit Company, to build electric railways over the Shakertown, Dayton and Wilmington pikes. It is stated that the franchise will be transferred to the Dayton, Springfield & Xenia Southern Traction Company, which was organized some time ago to extend these lines to Washington C. H. [E. R. J., Oct. 10, '08.]

Forest Grove, Ore.—The United Railways, Portland, have applied to the City Council for a 25-year franchise to construct an extension into Forest Grove.

***Lebanon, Tenn.**—The Board of Aldermen has granted a 99-year franchise to H. B. Bond, Lebanon, to construct a street railway in Lebanon. Mr. Bond has requested that the franchise be put to a vote of the people.

Logan, Utah.—David Eccles, president of the Ogden (Utah) Rapid Transit Company, has applied to the City Council for a franchise for the construction of a street railway system in Logan. The proposed extension, which is to run from Ogden to Logan via the Cache Valley, 60 miles distant, has already been constructed as far as the Ogden Valley, a distance of 15 miles.

Wheeling, W. Va.—The City & Elm Grove Railroad has applied to the County Commissioners for a franchise to extend its railway around Wheeling Park and at Park View.

TRACK AND ROADWAY

Nashville & Huntsville Railroad, Huntsville, Ala.—It is reported that this company, which planned to build an electric railway from Huntsville, Ala., to Nashville, Tenn., has abandoned the proposition and is restoring the $200,000 subscribed by the people of Davidson, Marshall and Giles Counties, Tennessee, and Madison County, Alabama, with 4 per cent interest added. [E. R. J., Aug. 15, '08.]

Pacific Electric Railway, Los Angeles, Cal.—This company has completed surveys for the proposed extension in Pomona on the Huntington Boulevard route to a point beyond Ganesha Park.

Modesto (Cal.) Interurban Railway.—The grade for this electric railway, to connect Modesto, Newman, Crowe's Landing, Waterford and Empire, is completed and the work of laying the ties and track will commence immediately. The Pacific Construction Company has the contract for this work, and it is expected to complete and have cars in operation by Sept. 1. T. R. Beard, Modesto, president, and W. A. Cooper, 1370 Franklin Street, Oakland, chief engineer.

***Rome, Ga.**—It is reported that Col. Wright Willingham, Rome, is promoting a plan to build an electric railway to extend from Chattanooga to Atlanta via Rome, a distance of 160 miles. The route of the proposed line is from Chattanooga to Ringold, then to Dalton and on to Rome.

Savannah (Ga.) Electric Company.—This company has contracted with the Pennsylvania Steel Company for 30 tons of 70-lb. 7-in. high T rails, which is the first order of about 250 tons to be purchased for the Barnard Street improvements.

Belleville & Mascoutah Traction Company, Mascoutah, Ill.—Work on the grading for the proposed electric railway to be constructed by this company has been started at Rentchler station, midway between the two cities. McCann Brothers, contractors. Among those interested are G. J. Scheve and E. R. Hagist. [E. R. J., Aug. 7, '09.]

Chicago & Joliet Electric Railway, Joliet, Ill.—This company, in conjunction with the Highway Commissioners, has awarded a contract to the Newkirk & Powers Constructing Company for the construction of a bridge over Spring Creek at Cass Street. The company will pay $2,000 and the Highway Commissioners the remainder.

Evansville, Suburban & Newburg Railway, Evansville, Ind.—It is stated that this company is planning to extend its railway from Evansville to Henderson and Uniontown, Ky.

Cincinnati, Madison & Western Traction Company, Madison, Ind.—The Vienna and Lexington townships have voted subsidies amounting to $43,000 to assist this company to construct the proposed electric railway from Madison to Scottsburg by way of Hanover and Lexington, and later to Salem and French Lick Springs. The company has requested the township of Madison to vote for $51,000 subsidy, and the townships of Hanover and Republican for proportionate sums as subsidies. The proposed railway is to be operated in conection with the Indianapolis & Louisville Traction Company, and its promoters are also identified with the latter company, among whom are John E. Greeley, W. E. English and C. C. Tennis. [S. R. J., Feb. 8, '08.]

Kansas Union Traction Company, Altamont, Kan.—William J. Jones, general manager of this company, has made the people of Columbus an offer to build an electric railway from Cherryvale through Oswego to Columbus, provided they would raise a bonus of about $6,000. The company proposes to construct an interurban railway connecting Parsons, Cherryvale, Altamont, Mound Valley, Edna and Coffeyville. The people of Coffeyville and Parsons have already raised a bonus of $10,000 each. [E. R. J., Aug. 21, '09.]

Joplin & Pittsburgh Railway, Pittsburgh, Kan.—The final survey for the extension of this electric railway from Croweburg to Mulberry is being made, which completes the preliminary work.

***Winchester, Ky.**—It is stated that B. R. Jouett, M. T. McEldowney and John E. Garner have made a proposition to the people of Bath and Bourbon Counties to build an interurban electric railway from Winchester to Sharpsburg, if the towns interested will give the right of way and a bonus of $100,000.

Boston & Northern Street Railway, Boston, Mass.—This company has recently opened a 5½-mile extension of its lines from Stoneham Square through the Middlesex Falls to Spot Pond.

***North Wildwood, N. J.**—Augustus Hilton is said to be interested in a proposition to build an electric railway from Cape May Court House to Wildwood Junction, and on to Grassy Sound, Anglesea and Wildwood Crest. If this line is built, there will be a direct connection from Cape May to Atlantic City.

***Rahway, N. J.**—It is stated that A. F. Kirsten, S. H. Herman and Aaron Gries are interested in a plan to build an electric railway between Rahway and the towns along the shore opposite Staten Island, between Sewaren and the Rahway River. A meeting attended by members of the Common Councils of Rahway and Roosevelt was recently held, at which tentative plans were adopted. The proposed railway would be about 6 miles in length.

Lake Erie & Youngstown Railway, Youngstown, Ohio.—It is reported that grading has begun at Andover on this proposed electric railway to extend from Conneaut through Andover to Youngstown. The Stanley Contracting Company has the contract for the construction of this line. This system will connect with the Youngstown & Southern Railway, which extends from Youngstown to East Liverpool. [E. R. J., June 12, '09.]

Toledo, Bowling Green & Southern Railway, Findlay, Ohio.—It is said that this company is planning to extend its electric railway to Kenton within a year.

Lebanon, Ore.—The Electric Railway Journal is advised by Mealey Bros., Foster, that they have decided not to begin work on the proposed electric railway from Lebanon to Cascadia, at present, owing to the depression in the lumber market. [E. R. J., July 17, '09.]

Irwin & Herminie Traction Company, Irwin, Pa.—This company has been organized to take over the property of the Pittsburgh & Westmoreland Railway, now operating between Irwin and McKeesport. It is said that $40,000 in

bonds will be issued for improvements. [E. R. J., Aug. 14, '09.]

Wilkes-Barre & Wyoming Valley Traction Company, Wilkes-Barre, Pa.—This company advises that it is constructing an 8-mile extension and expects to complete this work by Nov. 1. The company is doing its own construction work. T. A. Wright, superintendent.

Rochester & Mars Street Railway, Pittsburgh, Pa.—It is said that right of way has been secured and plans have been completed for the construction of this proposed electric railway, to extend from the Baltimore & Ohio Railroad depot at Mars to Rochester, a distance of 23 miles. The railway will cost approximately $400,000 and will connect with the Pittsburgh & Butler Street Railway; with the Pittsburgh, Harmony, Butler & New Castle Railway, and with the Beaver Valley Traction Company. J. H. Barrett, 331 Fourth Avenue, Pittsburgh, chief engineer. The company has recently applied for a charter. [E. R. J., July 3, '09.]

Bryan, Tex.—Thomas L. Fountain, Houston, who has completed the survey of the proposed electric railway between Bryan and the State College, a distance of 5 miles, is preparing a report which will be submitted to J. T. Maloney, Mayor of Bryan. [E. R. J., Aug. 7, '09.]

Dallas (Tex.) Interurban Electric Railway.—It is reported that this company will at once begin construction on its proposed electric railway connecting Dallas, Fornly, Mesquite, Terrell, Canton and Tyler. The company has secured all franchises and rights of way in Dallas. Capital stock, $2,400,000, with $600,000 preferred stock. Henry Dorsey, Dallas, president.

Quanah & Medicine Mound Traction Company, Quanah, Tex.—Charles Hagelstein, Quanah, writes that this company has not yet been incorporated and that nothing will be done until a sufficient bonus has been raised. The railway will connect Quanah and Medicine Mound, a distance of 17 miles. The repair shops and power station will be located at Quanah and the company will probably furnish power for lighting. All communications should be addressed to W. L. Johnson, Medicine Mound, Tex. [E. R. J., Aug. 14, '09.]

Fairmont & Northern Traction Company, Fairmont, W. Va.—This company has effected an organization in Fairmont. Directors: C. W. Watson, J. E. Watson, S. L. Watson, A. B. Fleming, J. H. Wheelwright, C. L. Shaver, Van Lear Black, W. Miller and G. T. Watson. The officers of the company will be elected at a meeting to be held next week. The company was formed with the object of building an electric railway from Fairmont to Fairview, a distance of 15 miles. The survey of the railway has been made and most of the rights of way have been secured. [E. R. J., Aug. 14, '09.]

Parkersburg, Marietta & Interurban Railway Company, Parkersburg, W. Va.—This company expects to extend its railway across the Little Kanawha River in Parkersburg and from Marietta past Lowell and Coal Run to Beverly, Ohio.

***Appleton, Wis.**—It is reported that A. L. Gettys and C. R. Robins, Chicago, Ill., are interested in a project to build an electric railway from Appleton, Wis., to Menominee, Mich., via Seymour, Oconto, Green Bay and Marinette, Wis.

Wausau (Wis.) Street Railway.—It is stated that this company will extend its electric railway 1 mile south of Schofield. It is also planned to extend it north to Merrill by next season.

SHOPS AND BUILDINGS

Evansville, Suburban & Newburg Railway, Evansville, Ind.—This company is preparing plans for the erection of a warehouse near the river front in Evansville.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—The engineer's plans for a large paint shop to be erected on West Washington Street by this company have been approved and work of construction will begin at once. The structure will occupy the site of the shops recently destroyed by fire.

Boston (Mass.) Elevated Railway.—This company has filed plans with the Railroad Commissioners for the reconstruction of its elevated station at Sullivan Square, necessitated by the extension of the elevated line to Malden. By these plans material changes will be made inside the building and additional structures will be erected outside. The result will be that some of the surface cars on the upper level will be able to make a loop instead of stopping at a dead end and backing out, and passengers will enter the elevated train from a new platform on the outside of the present building. At the present time the elevated train cuts a loop through the square, the line entering the building and passing through its center with a large loop swinging around the building for the return. It is proposed to enlarge this loop by moving the outside track farther away from the building, so as to have room for a new platform and for a switch tower between the track and the building. The surface cars will continue out through the front end of the building on a new loop which will encircle the square in front of the building. This loop and the loading platform in Main Street will be the principal new outside structure. Connection between the unloading platforms inside and the loading platform outside will be made by means of two passages to be cut through the Main Street wall, the passages to have a rise of about two feet. An overhead bridge will be built inside the station for transfer purposes.

United Railways & Electric Company, Baltimore, Md.—This company has in course of construction a terminal and car house, which is located at the Fulton Avenue entrance to Druid Hill Park. It will be 422 ft. x 191 ft. x 433 ft. and will be built of reinforced concrete. There will be a large lecture hall on the second story, 100 ft. x 45 ft., which may be used at any time by the employees. In addition to this, there will also be a reading room, a pool room and a number of bowling alleys. Another feature of the building will be an instruction room, where motormen can be put through a regular course of training. Lockers will be given to the men, and an office for the superintendent.

Winnipeg (Man.) Electric Railway.—This company is said to have prepared plans for the construction of a car house, repair shops and substation, to cost $100,000, to be built at the north end of Winnipeg. Wilford Phillips, general manager and chief engineer.

Portland (Ore.) Railway, Light & Power Company.—It is stated that plans are being prepared by this company for the construction of a car house, to be located between East Burnside and East Ankeny Streets, east of East Twenty-eighth Street. The structure will be built of reinforced concrete and will cost, it is estimated, $35,000. Its capacity will be 50 cars. F. I. Fuller, vice-president.

York (Pa.) Railways.—This company advises that it has let the contract for the building of a new car house 50 ft. x 200 ft. The new building will be located about a block from the present one, at Hartley Street and Maryland Avenue, in West Manchester township. There will be four tracks in the building with a capacity of five cars each. The building will be, for the present, only for storage out of season.

POWER HOUSES AND SUBSTATIONS

Binghamton (N. Y.) Railway Company.—This company contemplates the installation of a turbine, additional boilers and appliances for its power station, orders for which have been practically closed.

Rochester Railways & Light Company, Rochester, N. Y.—This company contemplates making a number of improvements to station No. 4 at Genesee Falls. A 2000-hp General Electric converter and switchboard will be installed.

Toledo & Indiana Railway, Toledo, Ohio.—This company has purchased and is installing one Allis-Chalmers substation equipment.

Portland (Ore.) Railway, Light & Power Comapny.—It is stated that this company is preparing to begin preliminary work on a new high-water power plant on the east side of the Willamette River at Oregon City. The plant, when completed, will have a capacity of 45,000 hp.

Columbia Power, Light & Railways Company, Bloomsburg, Pa.—This company has recently purchased a 250-kw railway rotary converter from the General Electric Company, a 1600-kw of 25,000-volt power transformer from Westinghouse Electric & Manufacturing Company, and a 250-kw belted railway generator.

Seattle (Wash.) Electric Company.—This company has let a contract to the Stone & Webster Engineering Corporation, Boston, Mass., for a brick substation at Ballard to supply current to the new railways in the northern part of Seattle. Current from this station will also be sold to the Puget Sound International Railway & Power Company, which has an interurban line under construction between Seattle and Everett. This station will have an ultimate capacity of 25,000 kw in railway motor-generator sets and 4000 kw in 2200 volt light and power capacity. It will receive power from the generating stations over a 13,800-volt, three-phase transmission line. The synchronous motors on the motor generator sets will receive this power at 13,800 volts. It is the intention to install one 500-kw motor-generator set immediately, adding a 1000-kw set and two 1000-kw, 13,800-2200-volt transformers in the fall, thus giving 1500-kw capacity in railway machines and 2000 kw in light and power capacity for the peak loads during next winter.

Manufactures & Supplies

ROLLING STOCK

Northwestern Elevated Railroad, Chicago, Ill., is planning to purchase 20 additional cars.

Montgomery (Ala.) Traction Company has ordered 10 new trucks from The J. G. Brill Company.

Kansas City Railway & Light Company, Kansas City, Mo., expects to order 25 motor cars this fall.

Coney Island & Brooklyn Railroad, Brooklyn, N. Y., is in the market for register fittings for 401 cars.

Central Pennsylvania Traction Company, Harrisburg, Pa., expects to purchase one snow sweeper within a month.

Chicago & Southern Traction Company, Chicago, Ill., is remodeling 14 of its cars for pay-as-you-enter service.

Austin (Tex.) Electric Railway advises it will purchase several new cars during the next few months for 1910 delivery.

Denver (Col.) City Tramway has ordered two steel underframe snow sweepers from McGuire-Cummings Manufacturing Company, Chicago.

Piedmont-Carolina Railway, Salisbury, N. C., has purchased four closed motor cars from the Dorner Railway Equipment Company, Chicago.

Galesburg Railway & Light Company, Galesburg, Ill., has purchased one snow sweeper from McGuire-Cummings Manufacturing Company, Chicago.

Quincy Horse Railway & Carrying Company, Quincy, Ill., has placed an order with McGuire-Cummings Manufacturing Company, of Chicago for one snow sweeper.

Springfield (Mass.) Street Railway Company is having six cars altered over at the works of the Wason Car Company for pay-as-you-enter operation, under license of the Pay-As-You-Enter Car Corporation.

Fresno (Cal.) Traction Company is in the market for 10 double-truck cars of the California type. Mention that this company would have some cars built was made in the Electric Railway Journal of Aug. 7, 1909.

Hutchinson (Kan.) Inter-Urban Railway has placed in service two 12-bench open cars, just received from the Danville Car Company. This rolling stock will be used to relieve the heavy traffic at the parks and State Fair grounds.

Buffalo & Lackawanna Traction Company, Buffalo, N. Y., has specified American Locomotive Company's plate-frame swing bolster type of trucks for the 10 pay-as-you-enter cars ordered from the Cincinnati Car Company, and detailed in the Electric Railway Journal of Aug. 14, 1909.

San Diego (Cal.) Electric Railway is building 12 40-ft. car bodies in its own shops. An order has just been placed with The J. G. Brill Company for Brill 27-G trucks for these cars. Mention of the fact that this was contemplated was made in the Electric Railway Journal of Aug. 14, 1909.

Grand Rapids (Wis.) Street Railroad has ordered two motor and two trail cars from the American Car Company. They will be for interurban service and have a seating capacity of 46. Other details follow:

Weight .... 18,000-20,000 lb.	Car trimmings ..... bronze
Vestibule length....5 ft. 6 in.	Couplers .....Van Dorn
Length of body.....42 ft.	Curtain material.. Pantasote
Length over vestibule..41 ft.	Motors.....four 50-hp Allis-Chalmers
Width over sills...8 ft. 8 in.	
Sill to trolley base.....9 ft.	Registers ..... Ohmer
Body ..... wood	Sanders ..... Keystone
Air brakes ...Allis-Chalmers	Seats, style....H. & K., 99A
Bolsters ....steel plate truss	Trucks, type..... Taylor

Mention of this contemplated purchase was made in the Electric Railway Journal of April 3, 1909. The order was placed through the Knox Engineering Company, Chicago.

TRADE NOTES

Curtis Motor Truck Company, Decatur, Ill., has received an order from the Grand Trunk Railroad for 12 trucks.

Crocker-Wheeler Company, Ampere, N. Y., announces that it will establish an office in the Ford Building, Detroit, Mich., on or about Sept. 10. Charles W. Cross will be manager of this branch.

Burton W. Mudge & Company, Inc., has been organized in Chicago, Ill., with a capital stock of $50,000, to manufacture railway supplies. The incorporators are: B. W. Mudge, C. C. Roe and E. C. Wood.

Pacific Car & Foundry Company, Richmond, Cal., will erect a $1,000,000 car building plant at Richmond. The W. L. Holman Company, San Francisco, is said to be interested in the new project, which will employ 800 men.

Keystone Lubricating Company, Philadelphia, Pa., now has branch offices established in Chicago, Denver and San Francisco and Harold A. Buzby, secretary of the company, is making a two-months' trip through the territory which they serve, visiting a number of the smaller sales offices in other cities as well. He will return about Sept. 1.

Nachod Signal Company, Philadelphia, Pa., has received an order from the Mahoning & Shenango Railway & Light Company for equipping its entire Youngstown & Sharon division with Nachod automatic signals of type C. The order includes 24 boxes in addition to those already installed, which have been on trial for more than a year. Further signal extensions are contemplated by the railway company.

Lang Retrieving Trolley Company, Petaluma, Cal., elected the following officers at a meeting held on Aug. 9: President, C. E. Lang; vice-president, J. E. Bower; secretary, C. F. Fury; treasurer, R. M. Skinner. This company has completed equipping the cars of the Pacific Electric Railway in Los Angeles with the Lang retrieving trolley and has received an order from the Denver City Tramway Company for a number of equipments.

American General Engineering Company, New York, has completed arrangements for a number of agencies in England to handle its line of repair-shop, labor-saving devices. George E. Austin, president of the company, has just returned from a European trip and reports that a number of coil-winding and armature-banding machines have been sold abroad and are giving good satisfaction. The company is planning to enlarge its extensive domestic business by entering foreign fields.

The Morgan Fare Register Company, Indianapolis, placed one of its registers on Terre Haute, Indianapolis & Eastern Traction Company car No. 72, which carried the Indianapolis delegation to the Detroit meeting of the Central Electric Railway Association, Aug. 26. This device will register the station where the passenger boarded and at the same time register the station to which the passenger has paid fare and the amount collected by the conductor. The originating point, the destination and the amount are shown at time of register and also, in a concealed box away from the view of conductors, employees and passengers, the information is printed on a sheet of paper. The register will accommodate any size of paper and will register any amount of money up to $10. This register is installed on car 72 with the stations of Richmond, Dayton, Troy, Piqua, Lima, Findlay, Fostoria, Toledo and Detroit on the dial. This register is 9 in. in diameter and 5 in. thick, weighing 20 lb. The printing machine is separate and can be placed in any part of the car. It is contained in a box 12 in. x 9 in. x 8 in. and is operated at the time of registering fares by a rod running lengthwise through the car.

ADVERTISING LITERATURE

Dorner Railway Equipment Company, Chicago, Ill., in list B, dated August, 1909, catalogs for sale a number of types of open and closed street cars, railway motors and control apparatus, trucks and power-house machinery.

Massachusetts Chemical Company, Walpole, Mass., has just issued a second edition of its general catalog of insulations, tapes and fabrics and molded rubber goods. Each product is listed with a brief description of its qualities and the uses to which it is specially adaptable.

The J. G. Brill Company, Philadelphia, Pa., has printed an illustrated 40-page catalog of the various types of seats and seating materials for electric cars manufactured by the company. A number of order forms for the use of prospective purchasers have been bound in at the back of the catalog.

Electric Storage Battery Company, Philadelphia, Pa., has published Bulletin No. 115, describing the installation of chloride accumulators in the Hudson Terminal Buildings, New York City. The storage battery has been installed in a separate room on the third floor below the street and consists of 144 cells of the chloride accumulator, having a capacity of 2000-amp hours.

Barrett Manufacturing Company, New York, N. Y., has just issued an illustrated catalog descriptive of Barrett specification roofs. It contains a specification covering both materials and methods of application for roofs having a pitch not exceeding 3 in. to the foot. More than 30 photographs in the booklet show railroad buildings which have roofs laid according to this specification.

Ohio Brass Company, Mansfield, Ohio, has just issued its August bulletin, and in addition to the usual interesting descriptions of railway materials, it contains a number of illustrated articles entitled "The Chicago Subway," "An Interesting Catenary Installation" and "Bonding Special Work." Four pages of the booklet are devoted to a description and views of the main offices of the company.

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Trolley Wire Specifications

A criticism of the specifications for trolley wire, suggested by Committee W of the American Society for Testing Materials and printed in the columns of this paper for July 31, appears elsewhere in this issue. The author, Mr. Woods, believes that the tests for trolley wire recommended by Committee W, are not sufficient to disclose all of the possible defects, because no provision is made for a torsion test. This test, Mr. Woods believes, is not only essential to determine the absence in the sample of oxide seams as well as its ability to withstand bending stresses, but is also most desirable because it will indicate the presence of impure copper, excessive hardening or insufficient annealing. In fact, Mr. Woods makes out a strong case for the retention of the torsion test, and it would seem that material which has to withstand such constant flexure and pounding as that required of trolley wire should be examined most critically so far as this kind of wear is concerned. The subject is one which could be well considered by the Engineering Association through its committee on power distribution.

Long-Distance Interurban Traffic

The diary of a traveler by trolley from Hudson, N. Y., to Chicago, Ill., which was published in the ELECTRIC RAILWAY JOURNAL last week is convincing evidence of the possibilities of long-distance interurban travel. With one short gap between Peru and Warsaw, Ind., the connecting electric lines span the entire distance of nearly 1000 miles. Mile by mile the many breaks of a few years ago have been filled in and within a few weeks the last link will be completed. Throughout Indiana, Ohio and Michigan and in Central New York the interurban network has spread until now it is possible to travel from almost any city to any other city, sometimes over a roundabout route, by electric railways. The day of the isolated interurban line starting from nowhere and ending nowhere is fast passing. Most of the new construction in this territory during the past two or three years has been extensions of existing lines or building of connecting lines between two or more centers of electric railway development. The era of consolidation into large systems, building of cut-off lines, improvement of city entrances and terminals and general interchange of traffic has already begun. These tendencies mark an epoch in the history of interurban railways.

Long-distance passenger and freight traffic is now a reality and the field of future conquests. As Mr. Norviel pointed out in a paper read last week before the Central Electric Railway Association and printed elsewhere in this issue, the interurban railways have about reached the limit of development of strictly local traffic. Not much more revenue can be expected from this source except as the communities served grow in population and industry. They must look to the profits on long-haul freight and passengers for distances exceeding, say, 100 miles, for future large increases in their earnings. On some of the longer runs, for example between Indianapolis and Fort Wayne and between Dayton and Toledo, through cars are now being operated over several independent lines. Some of the larger systems are running through cars over connecting divisions for long distances. Interline freight and passenger tariffs are now in effect throughout the Central Electric Railway Association territory and most of the larger companies are working in close harmony to encourage through business by the publication of joint timetables and other

similar efforts. How successful this new invasion of the steam railroad field will be depends on the foresight and energy of the electric railway managements. They cannot expect to get any large share of the long-haul business without fighting for it, nor can they expect to hold what they get unless they are prepared to maintain a high standard of comfort, regularity and speed in the service which they offer.

Through Routes and Joint Rates with Steam Lines

Complaint of discrimination by various steam railroads has been made to the Interstate Commerce Commission by the Southern California Sugar Company, which has a factory on the line of the Pacific Electric Railway. The complaint is really based on the refusal of the steam roads to make through routes and joint rates with the electric railway on shipments to the Missouri River and other eastern points. This company, which manufactures sugar from sugar beets, states in its formal complaint filed with the Interstate Commission that its freight shipments of sugar will amount annually to 10,000 tons. Based on the through rates granted to other sugar factories, the company would pay freight charges in excess of $100,000, which amount would be increased $20,000 to $25,000 if two freights should be required. It appears from the complaint that the Pacific Electric Railway has side tracks in the yards of the sugar company and is equipped with freight cars to transport the freight and the manufactured products and by-products to any points on the line of the electric railway and the junctions with the San Pedro, Los Angeles & Salt Lake Railroad, the Atchison, Topeka & Santa Fé Railroad and the Southern Pacific Company. The Pacific Electric Railway is declared to be ready and willing to make through joint freight rates with each or all of these roads from Delhi, Cal., where the factory is located, to any points outside of the State of California which the steam railroads enter. Some of the steam railroads with which a similar question has been raised have been able to postpone action from time to time or, taking an arbitrary position, have refused directly to enter into any arrangement for through routes and joint rates in which an electric railway was involved. The Interstate Commission, however, will reach a decision in course of time and its construction of the law will be of great importance to all electric railways which have facilities for the transportation of freight and desire to interchange with steam lines, but have found it impossible to do so thus far because of the arbitrary refusal of the steam railroads to enter into the necessary arrangements.

Michigan Decision on Routing Cars

The Detroit United Railway Company recently won an important decision in the Supreme Court of Michigan, which involved the right of the city authorities to dictate to the company in regard to routing cars. The decision related to but two lines, one a crosstown line, the other a longitudinal line, at whose intersection transfers were given. The ordinance under which these lines were operated provided that the rates of fare were not to be reduced without the consent of the grantees, that the powers conferred and the obligations imposed were to be "deemed a contract," but that the City Council reserved the right "to make by ordinance such reasonable rules as may from time to time be deemed necessary to protect the interests, safety, welfare or accommodation and running of cars for the public in relation to said railways."

A few years ago the Council passed an ordinance of 20 sections, entitled "An ordinance to regulate the running and operation of street cars on streets within the corporate limits of the city of Detroit, to promote the public safety, and to repeal all ordinances or parts of ordinances inconsistent herewith," and sought, among other things, to establish a new continuous route, and prescribed a penalty for non-compliance. The opinion of the court rather severely condemned the ordinance. The judge said:

The defendant secured contracts right under the ordinance of 1891 to run two lines of street railway, one a cross-town line, and another running at right angles therewith, agreeing to give transfers at intersecting points. Now it is proposed to compel them to do more than this. They are asked to establish an additional route by putting on cars whose route shall be a combination of portions of both of said original routes. The effect would be to compel an unnecessarily frequent schedule on parts of the lines, or an infrequency of cars upon other parts, which would be likely to result in a greater inconvenience than the present method of transferring passengers. Furthermore, it would deprive defendant of its right to collect a second fare from passengers who should transfer to other lines intersecting Fourteenth street. The claim that the ordinance, in section 17, reserved power to the council to regulate the running of cars, is not overlooked. It would be an extraordinary stretch of judicial legislation to hold that either party supposed or intended that the council should have power to impose such duties and obligations on the company, which still has, and until the expiration of its 30-year franchise, will have, the right to run a cross-town line with transfers at Fourteenth street, and the duty of running cars upon the proposed route will have to be deferred until such time as the city may be able to make a contract for such service. The ordinance is an infringement of the constitutional provision regarding the impairment of contracts.

Not only were the judgments of conviction reversed, but the highest court of Michigan expressly ordered that no new trial be held and that the company should have costs of both courts.

Providing a Vault for Storing Records

A detail to which attention may properly be directed is the importance of having on every electric railway property a place, preferably a commodious vault, in which can be stored for safekeeping all the important records, papers, drawings and books that accumulate—everybody knows how rapidly—in the several departments. The laxity of some companies in this regard is well-nigh appalling even to the managements themselves when the matter has been brought to their attention. A favorite place for "storing" all papers and records and the accumulated mass of "dead" stuff that is of no current value, and yet which nobody wants to take the responsibility of destroying, appears to be the loft in some old car house. It is not uncommon to see piles of old papers and books heaped indiscriminately in out-of-the-way corners, subject to the ravages of mice and damage from dust and fire, and, in truth, offering in themselves the makings of an incipient conflagration. If by chance any record or book is wanted, the seeker after the information takes one look at the heap and usually decides forthwith the particular thing he wants is not there.

Such records as non-current vouchers, conductors' trip cards, account books of underlying companies, and even old files of the claim department and engineering drawings of existing buildings and other property, are all too often handled in this haphazard way, simply because no definite place had been provided for their orderly keeping or the vault intended for that purpose had been outgrown. Later, if the room is needed for some other purpose, or in the event of a general moving, the usual course is for the accumulation to be dumped out as so much rubbish. The chances are then that papers which should be preserved will be destroyed with those which are worthless. Again, this carelessness with regard to old documents always presents the possibility that old books and records, loosely guarded as they are, may come into the possession of unscrupulous persons, or those who have no right to them, and be used with unfair motives to cause the company trouble and annoyance. All of this points to the desirability of making provision for a definite place where can be stored, under lock and key, properly indexed and protected against fire and theft, everything of this nature, from vouchers to blueprints, that can be of any possible value to the company or its successors. We have already, in several recent issues, described the storage vaults erected to take care of this situation by the Brooklyn Rapid Transit Company, and in this issue an account is given of another, built by the Utica & Mohawk Valley Railway Company, large enough to hold for many years to come all the live and "dead" records, books and papers of the various departments of that company. The total expense of providing this latter vault was approximately $5,000; but it is not difficult to imagine a condition in which one set of papers in an accident case, or one map in a right-of-way controversy, or one set of account books in a physical valuation investigation, available because properly stored and indexed, might very easily save the company in actual cash more than the entire cost of the vault.

The Adoption of Standards

But little progress seems to have been made in the general adoption by electric railways of the standard details of rolling-stock equipment recommended by the American Street & Interurban Railway Engineering Association. These standards of wheels, axles, journal boxes, brake shoes, couplers and other parts were decided upon only after many conferences between the railway engineers composing the committee on standards and the manufacturers. They were indorsed by the association as a whole and earnestly advocated for use by many individual members. Yet in spite of this effort to agree on one design, and thus obtain the benefits of quick delivery, lower prices, interchangeability and an open market, a wide diversity of patterns and dimensions still prevails.

Standardization of the equipment of any road may be brought about by discarding all the old parts at one time, regardless of their capacity for future service, and replacing them by new standard designs. Few companies, however, could afford to make such a radical change for the sake of benefits ultimately to be derived, no matter how great they might be. The logical method of introducing standards is to adopt them gradually for all new equipment and replacements. This involves no extra expense and accomplishes the desired end in an astonishingly short time. That it is not being generally done, however, is shown by the recent statement of a large car-building company that less than 10 per cent of the rolled steel wheels bought for cars built by it were ordered by the railway companies to be of the standard designs of the Engineering Association. The fault lies directly with the purchaser and not with the manufacturer, who has nothing to gain and often much to lose by departure from stock patterns. It is expensive and takes time to make a set of dies and rolls to forge and finish a few hundred wheels, varying only in some slight degree from a standard in general use. Needless to say, the consumer pays for the extra labor in the end and gains nothing material for the outlay. The manufacturers, we believe, stand ready to furnish the standards promptly if they are asked for, but they cannot be expected to insist on furnishing them if their customers demand special patterns. When the demand for the standards reaches a point where they constitute the largest part of any manufacturer's output, price concessions can be expected over orders for the same parts made to special designs. The saving in time due to prompt delivery can often be measured in terms of dollars and cents on rush orders, and to large buyers the maintenance of an open market is of great importance. A greater appreciation of the aggregate saving resulting from the general use of the association standards would do much to promote their wide adoption.

Steam vs. Electric Transportation Methods

According to the English papers the reports of the British steam railroad companies for the last half year indicate that the tramway and omnibus competition for suburban traffic is less acute than for several years past, although it is still serious, especially in some parts of London. The result is that the railroad managers are uncertain whether it is advisable to spend money to regain their suburban business or boldly to make no efforts to secure it and confine their energies to developing their long-haul traffic. The London, Brighton & South Coast Railway has adopted the former alternative and hopes by the electrification of its South London line to compete on more even terms with the tramway and 'buses. Other steam railroad companies have inaugurated a system of low fares. In the meantime the traffic on the District Railway and on most of the tubes shows a gratifying increase. The District Railway particularly, owing to the adoption of improved methods of popularizing its service, has an especially good record of gross receipts for the past half year.

In many respects the situation in London differs radically from that in any American city. Owing to the large amount of underground electric railway construction which has been undertaken during the past five years, the city is intersected in almost every direction by rapid transit lines with frequent stations and a fairly general transfer system. When to this service is added that of the many motor 'bus lines on the street, with their low fares, it is not surprising that many travelers prefer to utilize these means rather than the more rapid, though less convenient, suburban service of the trunk line railways.

It is evident from the reports of their meetings that the latter, like many of the American steam railroads, have yet to learn the secret of conducting a successful suburban business in competition with frequent electric trains or cars. Elaborate terminal stations in which one has to walk through long waiting rooms and the length of a station platform before he reaches his train do not appeal to the short-distance traveler who can make as quick or quicker time by taking a slower moving car or subway train at a short distance from his residence or office. Nor is the suburban resident filled with delight if when he reaches his railroad station a few minutes late he finds that he must wait half an hour before the next train leaves for his destination. A frequent schedule may be impossible under the steam railroad operating conditions. In this respect the steam railroad will always be handicapped as compared with the line operating a multiplicity of small units, and it may be equally impossible with steam service to make the trains much more accessible than at present. But there seems little excuse for many of the designs of railroad stations which one sees in America, in which the train, the objective point, is reached only by a long walk over the marble floors and past the rows of benches with which the waiting-room is fitted.

Some Aspects of Piece Work

The possibilities of reducing the cost of maintenance of rolling stock by the introduction of piecework into the repair shop are now attracting attention in many shops. There is no question that in many cases where the subject has been given careful study and tests have been made of the average and minimum times which different jobs may be expected to take, some excellent economies in shop operation have been attained. Frequently the cost of a given operation has been cut down 20 or 30 per cent by this means. It is still uncertain, however, as to the place where piecework should stop and hourly or weekly wages begin. The general purposes of piecework are reasonably familiar to motive power officers, but there is at times a need of keeping more clearly in mind the fundamental advantages of such a method and the lines of work to which it is especially applicable.

In any consideration of piecework it is important to remember that the company usually desires to obtain as large a volume of work in a given time as possible, in order that the unit cost may be reduced. The shop employee, on his part, desires to earn as high a wage as possible. These two requirements meet on common ground in a well-designed piecework system, and they come together because of the value of time to both parties. There are still many public utility companies doing business without keen appreciation of the importance of having every man waste as little time as possible in non-productive work. Every man who works for himself in this world, as the saying goes, knows that each hour must be turned to fullest account if the results which he desires are to be obtained. Piecework tends to put each man employed under such an arrangement on the basis of being his own master so far as each particular job is concerned; it destroys the temptation to idle away any time, and if properly safeguarded, gives the company the maximum return in work done for a given expenditure of time. Efficiency is encouraged by the most potent of all rewards in business—a fatter pay envelope.

It is surprising how far the piecework system can be carried, even in a repair shop. In a large railroad shop recently visited, even the men who pushed handcar loads of timber from the cutting-up shop to the assembly shop were paid by the piece. The company manufactured many of its cars, and so it was on a par with the class of industrial establishments where piecework fits best, namely, those where the product is repeated over and over again—where the work of each department is to a large degree the same from one week to the next. In the street railway shop the work is generally of both kinds as regards repetition. Certain operations, like the painting of closed cars in summer and the refurbishing of open ones in the winter, the relining of bearings, undercutting of commutators, rewinding of armatures completely, changing of wheels, turning down of trolley wheels and other tasks of a standard character lend themselves particularly to piecework. Other work, such as the repairing of burned-out electrical equipment, which is only partially spoiled for service, the replacement of vestibules and rebuilding of panels crushed in a collision, the renovation of motor brushes and the repairing of fused or broken leads is apt to be of such an irregular type that the institution of unit remuneration is difficult, if not impracticable. The most careful analysis of each job is therefore necessary before a company can fairly decide whether its character is sufficiently repetitive to warrant piecework payments, and closely associated with this is the important problem of determining the maximum amount of work which an unusually able man can accomplish in a specified repetitive task. The company must obtain a fair idea of the physical limits of each job; in other words, it must know how much any man can force the organization to pay him by accelerating his working pace. Only with actual local figures covering a wide range of service can the company proceed on a firm foundation for changes in its method of payment.

The Brooklyn Rapid Transit Report

The most notable electric railway annual report of the year is that of the Brooklyn Rapid Transit Company. It includes not only statistical tables and other information of the greatest interest to the traveling public and to the security holders of the company, but also a discussion by President E. W. Winter of the most important events of the year affecting the property. In the current report, relating to the year ended June 30, 1909, even fuller information is presented respecting some features of the operations than has been given previously.

In the general comparative statement of results of operations for the last two years many changes are indicated. Total gross earnings from operation were $19,694,462, a decrease of less than 1 per cent from the record of the preceding year. This reflects the business depression, the effect of which continued to be felt during the first six months of the fiscal year; gross passenger earnings in this half-year were $358,479 less than in the corresponding period of 1907, but subsequent improvement in the general

business situation affecting street railway traffic overcame this decline, and the result was an increase in passenger earnings for the entire year of $128,529. Of this total increase the surface division, which furnished nearly 60 per cent of the total passenger earnings, contributed almost four-fifths.

In other departments contributing revenue material changes from the previous year have taken place. As the contract of the American Railway Traffic Company with the city, which expired near the close of 1908, was not renewed, that company experienced a decrease of $244,233 in its gross earnings. Freight earnings were lighter, due also to business depression, and express earnings were affected by the expiration without renewal of a contract with the American Express Company, which was terminated with the close of 1908. While the earnings from these sources constituted a relatively small proportion of the total revenue, the decreases were sufficiently large to overcome the effect of the small gain in passenger earnings and produce the net decline indicated in gross earnings from operation.

The net earnings remaining from operation were helped in comparison with the previous year by a substantial reduction in operating expenses. The volume of business was handled with an expenditure charged against revenue of $11,394,655, a decrease of $544,924, or 4.56 per cent from the total outlay for operating expenses during the previous year. Analysis of the operating expenses shows that the saving was not made by reduction in the expenditures for maintenance of the property. Total expenditures for maintenance of way and structure and equipment in the last year aggregated $2,884,930, as compared with $2,857,654 in the preceding year. The division of these expenditures as between way and structure and equipment was somewhat different in 1909 from 1908. The maintenance of equipment expenditures were decreased 8 per cent. Mr. Winter states that this reduction was made possible by the centralization of the power production and the practical completion of standardization of the equipment—a standardization which has been described in recent issues of this paper. The maintenance of way and structures expenditures were increased 17 per cent. The aggregate of the expenditures for maintenance equalled 14.7 per cent of the total gross earnings. Because of the decline in business of the American Railway Traffic Company and the elimination of part of the express arrangements there was a reduction of $260,062 in the expense charged against the revenue of the traffic company and that apportioned in the accounts to "freight, mail and express."

General expenses were larger by 3.84 per cent than in the previous year, but in the operation of both power plant and cars and in the cost of "damages and legal expenses" there were important savings. Operation of the power plant cost $1,596,759, or 3.44 per cent less than in 1908; this expenditure amounted to 8.1 per cent of the total earnings from operation. Operation of the cars cost $4,812,556, a decrease of 6.07 per cent. This, it should be noted, was effected notwithstanding an increase of a little under 1 per cent in the revenue mileage. A reduction of 9 per cent in the cost of damages and legal expenses indicates a tendency toward improvement in a feature of the operation which is so serious, still, however, as to lead President Winter to call further attention to it in his remarks to stockholders. He states that the item of damages is still a burdensome feature of operation, but that there was a marked decrease in the number of both serious and minor accidents and a material reduction in number and gross amount involved in both outstanding claims and pending suits. Mr. Winter thinks it is reasonable to expect that through steady improvement in physical operating conditions, exercise of care in detecting fraudulent claims and readiness to settle fairly just claims, the companies in the system will be called into court less frequently and the industry of "ambulance chasers" will continue to decline.

Reduction in operating expenses thus indicated made possible a gain of 4.65 per cent in net earnings from operation. Income from other sources, while relatively small, decreased. A heavy increase was made in the appropriation for taxes and a slightly larger outlay in the net expenditures for interest and rentals.

The seriousness of the tax situation is discussed at length by Mr. Winter, as the appropriation for taxes was 43.8 per cent greater than in the preceding year. The charge as made by the company covers the full liability in all cases except the special franchise tax, which has been charged at "somewhat more than the admitted liability, although not the full amount assessed." Mr. Winter believes that the interests of both the State and the corporations imperatively require a modification of the special franchise tax law that its application may be more just and its operation more direct and certain.

The report also takes up the question of official impositions and public benefits which affect the earnings of the company. It is estimated that not less than $200,000 annually is expended in relieving the city of the cost of maintaining certain pavements, shifting tracks for sewers, water mains, etc., and this estimate is made without the inclusion of interest on over $4,000,000 "invested by the company in paving in various streets which the city would have had to pave had tracks not been there." The Federal corporation tax will cost the system about $50,000 on the basis of the net income during the calendar year 1908.

In connection with this recital of facts Mr. Winter observes that the State cannot consistently expect railroad corporations to meet requirements as to rates and services and to cripple their power to discharge their duty by imposition of unreasonable financial burdens. Statistics are given to show that the contribution of the company in transportation for the members of the city police and fire departments during the year was $319,096, based on the ticket returns from these sources as applied to the average rates of fare for passenger traffic. The vitality of the transfer evil, Mr. Winter declares, is worthy of a better cause; and to add emphasis to his remarks on this subject he presents figures showing the increasing disproportion between the increase in pay and transfer passengers.

The report justly invites attention to the disquieting features of the situation, which are felt, to some extent, on all electric railways in large cities, but are not appreciated as they should be by the general public.

EXPRESS DEPOT, VAULT AND STABLES AT UTICA, N. Y.

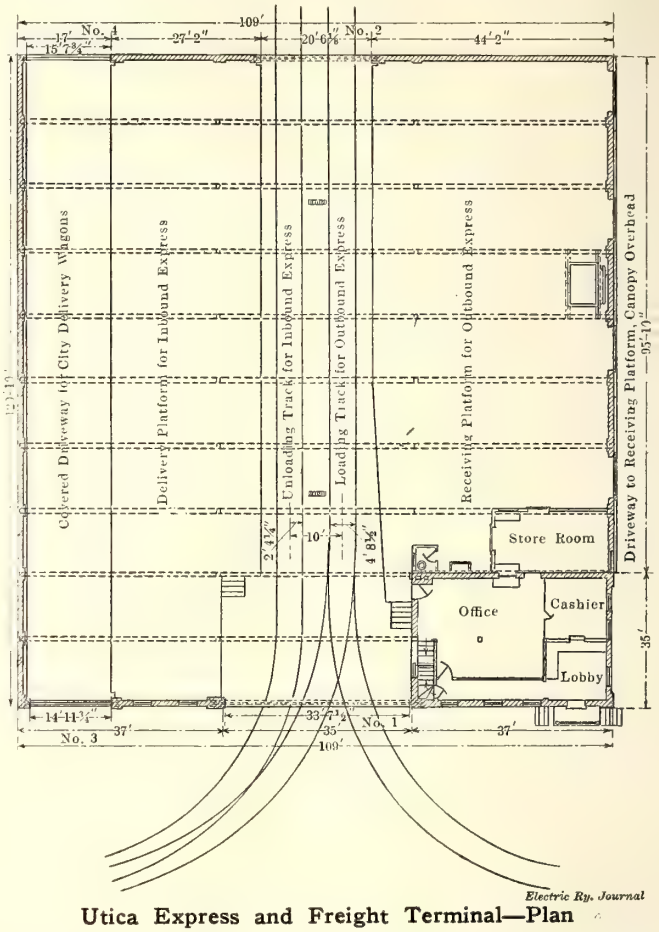
The Utica & Mohawk Valley Railway Company maintains at Utica an express and freight terminal building which has a number of unusual and interesting features. It was designed to take care of the express and freight service of the Utica & Mohawk Valley Railway, which has now reached large proportions, as well as to handle the express and freight business of the Oneida Railway (West Shore electrification between Syracuse and Utica) and the Oneonta & Mohawk Valley Railway.

As showing the capacity of the station, it may be said that during the six months ending June 30, 1909, approximately 18,330,000 lb. of express and freight were handled and passed through the building. It will also interest other companies who have terminal problems to know that the total cost of handling this business at the terminal was $4,717, giving a terminal cost of $0.0257, or approximately 2½ cents per hundred pounds handled. This includes interest and depreciation on land and building, warehousemen and terminal employees and a proper pro rata charge of other expenses.

Through the courtesy of the management of the Utica & Mohawk Valley Railway the following article is published, describing and illustrating the express and freight station, a novel and fireproof vault for storing tickets and records, which is a part of the station, and the model stables erected at the rear of the depot for housing the horses and wagons attached to the express department. The items showing the cost of the terminal given at the end of this article will also be found valuable for comparison and reference use. The terminal was designed and built under the supervision of C. Loomis Allen, vice-president and general manager. Albert Eastman is general express and passenger agent, and M. J. French was the engineer in charge.

The express and freight depot is located at the corner of Lafayette Street and Broadway, about two blocks west from the business center of Utica, and convenient to the shipping and warehouse districts.

The entire building is approximately 120 ft. long by 109 ft. wide, and is laid out in three bays, each bay being 36 ft. wide by 120 ft. long. The front portion of one bay is divided to give a two-story office section 36 ft. wide by 25 ft. long. The remaining portion of the structure comprises the warehouse proper for the handling of express matter. Running through the center of the building from front to rear are two tracks, with right and left curve connections to the tracks at the front of the depot on Lafayette Street. Each of the warehouse tracks will accommodate two 56-ft. express cars at a time, or four in all, two loading and two unloading.



Utica Express and Freight Terminal—Plan

The theory of the design to facilitate the movement of goods through the station will be understood from the plan. Along the Broadway side of the building is a driveway protected by an overhanging canopy. Here the wagons deliver shipments to the receiving platform. The shipments are weighed on Fairbanks scales, conveniently

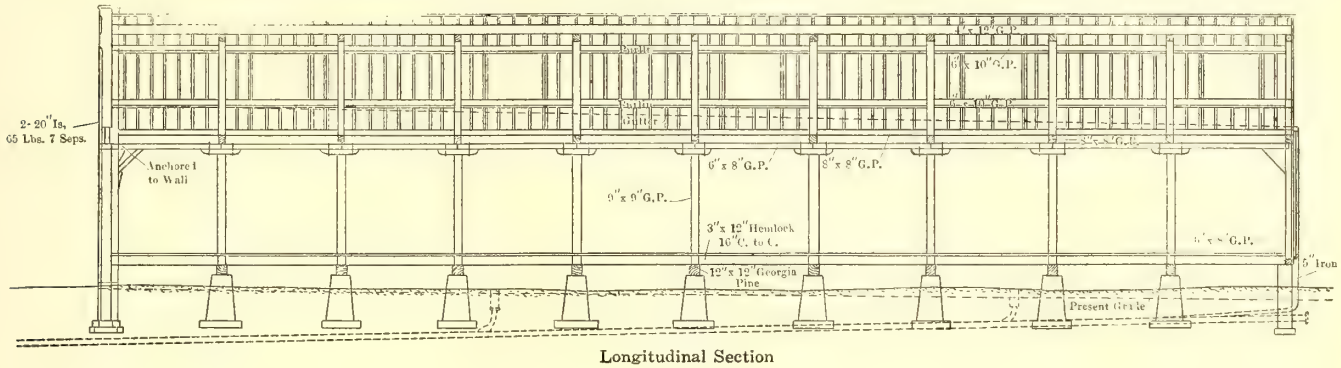


Utica Express and Freight Terminal—Entrance to Warehouse, Tracks in Front, Office at Corner and Wagon Receiving and Delivery Platform at Side

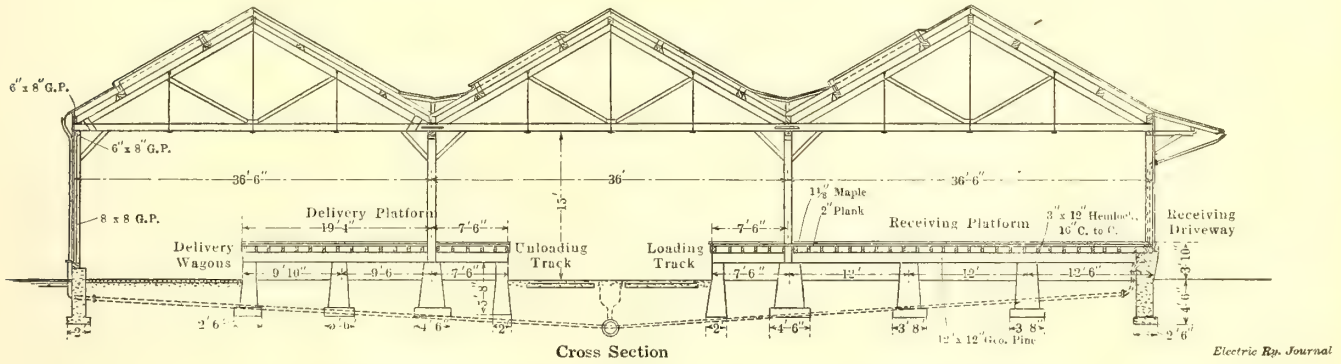
located, and are then handled across the receiving platform into the outgoing express cars. The incoming cars use the other track, and the inbound express matter is unloaded directly onto the delivering platform, where it is sorted and loaded into the delivery wagons, which use a covered driveway on the far side of the delivering platform. It will be noted, therefore, that the design of the depot provides for the progressive movement of goods across the warehouse from east to west, and there is no conflict between inbound and outbound express. This is an important feature.

The receiving platform is 44 ft. wide, giving about 4000 sq. ft. of clear space for handling and routing shipments. The delivery platform is 27 ft. wide, giving approximately 3240 sq. ft. of clear area. The platforms are 3 ft. 10 in. above the finished grade of the driveways and of the loading and unloading tracks so they are practically on a level with the floors of the cars and wagons, thus avoiding unnecessary lifting of goods.

Structurally the depot is a substantial, well-designed building, attractive in appearance and admirably suited to the requirements.



Longitudinal Section



Cross Section

Utica Express and Freight Terminal—Longitudinal and Cross Sections

The main walls are red burned brick laid in concrete foundations and footings. The walls are 12 in. thick and the brickwork is well bedded, flushed up and tied in every sixth course and worked in regular bond. The brick were laid with flush solid joints, with mortar composed of one part Portland cement, two parts best quality lime and four parts clean, sharp sand. All brick on facing or exterior walls and chimney tops are assorted hard burned Syracuse common pressed bricks, joints neatly laid up and struck and cleaned down with *aqua fortis* at completion. All of



Utica Express and Freight Terminal—Loading Cars on Receiving Platform

the stone trimming, including window sills and water table, corbels, coping, etc., is litholite, except the front door sill and pilaster caps, which are Onondaga gray limestone, axe-hammered to smooth surface.

The Portland cement concrete for piers, walls and footings was made of one part cement, three parts sand, six parts stone from ¼ in. to 2 in. in size. The car shed floor and cellar floor are of the same proportions, with 1 in. wearing surface of one part cement to two parts sand, floated and troweled to a smooth surface. The car shed floor is laid to grade of rails and is blocked off in flags about 6 ft. square.

The roof of the warehouse consists of ⅞-in. matched boards and is supported on timber joist trusses, giving practically slow-burning mill construction. The entire warehouse is lighted from 27 skylights in the roof each 6 ft. x 10 ft., and glazed with wire glass in metal frames. At night ample lighting is secured from 70 drop incandescent lamps distributed over the warehouse platforms and taking current from the trolley circuit, the wires being placed in standard conduit. The office section and vault are lighted from the local city a.c. lighting service.

heavy ball-bearing freight-house door hangers, supported on steel tracks, with guides at the bottom of doorways.

The two-story office section of the warehouse gives accommodations for the executive and clerical forces of the express and passenger departments. There is also a storeroom, heated by separate radiators for keeping perishable goods. The office building is trimmed with Georgia pine with sand-finished walls of hard wall plaster, painted with light shades of oil paint.

The office section is heated by a hot water heater of ample capacity to maintain a temperature of 75 deg. Fahr. in zero weather. The warehouse proper is not heated.

A separate toilet room for the warehouse men is provided at one end of the receiving platform.

VAULT FOR RECORDS

Finding itself in need of a place in which to store tickets and records for safe-keeping, the company, after the express depot had been in use for some time, decided to take advantage of the location to build an extensive fireproof vault.

Accordingly, a section of the bay under the receiving platform was excavated and a vault with reinforced con-



Utica Express and Freight Terminal—Delivery Platform, Showing Typical Collection of Shipments

The floor of the receiving platform is concrete and this serves as the roof of the vault beneath, to be referred to later. The delivering platform is floored with maple which affords a very smooth and durable trucking surface. Although a hardwood flooring seems somewhat expensive for a warehouse platform, it is believed that the life of the maple under the constant trucking will be so much longer than a softer wood as fully to justify the higher first cost.

The receiving driveway on the Broadway side is paved throughout with sandstone blocks on Portland cement concrete. The delivery driveway and the driveway in the rear of the building, including the entrance to stables, are paved throughout with standard vitrified paving blocks supplied by the Mack Manufacturing Company.

The entrances to driveways and trackways in the front and rear of the warehouse are closed with hand-operated Kinnear steel rolling doors. The warehouse doors under the canopy on the Broadway side where express is received from the wagons are made of two layers of ⅞-in. x 3-in. matched pine flooring of good quality, laid crosswise and covered on all sides and edges with Merchants I. C. old-method tin plate, soldered and painted on inside with red lead before nailing to the doors. The doors are hung on

crete roof, sides and floor and steel, combination-lock safe door, was built. The vault gives ample room for storing and safe-keeping the entire supply of unused tickets and transfers comprising over 500 different forms and aggregating upward of a million dollars in potential value, as well as records, maps, books, vouchers and accumulated papers of the auditor's, engineer's and cashier's departments of the Utica & Mohawk Valley and associated companies.

The vault proper measures 95 ft. long by 32 ft. wide by 7 ft. 10 in. high, inside measurements. The details of the construction merit description.

The walls of the vault are concrete, the outer walls of the freight station, which are 16 in. thick, forming the walls of the vault except on one side, where a new 8-in. wall was built. The floor consists of 3 in. of concrete laid on a 4-in. bed of cinders. On the inside of the walls commencing at a point 1 ft. above the ground line and extending down the walls and under the floor was placed waterproofing consisting of three-ply felt and tar. The vault walls proper consist of one course of 4½-in. hollow brick laid next to the felt waterproofing and plastered on the inside with hard wall plaster made by the American Hard Wall Plaster Company, of Utica, N. Y. The floor was com-

pleted by laying directly on the waterproofing a 2½-in. bed of Portland cement flooring with a ½-in. wearing surface on top, consisting of cement mixed in equal proportions of cement and sand.

The vault roof, which also forms the floor of the warehouse receiving platform, consists of 7 in. of reinforced Portland cement concrete supported by cross-beams spaced 12 ft. on centers. Each beam consists of two 9-in. girder rails 12 ft. long surrounded with Portland cement concrete to form a beam 12 in. wide by 15 in. deep. These beams are supported by concrete posts on 12-ft. centers, each reinforced with two 9-in. girder rails, the posts being 15 in. square and carried on footing piers which are 36 in. square and 36 in. deep.

The entire inside of the vault is painted with two coats of white cold water paint and lighted by clusters of incandescent lamps, giving a bright, cheerful effect, in sharp contrast with the common impression of an underground vault.

The interior of the vault is divided by wire partitions into three large compartments. The section used by the passenger department for the storage of unissued tickets and transfers is about 42 ft. long by 21 ft. 9 in. wide. The various forms of tickets are kept in a metal rack along one wall. This rack contains 340 pigeon holes each 12 in. by 8 in. by 12 in. deep.

The other two compartments are provided with metal racks and filing cases for storing vouchers, maps, drawings, records and papers of other departments. There is no wood in or near the vault. The steel racks and filing cases were furnished by the General Fireproofing Company, of Youngstown, Ohio, and the Lyons Metallic Manufacturing Company, of Aurora, Ill.

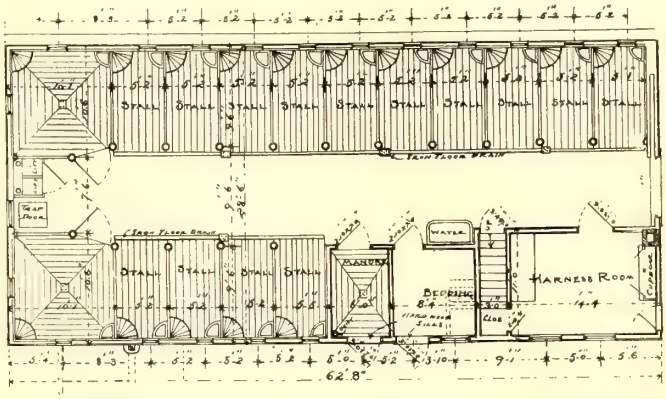
STABLES

Companies that are contemplating remodeling old stables or building new ones may find something of interest and value in the plans here reproduced showing the model stables provided for housing the horses and wagons used by the express department of the Utica & Mohawk Valley Railway.

The stables and an open carriage shed for the delivery wagons are in the rear of the express depot. These buildings are of wood on concrete foundations. The sides of the stable proper are covered with 5-in. white pine siding with one thickness of three-ply "Neponsit" building paper placed under the siding up to the second floor. The roof is shingled.

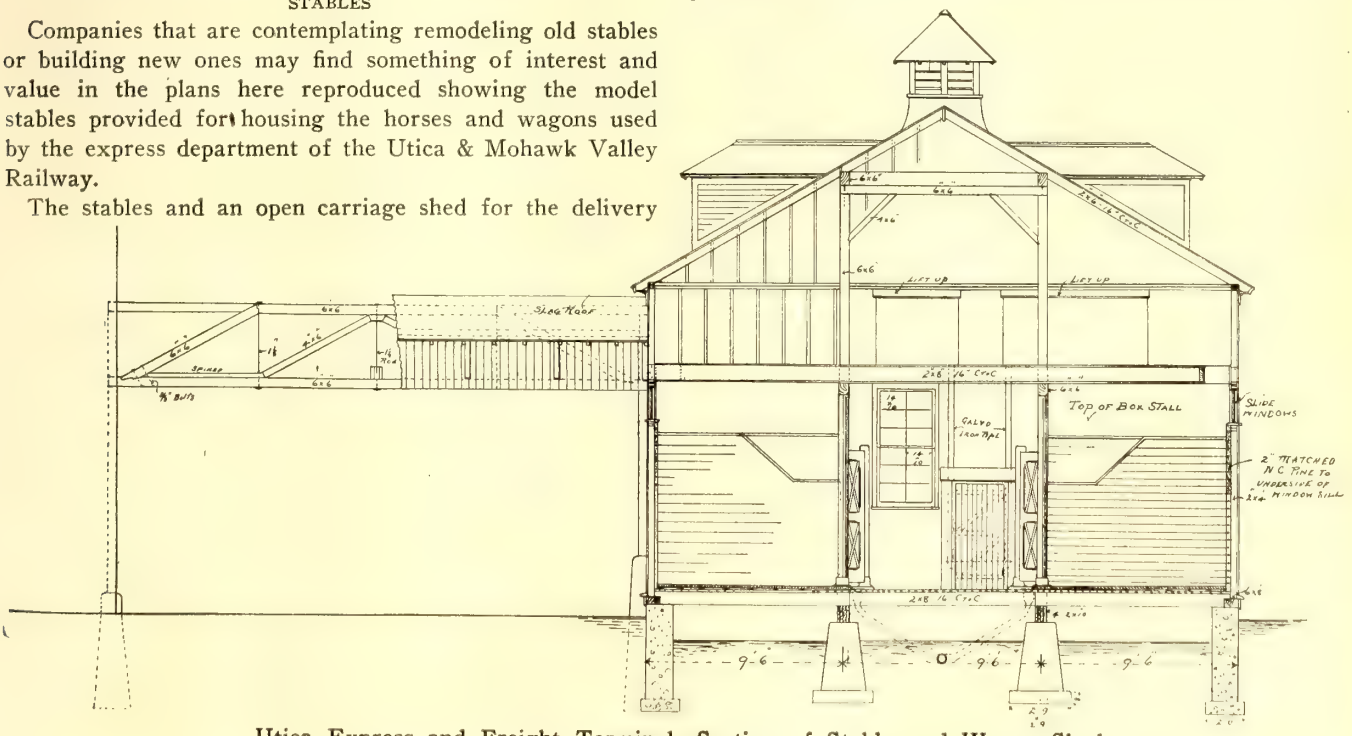
The floor plan of the stable gives accommodations for 14 single stalls, two box stalls, a commodious harness room, manure and bedding compartments and a wide aisle between the ends of the stalls. In the second story are the haylofts and feed bins. In addition to the doors, ample ventilation is received by sliding windows over each stall.

Particular attention was paid to the drainage. Running along each side of the aisle, just back of the rows of stalls,



Utica Express and Freight Terminal—Plan of Stable

is a trough let into the stable floor for collecting liquid matter and permitting thorough flushing of the floor and stalls. At each stall is a cast-iron drain, connected by a 4-in. cast-iron pipe to a sewer drain pipe laid under the center line of the building and consisting of a 5-in. cast-iron sewer pipe to a point 3 ft. outside of wall, where it is continued by 6-in. vitrified pipe to the main sewer. The stalls and manure bins are graded at the rate of ⅛ in. to 1 ft. and 3-in. by 3-in. chamfered strips are placed around partitions and walls of stalls.



Utica Express and Freight Terminal—Section of Stable and Wagon Shed

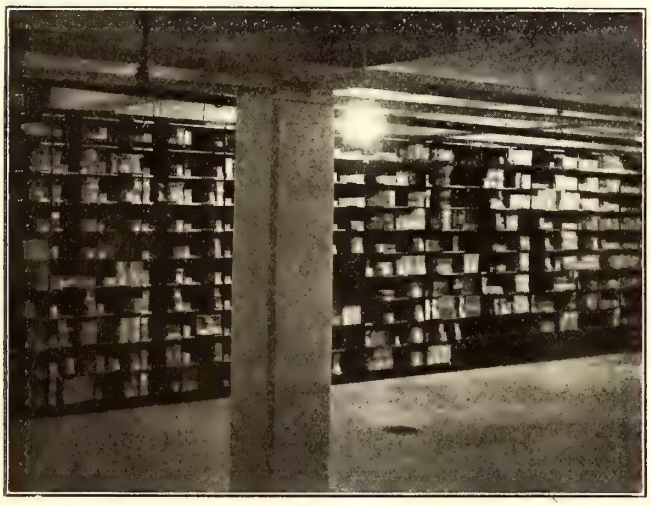
One essential of a sanitary stable is a thoroughly watertight floor and interior finish that can be kept clean and sweet. Throughout the entire stable was first laid a good 2-in. matched hemlock underflooring, laid across the joists and double-spiked at each joist. Upon this floor was placed a good quality 2-in. matched spruce floor tightly driven up, butted and blind nailed. The doors to the bedding and

manure compartments are of two thicknesses of 1-in. by 3-in. matched pine laid diagonally of half-door type, made in upper and lower sections and tight fitting to the casings.

The stalls are built of sound 2-in. matched North Carolina pine, posts of stalls and girders turned of the same material, posts set in cast-iron floor sockets. The sides and ceiling of stable are ceiled with 7/8-in. beaded North Carolina pine placed vertically. All angles are filled with quarter-round molding.

The harness room contains a harness closet with suitable hooks for the orderly keeping of harness. A seat runs across one end of the harness room made of 7/8-in. by 2-in. slats on forms to conform to the body and open underneath. At the left of the inside door is placed a blanket rack with three turned bars, 2 in. in diameter, with a distance of each from the floor varying by 6 in. and distance from the wall varying by 4 in.

The feed bins in the loft are lined with tin, have counterweighted covers and connect with 5-in. galvanized iron pipes with slides to feed bins in a closet on the first floor. Openings with trap doors and hay chutes to stalls facilitate the handling of hay. For watering the horses there is a 24-in. by 48-in. cast-iron roll-rim enameled water trough 16 in. deep, placed on heavy cast-steel brackets and



Utica Express and Freight Terminal—Interior of Vault, Showing Racks for Holding Unused Tickets

provided with plug and chain for waste, also overflow pipe, all connected with sewer lead trapped pipe and 3-in. iron pipe. Each stall has a cast-iron corner manger.

It is the practice at these stables to place the hay for feeding in the corner of the stalls on the floor, as it has been found that the horses will not paw the hay under foot when it is placed on the floor, as they will do when they have to pull the hay from a rack overhead. Another humane feature is the placing in each stall of a salt brick holder in which is provided at all times a brick of salt, and the horse can reach up and lick the salt whenever he feels so inclined.

COST DATA

The following is the actual cost of constructing the express terminal, excluding the vault and stables:

Mason and carpenter work	$17,652
Plumbing	329
Heating for office building	376
Electric wiring	342
Steel rolling doors	1,128
Designing, superintendence and inspection	400
Total cost of terminal building, exclusive of real estate	$20,227
Cost per cubic foot of entire station, approximately	6.83 cents
Cost per square foot of entire station, approximately	$1.55
Cost of vault complete, including heating, plumbing and electric lights	5,550.00
Cost of stables and carriage shed, complete	4,922.00

TRAINING MOTORMEN IN BERLIN

The motormen's instruction system of the Grosse Berliner Strassenbahn, while thorough, is interesting for its absence of the use of printed diagrams. The student is brought immediately into direct contact with the realities and each day must come into the classroom prepared to answer verbally any query relating to the previous lessons. The instruction course is so arranged that theory and practice alternate throughout the day. Thus every week of schooling comprises 60 hours, of which 20 are spent in the classroom and 40 on the cars. The course covers from 14 days to 21 days, according to the intelligence of the student. There are two instruction rooms, both of which have practically the same equipment. Each contains the usual dummy platform with its outfit of controller and braking handles, current meter, circuit breaker, fender, switch rods, bells, etc. This is supplemented by loose individual specimens of each important electrical part in car equipment, so that in making out a trouble report there will be no excuse for using incorrect or indefinite terms. Every motorman must also know enough of track and overhead construction to describe observed defects intelligently. For this reason each instruction room contains the principal types of overhead equipment as installed complete at crossings, on tangents, at feeder points, etc., together with specimens of rails in section. A complete telephone equipment is also installed to teach the recruits how to describe an accident and call for an emergency wagon in the clearest and quickest manner. This telephone lesson is particularly valuable in Berlin, partly because the men are often unfamiliar or clumsy with the apparatus and partly because an arrangement exists whereby the company's central operator immediately notifies the nearest emergency station upon receipt of an accident call. In general, all the schoolroom instruction is given by experienced motormen, but is supplemented by occasional talks by the engineer of car equipment on how to make repairs, use the least current, make out reports, etc.

After the recruit has completed the regular instruction course he must pass separate examinations by the car engineer and traffic inspector of the district to which he is assigned. He is then given charge of a car for about two weeks under the observation of a roadmaster and is finally accepted only upon the recommendation of this instructor. Should the new man cause an accident through serious negligence on his part the roadmaster is warned not to pass men of this type in future on penalty of reduction to the ranks. Applicants for the position of motormen are paid from 50 cents to 75 cents a day during the instruction period, but as the cost of teaching is considerable, they must deposit $16 to $18 to save the company from loss. This money is returned in full after one year's employment, or in part if the applicant failed to pass the final test.

British Parliamentary returns just issued show that at the end of 1908 the miles of electrified steam railroad track in Great Britain worked solely by electricity was 204½, and partly by electricity 200½. The kilowatt-hour consumption by these lines in 1908 was 249,287,308.

SINGLE-PHASE EXTENSIONS OF THE LYONS (FRANCE) CITY LINES

The two 6000-volt single-phase catenary lines which have recently been completed for the Lyons (France) electric railway system are of particular interest, inasmuch as they are practically suburban a.c. extensions of old d.c. lines operated from the heart of the city. Previous to the commercial development of single-phase traction, the Lyons company had extended its suburban lines to the point where the d.c. substation and feeder losses had become so large that further growth would have been unprofitable. It may be said, therefore, that the adoption of a high-tension alternating-current trolley has been the direct cause for the increase of electric railway facilities in this important manufacturing city.

The first two a.c. extensions installed are those to Miribel and Jons, and as the cars are operated through the city, the equipment had to be designed for d.c. operation at 600 volts as well as for the a.c. potential of 6000 volts. The Miribel line is 12 km (7.4 miles) long, of which 5 km (3.1 miles) are operated with direct current. It will be extended eventually to Montluel, which will give a total length of 20 km (13.4 miles), all on the highway. The Jons line is 21 km (13 miles) long, of which 6 km (3.6 miles) are operated with direct current. This road is to be extended to Saint-Brémaz, a town 60 km (37.2 miles) from Lyons. Both of these lines are standard gage, single track and bonded with Chicago bonds of 50 sq. mm section.

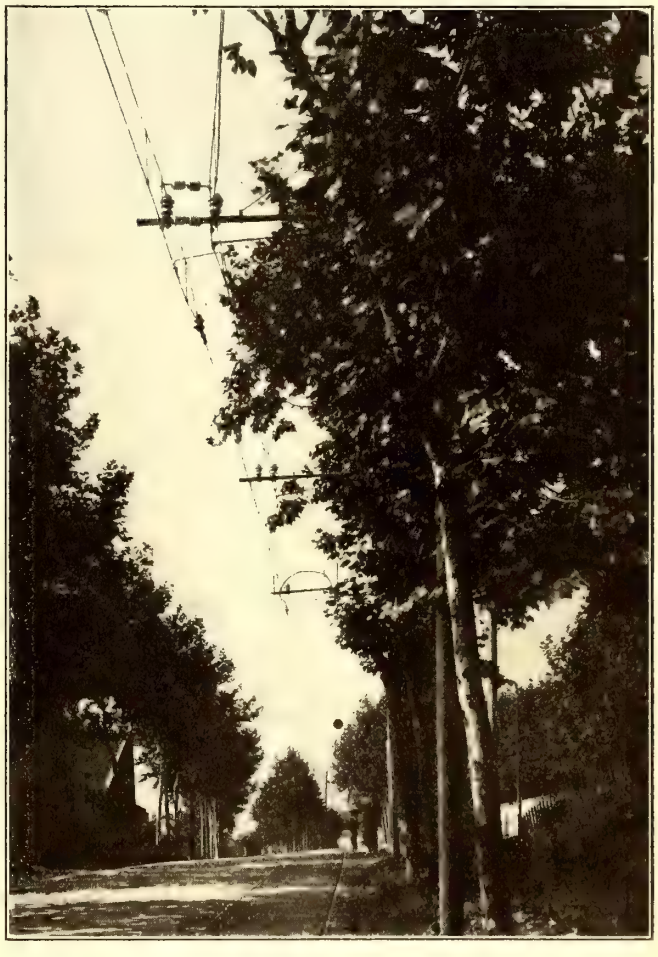


Lyons Single-Phase Tramways—Separator Construction at Siding

LINE CONSTRUCTION

The overhead construction is carried from two types of steel poles. Throughout the city, villages and at turnouts the poles are of the Mannessmann tubular design, capable of supporting a load of 800 kg (1760 lb) at the summit. Elsewhere, and particularly on short curves, a double T-beam 160 mm (6.3 in.) wide is employed. The results given by the latter type of pole have been very satisfactory. The pole spacing on tangents varies from 35 m to 54 m (115 ft. to 177 ft.). All poles are set in concrete and have a ground connection to the rails. In general, the line construction is of the bracket design, with the bracket tubing interchangeable with the topmost member of the Mannesemann poles. Span wires are used at stations and sidings, but in a few cases the catenary is carried from light steel channels, as illustrated.

The messenger insulators are triple-petticoat porcelain, and before installation were subjected to a test with 50,000 volts. The messenger cable is of steel and the trolley of figure 8 copper of 50 sq. mm (100,000 circ. mils) section. The hangers have a closed loop over the messenger, and are clipped to the trolley. The messenger and trolley are maintained in a vertical plane at curves, and even on tangents, by steady strains. As shown in the illustrations, these steady strains are made either of wood and are rigid or are made of wire and are flexible, in accordance with the conditions. The strain insulators are similar to those carrying the messengers.

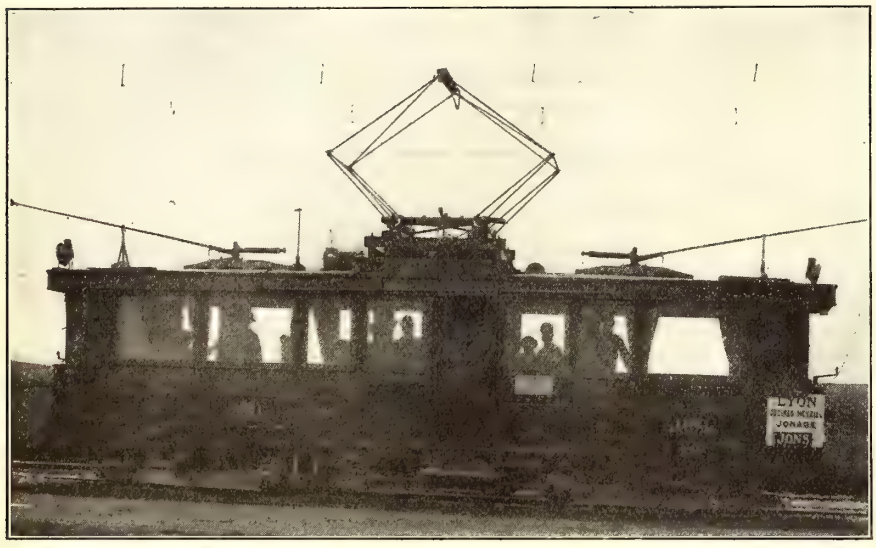


Lyons Single-Phase Tramways—Passing from A.C. to D.C. Sections

The lines are electrically divided into sections of 3 km (1.86 miles) each. The steel cabinets, placed at the intersections of two such divisions, are provided with an oil switch section breaker and lightning protection.

The more distant portions of the single-phase divisions

are supplied by 6000-volt feeders, one being 6.5 km (3.8 miles) and the other 4.5 km (2.8 miles) long. The passage from the a.c. to the d.c. sections is made simply through the interposition of a neutral zone of dead wire. The construction at one of these neutral points is shown in one of the accompanying views. The d.c. sections in the city are of the ordinary, single-trolley construction.



Lyons Single-Phase Tramways—Car with Pantograph Raised on A.C. Section

ROLLING STOCK

The motor cars used on both lines will number 15 in all. They are about 33 ft. long over all and about 6 ft. wide. They are divided into first and second-class compartments, with a total of 50 seats. Standing room is therefore furnished by a central instead of end platform. There is a motorman's cab at each end of the car. As is customary in European cities, the motor cars are frequently operated with trailers. The motor trucks are of the Brill maximum traction type, and were made in America. They are set about 19 ft. center to center and have driver wheels of 850 mm (33 in.) diameter. The truck axles are 1.21 m (3 ft. 11 in.) apart.

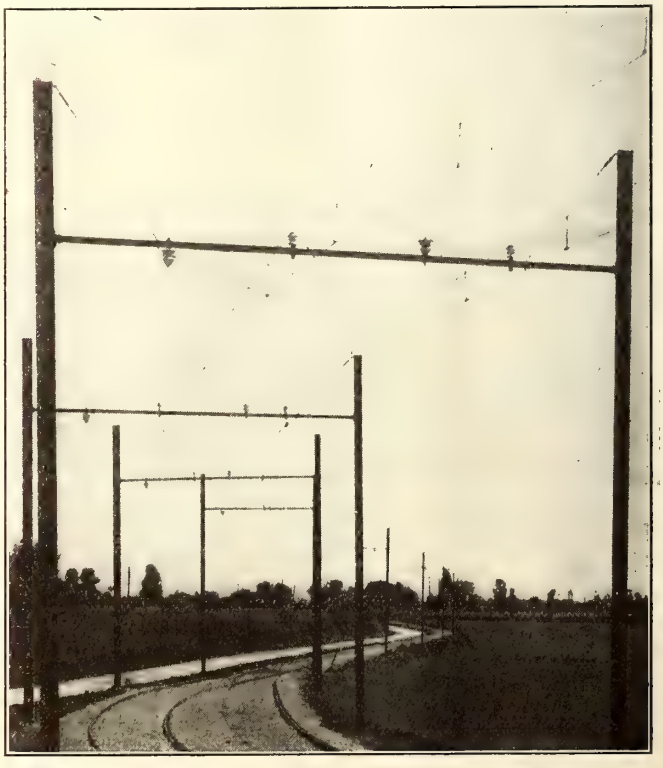
The electrical equipment per car, furnished by the French Westinghouse Company, comprises the following: Two No. 1180 motors, two No. 225 controllers, one auto-transformer, one reverser, d.c. resistances, high and low-tension lightning arresters, disconnecting switches, fuses and air-braking equipment. It will also be noted that the motor car carries both a pneumatic pantograph and two trolley poles. The latter are necessary, as the old city overhead work is not suitable for the pantograph. The latter is carried on a wooden framing and four carefully grounded insulators.

When a car is leaving the d.c. zone to enter the a.c. section it passes a special pole arm, which strikes an upright lever of the car reverser. This shock has the effect of turning the reverser to such an angle that the a.c. circuit becomes operative. When the car is returning the lever, of course, is thrown to its original position, and the d.c. circuit becomes operative. The alternating current must pass through the reverser, the high-tension fuses, and thence to the transformer under the car. This circuit is carried in grounded metal conduits.

The transformer is of the oil-cooled type made for 55 kva, 15 cycles, and is grounded. It takes current at 6000 to 6600 volts and transforms it to any desired potential between 100 and 315 volts. The controllers are furnished with three drums, two of which correspond to the running and reverser cylinders of the d.c. types, while the third regulates the speed when the motors are working with



Lyons Single-Phase Tramways—Catenary Construction in the Country



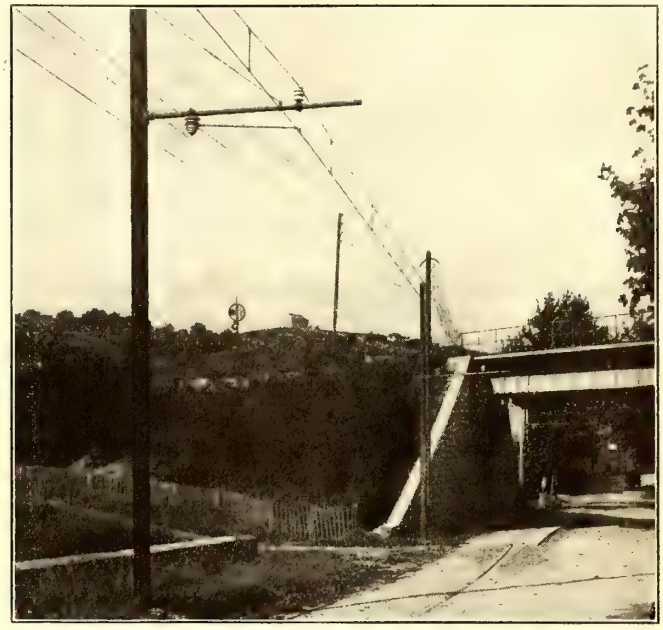
Lyons Single-Phase Tramways—Span Construction, with Channel Poles and Carriers

alternating current. There is only one main controller handle, and in passing from one current to another the motorman shifts his handle.

Both motors of the equipment are mounted on one truck,

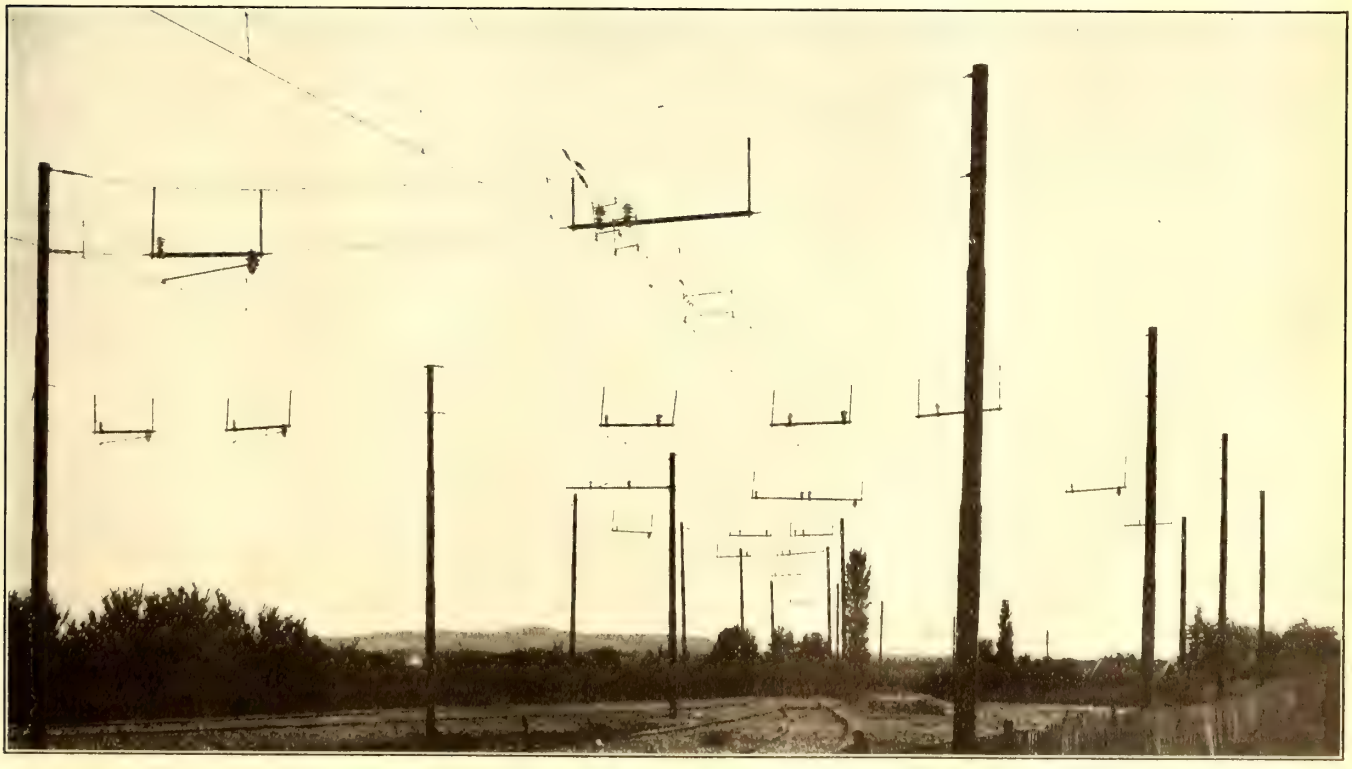


Lyons Single-Phase Tramways—Rectangular Separators at a Siding



Lyons Single-Phase Tramways—Plain Catenary Brackets on Channel and Tubular Poles

and they are rated at 45 hp each when taking 275 volts a.c. or 575 volts d.c. As a.c. motors, they are operated in parallel and as d.c. motors in series. Electrically considered, the motors are of the compensated type. The air compressor is of 5-hp capacity, and is also designed for a.c. and d.c. service.



Lyons Single-Phase Tramways—Catenary Construction in the Yard

GENERAL

Operation of the lines described was begun in March, 1909. The Miribel line has three motor cars, which give a half-hourly service on week days, and six motor cars for a 20-minute service on Sundays and holidays from 5 a. m. to 11 p. m. The Jons line has three motor cars for an hourly week-day service and six cars for a half-hourly Sunday and holiday service from 5 a. m. to 11:30 p. m. When the traffic is heavy each car takes one or two trailers. The maximum trial speed of the motor cars was 50 km an hour (31 m.p.h.), and an average speed of 24-25 km an hour (14-15 m.p.h) is obtained between the stations. The schedule speeds mentioned are considered to be remarkably good for routes where stops and slow-downs are necessarily frequent. It has been observed that the pantograph requires very little attention or maintenance expense.

REPORT ON ACCOUNTS OF CHICAGO RAILWAYS COMPANY

Price, Waterhouse & Company, chartered accountants, made an examination of the books and accounts of the Chicago Railways Company recently at the request of Mayor Busse, of Chicago. A short notice concerning this examination was published in a previous issue of the Electric Railway Journal, but the full report contains discussion and information on several topics which have a bearing on the relations between the city of Chicago and the surface lines and an abstract of the principal points is therefore presented herewith. The investigation of the accountants concerning this company follows similar reports regarding the books and accounts of the Board of Supervising Engineers, Chicago Traction and of the Chicago City Railway. Abstracts of these reports were published in the issue of the Electric Railway Journal for April 24, 1909, page 788.

The accountants examined the accounts of the Chicago Railways Company for the two years ended Jan. 31, 1909, being the first two years of the partnership arrangements under the ordinance of Feb. 11, 1907. Owing to the delay in the consummation of the reorganization, the Chicago Railways Company was not in a position to accept the ordinance within the term of 210 days allowed therein. This term was extended, however, to Feb. 1, 1908, and the ordinance was finally acepted on Jan. 29, 1908, and went into effect as of Feb. 1, 1907. During this interval the property was operated by the receivers of the Chicago Union Traction Company, and the accounts were kept without regard to the probable future relationship with the city. The report states:

It became necessary, therefore, to rewrite the earnings and expense accounts, and they were rewritten on the theory that, if only there were excluded therefrom the expenses pertaining to the period prior to Jan. 31, 1907, the balance of the receivers' expenses must represent the expense chargeable to the partnership, and through a misunderstanding it was believed that the city comptroller concurred in this view. It happened, however, that the receivers' expenses of this first year (in addition to expenses dating from prior to the period of the partnership) included also numerous charges incidental to the reorganization of the company and otherwise, which were not properly expenses of operation, and the comptroller took exception to certain of these charges amounting to $119,000, but not until the accounts of the first year were practically closed.

It was thereupon mutually agreed that the matter should be adjusted by charging a corresponding amount of strictly partnership expenses of the following year to the individual company instead of to the partnership account. Accordingly there was charged to the individual account a proportion ($119,000) of certain legal fees and expenses paid in the year 1908, but these, being subsequently found to have been incurred chiefly in connection with or in effectuating the plan of reorganization, were objected to by the board of supervising engineers in the course of an investigation which the board undertook to make of the company's accounts in the latter part of 1908, and the objection was very properly sustained by the city's special traction counsel. In addition to the charges of $119,000 in question, and on the ground that the expenses of the receivership were not *per se* expenses of the partnership, the board decided to exclude further charges amounting to $93,076 while a special claim of $42,411 was made against the receivers of the Chicago Union Traction Company or of the Chicago Consolidated Traction Company for their proportion of the cost of the trial department of the Railways Company for the two years, with the result that the partnership account was relieved of expenses theretofore charged against it up to Jan. 31, 1909, amounting in all to $254,487.

In issuing its certificate of expenditures up to the end of January, 1909, the board reserved the right to make such further audit and adjustment of the accounts as it considered necessary, and this further audit was made concurrently with our own and the adjustments found to be necessary as a result of both audits were compared, and, so far as they were agreed to by the company's auditor and the auditor for the board, correcting entries were to be made in the books of the partnership forthwith.

The most important of the adjustments agreed upon related to the treatment of the "income miscellaneous account." For the year ended Jan. 31, 1908, the net income derived from property owned or in use in the operation of the railway, remaining after deducting the expenses, was added to the gross operating receipts for the purpose of the settlement with the city, whereas in the following year the gross income was included in the gross receipts of the railway, the expense of upkeep and maintenance being included in the gross operating expenses of the railway. The report adds:

We find on investigation that both operated and non-operated property were included in the original appraised value of $29,000,000 as of June 30, 1906, and we conclude that so far as the city is concerned, the non-operated property is, to all intents and purposes, the same as the operated property. We reach the conclusion, therefore, that the treatment adopted by the Railways Company in the first year was erroneous and that that adopted in the second year was the correct one, and the accounts of the first year should now be readjusted in accordance therewith.

There were other adjustments relating to various discrepancies which, though numerous, did not involve any items of any magnitude. The corrections of all of these items will result in an increase of the divisible profits by $14,197 (of which the city's 55 per cent share amounts to $7,808), but inasmuch as the corections will involve also an addition of $35,106 to the capital account, they are, in the whole, in favor of the company.

A somewhat similar question arose regarding the manner in which the sale of power should be treated in the partnership accounts. The report states:

The practice of the Railways Company has been to apply the cost of the power sold in reduction of the proceeds of sale and only the net profit on the sale has been carried to the credit of earnings. While this practice is in accordance with sound accounting, in that it enables the company to ascertain and state separately not only the profit on the sale of power to outside interests, but also the cost of power actually consumed in the operation of the railway, it is perhaps not in strict conformity with the requirements of the ordinance in regard to the manner in which a settlement is to be effected with the city, namely, by deduction of 70 per cent from the gross receipts from all sources and of every kind. It seems to us that the gross receipts from the sales of power should have been credited as gross receipts from operation, and the result would have been to increase the profit available for division with the city by $17,190. On the other hand, the elimination of certain purely bookkeeping entries on both sides of the account (which add to the apparent expense as well as the apparent credits for power) would serve to reduce the divisible profits by $4,368, making a net increase of $12,821 by reason of the readjustment of the power account, of which amount the city would be entitled to 55 per cent, or $7,052 on a revision of the accounts.

Some confusion had arisen as between the receivers and the new corporation in regard to the treatment of the reserve for accidents and injuries. The property was sold subject to the condition that the purchasers gave security for the payment of all liabilities of the receivers arising out of the operation of the street railways by the receivers which might not be met out of the cash funds remaining in the hands of the receivers after execution of the decree of sale. The Railways Company was to deposit with the court $750,000 of 5-year, 6-per cent collateral bonds of the

Chicago Railways Company as a complete release and bar to any and all other liabilities in respect to these matters. From the sale of these notes there was realized $697,500. Out of these funds the receiver continued to pay claims originating during the receivership and paid not only claims which dated from prior to Feb. 1, 1907, but also such as originated subsequent to that date and up to the time of the sale of the property in January, 1908. The claims originating in the last-mentioned interval and so paid by the receiver have amounted to approximately $163,000.

The accountants say they are informed that it has now been decided that the payment by the receiver of claims pertaining to the year ending Jan. 31, 1908, was erroneous, or was at least founded on a misapprehension of the question of accounting involved, and accordingly the receiver will be reimbursed for these payments of $163,000 approximately, the reimbursement being charged against the partnership reserve and so shifting the payment of the claims on to the partnership books where they properly belong.

The capital account was scrutinized carefully, and the only items as to which any question arose outside of those in the adjustment of which the company's auditor and the auditor for the board had already acquiesced were the addition of the commission and brokerage charge of 15 per cent on the final payment of $9,297 in February, 1907, for a converter, amounting to $1,394, and the duplication of certain charges to capital account amounting to $1,843, a total of $3,237.

It was held by the accountants that the final payment of $9,297 was merely a payment in discharge of an obligation of the company outstanding on Jan. 31, 1907. It had no place on the books as an actual physical addition to the property subsequent to the date when the ordinance went into effect. Exception was taken to the second item of $1,843 as being, in effect, a duplicate charge to capital account, inasmuch as the labor and material, or the property represented thereby, would have been covered in the supplementary appraisal which the board of engineers made of the property as of Jan. 31, 1908.

A question having been raised as to what proportion, if any, of the salaries of general officers and maintenance and other expenses was transferred from operating to construction, or charged direct to construction in the first instance, as being that proportion of the expenses of the character above described which the management of the company may have regarded as fairly applicable to the cost of the rehabilitation work over and above the labor and other direct charges entering therein, it was ascertained that the only charges of this nature which the company had made to capital account related to the use of teams and work cars and to the salaries of some additional clerks employed in the engineering department, and that these charges had amounted in all to not exceeding $9,200 for the two years.

Careful inquiries were made as to rebates, but no evidence was found of the existence of any rebate agreements except one with a varnish company. Under an arrangement of long standing with that company, an allowance of 50 cents per gallon is received. The allowances amounted to $568 in the two years, and in every case the credit was found to have been deducted from the gross amount of the purchase before recording in the books.

A question had arisen in regard to the allowances to the city for interest on its share of the annual earnings for the interval between Jan. 21 and the time allowed for the final accounting and settlement up to April 10, following. It was the view of the board of supervising engineers that some reasonable time was necessary after the compilation of the accounts to ascertain the earnings and the city's share thereof, and that the intention of the ordinance was doubtless to allow such time after Jan. 31 and up to April 10 as the company may require for the purpose stated without any question of interest for this brief interval. As a difference of opinion existed on this point, the accountants suggested that it be referred to the special traction counsel of the city for a ruling and agreement. The present practice is to credit the partnership account with interest at the rate of 2 per cent per annum on 30 per cent of the monthly traffic receipts as they are deposited in bank from day to day. The accountants expressed the following conclusions on this point:

It would seem, therefore, that if the company continued to credit the city with interest calculated at some reasonable rate on the undistributed profits for the time elapsing between the close of the year and the date of final payment over of these profits (during which time the company has the use and benefit of the funds representing the profits) this course would be merely an extension of the same principle to its logical conclusion.

A statement of the various errors and discrepancies disclosed by the audit and which appeared to the accountants to call for an adjustment of the accounting with the city has been appended to the report. So far as the city is more directly concerned, the net effect of the adjustment is to add the sum of $46,337 to the capital investment and of $14,860 to the share of earnings accruing to the city. The accounts are still, however, subject to adjustment of interest on all the items enumerated in this schedule as well as of interest on the expenditures excluded by the board in its first audit of the accounts. The report continues:

There would then remain open for settlement, according as the legal advisers of the city may determine, the question of (1) the proportion, if any, of the maintenance and general expenses, which may be charged either to capital account as being fairly applicable to the cost of the rehabilitation work over and above the direct charges entering therein, or to the individual account as being that proportion of these expenses which was intended to be borne by the individual company in view of the requirements of Section 7 of the ordinance (the determination of which question would necessarily also control the adjustment of interest), and (2) the interest, if any, which it may be proper to allow on the city's share of the profits in respect of the interval elapsing between the close of the fiscal year on Jan. 31 and the date of final payment over of these profits to the city.

In conclusion we would report that, in addition to embracing the books of the partnership proper, our examination was extended to the so-called individual or private books of the corporation, which were thrown open to our inspection as accredited representatives of the city and without any reservation on the part of the management, and that every facility was afforded us for the purpose of this examination.

The recent strike of the street railway employees of Stockholm, Sweden, resulted in a complete failure, and has been declared off. The few strikers who have been reinstated have been compelled to sign a contract and give a bond to insure their future loyalty to the company.

On Sunday, July 25, the first section of the Mont Blanc electric railway was opened to the public, and passengers were carried up to a point 5,495 ft. above Le Fayet, the starting place of the railway. The total altitude of Mont Blanc, 15,781 ft. above sea level. The second section, upon which work is now under way, will reach a height of 10,800 ft. The two lower sections will run, without tunnel, in the open for 5 miles. The gradients will be never less than 1 in 12, and in places will be as steep as 1 in 5

CONCRETE POLES

The Oklahoma Gas & Electric Company, Oklahoma City, Okla., during the past year has experimented with reinforced concrete poles on a large scale. At a recent meeting of the Oklahoma Electric Light, Railway & Gas Association, J. M. Brown, superintendent of the company, read a paper in which he described the methods of molding and setting the poles and gave some figures of cost.

The poles are made hexagonal in shape and hollow in the center. A 35-pole is 7 in. across the corners at the top and 16 in. across at the butt. The forms are arranged so that by adding sections 5 ft. long to either end poles of any length can be molded. The forms are made of heavy timber to avoid warping and are built in two halves which are clamped together and accurately lined up to insure the pole being straight. The 12¼-in. high-carbon-steel, deformed-section reinforcing rods are then put in place symetrically about the central axis. At the top of the pole



Setting Reinforced Concrete Pole

the rods are secured by passing them about 2 in. through holes in a steel plate, bending over the ends and then bolting down a second plate on the bent-over ends with four small bolts. The rods are then stretched and anchored in the butt by an ingenious method. The ends of the rods project about 6 in. through holes in a steel plate fastened in the form. Pieces of ½-in. steel rod 10 in. long with an eye formed in one end and threads on the other end are used for stretching. The ends of the reinforcing rods are bent over and hooked into the eyes of the stretchers and short pieces of pipe are passed over the stretchers butting against the steel plate. A nut and washer bearing on the outer end of the piece of pipe is screwed down on the threaded end of the stretcher giving any desired tension to the rods. The form is then ready for placing the core, which is made in two sections, telescoping with each other. The core is wrapped with one thickness of building paper and is hung in the center of the mold by suspension wires placed at intervals along the length of the form.

The concrete used consists of a mixture of one part cement, two parts sand and three parts chats or zinc tailings, which can be obtained in large quantities from the zinc mines of southwestern Missouri. With cement costing $1.50 per barrel, sand at $2 per cubic yard, chats at $2 per cubic yard and labor at $2 per day of eight hours, the cost of manufacturing a 35-ft. pole, 7 in. across at the top, averages $10. Three men can make three poles per day. Poles have been molded, hauled 3½ miles and set in five days' time, but this requires very careful handling and a longer time should be allowed for the concrete to set thoroughly. A 35-ft. pole molded, hauled to place and set, with steel cross-arms and pins mounted ready for stringing wires, costs $18.

The advantages claimed for concrete poles are numerous. They are more rigid than wooden poles and wires do not swing as much as when mounted on wooden poles. The maintenance cost is practically negligible and the depreciation far less than for wooden or steel pole lines, as they do not rot or rust. They resist lightning discharges and accidental grounds, can be erected with no more trouble than wooden or steel poles and can be climbed for inspection or repairs as easily as a steel pole.

CAPITALIZATION, CARS AND MILEAGE OF ELECTRIC RAILWAY COMPANIES IN THE UNITED STATES

The accompanying table shows the mileage, number of cars and capitalization of the street, elevated and electric interurban railway companies in the United States and its insular possessions, including Porto Rico, Hawaii and the Philippines; also in Canada (including Newfoundland) and Cuba. The figures are given for the last two years, and are compiled from the last two editions of the Red Book of American Street Railway Investments.

The decreases noted in the columns of capital stock and funded debt require some explanation, as they are more apparent than real. That in Massachusetts was caused principally by the decision to omit the capitalization of two or three of the underlying companies because the securities are also included in that of the holding company. The Massachusetts figures are now on the same basis as that of the other States. The other small decreases are due to consolidation, mergers, etc., or from estimating 1908 capital when for 1909 actual amounts were available. As in last year's table, the statistics of the electrified trunk lines are omitted.

The dates of the reports from different companies as given in the Red Book vary, but practically all of those in the 1909 edition are within the limits of June 30, 1908, and May 1, 1909. The average is believed to be not far from Dec. 31, 1908. For this reason the figures given in the table for 1908 may be considered as fairly representing the conditions at the close of that year.

Where reliable reports could not be obtained of the capital stock and funded debt of the companies, estimates have been made based upon the known physical property of the separate companies. As the roads not thus reporting were very small, however, both in number and importance, these estimates do not vitally affect the accuracy of the table. More important estimates had to be made of the outstanding stock and funded debt in cases where holding or leased companies owned a portion of the outstanding obligations or capital of sub-operating companies. These estimates were required, as some holding companies do not report the capitalization of sub-companies controlled by them.

STREET AN D CANADA

LIABILITIES.

STATES		INCREASE FOR YEAR.
	1908	
New England States		
Maine		
New Hampshire	2,872,213	$ 75,532
Vermont	0,994,200	*505,800
Massachusetts	7,295,500	200,990
Rhode Island	1,814,800	*3,794,850
Connecticut	3,646,200	4,520,800
Total	3,869,478	*586,700
	0,492,391	*90,028
Eastern States		
New York		
New Jersey	1,143,125	141,328,032
Pennsylvania	1,408,480	17,306,140
Delaware	4,559,918	71,760,003
District of Columbia	9,679,000	*100,000
Maryland	3,853,187	16,992,578
Virginia	9,758,050	19,405,000
West Virginia	7,627,700	5,931,250
Total	6,227,900	6,966,900
	4,257,360	279,589,903
Central States		
Michigan		
Ohio	99,896,800	9,843,100
Indiana	59,108,973	22,649,000
Kentucky	33,374,400	11,285,280
Wisconsin	78,091,010	6,997,400
Illinois	43,351,900	14,924,400
Minnesota	70,303,340	25,104,040
Iowa	56,370,000	1,985,000
Missouri	61,492,700	2,689,000
Total	87,164,700	*796,300
	49,153,823	94,680,920
Southern States		
North Carolina		
South Carolina	12,313,000	5,473,100
Georgia	9,789,280	6,280
Florida	46,235,794	2,366,300
Alabama	8,171,000	1,257,000
Mississippi	33,259,000	5,262,000
Tennessee	7,417,870	*353,030
Louisiana	42,155,600	186,900
Arkansas	84,896,900	697,100
Total	10,089,800	308,000
	54,328,244	15,203,650
Western States		
North Dakota		
South Dakota	660,000	*3,000
Nebraska	150,000	.....
Nevada	24,614,400	1,809,800
Kansas	1,230,000	730,000
Oklahoma	15,406,000	980,000
Texas	8,325,000	781,200
Colorado	44,036,000	938,400
Montana	43,752,200	4,624,200
New Mexico	4,409,615	*40,000
Idaho	700,000	.....
Utah	4,199,400	900,000
Washington	16,097,500	*950,000
Oregon	77,706,810	6,912,900
California	46,184,000	5,791,000
Arizona	260,398,400	21,267,400
Wyoming	960,000	100,000
Total	75,000	75,000
	548,904,325	43,917,300
United States	557,136,143	433,301,745
Hawaii, Porto Rico and Philippine Islands & West Indies	26,014,500	11,256,500
Canada and Newfoundland	101,437,074	18,831,578
Cuba	40,785,681	*1,476,819

* indicates a decrease

STREET AND ELEVATED RAILWAY MILEAGE, CARS AND CAPITALIZATION IN UNITED STATES AND CANADA

COMPILED FROM THE STATISTICS OF THE VARIOUS PROPERTIES CONTAINED IN "AMERICAN STREET RAILWAY INVESTMENTS," EDITION OF 1909

STATES	No. of Ry. Cos.	ELECTRIC RAILWAYS. Track Mileage		Electrically Equipped Cars, Sweepers and Locomotives.		All Other Cars.		Total Cars		CAPITAL STOCK Total.		Increase For Year	FUNDED DEBT. Total		Increase For Year.	CAPITAL LIABILITIES Total		Increase For Year.
	1908	1907	1908	1907	1908	1907	1908	1907	1908	1907	1908		1907	1908		1907	1908	
New England States																		
Maine	16	446	495	502	530	245	225	747	755	$ 10,904,681	$10,904,713	$ 32	$11,892,000	$11,967,500	$ 75,500	$ 22,796,681	$ 22,872,213	$ 75,532
New Hampshire	20	292	295	355	450	69	45	424	495	6,446,000	6,570,200	124,200	5,054,000	4,424,000	*630,000	11,500,000	10,994,200	*505,800
Vermont	11	123	125	122	130	20	20	142	150	3,721,510	3,970,000	248,490	3,373,000	3,325,500	*47,500	7,094,510	7,295,500	200,990
Massachusetts	69	2,949	2,980	8,136	8,260	2,455	2,250	10,591	10,510	107,169,650	99,074,450	*8,095,200	68,440,000	72,740,350	4,300,350	175,609,650	171,814,800	*3,794,850
Rhode Island	10	450	460	1,000	1,000	224	200	1,233	1,200	21,902,000	26,192,700	4,200,700	17,133,400	17,453,500	320,100	39,125,400	43,646,200	4,520,800
Connecticut	14	855	1,035	1,690	1,930	350	170	2,040	2,100	36,691,100	36,524,100	*167,000	37,765,078	37,345,378	*419,700	74,456,178	73,869,478	*586,700
Total	140	5,124	5,390	11,814	12,300	3,363	2,910	15,177	15,210	186,924,941	183,236,163	*3,688,778	143,657,478	147,256,228	3,598,750	330,582,419	330,492,391	*90,028
Eastern States																		
New York	168	3,950	4,720	13,011	13,700	4,232	4,290	17,243	17,990	437,269,849	495,714,675	58,444,826	372,545,244	455,428,450	82,883,206	809,815,093	951,143,125	141,328,032
New Jersey	48	1,215	1,285	2,590	2,825	330	365	2,920	3,190	95,873,590	105,549,980	9,676,390	108,228,750	115,858,500	7,629,750	204,102,340	221,408,480	17,306,140
Pennsylvania	170	3,950	4,210	8,333	8,475	1,178	1,150	9,511	9,625	264,516,930	302,411,687	37,894,757	178,282,985	212,148,231	33,865,246	442,799,915	514,559,918	71,760,003
Delaware	4	85	75	170	155	5	16	175	171	4,450,000	4,350,000	*100,000	5,329,000	5,329,000	.....	9,779,000	9,679,000	*100,000
District of Columbia	8	340	393	1,000	1,015	470	435	1,470	1,450	34,964,800	42,048,100	7,083,300	31,895,809	41,805,087	9,909,278	66,860,609	83,853,187	16,992,578
Maryland	14	528	560	1,960	1,990	179	185	2,139	2,175	20,243,050	26,808,050	6,565,000	60,110,000	72,950,000	12,840,000	80,353,050	99,758,050	19,405,000
Virginia	24	543	470	666	670	190	210	856	880	29,682,650	32,766,600	3,083,950	32,013,800	34,861,100	2,847,300	61,696,450	67,627,700	5,931,250
West Virginia	24	349	350	421	435	38	35	459	470	10,844,000	14,217,900	3,373,900	8,417,000	12,010,000	3,593,000	19,261,000	26,227,900	6,966,900
Total	460	10,960	12,063	28,151	29,265	6,622	6,686	34,773	35,951	897,844,869	1,023,866,992	126,022,123	796,822,588	950,390,368	153,567,780	1,694,667,457	1,971,257,360	279,589,903
Central States																		
Michigan	28	1,700	1,355	2,011	1,915	492	500	2,503	2,415	42,538,200	42,666,800	128,600	47,515,500	57,230,000	9,714,500	90,053,700	99,896,800	9,843,100
Ohio	105	4,450	4,455	4,948	5,100	698	620	5,646	5,720	219,018,473	234,240,973	15,222,500	127,441,500	134,868,000	7,426,500	346,459,973	369,108,973	22,649,000
Indiana	53	2,281	2,320	1,840	2,000	400	440	2,240	2,440	96,214,980	102,297,260	6,082,280	70,590,750	75,793,750	5,203,000	166,805,730	83,374,400	11,285,280
Kentucky	13	349	380	599	625	303	300	902	925	20,924,200	23,620,900	2,696,700	15,430,300	19,731,000	4,300,700	36,354,500	178,091,010	6,997,400
Wisconsin	23	785	790	831	835	110	115	941	950	34,091,000	38,477,000	4,386,000	34,359,000	44,897,400	10,538,400	68,450,000	43,351,900	14,924,400
Illinois	65	2,821	3,015	5,096	5,100	2,184	2,260	7,280	7,360	168,465,800	172,956,500	4,490,700	176,733,500	197,346,840	20,613,340	345,199,300	370,303,340	25,104,040
Minnesota	10	546	560	782	790	78	50	860	840	32,565,000	32,912,000	347,000	21,820,000	23,458,000	1,638,000	54,385,000	56,370,000	1,985,000
Iowa	30	756	760	896	860	140	130	1,036	990	36,653,200	36,588,200	*65,000	22,150,500	24,904,500	2,754,000	58,803,700	61,492,700	2,689,000
Missouri	27	1,172	1,088	2,254	2,320	372	390	2,626	2,710	88,262,000	87,975,700	*286,300	99,699,000	99,189,000	*510,000	187,961,000	187,164,700	*796,300
Total	354	14,860	14,723	19,257	19,545	4,777	4,805	24,034	24,350	738,732,853	771,735,333	33,002,480	615,740,050	677,418,490	61,678,440	1,354,472,903	1,449,153,823	94,680,920
Southern States																		
North Carolina	14	115	150	180	185	39	40	219	225	3,592,100	6,842,000	3,249,900	3,247,800	5,471,000	2,223,200	6,839,900	12,313,000	5,473,100
South Carolina	7	139	140	138	160	26	30	164	190	4,283,000	4,369,280	86,280	5,500,000	5,420,000	*80,000	9,783,000	9,789,280	6,280
Georgia	13	386	395	557	570	108	105	665	675	23,269,394	24,378,294	1,108,900	20,600,100	21,857,500	1,257,400	43,869,494	46,235,794	2,366,300
Florida	10	151	150	175	175	39	60	214	235	4,666,000	5,074,000	408,000	2,248,000	3,097,000	849,000	6,914,000	8,171,000	1,257,000
Alabama	11	302	302	484	410	173	190	657	600	15,467,000	18,475,000	3,008,000	12,530,000	14,784,000	2,254,000	27,997,000	33,259,000	5,262,000
Mississippi	10	92	96	122	155	10	20	132	175	4,122,400	3,421,370	*701,300	3,648,500	3,996,500	348,000	7,770,900	7,417,870	*353,030
Tennessee	11	352	360	650	680	92	65	742	745	19,354,700	19,346,600	*8,100	22,614,000	22,809,000	195,000	41,968,700	42,155,600	186,900
Louisiana	8	252	250	590	640	59	60	649	700	52,257,800	53,395,900	1,138,100	31,942,000	31,501,000	*441,000	84,199,800	84,896,900	697,100
Arkansas	9	128	132	192	193	35	35	227	228	5,461,800	5,491,800	30,000	4,320,000	4,598,000	278,000	9,781,800	10,089,800	308,000
Total	93	1,917	1,975	3,088	3,168	581	605	3,669	3,773	132,474,194	140,794,244	8,320,050	106,650,400	113,534,000	6,883,600	239,124,594	254,328,244	15,203,650
Western States																		
North Dakota	3	18	18	45	45	5	5	50	50	360,000	360,000	.....	303,000	300,000	*3,000	663,000	660,000	*3,000
South Dakota	4	25	30	6	8	2	2	8	10	100,000	100,000	.....	50,000	50,000	.....	150,000	150,000	.....
Nebraska	10	280	240	450	460	53	60	503	520	14,329,600	14,587,400	257,800	8,475,000	10,027,000	1,552,000	22,804,600	24,614,400	1,809,800
Nevada	2	10	11	10	10	...	2	10	12	200,000	1,100,000	900,000	300,000	130,000	*170,000	500,000	1,230,000	730,000
Kansas	17	279	295	230	235	80	95	310	330	7,826,000	8,751,000	925,000	6,600,000	6,655,000	55,000	14,426,000	15,406,000	980,000
Oklahoma	15	213	215	120	140	24	30	144	170	5,345,800	5,604,000	258,200	2,198,000	2,721,000	523,000	7,543,800	8,325,000	781,200
Texas	29	541	550	720	735	143	130	863	865	26,980,600	26,770,000	*210,600	16,117,000	17,266,000	1,149,000	43,097,600	44,036,000	938,400
Colorado	17	457	472	474	445	225	480	699	925	20,191,000	24,192,200	4,001,200	18,937,000	19,560,000	623,000	39,128,000	43,752,200	4,624,200
Montana	6	81	81	106	117	24	20	130	137	2,799,615	2,759,615	*40,000	1,650,000	1,650,000	.....	4,449,615	4,409,615	*40,000
New Mexico	2	11	11	14	10	3	1	17	11	350,000	350,000	.....	350,000	350,000	.....	700,000	700,000	.....
Idaho	7	138	145	57	65	70	50	127	115	1,610,000	2,460,400	850,400	1,689,000	1,739,000	50,000	3,299,000	4,199,400	900,000
Utah	5	156	166	177	255	17	25	194	280	7,712,500	7,512,500	*200,000	9,335,000	8,585,000	*750,000	17,047,500	16,097,500	*950,000
Washington	18	895	900	885	875	1,021	1,025	1,906	1,900	41,795,910	45,031,810	3,235,900	28,998,000	32,675,000	3,677,000	70,793,910	77,706,810	6,912,900
Oregon	12	373	390	329	360	235	295	564	655	22,010,000	22,310,000	300,000	18,383,000	23,874,000	5,491,000	40,393,000	46,184,000	5,791,000
California	53	2,432	2,530	2,680	2,579	1,316	1,330	3,996	3,909	143,078,000	162,435,400	19,357,400	96,053,000	97,963,000	1,910,000	239,131,000	260,398,400	21,267,400
Arizona	4	42	37	23	30	7	7	30	37	760,000	860,000	100,000	100,000	100,000	.....	860,000	960,000	100,000
Wyoming	1	...	5	...	5	...	1	...	6	.....	75,000	75,000	.....	.....	.....	.....	75,000	75,000
Total	205	5,951	6,096	6,326	6,374	2,225	3,558	9,551	9,932	295,449,025	325,259,325	29,810,300	209,538,000	223,645,000	14,107,000	504,987,025	548,904,325	43,917,300
United States	1,252	38,812	40,247	68,636	70,652	17,568	18,564	87,204	89,216	2,251,425,882	2,444,892,057	193,466,175	1,872,408,516	2,112,244,086	239,835,570	4,123,834,398	4,557,136,143	433,301,745
Hawaii, Porto Rico and Philippine Islands & West Indies	11	203	185	228	240	86	140	314	380	6,850,000	12,061,000	5,211,000	7,908,000	13,953,500	6,045,500	14,758,000	26,014,500	11,256,500
Canada and Newfoundland	52	1,151	1,250	2,685	2,800	268	255	2,953	3,055	54,333,196	62,585,662	8,252,466	31,272,300	41,851,412	10,579,112	85,605,496	104,437,074	18,831,578
Cuba	4	167	140	256	326	377	329	585	703	22,862,500	22,862,500	.....	19,400,000	17,923,181	*4,476,819	42,262,500	40,785,681	*1,476,819

* indicates a decrease from previous year.

FINAL REVISION OF CITY RULES

A final meeting of the committee on city rules of the American Street & Interurban Railway Association was held Aug. 27 at the headquarters of the association, 29 West Thirty-ninth Street, New York. There were present R. E. Danforth, general manager, Public Service Railway Company, Newark, N. J.; L. H. Palmer, assistant to manager, Metropolitan Street Railway Company, New York; H. H. Hunt, district manager, Stone & Webster Managers' Organization, Boston, and N. W. Bolen, superintendent of transportation, Public Service Railway Company, Newark.

At the last meeting of the city rules committee, held June 7 and 8, and reported in the ELECTRIC RAILWAY JOURNAL for June 12, a number of revisions in the Standard Code of Rules were made. The rules as thus revised were printed in bulletin form and, as members of the association know, a copy was mailed to all the members, with the request that any criticism of the rules be sent to the committee in time to permit a final revision before the Denver convention. In response to this circular a number of letters were received by the chairman, some containing suggestions for additional changes. All of these suggestions were considered at the meeting Aug. 27, and a number of them were adopted.

The new rules, as revised by the committee at the meeting last week, are printed below, and it is expected that this is the form in which they will be presented to the association, accompanied by a report which will describe the work of the committee this year, and possibly outline that suggested for the coming year.

Very few of the rules have been changed in intent, as compared with the tentative list published in the ELECTRIC RAILWAY JOURNAL for June 12, but the captions have been altered in a number of cases to make them indicate more clearly the purpose of the rule. The most important changes in the text of the rules themselves are as follows: In Rule 10, on bell signals, the five-bell signal from the motorman to the conductor has been omitted. Rule 20, on warning passengers, has been entirely rewritten. Rule 103, on route signs, has been changed, so that the conductor is required to change the route signs on each half-trip, but by an addition to the rule on responsibility (Rule 2), both conductor and motorman are held responsible for seeing that this is done. Rule 107, on inspection of cars, has been elaborated. A new rule on destination signs (206) has been added, and the rules following this new rule have been advanced one number. Former rule 224, regarding pedestrians between tracks, has been omitted.

RULES FOR CITY OPERATION

GENERAL NOTICE.

To enter or remain in the service is an assurance of willingness to obey the rules.

Obedience to the rules is essential to the safety of passengers and employees, and to the protection of property.

The service demands the faithful, intelligent and courteous discharge of duty.

To obtain promotion, capacity must be shown for greater responsibility.

Employees, in accepting employment, assume its risks.

In all cases of doubt, take the safe side.

The rules herein set forth are for the government of the employees of the.....Company, and become effective ....., superseding all previous rules and instructions where they conflict with the same.

Special instructions may be issued from time to time by proper authority.

.....
General Manager.

GENERAL RULES.

KNOWLEDGE OF RULES.

Knowledge of Rules.

1. All employees whose duties are prescribed by these rules will be furnished with a copy, for which they will sign receipt, and will be required to have the same in their possession at all times while on duty.

Conductors and motormen are required to be familiar with the rules, and with every special order issued. The bulletin board must be examined daily for special orders. Employment by the company binds the employee to comply with the rules and regulations, and ignorance thereof will not be accepted as an excuse for negligence or omission of duty. If in doubt as to the exact meaning of any rule or special order, application must be made to the proper authority for information and instruction.

In addition to these rules, special orders will be issued from time to time; such orders, when issued by proper authority, whether in conflict with these rules or not, must be obeyed while in force.

RESPONSIBILITY.

Responsibility.

2. The motorman is held responsible
(a) For the safe running of the car.
(b) For the proper operation of the machinery of the car.
(c) For running car according to schedule.

The conductor is in charge of the passengers on the car and is held responsible
(d) For the safety and convenience of the passengers.
(e) For the collection and proper accounting of fares.

Conductors and motormen will see that route and destination signs are properly displayed and will be held jointly responsible therefor.

All employees whose duties are prescribed by these rules will be furnished with a copy, for which they will sign receipt, and will be required to have the same in their possession at all times while on duty.

PERSONAL CONDUCT.

Personal Appearance.

3. Conductors and motormen must report for duty clothed in full regulation uniform, and must be clean and neat in appearance

Politeness.

4. Conductors and motormen must treat all passengers with politeness, avoid difficulty, and exercise patience, forbearance and self-control under all conditions. They must not make threatening gestures or use loud, uncivil, indecent or profane language, even under the greatest provocation. Badge number of conductor and motorman must be given on request of a passenger at any time.

Habits.

5. The following acts are prohibited:
(a) Drinking intoxicating liquors of any kind while on duty.
(b) Entering any place where the same is sold as a beverage while in uniform or while on duty, except in case of necessity.
(c) Constant frequenting of drinking places.
(d) Carrying intoxicating drinks about the person while on duty.
(e) Carrying intoxicating drinks on the company's premises at any time.
(f) Indulging to excess in intoxicating liquors at any time.
(g) Gambling in any form, including the laying of bets (and playing raffles) while upon the premises of the company.
(h) Smoking tobacco while on duty.
(i) Smoking tobacco while off duty in any part of the company's buildings, except in the conductors' or motormen's room.
(j) Reading books or newspapers while on duty.

Conversation.

6. Motormen while operating cars are permitted to answer questions of superior officers, and to give proper instructions to students only. All other conversation with motormen while car is in motion is forbidden.

Run on Time.

7. Cars must never be run ahead of schedule time, but must pass time points and leave terminals promptly on time, unless unavoidably delayed. Should a motorman be unavoidably detained he must not attempt to make up time by reckless running.

Conductors and motormen must carry reliable watches which must show correct time and be compared daily with the standard station clock.

Starting.

8. Motorman must never move car (whether stopped on signal or for any other reason) without signal from conductor, and then only when assured that no one is getting on or off front platform.

Conductor must never give signal to start when passengers are getting on or off.

Conductor must not put his hand on bell cord until passengers have boarded or left car; bell cord must not be touched until it is time to signal motorman to go ahead.

Conductor must never give signal to back a car unless he is on rear platform and sees that track is clear behind the car.

Starting Cars After Blockade.

9. In the event of a blockade of cars from any cause, the cars in such blockade must not all be started at one time, but singly, and at such intervals as will not burden the feeder line.

Bell Signals.

10. From conductor to motorman, to be given on motorman's signal bell:
1 bell—"Stop at next crossing or station."
2 bells—"Go ahead."
3 bells—"Stop immediately."
4 bells—(given when car is standing)—"Back car slowly."

From motorman to conductor, to be given on conductor's signal bell:
1 bell—"Come forward."
2 bells—"Watch the trolley" and danger signal to the conductor.
3 bells—"Set rear brake."
4 bells—Signal to conductor that motorman desires to back the car.

Whenever a car in service is stopped, for any cause except to take on or let off passengers, the motorman will, as soon as he is ready to go forward, give two taps of the gong; after which, if the conductor is ready to proceed, he will give the "Go ahead" signal.

The motorman will answer the signal to stop from conductor by one loud tap of gong; and two loud taps of gong after receiving the signal to go ahead. If unable to proceed immediately upon receipt of signal, motorman will wait for another "Go ahead" signal before starting the car.

When the car is standing, and motorman desires to back, for any reason, he will give the conductor four bells, but must not move the car until the conductor has answered with four bells to signify "All is clear behind." However, when it is necessary to back for any distance, or whenever any danger would be likely to result from backing, motorman must always change ends.

When two or more cars are coupled together, "Go ahead" signal must first be given by conductor of rear car and be repeated by each conductor in succession on his signal bell, when he is ready to start.

Obstructions Near Track.

11. Before passing any vehicle or obstruction close to the track, where passengers or conductor are liable to be injured while standing on the step of an open car, motorman must give two taps on conductor's signal bell as a warning, and must bring his car to a full stop before passing vehicle or obstruction unless he has received GO AHEAD signal from the conductor, indicating that all is clear. Great care must be exercised in passing over all excavations; workmen should be warned of the approach of car by sounding the gong repeatedly, and the car should be kept under full control. Where excavations are near regular stopping place, car should be run clear thereof before stopped.

Danger Signals.

12. Red lights or flags indicate danger, and when placed on the track cars must come to a full stop until such signal is removed.

Report Defects.

13. Conductors and motormen will report to superintendent, inspector, starter or foreman any defect in car, track or wire, and fill out blank provided for that purpose.

Disabled Cars.

14. The motorman or conductor of any disabled car, withdrawn from the main track, must remain with the car until relieved by proper authority. When a disabled car is being pushed or pulled, the signal for starting must first be given by conductor on rear car, and repeated by conductor on forward car, each conductor being careful not to give the signal when passengers are boarding or leaving car.

Leaving Car.

15. When necessary for conductor to leave his car he must notify the motorman to protect passengers and car. Should passengers board car during absence of conductor, motorman will notify conductor of the number and location of such passengers upon his return.

Cars in commission must not be left unprotected; either conductor or motorman always remaining in charge.

Responsibility for Damages.

16. Employees will be held responsible for any damages caused by their neglect or carelessness or by disobedience of rules.

Transfer Point Meetings.

17. Motormen and conductors will be held equally responsible for leaving a transfer point so quickly as to prevent the transfer of passengers from an approaching car on a connecting line.

Steam Railroad Crossings.

18. Car must be brought to a full stop at a safe distance approaching steam railroad crossings at grade, and motorman must not proceed until conductor has gone ahead to the center of crossing, looked both ways, and given the COME AHEAD signal. Before starting, the motorman will look back to see that no passengers are getting on or off; and in no case proceed, even after conductor's signal, until he has also examined the crossing and satisfied himself that steam cars are not approaching.

When there is more than one track the conductor must remain in advance of the car until the last track is reached.

After boarding car, conductor will give GO AHEAD signal to notify motorman that he is aboard. Motorman is forbidden to proceed without this signal.

Where crossing is protected by derail, interlocking plant, or flagman (employed by the company) this rule does not apply, special instructions being issued to govern in such cases.

SAFETY OF PASSENGERS.

Safety.

19. The safety of passengers is the first consideration. All employees are required to exercise constant care to prevent injury to persons or property, and in all cases of doubt take the safe side.

Warning to Passengers.

20. While persons assuming positions of danger, such as boarding or leaving moving cars, walking behind a moving car when another car is approaching, etc., do so at their own risk. Conductors and motormen should call the attention of such persons to the danger of so doing. Conductors on moving cars must give the danger signal (three bells) if an accident appears imminent.

Standing on Steps.

21. Permit no person to stand on the steps or buffers. Passengers should be fully inside of the car or safely landed on the platform before the signal is given to start.

Stealing Rides.

22. Any person caught stealing a ride on a car must never be driven therefrom while it is in motion, but car must be stopped at next street or station and such person put off.

ACCIDENTS.

Assistance.

23. In case of accident, however slight, to persons or property, in connection with or near any car, the motorman and conductor in charge of the same will render all assistance necessary and practicable. In no case will they leave injured persons without first having seen that they are cared for.

Medical Attendance.

24. Motormen and conductors are directed not to employ medical attendance to injured persons, except for the first visit, in cases of personal injury; nor will they visit such persons at any other time afterward unless specially instructed so to do by an officer of the company.

Fire in Car.

25. When there is evidence of car being on fire, motorman will immediately throw overhead switch to OFF and conductor pull down trolley, both motorman and conductor using every effort to prevent passengers becoming panic-stricken or leaving car before it is brought to a stop.

Written Reports.

26. A full and complete written report of every accident, no matter how trivial, and whether occurring on or near the car, must be made by the conductor. Accidents sometimes considered as not worth reporting are often the most serious, troublesome and expensive.

The conductor will obtain the name and residence in full of all witnesses on or near the car, including badge number of any policeman, fireman, private officer, postman or uniformed employee of the company.

The motorman will assist the conductor in securing the names of witnesses whenever practicable, and will be held responsible for any neglect to render assistance.

In all cases full facts must be obtained and stated in the report, as follows:

The date, exact time, exact place, run and car number, and the direction in which the car was moving, the nature of the accident or collision, and the cause of its occurrence.

The full name and address of the person injured, or whose vehicle was in collision (giving the name of both the driver and the owner of the vehicle).

Ascertain the extent of injuries or damage, if any, before leaving the spot.

In case there has been an accident on the car, and the crews change ahead, the conductor taking car on which the accident happened must secure the names of witnesses as above.

In case a person is struck by a car after passing around the rear of a passing or standing car, the numbers of both cars must be obtained, and both crews must report the accident.

If an accident is caused by any defect or damaged condition of car, conductor must report the same and its cause.

Accidents to employees will be reported the same as accidents to passengers.

Any trouble or disturbance of a boisterous or quarrelsome character which occurs on a car, or the ejectment of a person from a car, will be reported as an accident.

Report Accidents to Inspectors.

27. Conductors and motormen will make a verbal report to the first inspector or official of the company they meet of any accident, blockade or mishap of any kind. The depot starter or dispatcher must also be notified.

Information to Proper Persons Only.

28. No employee shall, under any circumstances, give any information whatever concerning any accident, delay, blockade or mishap of any kind to any person, except to a properly authorized representative of the company.

Information by Telephone.

29. In case of accident involving personal injury or serious damage to property, conductor, after attending to the case and getting witnesses, will telephone at once to headquarters, giving notice and particulars of accident.

In case of a blockade, where assistance is required to get cars moving, conductor of car first in block must summon assistance. Conductor of the second car, however, will also be held responsible for being sure that assistance has been summoned. Expense of telephone message will be refunded upon application at office.

EJECTMENTS.

Ejectments.

30. Ejectments shall be made by the conductor with the assistance of the motorman after the car has been brought to a stop, using "only such force as is sufficient to expel the offending passenger with a reasonable regard for his personal safety." No passenger shall be forcibly ejected from the car for any cause whatever without order from an inspector, starter or official of the company, unless the conduct of the passenger is dangerous or grossly offensive.

Where to Eject.

31. Any person ejected from a car must be put off at a regular stopping place.

No passenger will be put off at a point where likely to be exposed to danger.

Particular attention must be paid to this rule during bad and inclement weather, late at night, or when a passenger is intoxicated.

Intoxicated Persons.

32. No passenger will be ejected from a car for mere intoxication, unless said passenger becomes dangerous or offensive; such passenger must then be ejected with great care and must be guided until free from probable injury.

CAR-HOUSE RULES.

Report for Duty.

33. Regular conductors and motormen must report for duty ten minutes before leaving time for their first trip, or, if for any good reason unable to so report, must give notice at least ten minutes before such leaving time.

Extra men must report at such time as ordered, or must give notice at least ten minutes before such time. They must not absent themselves after answering roll-call without permission.

HEARING BY SUPERINTENDENT.

Hearing by Superintendent.

34. A hearing will be given by the superintendent to every employee who desires to complain. Reports or suggestions for the betterment of the service will always receive consideration.

RULES FOR CONDUCTORS.

OPERATING RULES.

Position on Car.

101. Remain on rear platform when not collecting fares, keeping a lookout for persons desiring to board car. Keep careful watch of passengers to observe requests to stop car. When stops are made at principal streets, places of amusement, churches, or at any point where a considerable number of passengers enter or leave the car, conductor should be on rear platform until such point is passed. When descending steep grades conductor will remain on rear platform.

Announcements.

102. Announce distinctly the names of streets, public places and transfer points when approaching the same.

Route Signs.

103. Properly display route signs on each half trip.

Trolley.

104. Trolley rope must be held when passing over switches, crossings, or going around curves. Should the trolley leave the wire, the conductor must at once pull down the trolley and signal the motorman to stop. After the car has stopped, replace the trolley on the wire, look around and through the car and see if any persons are boarding or leaving same before giving motorman signal to start. See that passengers keep their hands off the trolley rope. Do not remove trolley from wire at end of run, or elsewhere at night, until passengers have alighted from car.

Gates.

105. Front and rear gates on closed cars on the side between the tracks must always be kept closed and securely fastened. On open cars the guard chains must be kept fastened and guard rail lowered on the side between the tracks. When gates or chains or their fastenings are broken or out of order, prompt report must be made to superintendent, inspector, starter or foreman.

Disabled Motorman.

106. In case motorman is disabled from any cause while car is in motion, conductor must stop the car as promptly as possible.

Inspection of Car.
107. Conductors will see that cars are clean, and will carefully inspect floor, windows, grab-handles, steps, signs and all others parts of car which passengers may use to see that same are in proper condition before car is taken out on the road.

HANDLING PASSENGERS.

Moving Forward.
108. On closed cars when standing passengers crowd the rear door, request them to PLEASE STEP FORWARD.

Seating Passengers.
109. Standing passengers should be directed to vacant seats, and an effort made to provide them with seats where possible.

Assisting Passengers.
110. Elderly and feeble persons, women and children, should be given assistance getting on and off car, when possible. Crippled, blind or badly intoxicated persons should be assisted to sidewalk if necessary.

Information to Passengers.
111. Conductors are expected to be familiar with principal points along their route, so as to be able to give information to passengers about streets, parks, connecting or intersecting railway lines, depots, ferries, public buildings, large stores, hospitals, theaters, etc.

When on the stand at terminals, and when approaching passengers, conductors must announce the route and destination of car.

Spitting on Floor.
112. No passenger will be ejected from a car for spitting on the floor. If a passenger violates the rule or law prohibiting spitting, the conductor will call the attention of the passenger to the law prohibiting such conduct and endeavor to persuade the passenger to desist.

Carrying Packages.
113. Passengers must not be allowed to carry bulky or dangerous packages aboard cars.

Employees must not carry packages, letters or newspapers without an order from the proper authority, and must not assume responsibility for any package which a passenger may bring upon the car, excepting such articles as are to be turned into the Lost Article Department.

They must not hang nor allow articles to be hung on the brake handles.

Lost Articles.
114. Any article left in the car must be turned in promptly at office. Concerning articles found, conductors must not give information to any person, but must refer such person to the proper office. The names and addresses of parties giving lost property to conductors must be obtained.

Dogs in Cars.
115. Dogs will not be carried on any car.

FARES AND TRANSFERS.

Collection of Fares.
116. Fares must be collected promptly after passenger has boarded car and immediately registered. When more than one person boards car at a time, the fares must be registered immediately in the presence of the passenger who paid them before any more fares are collected. Fares should be collected separately and not in bunches.

Should a conductor for any reason return a fare to a passenger, or by error register more fares than he collected, he must not attempt to recover same by omitting to register fares subsequently collected, but should make report of such fact.

Change.
117. When necessary to give change, first register fare, and immediately thereafter give change, stating the amount received and amount returned.

Should a conductor have any dispute with a passenger in regard to change, he must make a report in writing to the superintendent.

Conductors will make change for passengers to the amount of two dollars.

Register Bell.
118. Be careful to see that register rings each fare.

Register Out of Order.
119. In case the register gets out of order, stop using it, make report of fares on back of trip report or on blanks supplied for that purpose, and report the fact to the first inspector, or starter, met on the road, and subsequently report to superintendent.

Transfers in Blockades.
120. In case any line is blocked it is the desire of the company to carry passengers to their destinations on other lines. Under such circumstances conductors of parallel or intersecting lines will accept transfer tickets accordingly and will issue a transfer on a transfer if necessary. They will also accept transfer passengers without tickets on orders from any inspector or authorized representative of the company, making report of same on back of trip report.

Issuance of Transfers.
121. Correctly punched transfers will be issued only on request made at time fare is paid.

Acceptance of Transfers.
122. Transfers will be accepted only when properly punched and offered for ride at designated transfer point within the time limit punched on transfer.

Refusal to Pay Fare—Transfers.
123. When a passenger refuses to pay fare or presents a defective transfer or ticket, upon which, in the judgment of the conductor, the passenger is not entitled to ride, the conductor must secure the names of as many witnesses to the facts as is possible, whereupon the car must be stopped and the passenger requested to leave.

If the passenger fails to comply with such request, the facts of the case must be brought to the attention of the first inspector, starter or official of the company who is met, and the conductor must act according to instructions received from such inspector, starter or official. In all cases the passenger must be given the benefit of any doubt.

When a passenger who refuses to pay fare requests to be allowed to leave the car, the car must be stopped and the person permitted to alight.

RULES FOR MOTORMEN.

HANDLING CARS.

Stopping for Passengers.
201. Keep a careful lookout on both sides of the street and bring the car to a full stop for every person who signals, except that when a car has considerable headway, is overcrowded, and another car of the same line follows within 500 feet passengers should be requested to take the following car.

Cars will stop on signal only at farther corners, at car stations, transfer points, and at points as provided in special orders.

Do not stop cars so as to block cross-streets or cross-walks.

Churches, Hospitals and Schools.
202. When passing a church during the hours of service, and at all times when passing a hospital, run slowly and do not ring the gong unless necessary.

Cars must be run slowly and with great care, and gong sounded, in the vicinity of schools when there are children on the street.

Run Slowly.
203. When passing standing or slowly moving cars, gong must be rung and car brought to slow speed.

Run slowly over special work, especially over all facing switch points, and if there is another car moving in the opposite direction on the other track, allow that car to pass before striking the switch point.

Motormen must see that all switches are properly set before passing over them, coming to a full stop if necessary.

Looking Back While Car Is Moving.
204. Motorman must not look back, either through or around car, while it is in motion.

Changing Ends.
205. When changing ends at terminals motormen must not pass through car.

Destination Signs.
206. Properly display destination signs on each half trip.

Entering Terminals.
207. Motormen must reduce speed when running into terminals to a rate just sufficient to carry the car into terminal.

Persons Authorized to Run Car.
208. Motormen must not allow any person to run their car except men placed there for instruction or some inspector or duly authorized officer of the company known to the motorman to be such. Conductors must not be allowed to run cars. A motorman who has a student "breaking in" in his charge must, under no circumstances, allow the student to handle the car unless he (regular motorman) is at his side, ready to take the brake or controller immediately if necessary.

Inspection of Car and Equipment.
209. Motormen must test brakes, switches, controller, lights and other apparatus and examine sand boxes to insure himself that car is in proper running order before taking it out on the road.

Emergency Stop.
210. Motormen must not use the reverse to stop car except to avoid accident or when the brake rigging is disabled.

Do not reverse when the brake is set, but release the brake and throw the reverse handle simultaneously, and, when the reverse handle is thrown in position, apply the current one point at a time; otherwise the fuse will melt or the breaker will release. Sand should be used when making an emergency stop

Runaway Car.
211. While descending a grade, should it not be possible to stop a car equipped with two motors by means of brake, the motorman must immediately turn off hood switch, reverse and advance controller cylinder to last position. In the event of car being equipped with four motors, simply reverse to stop.

Should a car equipped with two motors start to roll backward while ascending a grade and the brakes be unable to hold it, the hood switch must be immediately turned off and the controller cylinder advanced to last position. Should the car be equipped with four motors, if the reverse is set in forward position the car will stop.

Leaving Car.
212. Never leave platform of car without taking controller and reverse handles, throwing off the overhead switch and applying brake. Always remove reverse handle first.

Before leaving car at any point set hand brake sufficiently to prevent car from drifting.

Overhead Switch.
213. An overhead switch must never be thrown until power is turned entirely off, except in case controller cylinder fails to turn when power is on. It must be thrown by hand only.

Power Off Line.
214. When the power leaves the line the controller must be shut off, the overhead switch thrown and the car brought to a stop; the light switch must then be turned on and the car started only when the lights burn brightly.

Economical Use of Current.
215. In order to effect an economical use of the electric current it is necessary that the continuous movements of starting and increasing speed should be made gradually. In starting a car let it run until the maximum speed of each notch has been attained before moving handle to the next notch.

Rapid feeding of controller is injurious to the equipment of the car and causes discomfort to passengers. Controller must never be thrown on last point if car does not start from preceding points. The controller must never be thrown from a higher to a lower notch. Controller must not be held for any length of time on any one point except the first and second running positions. If necessary to run slower than the first running position speed, power must be thrown on and off, and not be taken continuously from a lower notch than that of the first running position.

Do not apply brakes when the current is on.

Do not apply current when brakes are applied.

Do not allow the current to remain on when car is going down grade or when passing over section breakers. Endeavor to run car with the least amount of current, allowing the car to drift without the use of current when it can be done without falling behind time.

A great amount of power can be saved by using judgment and discretion in approaching stopping places and switches by shutting off the power, so as to allow the car to drift to the stopping place or switch without a too vigorous use of the brake.

Release of Brakes Before Stop.
216. When brakes are set to make a stop they should always be released or nearly so just before the car comes to a standstill.

Water on Track.
217. When there is water on the track run the car very slowly, drifting without the use of power whenever possible.

Sanded Rails.
218. Never run on freshly sanded rails with brakes full on except to prevent an accident. On cars provided with sand boxes, in case of slippery rail, always sand the track for a short distance before applying the brakes.

Spinning of Wheels.
219. Care must be taken particularly during snowstorms to avoid spinning of the wheels with no forward or backward movement of the car.

Slippery Rail.
220. On a slippery rail do not allow the wheels to skid; as soon as wheels commence to skid the brake must be released and reset.

Extreme caution must be used to keep car under full control approaching all intersections, junctions, railroad crossings and prominent driveways, being very careful when approaching wagons and other cars, disregarding schedule if necessary.

Do Not Oil Car.
221. Do not oil or grease any part of a car.

VEHICLES.

Passing Vehicles.
222. Motormen are cautioned to exercise great care when a vehicle is passing alongside of track ahead of car. Ring the gong vigorously to attract the attention of the person driving, as a warning not to pull in ahead of car; and run cautiously until the vehicle is passed in safety.

Fire Apparatus.
223. When any fire department vehicles are observed approaching from any direction, cars must be stopped until such vehicles have passed.

Ambulances, Patrol and Emergency Wagons.
224. Ambulances, police patrol and the emergency wagons of the company must be allowed the right of way, and when approaching or passing, cars must be kept under control to avoid collision.

DETROIT MEETING OF CENTRAL ELECTRIC RAILWAY ASSOCIATION

The first fall meeting of the Central Electric Railway Association was held at the Cadillac Hotel, Detroit, Mich., Thursday, Aug. 26, 1909. The meeting was attended by a large number of railway men, principally from Ohio and Indiana, many of whom made the trip from their home cities by special cars. The longest run was that of car No. 72, belonging to the Terre Haute, Indianapolis & Eastern Traction Company. This car left Indianapolis at 6 a. m., Aug. 25, and ran on a schedule which enabled it to cover the entire distance of 326½ miles in 12 hours.

Only one session of the convention was held, beginning at 11 a. m. and adjourning at 2 p. m. In the afternoon many in attendance made a trip down the Detroit River in the steamer *Pleasure*. In the evening a dinner was served at Belle Isle Park, after which another boat trip was enjoyed. The entertainment features were provided by the Detroit United Railway.

EXPRESS AND FREIGHT BUSINESS

The technical proceedings of the convention began with the presentation by J. H. Crall, general freight and passenger agent, Terre Haute, Indianapolis & Eastern Traction Company, of a paper on "The Growth and Development of Express Business on Interurban Lines." This paper was published in the Electric Railway Journal for last week, page 326.

A. A. Anderson, general manager, Indianapolis, Columbus & Southern, said his company is now negotiating with two old-line express companies with a view to making contracts whereby all the express business on his lines will be handled by these companies. He stated he believed many railway companies do not keep close enough account of the cost of handling freight to know what the business really is worth, nor what it costs to handle.

G. W. Parker, general freight agent, Detroit United Railway, stated that his company handles its own express business in a manner similar to that of steam railroads. The company also has a satisfactory arrangement with the old-line express companies, which affords its patrons facilities for making foreign shipments. Under the contract entered into with the old-line companies and renewed each year, the Detroit United Railway does not have to give up any of its local express business. No interchange arrangements are made with steam railroads for the handling of freight.

C. N. Wilcoxon, general manager, Cleveland, Southwestern & Columbus Railway Company, briefly reviewed the plans that were made a few years ago which resulted in the formation of the Electric Package Company at Cleveland. He thought this express company has succeeded in building up a business which surpasses in extent that of other companies catering only to electric railways. This company furnishes an express service that is as reliable as the service furnished by the old-line companies. It has its own collection and delivery wagon service and its own regularly appointed agents. The cars employed in regular express service furnish greater earnings with two exceptions than passenger cars operating on the same lines.

J. H. Pardee, operating manager, J. G. White & Co., thought the success of handling express on electric lines depends to a great extent on local operating conditions. Past experience lead him to believe that the handling of freight and express on a large scale is not as profitable as is the business when made supplementary to the passenger business. He said that electric railways of the State of New York are trying to raise the rates for carrying express, which have heretofore been very low.

E. H. Hyman, representing the Electric Package Company, Cleveland, said the essential conditions necessary for building up a lucrative electric express business are obtained where large manufacturing plants are located in many small towns within a radius of 60 miles of a large central city. With these advantageous conditions and unsurpassed express service, good rates can be charged and a large business done. The company with which Mr. Hyman is associated, being engaged only in the express business, necessarily charges the complete cost of operation direct to the earnings derived from the handling of this class of traffic. He stated that he believes any electric railway can, by furnishing unsurpassed service, secure a large percentage of the local business that is now handled by the old-line companies. His company has an agreement with three old-line express companies for the handling of foreign shipments on a tonnage basis. The messengers on express cars operated by the company are paid jointly by the Electric Package Company and the old-line companies.

F. Hardy, superintendent interurban division, Ft. Wayne & Wabash Valley Traction Company, said that the freight and express business on his company's lines has been made self-sustaining. The company handles all the local express business, but has arrangements with an old-line company for handling the through business. About 75 per cent of the business originated by this company is sent to foreign points. The agreement does not conflict with the railway company's local traffic. A very low rate is made on carload shipments, as this class of business can be handled by freight cars attached to regular passenger trains without interfering with them.

FILING SYSTEMS

S. D. Hutchins, chairman of the committee on loose leaf filing systems for trade papers, reported that no definite progress had been made toward interesting publishers in the loose leaf system, which was proposed some time ago by R. N. Hemming, Ohio & Southern Traction Company. On motion of C. D. Emmons, the report was accepted and the committee was instructed to confer further with the publishers of trade papers and ascertain what plans can be made for facilitating the filing of articles published in the papers from time to time.

WATTMETERS ON CARS

Thomas J. Henkle, Electric Service Supplies Company, then read a paper on "The Application of Recording Wattmeters on Electric Cars," which was published last week on page 325. In the discussion of this subject the arti-

cle on "Reducing Power Consumption on Trains of the Metropolitan West Side Elevated, Chicago," which was published on page 1127 of the ELECTRIC RAILWAY JOURNAL, of June 19, 1909, was read. This article gave the results of tests conducted by B. I. Budd, general manager of the company, to determine the amount of current which could be saved by a careful manipulation of the controller, and elicited an interesting discussion as regards what may be accomplished by taking car readings of the current consumed during operation.

H. A. Nicholl, general manager, Indiana Union Traction Company, said his company has had some difficulty in getting satisfactory readings from meters placed on cars.

F. W. Coen, vice-president, Lake Shore Electric Railway, stated that tests have been made in Cleveland to ascertain the relative consumption of current by city and interurban cars. Tests were run on 14 city and 14 interurban cars representing the different classes of equipment operated in that city. The results of these tests showed that while the interurban cars each weighed practically 50 per cent more than the city cars, the current consumed was 3 per cent less per car-mile. It was said this showing was partially due to the fact that the interurban cars made approximately 15 stops, while the city cars made 65 stops. In answer to a question, Mr. Coen stated that he believed the current consumption of interurban and city cars would be directly proportional to the tonnage of these cars if they were operated under identical conditions.

W. H. Evans, formerly master mechanic, International Railway, Buffalo, N. Y., said that the Denver City Tramway Company has developed a thorough system for keeping records of the current consumed by its cars. He recalled instances where the rivalry created among motormen as the result of carefully compiled readings resulted in greatly reduced current consumption.

LONG DISTANCE PASSENGER AND FREIGHT BUSINESS

F. D. Norveil, general freight and passenger agent, Indiana Union Traction Company, then read a paper on "Development of Long Distance Passenger and Freight Business," which is printed in the next column. Mr. Norveil supplemented his paper with sample copies of the company's magazine, and with maps, folders, etc., all of which are used in a general scheme to attract new traffic.

A. A. Anderson, president, thought every railway man should lend his support to a plan to develop long distance travel. Inasmuch as special cars can be successfully run from Indianapolis to Detroit, he knew of no reason why passengers should not be carried an equal distance.

A representative of the Ohio Electric Railway said that there is a big future for electric railways which start right in the development of freight and express business. As an indication of the revenue derived from freight traffic he called attention to the fact that steam railroads in Ohio earn $3 from freight handling to every $1 earned from passenger traffic. He urged systematization in the soliciting and handling of freight.

F. Hardy said some companies who have not found freight and express business profitable have tried to give express service at freight rates. He though that any company can increase its revenue in a large way by properly classifying freight and express and by providing a good, reliable service.

In response to a question asked by F. W. Coen, Mr. Anderson stated that his company has had satisfactory results from charging excess fare for passage on limited trains. This plan encourages long distance travel by providing better accommodations. The excess fare on six limited trains operated both ways daily on the Indianapolis, Columbus & Southern aggregates from $28 to $30 a day. This more than offsets the increased cost of operating the cars.

H. A. Nicholl stated that the Indiana Union Traction Company abandoned the excess fare rate for the reason that its regular rate of fare is practically 2 cents a mile, which is the maximum rate that can be charged in Indiana.

The next meeting of the association will be held at the Claypool Hotel, Indianapolis, Ind., on Nov. 18, 1909.

THE DEVELOPMENT OF LONG-DISTANCE FREIGHT AND PASSENGER BUSINESS*

BY F. D. NORVIEL, GENERAL FREIGHT AND PASSENGER AGENT, INDIANA UNION TRACTION COMPANY

The growth of long-distance freight and passenger business of electric railways is of such recent origin that facts and figures are lacking. To get useful statistics would be a very hard matter, and to treat the subject from the standpoint of one road would be of small interest to the members of this association. This paper is intended to take up the subject in a broad way, defining the ideal conditions under which the traction lines may enjoy a much larger proportion of this traffic than is now being handled by them. The business is here and needs no creation, but does need intelligent cultivation. Information regarding rates and schedules should be distinctly and plainly set forth in circulars or instructions to agents, trainmen and others interested, so that the passenger need not ask in vain at any point of the journey.

We know that a fair proportion of the strictly local business along our respective lines comes to use at rates as high as those of the steam lines, if we only give adequate service and accommodations. The writer believes that we ask more of the public than we should in the matter of congested loading of cars, especially at times of peak travel. Our trains are late probably more often than they should be, but the principal causes of complaints are lack of comfort, not watching the water can, and congested cars. In our efforts to make large earnings per car-mile we overlook the fact that the traveler's comfort is to be considered or we may lose the very means of getting this revenue. We know that we are handling our share of local travel, but this "pot" has been scraped nearly clean. We cannot expect much more from this source, except as the population increases through the upgrowth of commercial and industrial enterprises, in which every traction line should take an active and substantial interest. Take care of the local business properly and it will remain yours, without question.

But to get the long-distance passenger travel, as well as the freight business, requires something more:

First, tariffs naming rates should be prepared in as clear and distinct but plain a way as is possible, stating in positive language what an agent may do and what he may not do.

Second, arrange for a plan of division of interline revenue just as plain and positive as your tariffs, so that there may be no need of useless correspondence between the accounting departments of connecting roads. (We are woefully lacking in this respect now, and it should be given immediate attention.) Let all lines adopt for their interline accounting some standard system, probably the one to be recommended at the next meeting of the American Street & Interurban Railway Accountants' Association, at Denver in October. Let the the division of every rate and route be agreed to by the traffic departments before the rates are put into effect, and let this information be in the hands of the accountants.

Third, have maps and through timetables arranged in such a manner as to enable agents to give information about junction points and connections to the passenger at the time he buys his ticket; arrange for the transfer of baggage at junctions and for carriage transfer of pas-

*Abstract of a paper read before the Central Electric Railway Association, Aug. 26, 1909, at Detroit, Mich.

sengers, where necessary, so that the passenger is put to the minimum of trouble.

Fourth, instil courtesy into your agents and trainmen. If they cannot acquire it, do not keep them, but insist on this one thing above all else. It is your best stock in trade.

Fifth, the things absolutely essential to secure and hold long-distance travel, which must be provided, are good cars, through service, reliability of schedules, proper inspection, sanitary care of toilet rooms, proper icing and watering of cars and careful cleaning of cars. On long runs this cleaning should be done en route by men with proper appliances. Buffet arrangements for meals should be provided also, if possible. If this is not practicable, stated stops for meals should be made at some hotel, where patrons can secure something to eat at prices to suit the individual purse. This service should be advertised, and conductors should arrange in advance for passengers wishing meals.

Allow sufficient room so that each passenger may ride in comfort. An average of 25 to 30 passengers to a car, on a basis of 2 cents per mile per passenger, is good earnings for a passenger car, either motor or trailer. Do not expect to retain business and annoy long-distance passengers with stops at every hamlet. They no sooner arrange themselves and their luggage so as to take a moment's rest and enjoy the scenery you have advertised, when you require them to move and make room for some roughly dressed man, possibly a farm laborer or mechanic, all right in himself, but not in apparel suitable for sitting beside some one in good dress. We are too prone in our democratic fashion to say, "That's all right—it won't hurt 'em," but it does hurt your business. Have we not now reached the stage where, except in emergencies, we should furnish more seating space for our patrons?

Some measure of attention as to ventilation in winter, as well as in summer, and a proper regard for general comfort, with, perhaps, a little luxury, will have great weight in coaxing business to the electric lines. When you get it, take measures to hold it, for patronage is fickle.

A through car between Indianapolis, Ind., and Toledo, Ohio, Detroit, Mich., or Cleveland, Ohio, the writer feels sure, would get its share of business at an equal rate of fare with the steam lines, even though it ran on a longer schedule, if properly advertised and the goods delivered. There are many runs of more than 100 miles now being operated successfully. However, for these longer hauls it will require better and more commodious equipment and more regard to the privacy and dressing accommodations of lady passengers. This means work for the car builders and designers, but it also means additional earnings to the railway companies.

These are some of the possibilities in long-distance passenger travel. The same rules apply to the development of freight traffic as well. We have to-day no switches, no cars and no warehouses worth mentioning for handling through freight. Not one traction line in Indiana or Ohio has sufficient equipment to offer the public a bid for their freight traffic, yet it continually knocks at our doors, asking for help which we cannot now give them. While it is true that we do get some of the local freight traffic it is only a small part of the business that we might get.

The advantage of time of handling (especially the handling of carloads) is in favor of the traction lines, at least for distances up to 150 or 200 miles. With necessary equipment and prompt movement there is no reason why we should not get this traffic. The amount of freight business, both local and interline, handled by traction lines varies from 5 to possibly 20 per cent of the gross earnings. From 60 to 80 per cent of the gross earnings of a steam road comes from its freight business. This gives some idea of the immensely increased earning power of the electric lines, provided they have facilities to care for this kind of business. Some attention must be paid to the standardization of equipment; easier curves and grades must be provided; freight houses and storage tracks must be built.

That there is money in through freight and passenger business is beyond question, but there is a long lane of improvements which must be made in every branch of electric railway equipment before we can say we are prepared for this traffic. When you design your next cars don't design them simply for the service of to-day or to-morrow, but for the future. Do not see how light and cheap they can be built, but how large and how many luxuries may be added. Build big, heavy motor cars complete in themselves and capable of handling one, two or three trailers, each as complete and just as comfortable as the motor car.

The schedule of all through trains should be the outcome of a joint conference between the traffic department, the operating department, the mechanical department and the electrical department with the general manager as referee. The traffic department, in order to offer inducements to the public, sometimes wants more than it is possible or practicable to give it. The operating department, on the other hand, may expect something from the equipment, either the cars or power, which it would not be possible to obtain. However, a joint conference with a disposition to give or take according to the best judgment of the majority, should result in something practicable and fair to all.

Trains should start from terminals and be split up at junctions, giving practically through service to such points as business will justify. All of the features of the through service must then be put before the public in as alluring shape as is possible and constantly be kept before them until the success of these runs has advertised them for themselves. Then by attractive literature constantly keep your service in the limelight. Show comprehensive through schedules, transfer arrangements and through tariffs; in fact, go into every and all details, even to the smallest.

HISTORICAL POINTS MARKED BY BERKSHIRE STREET RAILWAY

A folder issued by the Berkshire Street Railway, Pittsfield, Mass., calls attention to the fact that it has marked over 60 points of historical, geographical and industrial interest on its lines between Great Barrington, Mass., and Bennington, Vt. The Berkshire Street Railway and connecting lines reach Great Barrington, Stockbridge, Lee, Lenox, Pittsfield, Cheshire, Adams, North Adams and Williamstown in Massachusetts; Pownal and Bennington in Vermont, and Hoosick Falls, N. Y. A typical description of the 62 contained in the folder is the following: "24.—This point gives the best far view of Greylock Range, being about 16 miles distant. The central mountain in the group is Mount Greylock, whose summit, 3505 ft. above sea level, is the highest point in Massachusetts."



Folder Calling Attention to Points on Berkshire Line

The University of Michigan has arranged a special course in railway administration which will be started with the fall term. The course is divided for four classes of students. First, those who desire to enter any of the business or administrative branches of railway service. Second, those who desire to enter the service of State or Federal commissions as statisticians or economic investigators. Third, those who wish to undertake statistical or appraisal work for bankers and brokers. Fourth, those who wish to make a study of transportation problems as part of a general education. The general academic, law, engineering and economics departments will all be utilized for special courses.

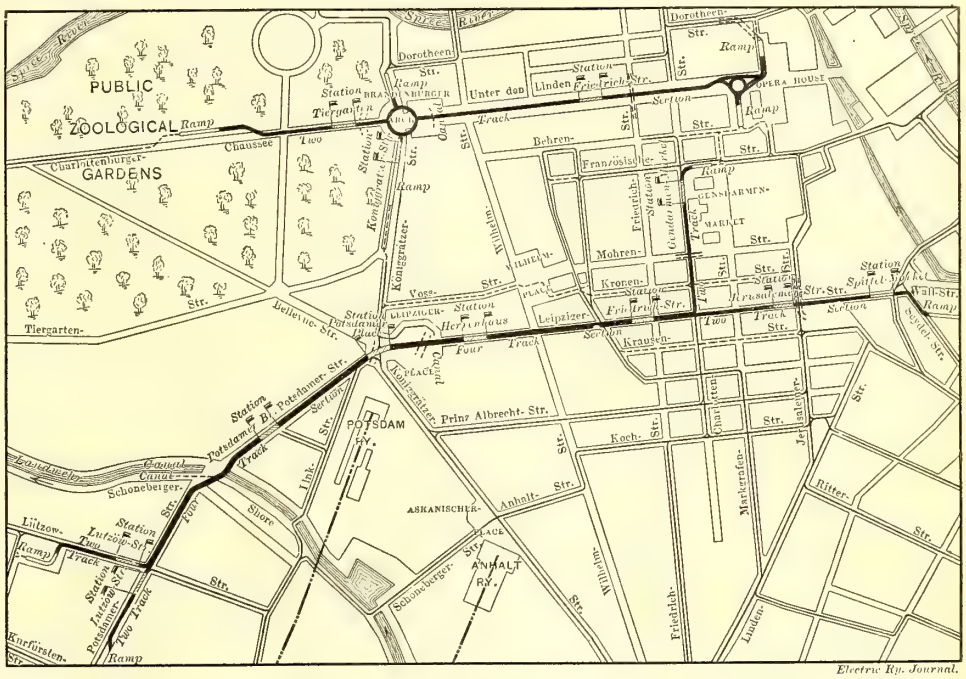
PROPOSED SURFACE CAR SUBWAYS IN BERLIN

The Grosse Berliner Strassenbahn now has pending before the franchise authorities of Berlin a proposition to build two subways for the use of its surface cars. As shown in the accompanying map, one of these tunnels is to be built under Potsdamer and Leipziger Streets and the other under the Unter den Linden Boulevard. The principal object of the first or southern tunnel is to relieve Leipziger Street of the greater part of its surface car traffic, which includes almost every line in Berlin. The second or northern tunnel is intended to improve the through service between outlying sections, and not primarily to serve local travel. Different station spacing is proposed to accord with the different purposes for which the two subways are to be used. The Leipziger Street subway is to be 3.5 km (2.2 miles) long, with an average distance of 385 m (1255 ft.) between the stations, whereas the Unter den Linden subway, which will be about 1.85 km (1.15 miles) long, will have only a west and south station at the Brandenburger loop and a second station about 1.3 km (0.81 mile) distant at the important business thoroughfare, Friedrich Street. The stations on the Leipziger Street subway will be 220 ft. to 250 ft. long, to accommodate three two-car trains at a time. Portions of this tunnel are to have four tracks.

The company does not propose to make any changes in routing or maximum speed in the Leipziger Street subway, but has calculated that the tunnel distance will be traversed in 13 minutes, as against the present periods of 19 minutes and 23 minutes for the run on the street. It is customary in Berlin to run single trailers with motor cars, and the spacing between the rear ends of such 62-ft. trains is to be 110 m (361 ft.), so that at a speed of 25 km (15.5 miles) an hour the headway will be 15.8 seconds. This headway is regarded as ample, since the average stop, according to surface experience, does not exceed 10 seconds.

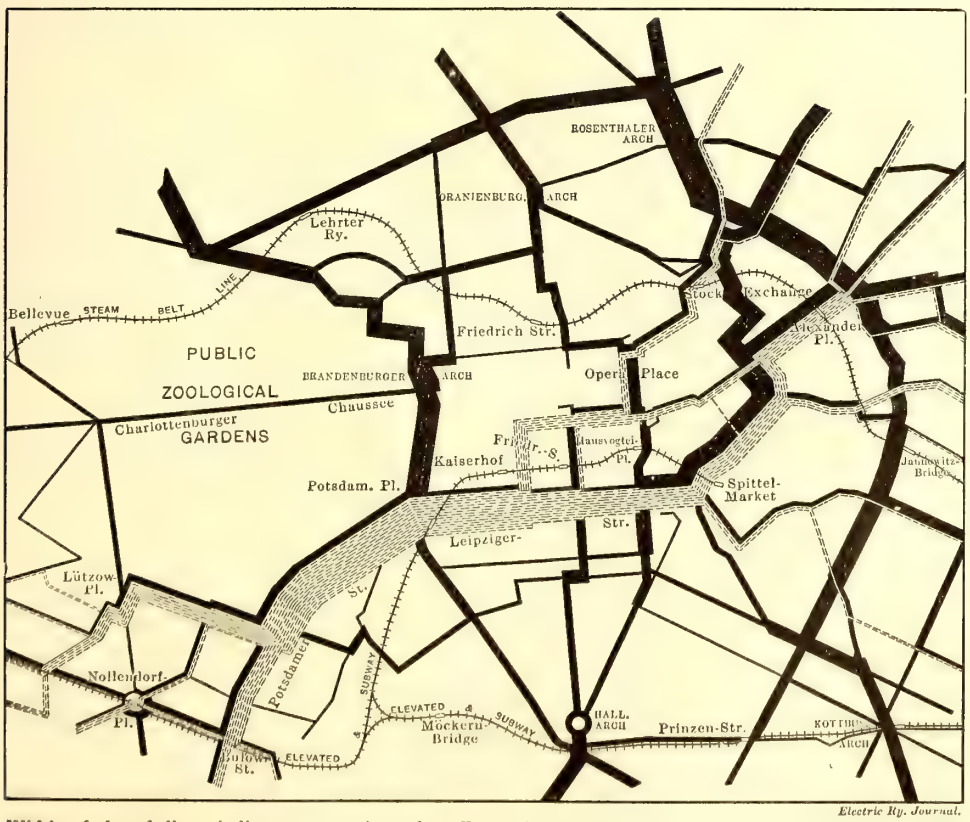
The station will load and unload passengers practically as on the street. There will be no ticket booths, turnstiles or other impediments to rapid movement, and no special form of rolling stock.

The importance of the proposed Leipziger Street subway is shown in the accompanying travel density map, which illustrates the effect the subway would have in relieving the present surface lines. The map is drawn upon the basis of a count of passengers taken Nov. 9, 1907. The width of the lines is proportional to the number of passengers traveling over each route on that day, the scale being approximately ¼ in. to every 150,000 passengers per day. As explained, the dotted lines indicate the proportion of traffic which will be



Solid line shows proposed subway; thin lines, existing routes; dotted lines new routing required by subway.

Map of Berlin, Showing Proposed Route of Subway



Width of dotted lines indicates proportion of traffic to be taken by subway; width of solid lines that remaining on street.

Traffic Map of Berlin, Showing the Estimated Relief Afforded by Proposed Subway

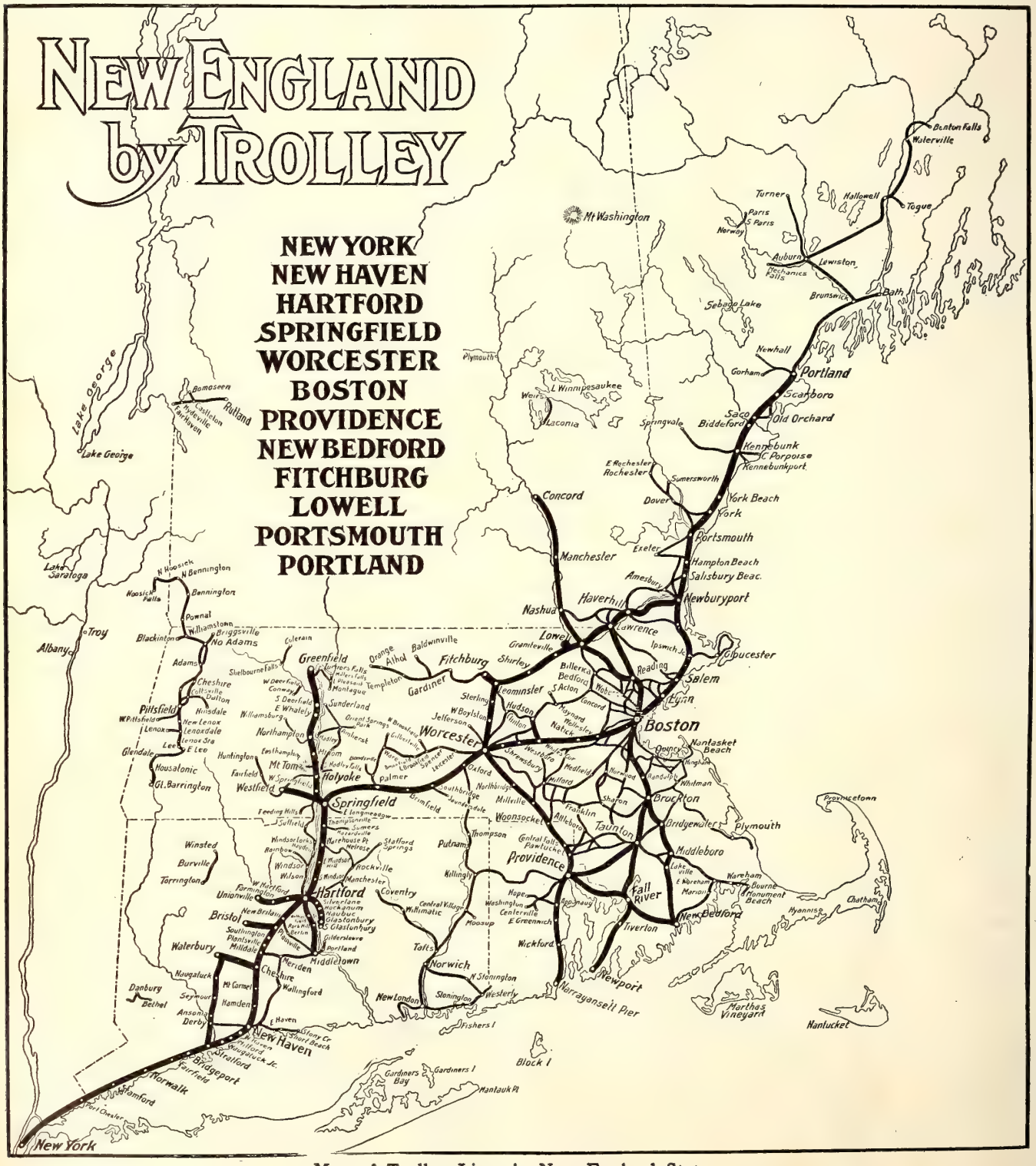
taken by the Leipziger Street subway and the width of the solid lines the proportion of remaining surface car traffic after the subway is built. About 70 per cent of the present traffic goes to Leipziger Street, while the remaining 30 per cent is through travel. The average daily number of cars, with or without trailers, passing Potsdamer Place between 6 a. m. and 10 p. m varies between 4800 and 4900, to which must be added some 4500 omnibuses and heavy trucks and 20,000 cabs and other light vehicles.

The Unter den Linden tunnel is to have two tracks throughout. It will not only serve to facilitate through service between the eastern and western portions of Berlin, but may also act as a relief to the other tunnel should two tracks eventually be used for through service.

NEW ENGLAND BY TROLLEY

The Hartford & Springfield Street Railway has issued a large map in three colors entitled "New England by Trolley" and is circulating also for advertising purposes a folder on which this map is reproduced in smaller size. The accompanying illustration shows the map as circulated by the company. It is believed that it will be effective as an advertisement to induce long-distance trips by electric railways in New England. Thomas C. Perkins, vice-president of the company, has been active in a movement designed to arouse interest in long-distance trolley trips.

In the folder, photographs of various scenes in the places reached are reproduced. The approximate running



Map of Trolley Lines in New England States

time and fares by trolley between New York and Portland, Maine, and intermediate points are given as follows:

New York City Hall to:	Fare.	Time, hrs.	min.
Stamford	$0.35	3	45
South Norwalk	.50	5	00
Bridgeport	.75	6	30
New Haven	.95	8	30
New Britain	1.30	10	52
Waterbury	1.20	9	15
Meriden	1.30	10	15
Middletown	1.45	10	58
Hartford	1.40	11	37
Warehouse Point	1.55	12	25
Thompsonville	1.60	12	50
Springfield	1.70	13	27
Westfield	1.75	14	17
Holyoke	1.75	14	17
Mt. Tom	1.80	15	07
Northampton	1.85	15	02
Greenfield	2.20	16	32
Palmer	1.80	14	27
Southbridge	2.15	15	39
Worcester	2.45	16	57
Boston	3.04	19	12
Salem	3.24	20	47
Portsmouth	3.99	25	07
Portland	5.04	29	17
Fitchburg	2.70	18	27
Lowell	3.15	20	27
Lawrence	3.30	21	17
Concord, N. H.	3.85	24	02
Woonsocket	2.90	19	37
Providence	3.10	21	02
Brockton	3.29	20	47

These fares and running times are stated to be approximately correct, but to vary somewhat according to the connections made.

SPECIMENS OF RAIL CORRUGATION IN EUROPE

Since the publication of the abstract of Mr. Peterson's study of rail corrugation this paper has received from Arthur Busse, chief engineer of way and construction, Grosse Berliner Strassenbahn, photographs of a number of specimens of rail corrugation on the surface, elevated and



Fig. 1—Rail on Tangent in Paved Street in Berlin, Showing Slanting Corrugations

steam railroad lines in that city. These photographs accompanied the paper on rail corrugation presented by Mr. Busse at the Munich convention of the International Street & Interurban Railway Association last year, published in abstract on page 1323 of the ELECTRIC RAILWAY JOURNAL,

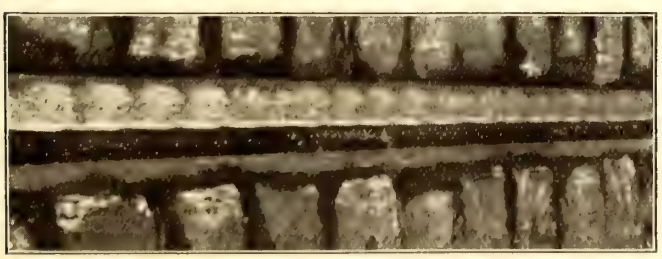


Fig. 2—Corrugated Rail Laid on Concrete Foundation

Nov. 7, 1908, and several of the most interesting are reproduced herewith. At that time Mr. Busse enunciated the theory, which he still holds, that a predisposition to corrugation is given in the rail mill and that corrugation is then developed by rapid braking, quick acceleration, high speeds which cause hammer blows, lurching due to defects in truck construction, large radius curves where a tendency exists for the outer wheels to slide in jerks on the longer

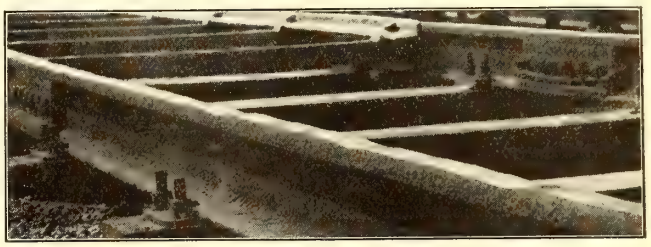


Fig. 3—Badly Corrugated Rail on Triangular Curve of Berlin Elevated Railway

outer rail, rigid roadbeds which fail to take up the blows like an elastic substructure, etc.

Fig. 1 shows a section of a tangent track with slanting corrugations in paved streets in Berlin. Fig. 2 shows a section of corrugated rail laid on a concrete foundation. On this rail waves had developed to such a degree that the

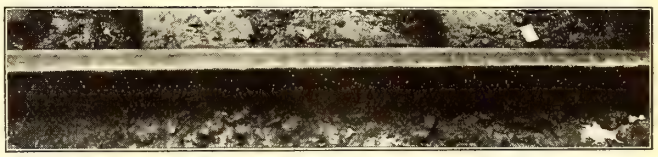


Fig. 4—Corrugated Rail Near Station on Berlin Steam Belt Railway

passing cars loosened the whole structure. Similarly embedded rails on the same section with little or no corrugation are still as secure as ever. Fig. 3 illustrates very badly worn rail on the triangular curve of the Berlin elevated system, where the corrugations are of a depth of 0.97 in. Fig. 4 illustrates a corrugated rail near a station on the

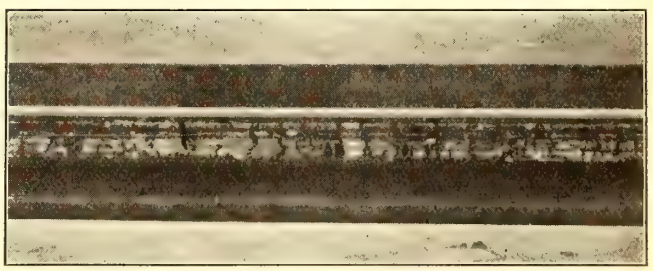


Fig. 5—New Rail, Filed to Show Incipient Corrugations

Berlin steam belt railway. The deepest corrugations on this line occur, however, on the free-running sections, in switches and opposite crossings. Fig. 5 illustrates an unused rail received from the mills, but with the tread filed and showing, Mr. Busse thinks, corrugations which will develop in service. Mr. Busse approves of the plan to use softer rails to secure more uniform wear.

The negotiations for the purchase of the tramway and electric lighting system of St. Petersburg, Russia, are still pending. The purchasing syndicate is said to include the German General Electric Company, Siemens & Halske and the British Westinghouse Company. The price is 20,000,000 rubles, and an additional sum of 30,000,000 rubles is to be reserved for immediate extensions and improvements to the system.

WISCONSIN CLASSIFICATION OF ACCOUNTS

Copies of the classification of accounts for street and interurban railways as finally adopted by the Railroad Commission of Wisconsin have been issued, with an introductory letter, dated July 1, 1909.

Some slight changes have been made since the preparation of the titles of the accounts as published in the Electric Railway Journal of June 12, 1909, page 1076. The power accounts, as finally prescribed for street and interurban railways, are identical with those prescribed for electric utilities. William J. Hagenah, statistician of the commission, from whom a copy of the classification has been received, writes: "Several of the operating expense accounts which appear in the classification of the Interstate Commerce Commission were excluded from our classification because they had no application to Wisconsin railways." In its introductory letter the commission says:

It will be observed that this classification in many respects conforms quite closely to that prescribed for electric railways by the Interstate Commerce Commission. A special effort was made to secure similarity wherever possible, but in a number of instances it was found that changes were necessary to secure greater detail in expenditures or to combine or eliminate accounts which had no application to Wisconsin electric railways. The greatest departure from the classification of the Interstate Commerce Commission is in the power accounts, those herein prescribed being identical with the power accounts prescribed for electric utilities. Where corporations are engaged in only a railway service, greater detail of the cost of power generation was deemed desirable. Where, however, corporations are engaged in both railway and electric light and power service, the change in question will result in greater simplicity, since but one group of power accounts will be required, the total cost of power being apportioned over the several departments on the basis of benefits received.

In the preparation of this classification conferences were had with the accounting committee of the Wisconsin Street & Interurban Railway Association and with officers of the association and of individual railway systems. Co-operation and assistance were afforded by representatives of the electric utilities.

Owing to the great difference in size of the railways, it was found necessary to prepare three separate schedules which would recognize these conditions, and by each following the same general principles would permit comparison of the operating results between the smallest and the largest companies. Class C schedule is the basis upon which class B and class A schedules have been founded, the latter two being an unfolding and refinement of the smallest classification. The basis of the classification is as follows:

Class A companies—Those having gross earnings in excess of $500,000.

Class B companies—Those having gross earnings less than $500,000 but in excess of $80,000.

Class C companies—Those having gross earnings less than $80,000 per year.

Any railway in class C or class B desiring a more detailed classification than that prescribed for its class should open the accounts prescribed for the next highest class, and any railway in class A requiring a more detailed system may go into as much subdivision and refinement of each of the submitted accounts as its interest requires, but must not rearrange or combine any two or more of the accounts in such a manner as to interfere with the integrity of the scheme and thus destroy the possibility for comparison. A copy of all additional accounts and the desired subdivisions of the prescribed accounts must be filed with the Railroad Commission before such accounts are opened. All records and accounts, including those which are an enlargement, subdivision or refinement of the prescribed accounts are to be open at all times to the examination of this commission.

Provision is made for changes into operating expenses to cover depreciation and extraordinary contingencies. The text covering these accounts is as follows:

Depreciation.—Every electric railway shall carry a proper and adequate depreciation reserve to cover the full replacement of all tangible capital in service. There shall be opened a depreciation account, to which shall be charged monthly, crediting the depreciation reserve, an amount equal to one-twelfth of the estimated annual depreciation of the tangible capital in service of the railway, or as near that amount as the finances of the property will permit. Tangible capital comprises all land and its improvements and all interest in land the term of enjoyment of which is one year or more from the date of grant, buildings and structures and all equipment, facilities and apparatus used and useful in the operation of the railway and having an expectation of life in service of more than one year. Hand and other small portable tools, because of their liabiliy to loss and theft, are to be treated as part of the operating expenses of the year in which they were purchased. The estimate here required shall be made upon a rule designed to effect by its uniform application during the life of the tangible capital in service, a charge into operating expenses of the total original cost of such capital, less its salvage or scrap value upon retirement. When any building, structure, machine, facility or unit of equipment which at the time of its construction or installation was classified as tangible capital becomes through wear and tear economically irreparable, the substitute therefor having substantially no greater capacity than the unit for which it was substituted, shall be charged against the depreciation reserve. When, however, the building, structure, machine, facility or unit substituted has a substantially greater capacity than that for which it was substituted, the cost of the substitution of one of the same capacity as the unit replaced, shall be charged to the depreciation reserve, and the remaining cost of the actual substitution shall be charged to the appropriate construction and equipment account. The details of the deduction on account of depreciation and the basis thereof will be called for in the annual report to the Railroad Commission.

Contingencies (extraordinary).—When the property of the carrier is visited by an extraordinary casualty of such a nature as to be beyond anticipation through the exercise of ordinary and reasonable prudence, and of such a nature as not to be contained in the provision for depreciation, as earthquakes, floods, cyclones, etc., resulting in irreparable damage, there may be charged to this account the original cash cost of such irreparably damaged property, less the salvage or scrap value and irreparable wear and tear from use accrued thereto. When the amount of such damage or loss is considerable, there may be set up an extraordinary casualties suspense account, to which shall be credited monthly the amount charged to the account contingencies (extraordinary) until the total loss or damage caused by such casualty shall be wiped out through operating expenses. All ordinary casualties, that is, those which occur with such uniformity and frequency that the principles of insurance are applicable thereto, must be provided for by suitable charges to the insurance reserve, set up and maintained for such losses, or are considered as included in the provision for depreciation, or constitute an item of current maintenance.

The required reserves are three in number, covering depreciation, sinking fund and amortization. The text of these accounts is as follows:

Depreciation reserve.—To this account shall be credited monthly, or as they are made, all charges to the depreciation account (hereinbefore described), the income from the investment of any money or from any security belonging to the depreciation reserve, and any other appropriations which may have been made to it. When, through wear and tear in service, casualty, inadequacy, supersession or obsolescence, any building, structure, facility or unit of equipment originally charged to capital is no longer economically repairable, and in order to keep the capacity of the railway system up to its original or equivalent state of efficiency it is necessary to make a complete replacement of such building, structure or unit of equipment, the money cost of the original unit replaced and charged to capital (estimated if not known, and if estimated, the basis thereof shall be shown in the record entry) shall be charged to the depreciation reserve, and the excess cost of the substituted unit

over such original unit shall be charged to the appropriate capital account. When any building, structure, facility or unit of equipment originally charged to capital is retired from service and not replaced by any other unit of similar nature or equivalent thereto, the original money cost thereof (estimated if not known, and if estimated the basis thereof shall be shown in the record entry) shall be charged to this account and such amount originally entered or contained in the charges to capital in respect to such unit so being retired shall be credited to the capital account to which it was originally charged, and any adjustments necessary made through the surplus account. The salvage or scrap value of any unit of equipment retired from service or replaced by any other unit will be credited to this account. An analysis of the charges and credits to this reserve will be called for in the annual report to the Railroad Commission.

Sinking fund reserves.—Sinking fund reserves shall be maintained whenever they are required in pursuance of the provisions of mortgage deeds, deeds of trust, contracts or provisions of the law. A separate sinking fund reserve shall be maintained for each contractual requirement, to which reserve shall be credited any appropriation made in pursuance of the terms of the respective mortgage and trust deeds, contracts, etc., and charged to the account contractual sinking fund requirements, and also accumulations resulting from any security belonging to such particular reserve. The title of each reserve shall clearly indicate the purpose for which it is being maintained. An analysis of the charges and credits to this reserve will be called for in the annual report to the Railroad Commission.

Amortization reserve.—This account shall be raised to provide for the amortization of intangible capital in service. To it shall be credited monthly, or as they are made, all the amounts charged from time to time through operating expenses to the account amortization reserve requirements, which account is to be set up where the nature of the capital occasions the setting up of this reserve. Such reserve shall also be credited with all accumulations resulting from the investment of any moneys or the interest or dividends from any securities belonging to it. For example, a corporation pays $100,000 for a 20-year franchise to operate an electric railway. In order that this amount shall be set aside out of revenue and the actual capital of the corporation not impaired by dividends paid, there shall be charged monthly to the account amortization reserve requirements, crediting the amortization reserve an amount which, invested at current rates of interest, will at the end of the franchise term have created an amount equivalent to the cost of the franchise. An analysis of the charges and credits to this reserve will be called for in the annual report to the Railroad Commission.

The optional reserves are as follows:

Maintenance reserve.—This reserve may be raised by those electric railways which operate equipment, the repairs to which are occasioned only at remote intervals, and are then so considerable in amount as to cause wide fluctuations in the operating expenses for the division of operation or group of expenses of which the maintenance account in question is a part. This reserve must not be charged with renewals and replacements of property and equipment which, from their nature, are chargeable against the depreciation reserve.

Injuries and damages reserve.—Railways may open an injuries and damages reserve, to which will be credited monthly any amounts which may be charged to the proper operating expenses or other expense accounts. The amounts so charged and credited shall be such as are estimated to meet the admitted liability against it for injuries to persons and damages to property other than that of the railway, insofar as such claims can be anticipated by the exercise of reasonable judgment. All such claims, when paid to satisfy admitted liability and judgments obtained in the courts of law, shall be charged to this account.

Insurance reserve.—Railways may set up this reserve, to which shall be credited monthly the charges made in operating expenses to the insurance account to cover self-carrying risks. When any irreparable damage to the property of the railway occurs, and the nature of such damage is such as to be covered by the provisions of self-insurance, the cost of repairing the property damaged, or the cost of its replacement, shall be charged to this reserve.

ELECTRIC LOCOMOTIVE BUILT BY THE INDIANAPOLIS COLUMBUS & SOUTHERN TRACTION COMPANY

The accompanying illustration shows an electric locomotive which was built at the Greenwood shops of the Indianapolis, Columbus & Southern Traction Company, Indiana. The car is short, being only 16 ft. in length, but is strong and compact. The body is mounted on an old style Brill single truck, which has been remodeled, and carries two GE-57, 50-hp motors geared 16.69. The locomotive is 10 ft. above the rail, and was built for handling coal cars about the power house and yards.

The bottom framing consists of four 5 in. x 7 in. oak sills with one 5 in. x 7 in. needle beam. There are four 1¼ in. truss rods bolted through the end sills which support the needle beam at the center. There are also filling blocks placed between the sills, mortised into the sills and held together by ¾ in. rods. The end sills and intermediate sills have ¾ in. x 7 in. corner irons on the inside corners, and are bolted through the sill, and a ½ in. x 7 in. plate, which runs the entire length and also across the ends of the car. The draw bars are the standard M. C. B., and



Indianapolis, Columbus & Southern Traction Company's Electric Locomotive

are hung 34½ in. above the rail. There are two 1½ in. rods that connect the two draw bars together in such a way as to take a part of the load from the opposite end of the car. The top framing is 3 in. x 3 in. oak for posts placed 2 ft. apart except in the cab. This framing is securely bolted and held in place with angle irons. The inside of the body is lined with 1 in. lumber, and the outside covered with No. 16 iron riveted and screwed to the posts. The cab is 4 ft. x 6 ft. 4 in., and is finished in wood.

The locomotive is fully equipped with air, sand, classification markers, electric headlight, etc. The ends are filled with scrap iron to give the car sufficient weight. The total weight of the locomotive is 25 tons, and it is capable of hauling three 50-ton coal cars up a 2 per cent. grade into the boiler house.

In a paper on steam turbines read last month before the Incorporated Municipal Association, at Manchester, by Alfred S. Blackman, borough electrical engineer and manager at Sunderland, the author estimated that the maintenance of a steam turbine plant, consisting of turbine, alternator and condensing plant, should not exceed $500 per year per 10,000,000 generated, and in many cases would be less than this. He quoted some figures on the consumption of his 2000-kw turbine, as follows: Steam with 27½-in. vacuum, 17.07 lb. per kw-hour on one test and 17.1 lb. on another. The cost of oil per turbine, generating 9,000,000 kw-hours during the year, was $64, and for the auxiliaries $88.12 for the year.

COMMUNICATIONS

TROLLEY WIRE SPECIFICATIONS

Arthur D. Little, Inc., Laboratory of Engineering Chemistry

Boston, Aug. 24, 1909.

To the Editors:

In the issue of the Electric Railway Journal for July 31 there appeared the report of committee W of the American Society for Testing Materials on proposed "Standard Specifications for Hard Drawn Copper Wire." A long-felt want has existed for copper wire specifications which would enable intelligent purchase, and also establish a reasonable manufacturing standard. Specifications issued by the American Society for Testing Materials justly attract widespread attention and respect, but before their adoption by electric railway companies a careful consideration of the requirements of such users is desirable. The proposed specifications cover all sizes and kinds of hard drawn copper wire, but the principal interest to electric railroads lies in their application to trolley wire.

During the past three years the company with which the writer is connected has tested all of the trolley wire purchased by the Boston & Northern and Old Colony Street Railway companies, of Boston, Mass., under specifications which clearly defined the quality of wire desired. Every reel has been tested before purchase, and the specifications have been rigidly adhered to. The results have been so satisfactory that a criticism of the proposed specifications seems justified.

The determination of the characteristics of high-grade trolley wire and the selection of necessary tests must be preceded by a knowledge of the service demands and the possible defects incident to manufacture. Trolley wire in service is subjected to the tension of the span, to the stresses of ice, wind and snow, and to the severe pounding and wear of trolley wheels. The passage of the wheel produces a wave motion on the wire which proceeds until a fixed support checks the wave and produces a sharp upward bend of the wire. A daily record of the breaks at or near a fixed support proves the seriousness of this factor. Efficient trolley wire must therefore possess the following characteristics to a marked degree:

(1) Conductivity, for economical power transmission.

(2) Tensile strength, to withstand abnormal stresses.

(3) Flexibility, to enable stringing and to allow adjustment of the wire under stress.

(4) Homogeneity, to distribute stresses uniformly.

(5) Toughness, to withstand kinking, wrenching and slow distortion.

Each of these qualities is essential, but all of them are interdependent, so that marked increase in one produces a proportionate reduction in one or more of the others. Specifications must therefore require that the wire possess each of the maximum amount consistent with the others.

A study of manufacturing conditions reveals the following main causes for inferior wire:

(1) Impure copper, resulting either in diminished conductivity or lack of toughness.

(2) Insufficient drawing, producing low tensile strength and high ductility.

(3) Lack of or insufficient annealing, causing high tensile strength but lack of ductility.

(4) Accidents of manufacture, oxide seams, flaws and uneven drawing, which increase wear and accelerate fracture under repeated stress.

The first defect lies in the quality of copper in the bar. If the impurities are in the metallic state, the electrical resistance is raised, while if over oxidized in refining, the excess copper oxide produces brittleness, or "shortness."

The fundamental principle of hard drawn wire is the production of a hard, dense surface by drawing the wire through steel dies. Other things being equal, the tensile strength of wire varies directly with the amount of reduction produced by drawing, and is, therefore, a function of the cross-sectional area and the amount of work expended upon the surface. The ductility of the wire, however, varies inversely with the tensile strength. As the toughness is improved by drawing, high-grade trolley wire is annealed after a part of the drawing, to prevent excessive hardness and low ductility, and the partially annealed wire is then drawn through two or more "holes."

The fourth defect, that of accidents in manufacture, is most common because most difficult to avoid. Copper bars are covered with a layer of oxide, and frequently exhibit a concave upper surface due to shrinkage in casting. On entering the rolls the edges of such a bar are lapped over, enclosing the oxide, and the subsequent passes and drawing cover this flaw, which may extend through many feet of finished wire. Carelessness, changes in temperature, accidents to dies, produce wire of uneven hardness throughout its length.

The proposed specifications include three tests, by means of which these defects are to be detected. These tests are: Tensile strength, elongation and conductivity.

The committee states that "it is impracticable to so define the conditions of the test that a twist test can be made definite and reliable," and, further, that "wire which will meet the physical tests included in the proposed specifications will meet any properly made twist or wrap test that would reasonably be required."

The conductivity determination will detect metallic impurities; the elongation measurement will prevent over-oxidized copper, excessive hardness or insufficient annealing. The tensile strength test will detect "short" copper or insufficient drawing, and with the elongation may show non-homogeneity. But none of these tests reveals oxide seams or is sure to indicate variations in hardness. Tensile strength, as stated before, is dependent upon the area of cross-section and surface hardness. A flaw extending through many feet of wire may not have a cross-section at any point sufficient to affect the total area of the wire nor to reduce the ductility, but this same flaw, under the bending stresses of service, will open and offer added chance for wear and fracture. Further, a wire may be non-homogeneous, and yet sufficiently strong and ductile at all points to meet the specifications, which in service would fail because bending stresses would concentrate on the softer portions, and thereby subject the wire at such points to abnormal conditions.

These two defects can be detected with certainty only by a twisting test. Under such a test the seams open up as in service, and cause the wire to break after a comparatively few turns. Non-homogeneous wire exhibits concentration of twists in the soft portion, and consequent low number of turns before fracture. In addition, this test detects impure copper, excessive hardness or insufficient annealing as surely as an elongation measurement. It can be safely stated that to an experienced inspector this test affords more information on the quality of wire than any other test. It is therefore the writer's contention that, while an elongation measurement affords desirable data, a

specification omitting a torsion test fails to protect the purchaser of trolley wire.

The procedure followed in making this test for the Boston & Northern and Old Colony Street Railway companies affords an accurate method, the conditions of which are capable of exact repetition on different specimens. The machine employed for test is composed of two jaws attached to a rigid base in such a manner that the specimen lies in a horizontal plane and is subjected only to torsional stress. One jaw is free to slide horizontally to allow for elongation under stress, but is prevented from revolving by means of lugs. The other jaw revolves by machinery at a fixed speed of four turns per minute. Both jaws consist of two corrugated grips, which are clamped to the wire with sufficient force to prevent slipping. Little trouble is experienced by breaking of the specimen in the jaws, but if this occurs a retest is made. The test is carried out in the same room as the tensile test, so that temperature changes are alike for both. The details of such a machine may be varied, the essential requirements being to apply the torsional stress slowly and uniformly and to avoid any other stresses, such as bending or compression. Three specimens are carefully straightened and subjected to test, the operator noting the number of turns before fracture and the behavior of the wire under torsion. The specifications require the average number of turns of the three specimens to pass a certain figure, and provide a minimum below which no one of them shall fall. It is further specified that the wire shall show no slivering or splintering under torsion, and the twists shall be evenly and uniformly distributed. Inferior wire is invariably detected, and the wire which meets the requirements is admittedly of the highest grade.

The experience of the above mentioned railway companies has shown that certain defects of wire are detected only by the torsion test, and has established a reliable method of testing which affords consistent results. It is hoped that all consumers will consider this point carefully in preparing specifications, and that the American Society for Testing Materials will not adopt as standard, specifications which in any respect fail to protect the consumers' interest.

Carl F. Woods.

ALTERNATING VS. DIRECT CURRENT

London, Aug. 18, 1909.

To the Editors:

I have read the communication of Dr. Frederick Eichburg in your issue of Aug. 7. As the part inventor of a particular arrangement of coils on a particular kind of single-phase motor, he is entitled to such consideration as may be accorded him by those engineers who have pinned their faith to single-phase systems. My particular reason for taking notice of Dr. Eichburg's communication is on account of the statements he makes in connection with the Central London Railway—statements wholly inaccurate and sufficiently illustrative of Dr. Eichburg's method of dealing with facts.

I was not responsible for the form of locomotives on the Central London Railway nor for the type of motor specified. What I did recommend need not be discussed. The fact is, however, the locomotives were a mechanical and electrical success, with the exception of two equipped with motors made in Germany. These burned out with great promptitude and had to be rewound. The balance were made at Schenectady, U. S. A. The sole reason for replacing these locomotives was on account of surface vibration due to the concentrated weight on the locomotive drivers.

I note Dr. Eichberg's satisfaction with his Hamburg cars. I confess I have not seen them. But, having seen some of his motors after a few months' work, I trust there is more reason for self-glorification in this than in the former instance.

H. F. Parshall.

DISTORTED RAILS AND CORRUGATIONS

New York, Aug. 30, 1909.

To the Editors:

I have read with interest the resumé which you published last week of the report on rail corrugation by Mr. Peterson, manager of the municipal railways of Dortmund, Germany. While I am not in a position nor do I desire to dispute any of the facts presented, but regard them as a valuable contribution to the subject, it does not seem that they warrant the conclusions that are drawn. While it may not be that the investigator entered upon his work with any preconceived bias or ideas on the subject, the whole tone of facts set forth show that apparently the lack of homogeneity of the rail was the sole cause of the trouble that was looked for. It only needs a most casual reference to the pages of your journal to see that there has been from time to time other marshaling of facts to prove other plausible theories, that any one of a hundred things might cause corrugations—and still we are in doubt.

Taking up the matter of Mr. Peterson's hard and soft and indented surface of rails, I beg to call attention to the casual investigation along these lines that I made a few years ago and which was published on page 506 of your issue of Oct. 5, 1907. In this it appeared that the crown and hollow of the corrugations were both hard and soft indiscriminately and that by a judicious selection of locations or rails it would be possible to prove that there was no difference or that there was a wide difference, just as the mental bias might be inclined. Then, even granting that the crests or crowns of corrugations are hard and the valleys soft, it remains to be proved that this condition is not the result rather than the cause of the corrugations.

Great emphasis is laid, too, on the fact of the peculiar treatment in rolling to which street railway rails are subjected as the primal cause. This may be quite true, but it does not explain why some of the worst cases of corrugation occur with the ordinary T, or Vignole, rail that has not been subjected to this peculiar action of the rolls. Nor does it or the theory of varying homogeneity seem to have any bearing upon the fact that corrugations sometimes develop in rails that have been moved from a location of no corrugations to one where they are always found.

As a matter of fact, corrugations seem to be as illusive as the will-o'-the-wisp and have not as yet been tied down to any set of conditions which other conditions do not seem to disprove and this because of the limitation that has hedged in all observations thus far made. So, while the theory of non-homogeneity may be made to fit and explain the conditions set forth in this article, they fall short of explaining many others with which every one is familiar.

Finally, though the Dortmund investigations are of great value, it seems fair to ask for more and to consider that it is quite proper to render a Scotch verdict of "not proven" in the case.

The subject is a puzzling one, and its numerous anomalies and seeming inconsistencies are so difficult to unravel that no one has yet accomplished it. And this very fact leads me to the formulation of a theory.

When a result is brought about by any one cause that cause is usually easy to discover. But when a result is the product of two or more causes that must occur together and yet whose immediate manifestations are different and elusive, it becomes a matter of difficulty to detect, collect and connect them as productive of some resultant that may be of a totally different character from the separated results of the individual causes. And this difficulty increases with the variation in the character of the causes. It, therefore, seems quite probable that instead of rail corrugation being due to any one cause, it may be the result of a combination of causes, which impossible of detection up to the present time, can be caught, analyzed and remedied by a determined and systematic hunt.

Geo. L. Fowler.

THE "FILOVIA" TRACKLESS TROLLEY IN ITALY

On June 20 the Società Trazione Elettrica, of Milan, has recently put in operation a trackless trolley line, or "Filovia," as it is called in Italy, from Argegno, on the Lake of Como, to San Fedele. The line contains many interesting features, including the surmounting of very heavy grades. It is the eighth that has been installed in Italy by the Società Trazione Elettrica. The total length of these lines is slightly more than 60 miles, and for the most part they are over country roads.





Views of Trackless Trolley Car in Italy

The Argegno line has a total length of 9.3 km (5.81 miles), of which about 500 m (1640 ft.) are in the town of Argegno. There are many very sharp curves, and the grades are as high as 12.9 per cent. The average grade, including the practically level section at each end, is more than 5.7 per cent. The owners contemplate extending the line ultimately to Santa Margherita, on the Lake of Lugano, so that when completed it will have a length of about 14 miles, and will link together the Lake of Como and the Lake of Lugano.

The overhead equipment includes the use of two copper trolley wires of 105,000 circ. mil section, suspended about 18 ft. above the road surface and carried in the same horizontal plane, 350 mm (25 in.) apart. One wire, of course, is positive and the other negative. The negative wire is earthed at intervals of about 1 mile, and the line is divided into three sections, with appropriate section insulators and switches. The trolley wire hangers, insulators and fittings are practically identical with those used on double trolley street railway lines. The only difference is in the hangers, which are of special design, consisting of a yoke of special paraffined wood, to which are fixed two ordinary overhead insulators. This standardization permits the use, later, of the overhead system for a regular trolley line, if the traffic increases sufficiently to warrant the installation of rails. The overhead line is supported in the ordinary way, on wooden poles with steel brackets, except that steel poles are used wherever there are curves. One feeder is run to the end of the first section, the drop of voltage being from 8 to 9 per cent. In one of the other trackless trolley lines built by the same company, and 18 miles long, there is no feeder, the current being supplied to the line at 650 volts directly from the power station, which is half-way between the two termini.

The current in this case is supplied from the San Fedele end of the line by the Volta Electric Supply Company, and reaches the transformer house at 25,000 volts, three-phase, 42 cycles. It is transformed down to 3600 volts, and actuates a motor generator set composed of a 75-hp synchronous motor directly coupled to a 50-kw, 600-volt d.c. generator. A storage battery of 75 amp-hours is connected in parallel with the generator. The car house adjoins the power station, with room for about 10 cars, a repair shop and the company's offices.

The motor cars employed do not differ greatly in general appearance from a single-deck motor omnibus, except that each is provided with a trolley pole. The chassis frame is of pressed steel and the side members are bent in toward the front to allow of a wide turn to the front wheels, which is necessary because some of the curves are

only 20 ft. radius. The wheels are of cast steel and fitted with ball bearings and solid rubber tires. The diameter of the front wheels is 850 mm (33½ in.) and that of the back driving wheels 950 mm (37½ in.). The wheelbase is 8 ft. 6 in. and has had to be kept short on account of the sharp curves of the road. Special attention has been paid to the brakes on account of the heavy grades. There are three mechanical brakes, each independent of the other. One is a band brake working on the chain sprocket drum; a second one is a band brake working on the back wheels, and a third consists of two shoes which expand in the interior of a drum fitted to the back wheels. All these mechanical brakes are water cooled, and each is sufficient alone for holding the car on any of the grades. Spraggs are fitted to prevent the car from running backward if stopped on a hill.

The electrical equipment of each car consists of two 15-hp, 500-volt railway motors, which are spring suspended from the chassis and transmit their power to the driving wheels by means of a flexible coupling, spur reduction gear, sprocket and chain. The gear ratio from the motors to the road driving wheels is 1 to 13, but this ratio can be altered if desired. Each motor drives one wheel independently of the other. A series parallel controller is used. The method adopted of suspending the motors and the gears to the chassis is claimed to give a much longer life to the motors and also to the rubber tires. Each car is provided with a circuit breaker, a canopy switch and a lightning arrester of the ordinary type.

The current collecting apparatus deserves special attention. It consists of a tubular pole carrying at its top a little four-wheeled truck and mounted on a base very similar to that usually used. The connection of the current collecting truck to the trolley pole is made with a special joint, which allows the collector to move easily and to adapt itself to the oscillations of the car and of the overhead line. The pressure of the collector wheels on the wires is about 10 lb. The collector will allow the car to become displaced about 7 ft. either side of the trolley wire even when running full speed, and to take very sharp curves without the poles leaving the wires. The car is even able to turn completely round without removing the collector.

The cars have a seating capacity of 20 passengers and accommodation on the roof for parcels and luggage. The weight of a car complete in running order is about 3 tons.

The schedule of the new line is 10 trips each way, and the fares charged are 30 cents for the up trip and 20 cents for the down trip. The run is made between termini, with three intermediate stops, in 50 minutes. There are three passenger cars, one of which is held in reserve, and one freight car. The kilowatts required on the up trip with a full car of 20 passengers are from 12 to 18, when the trip is made in 50 minutes, and from 17 to 24 when the trip is made in 35 minutes. For the down trip practically no current is used.

The following operating expenses per car-mile are taken from a similar line installed in 1905 by the Società per la Trazione Elettrica from Spezia to Fezzano (Portovenere) with a length of about 9 miles:

Cost of energy	0.83	cents per car-mile
General expenses	1.188	" "
Rubber tires renewal	4.320	" "
Wages of conductors and motormen	2.800	" "
Maintenance of car and line	1.240	" "
Repairs of cars	0.912	" "
Total cost	11.290	" "

The cost of tire renewal looks, of course, high, but in all trackless trolley systems this is the serious question. It is stated, however, that the cost of tires varies greatly with the character of the roadway, and that the roads of Spezia are not very good. It is said that one of the trackless trolley lines in Italy has made a contract with rubber tire manufacturers for the maintenance of its tires at a rate of about 3.24 cents per car-mile. The Italian Government allows the company about $290 a year for the haulage of the mails.

Dr. A. M. Zani, of Milan, who has been actively associated with the development of this system in Italy, is now introducing it into England.

TELEPHONES ON AN AKRON ROAD

The Cleveland, Akron & Columbus Railroad Company has recently installed a composite telephone circuit on its lines between Akron and Columbus, Ohio, a distance of 130 miles. The line is constructed of No. 9 copper and has three intermediate telegraph offices between the terminal telephones. There are also three intermediate telephone stations connected to the line. The company has also equipped its wrecking train with a portable composite telephone, which may be connected to the line at any point along the road. An extra portable composite telephone is kept at the division headquarters, to be used on inspection trips or in cases of emergency. The Western Electric Company's instruments are used.

CONVENTION NOTES

The secretary's office mailed on Sept. 1 to members and associate members of the various associations the first installment of papers to be presented at the Denver meeting. Those sent out included all of the reports for the Engineering Association, all but one of the Accountants' Association and all but one of the Transportation & Traffic Association. These papers comprise all that will be distributed in advance. It is also understood that all of the papers of the Claim Agents' Association have been received, but will be distributed only at the convention. The secretary's office and the presidents of the various associations are to be complimented on their successful efforts in bringing about this early completion of papers.

The transportation committee in charge of the New York-Denver special train over the New York Central Railroad has issued a very attractively printed pamphlet descriptive of the train. It gives the schedule from the time of leaving New York, Sept. 30, at 3:30 p. m., until the arrival in Denver on Oct. 2, at 4 p. m., and gives particulars of the methods of securing accommodations on the train. An account is also given of Denver, and of some of the side trips which can be made from that city and from Colorado Springs. The pamphlet is well illustrated and has an attractive cover design.

K. D. Hequembourg has issued a circular to manufacturers in regard to the consolidation into carload lots of the exhibits which they expect to ship to Denver. The freight rate to Denver is high for small shipments, but reasonable for carload lots, and manufacturers who wish to take advantage of a consolidation of this kind should notify Mr. Hequembourg promptly. It might be said that recent inquiry at the offices of the railroad freight agents brought out the fact that the average time for a freight shipment at present from New York to Denver is two

weeks. The time required for freight from Cleveland to Denver is about 12 days and from Chicago to Denver 10 days.

Mr. Hequembourg also wishes to call attention to the importance of manufacturers ordering promptly such furniture as they will require for their booths. The contract for this furniture has been let to the Spangle House Furnishing Company, of Denver, on account of the low rate which this company quoted.

Following is a list of the manufacturers who have applied for space at Denver since the publication of the first list in the Electric Railway Journal for Aug. 14:

D & W Fuse Company, Providence, R. I.
Guy M. Gest, New York City.
Kerite Insulated Wire & Cable Company, New York City.
Massachusetts Chemical Company, Boston, Mass.
Rubberset Company, Newark, N. J.
Standard Paint Company, New York City.
United States Wood Preserving Company, New York City.
Pantasote Company, New York City.
Aluminum Company of America, Pittsburgh, Pa.
Hale & Kilburn Manufacturing Company, Philadelphia, Pa.
Jones & Laughlin Steel Company, Pittsburgh, Pa.
Nachod Signal Company, Philadelphia, Pa.
Sterling Varnish Company, Pittsburgh, Pa.
Standard Steel Works, Philadelphia, Pa.
American Railway Guide Company, Chicago, Ill.
Atlas Railway Supply Company, Chicago, Ill.
Colorado Cement Products Company, Denver, Colo.
Duntley Manufacturing Company, Chicago, Ill.
Electric Traction Company, St. Louis, Mo.
Forsyth Brothers Company, Chicago, Ill.
Handlan Buck Manufacturing Company, St. Louis, Mo.
National Brake & Electric Company, Milwaukee, Wis.
Peter Smith Heater Company, Detroit, Mich.
Buckeye Electric Company, Cleveland, Ohio.
Standard Brake Shoe Company, Chicago, Ill.

TESTS WITH FRICTION DRIVE IN EAST ST. LOUIS

Some interesting tests of an electrical locomotive equipped with friction drive instead of geared motors have been conducted during the past few weeks at East St. Louis, on the lines of the East St. Louis & Suburban Railway. The application is the invention of J. V. Heverling, of St. Louis, and among those associated with him in the development of the device are Geo. W. Baumhoff and Edwards Whittaker.

As used on the locomotive of the East St. Louis & Suburban Company, one 75-hp electric motor is mounted between the 48-in. wheels of the locomotive truck, and is arranged to be raised or lowered by pneumatic power, so that a 12-in. friction wheel on the end of its shaft is thrown in and out of engagement with the treads of the driving wheels. The motor operates continuously.

Tests were conducted last week with the completed car and with an ordinary geared locomotive equipped with two 35-hp motors. In each case a load of 10 empty coal cars, weighing altogether 308,500 lb., were drawn. The results were as follows:

	Friction Drive Car.				Geared Car.			
No. of Runs.....	1	2	3	4	1	2	3	4
Distance, feet.....	9340	9340	2310	2310	9340	9340	2310	2310
Time, seconds.....	625	520	200	225	440	350	160	160
Amperes, avge.....	65	60	71.1	70.1	168	145	209	175
Horse power.....	46.79	40.14	52.89	48.88	109	95	140.6	113
Saving of friction drive, per cent...	57	58	62	57	....	....	....	....

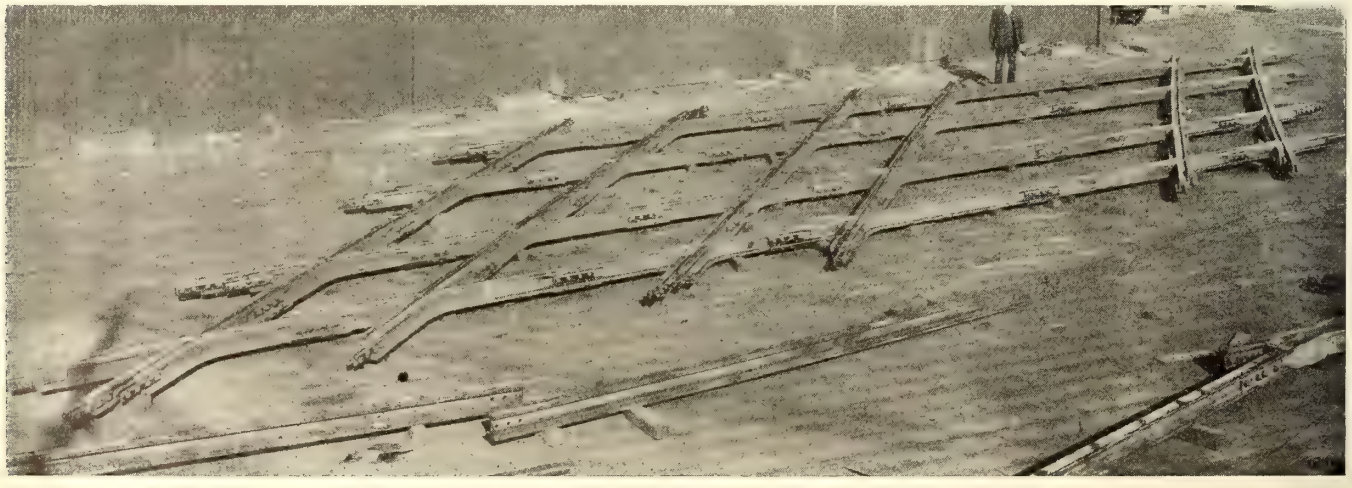
It is believed by the inventors that the application will find a wide field in electric railway service, particularly with alternating-current motors.

SPECIAL WORK FOR TRUNK LINE OPERATION

During the last convention of the British Railway Permanent Way Institution held at Sheffield, England, July 16-23, the members were invited by the Hadfield Steel Foundry Company to visit its East Hecla Works, whose special work for electric railways is well known in England.

Hitherto it has been the practice on most British railroads to have their switches and crossings made from rails, so that steel foundries have had little or no interest for railroad engineers responsible for the maintenance of the permanent way. But the severe working conditions prevailing on railroads now, due to the greatly increased weights of the locomotives, the increased carrying capacity of the rolling stock, the vastly higher speeds of the trains and the introduction of electricity have shown that corresponding improvements in the stability of the track and the quality of the switches and crossings are necessary.

At the time of the visit the Hadfield company had on its lay-out floor, said to be the largest in the world, several important pieces of special work of Era steel for the North Eastern Railway, which has a section of electrified lines. One of these crossings is illustrated in the accompanying engraving and attracted great attention. Afterward the party was shown the works. The various departments visited included the pattern shop, foundry, grinding shops, erecting shops for track work for the electric conduit system and its vast machine shops.



Large Piece of Special Work for North Eastern Railway, England

LONDON LETTER

(From Our Regular Correspondent)

The annual conference of the Municipal Tramways Association will be held in London on Sept. 22, 23 and 24 Arrangements are to be made for the inspection by the delegates of the metropolitan system of tramways, and free passes will be issued enabling them to travel all over the Council's tramways, the manager of which, Mr. Fell, is the president of the Municipal Tramways Association.

A useful guide book to places of interest on the South Lancashire Tramways route has just been issued. By means of this system the smaller towns and villages of Lancashire are brought in direct communication not only with each other, but with the great cities of Liverpool, St. Helens, Wigan, Bolton and Manchester. The book shows how to travel by tram from Manchester to Bolton, Bolton to Liverpool, Wigan to Manchester, as well as containing descriptions and views of places of interest on the route.

The electrified section of the London, Brighton & South Coast Railway between Peckham Rye and Victoria is now in working order and a service of 12 trains daily has been started to familiarize the public with the new system. The full service of 77 trains daily between London Bridge and Victoria will come into operation on Oct. 1, and a revised table of fares, involving considerable reductions for South London traffic, is under consideration. On the results of the working of this single-phase overhead system a great deal will depend. If satisfactory the system will probably be extended not only to the other suburban lines of the Brighton Company, but to those of other companies, which are watching the outcome of the experiment with great interest.

The last steam tramway in England has now been electrified and is in service in its new form. This event took place in August, when the Bacup Electric Tramways were officially thrown open to the public. The Rossendale Valley Tramways are now completed, the contracts for the Bacup l[illegible]e amounting to £36,000, and for the Rawtenstall sections £145,000. Rawtenstall Corporation will work the Bacup tramways for 30 years, taking the profits, and then handing the line over free as a going concern to the Bacup Corporation.

It seems that the traffic returns of the Liverpool Tramways Committee show that the modification of the first-class car system to "first-class inside only" has increased the car mile earnings to 10.40d. This compares favorably with other routes and the committee has decided to continue the first-class service.

The probable use of trackless trolley cars in British cities has not been forwarded by the decision of a Parliamentary committee. Recently the Gateshead and District Tramways Bill was before the committee on unopposed bills in the House of Commons. In the bill was a clause which would empower the running of trackless trolley cars with overhead electric equipment, but the committee has ordered that this clause should be omitted.

At the Johnson-Lundell Works of the J. L. Manufacturing Co., Ltd., Southall, a demonstration was given recently of a new surface contact or "stud" system, known as the "S. P." or "Simplex." The patents for this system are by a Russian named D. Suchostawer, and are owned by the S. P. Syndicate, Ltd., London. The demonstration was entirely successful, and showed a very simple system in operation, whereby overhead construction on tram lines can be entirely obviated, as the cost of this surface contact system is less.

The Observatory Department of the National Physical Laboratory, which had to be removed from Kew owing to the disturbing effect of the West London electric trams on the delicate magnetic instruments, is now installed in its new quarters in Dumfriesshire, and the report for the first year has just been published. Electric trams and trains are unlikely to trouble the staff for many years to come, for the new observatory at Eskdalemuir is in the midst of a wide-spreading pastoral district and nearly 20 miles from the nearest railway station. A room has been specially constructed underground in which seismographs will record the most minute earth movements. Little actual work has yet been undertaken, but the situation has proved ideal for the purpose.

The bill promoted by the Torquay Tramways Company, which proposes to authorize the construction of an additional line of tramways, commencing by a junction with the existing tramways in the Torbay Road opposite the Torquay station, and proceeding along that road to Paignton, and terminating close to Paignton station, has been allowed to proceed. The object of this line of tramway is to afford much-needed facilities of locomotion between the borough of Torquay and the urban district of Paignton.

An important point affecting the introduction of trackless trams in this country was mentioned recently at Leeds City Council, which a few weeks ago passed a resolution to make a trial of the trackless system in Farnley, a suburb of the city. It appears, however, that as the trackless tram has not yet been introduced in England, the Board of Trade has not decided whether local authorities must promote a Parliamentary bill for powers to adopt the system. The attitude of the Board of Trade indicated that at present it thought it would be necessary to ask for powers for trackless trams, but there was a chance that the Council's powers already obtained for electric traction might be sufficient, and that the fact of there being no rails in the trackless system would not be regarded as important. In any case, a resolution is to be proposed at the September meeting of the Leeds Council providing for an application for the necessary powers to introduce the trackless system in accordance with the resolution which has already been passed.

On the recommendation of the highways committee the London County Council has agreed to seek Parliamentary powers in the next session for the construction of about 24 miles of new electric tramways within the county. With the exception of about 4 miles in the neighborhood of Brixton and Wandsworth, the whole of the new track will be laid down in North London, one of the most important leading from the Marble Arch to Cricklewood. With the opening of the extension of the tramway service from Streatham to Norbury it is now possible to travel by tramcar from Barnet, on the heights of Hertfordshire, through London to Purley, at the foot of the Surrey Hills. The distance is 20 miles, and the journey can be done with only three changes.

General interest attaches to the annual reports of the working of the Wolverhampton Tramways, because it is there that the sole British installation of the Lorain surface contact system is working. The report shows the substantial decrease in the working costs as compared with last year of 0.135d. per car-mile, being 6.374d. against 6.509d. This figure of 6.374d. is below the average of other municipal tramway undertakings in this country, and Wolverhampton is one of the few towns where the working costs show a decrease per mile over the previous year. The result of the year's working is a gross profit of £17,048, and, after meeting standing charges, there remains a net balance of £746. The renewals fund was credited with £4,505, and it now stands at £26,590.

The report of the highways committee of the London County Council states that up to the date mentioned the capital expenditure on the tramways undertaking amounted to £9,483,561 18s. 1d., of which £1,068,971 2s. 2d. represents expenditure during the year 1908-1909. The total debt repaid up to the same date amounted to £1,074,345 4s. 11d. out of revenue, and £282,519 12s. 8d. from the proceeds of sales of horses and old materials, etc. The debt outstanding on March 31, 1909, was £8,126,697 0s. 6d., or deducting £83,558 for the value of surplus land, £8,043,139 0s. 6d. The Council decided on June 23, 1908, subject to the approval of the Treasury, to repay the debt (estimated at about £960,000) on the capital, which will be obsolete by March 31, 1914, owing to the electrification of horse tramways, within 15 years from that date. The present position with regard to this obsolete capital expenditure has accordingly been shown in the accounts for 1908-1909, where it is shown that the amount of obsolete capital, less proceeds of sales, on March 31, 1909, was £1,344,093 17s. 3d. Deducting the debt in respect of such capital repaid out of revenue, viz., £302,637 13s. 5d., the outstanding debt is £1,041,456 3s. 10d. The total receipts from the undertaking during the year and the working expenses were as follows: Electric traction—Total receipts, £1,572,251 8s. 7d.; working expenses, £896,286 4s. 7d.; surplus on working, £675,965 4s. Horse traction—Total receipts, £275,199 1s. 7d.; working expenses, £305,402 0s. 2d.; deficiency, £30,202 18s. 7d. Thus there is a total surplus of £645,762 5s. 5d.

Royal assent has just been given to the bill of the Central London Railway for an extension of its tube from the Bank to Liverpool Street, which, when completed, ought to add greatly to the value of the original twopenny tube. Liverpool Street being the logical terminus, and not the Bank, where it connected with nothing. The company is also to construct a moving platform between its British Museum station and the Holborn station of the Piccadilly tube. The depths of the two stations show a difference of a number of feet, and the platform will have to be made on an inclined plane. When it is finished passengers will be able to step out of the trains at either the Museum or Holborn, and they will be at once transported to the other line.

A. C. S.

News of Electric Railways

Cleveland Traction Situation

The week ended Aug. 28 was taken up by the City Council and the Cleveland Railway in considering a series of propositions and counter propositions.

Horace E. Andrews, president of the Cleveland Railway, has not yet yielded to the demand that the city be permitted to name a purchaser for the company's property within 10 years from the date of the granting of the franchise, and has also refused to yield to the proposal that the Cleveland Railway shall not have the right to retain its property after 10 years if it is willing to accept terms as liberal as offered by any other bidder. Mr. Andrews says that the company should not be deprived of the property if, after bids have been received, it should decide that it will operate under the terms offered by the most favorable bidder. He submitted a communication to the City Council on Aug. 23 embodying the views of the company on this phase of the question.

The same communication touched upon the acceptance of Judge R. W. Tayler of an appointment as a member of the legal committee that is to decide upon an invalidity clause for the proposed franchise. The company insists that Judge Tayler be a member of the committee. On Aug. 25 the Council replied that Judge Tayler would be accepted as a member of the committee provided City Solicitor Baker also act as a member of the committee with Judges Lawrence and Tolles as the other members. In this communication the Council also stated that its position fixing Jan. 1, 1917, as the date when the city might nominate a purchaser is unchanged. The company holds to the suggestion of Judge Tayler that the date shall be Jan. 1, 1919.

On the evening of Aug. 19 another communication was filed by the Cleveland Railway, in which it was suggested that Messrs. Tayler, Tolles and Lawrence act upon the local committee, with the city solicitor as an adviser of the Council and not as a member of the committee. It was also stated that the company is unwilling to agree to a board of arbitration composed of men interested on either side. The company would prefer to have disinterested experts thoroughly qualified by previous experience to decide the questions which may be submitted to them.

The reply of the Council, delivered on the evening of Aug. 20, contained a refusal to fix a date of limitation for a longer period than to Jan. 1, 1917, and a refusal to agree that the members of the board of arbitration shall be disinterested. The third man chosen will be the umpire, the reply states, and he should be chosen with special regard to his fitness and disinterestedness.

Transit Affairs in New York

William R. Willcox, chairman of the Public Service Commission of the First District of New York, sent a letter on Aug. 27 to Theodore P. Shonts, president of the Interborough Rapid Transit Company, in which the company's offer to build a subway north on Lexington Avenue from the Grand Central Station, and another south on Seventh Avenue, connecting with the present system at Forty-second Street and Broadway, is practically declined by the commission. The letter points out that the route proposed by Mr. Shonts is only an extension of the present underground, and that it would interfere with the construction of additional lines. While the action of the commission does not finally dispose of the bid made by the Interborough Rapid Transit Company, it is expected that Mr. Shonts will adhere to the position he resumed when the new roads were first proposed and decline to offer bids on any other subway construction.

The construction of the two-track line on Lexington Avenue, with a third track on Third Avenue, the letter says, would render impracticable, and perhaps impossible forever, the construction of a complete route from the Bronx to lower Manhattan. It suggested that plans might be prepared for the building of an underground line on Madison Avenue north from Forty-second Street, connecting with the West Farms branch of the present road at 110th Street, with a crosstown section on that street to bring the East and West side divisions of the road together. The provision for entering a new section of the Bronx also was spoken of in this regard, but nothing definite mentioned about the location of the spur.

It is made plain throughout the letter that the plan sent to the commission by the Bradley-Gaffney-Steers Company, which included the construction of an underground road from the Battery north on Broadway to Ninth Street and thence up Lexington Avenue to the Bronx, meets with favor at the hands of the commission. While the Bradley-Gaffney-Steers Company is not mentioned, it is pointed out that the construction of the new road under the route planned by the commission was most desirable. The plan of the Bradley-Gaffney-Steers Company includes all of the routes laid out by the commission with additions that are agreeable to that body.

The letter in conclusion requests that conferences be arranged between Mr. Shonts and the members of the commission, before the board finally disposes of the matter. The letter says in part:

"The commission considers it essential that the needs of the city a decade hence shall be considered and not merely those of to-morrow, and that the development of all rapid transit lines shall proceed in a logical, practical and systematical form, and not in a haphazard, disjointed and temporizing manner. The two two-track lines proposed by your company for Lexington and Third Avenue do not meet these requirements.

"The laying out of routes in no proper way interferes with the legitimate use of development or the present subway; neither is it an attempt to hamper the Interborough Rapid Transit Company. Assuming that the various routes proposed are advertised for bidders, such action will merely place every other bidder upon an equality with the Interborough Rapid Transit Company so far as the commission can do so. If the commission were to lay out routes upon which no one could bid but the Interborough Rapid Transit Company, it would be giving that company an unfair advantage, which could not be justified.

"It is realized that the Interborough Rapid Transit Company in some ways has an advantage over every other bidder, for it can offer transfers between future subways and the present subway and the elevated roads, which no other company is now in position to do. Consequently, the addition of independent routes in no way deprives the Interborough Rapid Transit Company of any privileges or rights which it has, but merely places, so far as it is possible and desirable to do so, other companies upon the same basis as the Interborough Rapid Transit Company. This is giving equal treatment to all, and any other course would involve discrimination and favoritism."

Wage Controversy in Chicago

The wage controversy between the street railway companies of Chicago and their employees is practically at a deadlock. Conferences have been held daily, but no proposition has been presented that, as a whole, was favorably received by both sides. It is now stated that the only hope for peaceable settlement lies in a board of arbitration.

Walter L. Fisher, traction attorney representing the city of Chicago, presented a plan on Aug. 27 advocating a graded scale of wages which provided for a maximum wage of 30 cents an hour. The agreement as proposed by Mr. Fisher was to be effective for five years from Aug. 1, 1909. It was founded on the basis of seniority and gave the employees who have been in the service of the railway company for more than nine years a wage of 30 cents per hour, and younger employees a wage of proportionately 1 cent per hour less for each year that they have been in the companies employ less than nine years. Under the suggested plan, new men would receive 23 cents per hour for the first three months' service, 25 cents per hour for the next nine months' service, 27 cents per hour for the second year's service, and an increase of 1 cent an hour each year until the expiration of the agreement. This plan was rejected by the employees.

An amended counterwage scale, relating to that part of the proposed agreement which fixes the wage scale of the new men in the service, was presented on Aug. 30 by the representatives of the employees. It was as follows:

First three months' service	23 cents
Next nine months' service	25 cents
Second year	27 cents
Third year	28 cents
Fourth year	29 cents
Fifth year	30 cents

At conferences held on Aug. 30, 1909, the employers stated that in the proposition presented on Aug. 13 they had consented to grant concessions which would represent an increase of practically $300,000 annually over existing wages. Mr. Fisher's plan would entail the payment of practically $420,000 a year in excess of existing wages. It was stated that the railway companies could not afford to grant more concessions and that further negotiations would be

useless. President John M. Roach, of the Chicago Railways Company, and President Thomas E. Mitten, of the Chicago City Railway Company, announced that they are now ready to arbitrate the entire wage question. It seems probable that the several plans which have been suggested for settlement of the pending difficulties will be acted upon by a referendum vote of the employees at an early date.

On Aug. 25 President Mitten issued a statement to the committee of employees of the Chicago City Railway Company, in which he said in part:

"Your communication of Aug. 23 is on its face a most unfair attempt to take advantage of concessions made by me as the representative of the Chicago City Railway Company and at the same time to ignore the considerations offered by you, which my concessions were based upon. It is a repudiation of the agreement embodying these mutual concessions which you promised not only to report to the men, but to recommend for adoption.

"This company has insisted and now insists that its trainmen should be graded and paid according to their length of service and efficiency resulting therefrom. The professed reason for the opposition to the graded scale has been that the company might show favoritism by dismissing the older and higher-priced men to make room for the newer men at a lesser rate. The company denies that this would be the case, and it is now taking this stand for a graded scale in favor of the old men in the service, first for the very selfish reason that the older men are a better investment at a higher wage, due to their having fewer accidents than the men less experienced in the service, the records of the company showing that during the month of July 732 men over nine years in the service performed 26.33 per cent of the actual work and had only 12.78 per cent of the accidents; 2041 men, including all men nine years and under in the service, performed 73.67 per cent of the actual work and had 87.22 per cent of the accidents; new men under one year in the service performed 8.41 per cent of the actual work, but had 29.62 per cent of the accidents; the percentage of accidents compared to the work performed growing less as the length of service and experience of the men increase. As a single accident often costs the company more than the entire wage which a trainman would receive during the entire period of his contract, it is to the advantage of the company to retain its older employees.

"Second, much expense and trouble is caused to the company by the constant changes in the force found necessary in weeding out the undesirable element among the new men; the company's record covering a period of three years shows that the changes have been less than 6 per cent in men over nine years in the service; changes in men nine years and under in the service being 94 per cent; changes in men from one to three years in the service being 77 per cent, the changes growing gradually less in number as the men are longer in the service of the company.

"In addition to the above, there remains the moral obligation of the company to see that its older men receive the maximum wage possible, in order that they may be able to lay aside something against the time when they are no longer able to perform their present duties.

"Your committee conceded that the gradual scale was correct in principle, but objected to its application to the men that had already entered the service on a different basis of pay. It was, therefore, agreed that the system should be started with the new men hereafter to be employed, and that a graded increase to 30 cents should be given to the present trainmen during the life of a contract to run three and a half years. You now state the discrimination between the new men and the old men is the chief cause of dissatisfaction with the settlement which you definitely agreed to advocate and support. Your proposal of Aug. 23, however, not only continues this discrimination, but would give the new men higher wages than the old men are to receive for the very same length of service.

"The company is entirely willing to wipe out all discrimination between new and old men, and to pay both alike the same pay for the same length of service, under a wage scale to go into effect at once, which shall give new men when they start 23 cents, and 30 cents to all men now or hereafter over nine years in the service, with corresponding wages to the men of less years in the service.

"The period of the contract to be three and a half years from Aug. 1, 1909, with the same working conditions as are contained in the contract which expired Aug. 1, 1909. It is my belief that this plan is fair and just and will serve to insure co-operation by recognition of efficient service.

"This company is prepared to discuss a contract upon the above terms or to submit all of the terms of a contract between us to any fair board of arbitration upon which we can agree."

On the same date President Roach issued a statement as follows to the committee of employees of the Chicago Rail ways Company:

"In the negotiations in reference to wages that have been conducted for the last few weeks, the Chicago Railways Company has never lost sight of the fact that it is a quasi-public institution and that it is under obligations to the general public, to the business interests of the community and to its employees, and therefore was willing, in making a wage scale, to strain its financial resources to the limit. But it must not be forgotten that the company also is under obligations to the interests that have made possible Chicago's constantly improving surface traction system.

"It is with sincere regret that I am obliged to state that the financial condition of the Chicago Railways Company is such that it is unable to grant any further increase in the wage scale beyond what has already been offered to employees of the company. With all due respect for yourself, allow me to suggest that even if we were financially able to make greater concessions than those already offered directly to our employees, it would be a breach of faith on my part to do more for others than I would for the committee directly representing an organization of our men.

"Believing that I have conceded to the employees all that our company can afford, and taking into consideration the equitable and fair treatment of employees, applying to all alike, I beg to suggest to you the acceptance of the graded scale for the old men as first proposed, or the subsequent proposition which was made and finally agreed upon with the committee who represented the employees."

Association Meetings

Central Electric Accounting Conference, Indianapolis, Ind., Sept. 11.

American Street & Interurban Railway Association and affiliated associations, Denver, Col., week commencing Oct. 4.

Colorado Light, Power & Railway Association, Denver, Col., Oct. 7, 8 and 9.

Empire State Gas & Electric Association, New York City, October, 1909.

Alabama Light & Traction Association, Birmingham, Ala., Nov. 15 and 16.

National Association of Railway Commissioners, Washington, D. C., Nov. 16.

Central Electric Railway Association, Indianapolis, Ind., Nov. 18.

Meeting of Traffic Officials with Ohio Railroad Commission.—Traffic officials of electric railways, responding to a request of the Ohio Railroad Commission, met in Columbus on Aug. 12 to consider the subject of tariffs.

Meeting of Central Electric Accounting Conference.—The next meeting of the Central Electric Accounting Conference will be held at Indianapolis, Ind., on Sept. 11. M. W. Glover, chairman of the conference, states that it has not yet been determined at just what place the meeting will be held in Indianapolis.

New Long Island Line Completed.—The Long Island Railroad placed its cross-island electric railway extending from Huntington to Amityville in operation on Aug. 25. The new road connects with the Port Jefferson branch of the Long Island Railroad at Huntington, with the main line at Farmingdale and with the Montauk division at Amityville. It is 18 miles long.

Transit Exhibit at New York State Fair.—The New York Public Service Commission, First District, will have an exhibit at the New York State Fair which opens at Syracuse on Sept. 14. Some of the charts and maps exhibited at the Conference on City Planning and Municipal Art, an account of which was published in the ELECTRIC RAILWAY JOURNAL of May 29, 1909, page 979, will form part of the collection at Syracuse. New material will also be added to the exhibit of the commission.

Public Utility Planks in Maryland Platforms.—The Republican State Convention was held in the Maryland Theater, Baltimore, Md., on Aug. 25. Practically all matters were put through as arranged previous to the meeting. A platform was adopted which touches a number of public questions, among them the public service matter. Thus both the Republicans and the Democrats are now on record regarding this issue. The Republican platform says: "We advocate a just, impartial and unprejudiced supervision and control of public service corporations and public utilities generally in this State through incorruptible, enlightened and non-partisan agencies, and we condemn any exemption from such supervision and control, or other special favors to any particular enterprise or corporation." The Democratic platform says: "We favor the creation by appropriate legislation of a public utilities commission applicable to all our public service corporations."

Financial and Corporate

New York Stock and Money Market

August 31, 1909.

To-day there was certainly decided dulness compared with the marked activity of the last fortnight. Professional traders are uncertain and timid and outsiders are holding aloof, generally so advised by their brokers when they deal with conservative houses. During the week the general trend of the market has been downward, although there was considerable recovery on Aug. 30. The market leaders have been the principal shares affected, and four or five issues have made up more than half of the trading. The tractions have not been active and, as a rule, have sagged in sympathy with the leading issues.

Money continues to be cheap and apparently plentiful. Rates to-day were: Call, 2¼ to 2½ per cent; 90 days, 3¼ to 3½ per cent.

Other Markets

In the Philadelphia market, Rapid Transit continues to appear every day in small quantities, and now and then small blocks of Union Traction are offered. Prices are practically unchanged from one week ago.

There is no trading in tractions on the Chicago market that is worthy of mention. A few shares of Subway stock are sold at about 20 every few days, and occasionally an odd lot of Kansas City Railway & Light preferred at around 82, but no other issues are in evidence.

In Boston, Massachusetts Electric and Boston Elevated have each been traded in during the week to a limited degree. Prices have been very firmly held at previous figures.

In Baltimore, the bonds of the United Railways have not been quite so active as heretofore although prices remain unchanged. Both the stock and bonds of the Maryland Electric Railways have been traded in to a limited degree.

Quotations of various traction securities as compared with last week follow:

	Aug. 24.	Aug. 31.
American Railways Company	46¾	46
Aurora, Elgin & Chicago Railroad (common)	*49¾	47½
Aurora, Elgin & Chicago Railroad (preferred)	*95	92½
Boston Elevated Railway	128½	129¼
Boston & Suburban Electric Companies	18	*18
Boston & Suburban Electric Companies (preferred)	*70	*70
Boston & Worcester Electric Companies (common)	a13	a13
Boston & Worcester Electric Companies (preferred)	a53	a55
Brooklyn Rapid Transit Company	80¾	78⅞
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	87½	86¼
Capital Traction Company, Washington	*141	136
Chicago City Railway	a190	a180
Chicago & Oak Park Elevated Railroad (common)	*3	*3
Chicago & Oak Park Elevated Railroad (preferred)	*12	*12
Chicago Railways, ptcptg, ctf. 1	a112	a112
Chicago Railways, ptcptg, ctf. 2	a38½	a38½
Chicago Railways, ptcptg, ctf. 3	a25	a26
Chicago Railways, ptcptg, ctf. 4s	a9½	a10
Cleveland Railway	*78	*78
Consolidated Traction Company of New Jersey	*77½	a77½
Consolidated Traction of N. J., 5 per cent bonds	a106½	a106½
Detroit United Railway	a70	69¼
General Electric Company	169	169⅛
Georgia Railway & Electric Company (common)	a95	a94⅛
Georgia Railway & Electric Company (preferred)	a87	a88
Interborough-Metropolitan Company (common)	15⅜	14⅝
Interborough-Metropolitan Company (preferred)	47½	47
Interborough-Metropolitan Company (4½s)	83⅜	83½
Kansas City Railway & Light Company (common)	a49	a48
Kansas City Railway & Light Company (preferred)	a83½	a82
Manhattan Railway	142	140
Massachusetts Electric Companies (common)	a14	15½
Massachusetts Electric Companies (preferred)	74	74½
Metropolitan West Side, Chicago (common)	a18	a18
Metropolitan West Side, Chicago (preferred)	a50	a50
Metropolitan Street Railway	a24	a24
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	84⅛	83
Northwestern Elevated Railroad (common)	a20	a20
Northwestern Elevated Railroad (preferred)	a71	a71
Philadelphia Company, Pittsburg (common)	48¼	47½
Philadelphia Company, Pittsburg (preferred)	a45	44
Philadelphia Rapid Transit Company	30⅞	30⅛
Philadelphia Traction Company	*91	90½
Public Service Corporation, 5 per cent col. notes	*100¼	a100¼
Public Service Corporation, ctfs	*93½	a93½
Seattle Electric Company (common)	116½	115
Seattle Electric Company (preferred)	*106¼	107
South Side Elevated Railroad, Chicago	a56	*a56
Toledo Railways & Light Company	a10½	*10½
Third Avenue Railroad, New York	23⅞	23¾
Twin City Rapid Transit, Minneapolis (common)	109	108¼
Union Traction Company, Philadelphia	54	54
United Railways & Electric Company, Baltimore	a14	13
United Railways Inv. Co., San Francisco (common)	a39½	38½
United Railways Inv. Co., San Francisco (preferred)	58	59
Washington Railway & Electric Company (common)	*47	44½
Washington Railway & Electric Company (preferred)	*92	90½
West End Street Railway, Boston (common)	a98	96
West End Street Railway, Boston (preferred)	106¾	106½
Westinghouse Electric & Manufacturing Company	87	86
Westinghouse Elec. & Mfg. Co. (1st pref.)	a132½	130

aAsked. *Last sale.

Annual Report of Brooklyn Rapid Transit Company

The annual report of the Brooklyn Rapid Transit Company for the year ended June 30, 1909, issued last week, gives the following comparative statement of operations for two years:

Gross earnings:	1909	1908	Increase
Passenger	$19,058,693.14	$18,930,164.18	$128,528.96
Freight, mail and express	254,642.81	315,719.08	61,076.27
Advertising	155,860.31	155,204.65	655.66
American Railway Traffic Company	225,265.85	469,478.64	244,212.79
Total earnings from operation	$19,694,462.11	$19,870,566.55	$176,104.44
Operating expenses:			
Maintenance of way and structure	1,194,014.13	1,020,103.81	173,910.32
Maintenance of equipment	1,690,916.33	1,837,550.29	146,633.96
Operation of power plant	1,596,759.17	1,653,727.74	56,968.57
Operation of cars	4,812,555.95	4,979,756.57	167,200.62
Damages and legal expenses	1,129,396.31	1,242,361.24	112,964.93
General expenses	676,665.93	651,669.03	24,996.90
Freight, mail and express—expenses	138,644.45	190,885.29	52,240.84
American Railway Traffic Company—expenses	155,702.39	363,524.62	207,822.23
Total operating expenses	$11,394,654.66	$11,939,578.59	$544,923.93
Net earnings from operation	$8,299,807.45	$7,930,987.96	$368,819.49
Income from other sources:			
Rent of land and buildings	74,948.65	63,836.85	11,111.80
Rent of tracks and structure	104,997.11	101,419.29	3,577.82
Miscellaneous	425,871.45	512,567.80	86,696.35
Total income	$8,905,624.66	$8,608,811.90	$296,812.76
Deductions:			
Taxes	1,337,620.14	930,007.47	407,612.67
Interest and rentals (net)	5,631,395.45	5,604,931.15	26,464.30
Total deductions	$6,969,015.59	$6,534,938.62	$434,076.97
Net income	$1,936,609.07	$2,073,873.28	$137,264.21
Special appropriations	65,429.82	229,781.18	164,351.36
Surplus	$1,871,179.25	$1,844,092.10	$27,087.15

Discussing various features of the operations of the company, Mr. Winter says in part:

"The underground terminal at the Manhattan end of the Williamsburgh Bridge was completed by the city and elevated train service across the Williamsburgh Bridge inaugurated Sept. 16, 1908.

"The elevation of surface tracks over Sands Street, Brooklyn, referred to in last year's report, has been completed, and by thus bridging this congested spot surface car operation has been greatly accelerated, not only on the bridge proper, but on all the lines converging at that point. In connection with this improvement, stations were constructed at Sands and High Streets for the transfer of passengers between surface cars and elevated trains for the convenience of local patrons.

"One additional steam turbine unit of 10,000-kw capacity has been installed in the Williamsburgh power station, and the construction of the station in other respects well advanced toward completion. Water from wells driven on the company's property is used for boiler purposes at the central station, and the purchase of water from the city for this plant has been discontinued.

"During the year the cost of power plant operation was reduced by $56,900, or over 3 per cent, and the cost per kilowatt hour for maintenance and operation from .00862 in 1904 to .00636 in 1909, a decrease of 26 per cent in five years. A greater centralization of power production will come with the completion of the Williamsburgh station, and a further reduction in the cost per kilowatt hour may then be expected.

"An item of service rendered to the city, which from long practice is taken as a matter of course and passes without special recognition, is the free transportation of policemen and firemen. It is the willing practice to issue books of tickets for the use of ununiformed members of the police and fire department and to pass uniformed members of those departments without further formality. The value of this concession to the recipients, and to the city, may be judged by the following figures:

"There were issued during the year to police and fire departments 7630 passbooks of 100 fares each, carrying transfer privileges. Counts of several days would indicate that the daily rides of uniformed policemen and firemen average approximately 21,381 rides per day, or 7,804,065 for the year. By applying to passbook tickets the regular rate of fare and to the non-ticket riders the average gross of 3.6 cents received per passenger, it appears that transportation to the current value of $319,096 has been in this form contributed indirectly to the city during the year.

"The vitality of the transfer evil is worthy of a better cause. Each year it absorbs far more than its proper share of the lean surplus, or unduly increases the deficit from

surface operations. Justice to the paying passenger—if the carrier be left out of consideration—demands that the mistaken theory of 'traffic development,' under which the reasonable and necessary limitations of this insidious feature of the business have been lost sight of, should be corrected. In the last fiscal year 141,326,128 transfers were redeemed—an increase of 110 per cent over 1904 and 9.8 per cent over last year, against an increase of 32 per cent in the gross passenger earnings, 1909 over 1904, and slightly over ½ of 1 per cent in the gross passenger earnings of 1909 over 1908.

"Although it is 10 years since the special franchise tax law was first put into effect, there has been no final adjudication by the courts of the general principles and methods which should control the State Board of Tax Commissioners in determining the value of this class of property, and the owners are still in doubt as to the measure of their liability. In the meantime, approximately three billions of assessments have been levied throughout the State, most of which are still in litigation. It is a fair assumption that the new law is actually yielding less revenue than the old method of taxing only the tangible property. There being no method laid down in the special franchise tax law by which the tax commissioners are directed to value such property, and the board persisting in its refusal to divulge the methods of appraisal, the resulting assessments seem to be largely a matter of guesswork, reached by no uniform rule and occasioning great inequalities and injustice. The progress of litigation is necessarily slow owing to the amount and complicated nature of the evidence, and while the procedure may be expedited by the operation of a law passed during the recent session of the Legislature at the suggestion of the Attorney-General and Governor, the ultimate status of the assessments will not be known until the highest court lays down the general principles and methods which should be followed by the State Board of Tax Commissioners. If the Court of Appeals, in a case now pending before it, should make such a general declaration, the atmosphere would probably be clarified and both the taxing officers and the corporations would better understand where their respective duties and liabilities end; but if no such declaration of principle should be enunciated each case must be determined upon its merits and the litigation will be indefinitely prolonged and the confusion intensified.

"The recital of such a condition is enough to condemn any tax law, and the interests of both the State and its creatures, the corporations, imperatively require the modification of the law to the end that its application may be more just and equitable and its operation more direct and certain.

"Out of the $1,337,620 of taxes charged during the fiscal year all, except $307,107, or $1,030,513, are in one sense franchise taxes, being levied either on the right to occupy public streets and places or on the enjoyment of corporate charters. This is equivalent to over 35 per cent of the net income after deducting other taxes and fixed charges—surely a tremendous burden to carry for corporations created to perform a public service. This amount would pay interest at 5 per cent upon upward of $20,000,000 worth of extensions and improvements.

"Neither do these franchise taxes measure the full extent of such burden, for other official impositions, namely, requirements for paving, free transportation, etc., are in a like category as to principle, although not included under the definition of taxes.

"It is a conservative estimate that, in addition to the taxes of $1,337,620, the company contributes to the public, annually, a further sum, estimated at not less than $200,000 per annum, in relieving the city of the expense of maintaining certain portions of pavement in the city streets, shifting tracks for sewers, water mains, etc. This does not take into consideration the item of interest on over $4,000,000 invested by the company in paving in various streets which the city would have had to pay had tracks not been there.

"The State cannot consistently expect railroad corporations to meet requirements in the transportation of passengers and property, both as to rates and services, and at the same time by the imposition of unreasonable financial burdens cripple their power to discharge their duty.

"The inevitable result of such a policy must be either the withdrawal of private capital from such enterprises or their assumption by the State—and in either case the public must be the chief sufferer.

"A federal corporation tax on net income will apply to the present calendar year and thereafter, and on the basis of the net income of the various companies during the calendar year 1908 will apparently cost the companies of the Brooklyn Rapid Transit System about $50,000. Inasmuch as your companies get no privileges from the national Government not enjoyed by every citizen and already contribute largely to the support of the federal Government as a consumer of materials (the manufacture of which is protected by tariff duties), we see no justification for such an additional burden, and it certainly is inequitable to the extent that it is an additional imposition on property already taxed several times and in different ways by the operation of State laws.

The following is taken from a table contained in the report, showing various statistics for the fiscal years ending June 30, 1902-'09, both inclusive:

Passenger earnings:	1909	1908	1902
Surface division	$11,645,569	$11,543,992	$9,049,229
Elevated division	7,413,124	7,386,172	3,272,036
Total passenger earnings	$19,058,693	$18,930,164	$12,321,265
Freight, mail and express, etc.	635,769	940,403	189,357
Other earnings	605,817	677,824	252,046
Total earnings	$20,300,279	$20,548,391	$12,762,668
Operating charges	11,460,084	12,169,360	8,268,325
Net income	$8,840,195	$8,379,031	$4,494,343
Taxes	1,337,620	930,008	742,817
Interest and rentals	5,631,396	5,604,931	3,732,633
Total fixed charges	$6,969,016	$6,534,939	$4,475,450
Surplus	$1,871,179	$1,844,092	$18,893
Passenger earnings	19,058,693	18,930,164	12,321,265
Increase over preceding year—per cent	0.68	2.64	.....
Passengers carried	530,149,597	515,184,967	321,501,524
Increase over preceding year—per cent	2.93	0.65	.....
Transfers redeemed	141,326,128	128,650,863	67,691,915
Increase over preceding year—per cent	9.82	5.57	.....
Revenue mileage	74,200,436	73,674,770	52,684,980
Increase over preceding year—per cent	0.71	7.91	.....
Earnings per revenue mile	25.7 cts.	25.7 cts.	23.4 cts.
UNITS PER PASSENGER			
Passenger earnings	3.60 cts.	3.68 cts.	3.83 cts.
Miscellaneous earnings	0.23	0.31	0.14
Total earnings	3.83 cts.	3.99 cts.	3.97 cts.
Operating charges	2.17 cts.	2.36 cts.	2.57 cts.
Taxes	0.25	0.18	0.23
Interest and rentals	1.06	1.09	1.16
Total	3.48 cts.	3.63 cts.	3.96 cts.
Surplus	0.35 cts.	0.36 cts.	0.006 cts.
CHARGES PER CENT OF OPERATING EARNINGS			
Repairs and renewals	14.65	14.39	13.81
General operating	37.48	39.45	42 85
Damages	3.66	4.14	6.88
Legal expense	2.07	2.11	1.87
Total operating	57.86	60.09	65 41
Taxes	6.79	4.68	5.94
Interest and rentals (net)	25.52	24.80	27.82
Special appropriations	0.33	1.15	0.68
Surplus	9.50	9.28	0 15
Total per cent	100.00	100.00	100.00

Hearing on Valuation of Coney Island & Brooklyn Railroad

A hearing in relation to the fare of the Coney Island & Brooklyn Railroad to Coney Island, at which the valuation of the property was considered, was held by the New York Public Service Commission, First District, on Aug. 25. Commissioner Bassett presided.

The commission made public a statement showing the tangible value of the Coney Island & Brooklyn Railroad as of Feb. 1, 1909. This statement, although relating solely to the physical property, had not taken into account, it appeared, various items of tangible property, the total value of which was large. Commissioner Bassett examined Henry Floy, an engineer connected with the bureau of appraisal of the commission, regarding these items. The statement made public by the commission, showing the tangible value of the property as of Feb. 1, 1909, without allowance for the additions concerning which Mr. Floy testified, is as follows:

Track	$729,852.80
Track special work	241,882.30
Paving	421,474.73
Overhead trolley construction	145,965.63
Overhead feeders	110,632.25
Underground conduits and cables	336,324.49
Power plants and substations	733,393.07
Buildings	579,983.80
Rolling stock	1,383,461.50
Total	$4,682,970.60
Add incidentals, 5 per cent; organization, 5 per cent; engineering, 5 per cent; total, 15 per cent	702,445.59
	$5,385,416.19
Miscellaneous stock, fixtures, etc	103,679.77
Real estate—assessed value	187,800.00
Grand total	$5,676,895.96

Commissioner Bassett asked Mr. Floy whether there were any elements of physical value that were not contained in the book showing the details of the appraisal. Mr. Floy said that certain items had been discussed between the

appraisal bureau and the owners of the property and that some further light that they had thrown on the matter had raised the question whether some allowance above the total appraisal as reported should not be made.

These matters included a question as to the proper price at which copper should be valued. At present and during the first part of this year copper had been very low in price compared with the average price for the last five years, and it had been proposed to take a five-year average and substitute that for the price applied in the appraisal.

In the same way concrete and piling work, used to complete the land on which the power house is located, had been brought to the attention of the bureau, and the railroad company had asked an allowance, which Mr. Floy thought was $100,000, for that item, which had not been included. The company had also asked for other allowances.

Under further examination, Mr. Floy said he was testifying that some additional price might properly be allowed to bring the value of copper in the appraisal to the present market price. Similarly, some proper addition could properly be made to bring real estate to the actual value if the assessed values were lower than present values. The report showed the assessed valuations on real estate.

Commissioner Bassett asked whether there were any other items like these. Mr. Floy answered that some real estate and buildings had not been included because they were not used in the operation of the road. For example, the old power house, which was no longer in use, now stood idle, and therefore it had not been included. The question should be considered whether or not some value should not be set on that building and the land on which it stands, and the figure added to the total report for the appraisal. There was a right of way at Coney Island about 25,000 ft. long which might properly be considered, at least, and possibly included.

There was also an old intake to the old power plant which had not been included by the bureau because all of the engines except one were now running non-condensing, and therefore the intake was useless so far as all of the engines except one were concerned. A question existed also as to a certain fill on Coney Island Avenue which might roughly be estimated at about 85,000 cubic yards. No allowances had been made for that, and it seemed to Mr. Floy that the company might give the appraisal bureau some light as to what its expenditures had been or demonstrate that the fill had not been done by the city but by the company, if such was the fact. The same situation existed regarding a change of grade on Coney Island Avenue between Park Circle and Kings Highway. Tracks on the bridges were not included by the bureau because it was understood that the tracks became the property of the city when laid; if paid for by the railway, Mr. Floy thought the expenditure would be a proper capital charge.

Mr. Floy also stated, in response to the questions of Commissioner Bassett, that no value had been allowed to cover franchise rights or the value of a going concern, etc. This aspect of the value of the property was brought before the commission on behalf of the company some months ago by Frank R. Ford, of Ford, Bacon & Davis, who submitted a list of intangible values in the reproduction of street railway property, as described in the Electric Railway Journal of June 19, 1909, page 1122. Mr. Floy added that the 15 per cent added for incidentals, organization and engineering, as indicated in the foregoing table, did not represent any allowance for franchise rights or the value of a going concern.

J. J. Kuhn, representing the Coney Island & Brooklyn Railroad, said that he desired to examine George A. Damon, who was in charge of the appraisal. Mr. Damon has been in Europe; but Commissioner Bassett said that he would return in time to be examined at a later hearing. Mr. Kuhn asked that the hearing be postponed for a month in order that the detail figures might be checked by Ford, Bacon & Davis, engineers for the company. Commissioner Bassett was not willing to allow so long a time, and adjourned the hearing to Sept. 8.

Brunswick Dock & City Improvement Company, Brunswick, Ga.—A special meeting of the stockholders of the Brunswick Dock & City Improvement Company has been called for the purpose of changing the name of the company to the Brunswick Terminal & Railway Securities Company and authorizing an increase in the capital stock of the company so as to provide for the acquisition of additional properties. H. H. Barnes, president of the company, in a circular addressed to the stockholders outlining the plans of the company, said in part: "For a number of years, the Mutual Light & Water Company has been supplying light and water in Brunswick, and it has already established a profitable business. Certain of the leading citizens of that city have lately procured a franchise for the construction and operation therein of an electric street railway, which is now in course of construction and is expected to be open for traffic early in the autumn. Our plans have been perfected to the point of arranging for the acquisition of the entire capital stock of the Mutual Light & Water Company and of all of the stock and bonds of the street railway company. In order to provide for these purchases, and for carrying into effect the other matters concerning which negotiations have not yet been completed, our directors have resolved that it is advisable that an increase in the capital stock of your company from 50,000 to 100,000 shares be authorized. Twenty thousand shares of the new stock are to be issued for all of the stock of the Mutual Light & Water Company, which shall in turn hold all of the stock of the street railway company, and for which, in addition, we are to receive $150,000 in cash. It has been agreed that not more than $100,000 shall be expended by those now controlling the street railway in constructing and equipping it, and that all sums advanced for the purpose shall be repaid out of the $150,000 to be received by us in cash, whereupon all bonds or other securities or obligations issued by the street railway company are to be transferred to your company. This will leave unissued 30,000 shares which the directors desire to utilize for further corporate purposes, as they shall deem best. In order that the company's title may be more suggestive of the business in which it will be engaged if these plans are carried out, it is also proposed to change its name from the Brunswick Dock & City Improvement Company to the Brunswick Terminal & Railway Securities Company."

Burlington County Railway, Mt. Holly, N. J.—John S. McMullin, Moorestown, N. J., has applied for a receiver for the Burlington County Railway. It was announced by the company that the interest on the first mortgage bonds of the company would be defaulted on Sept. 1, 1909. The rule to show cause why the receiver should not be appointed is made returnable on Sept. 7, 1909.

Chicago, Lake Shore & South Bend Railway, South Bend, Ind.—The officials of the Chicago, Lake Shore & South Bend Railway notified the Indiana Railroad Commission on Aug. 25, 1909, that arrangements had been made to turn over the management of the company to the Warren Bicknell Company, Cleveland, Ohio.

Farmington Street Railway, Hartford, Conn.—It is stated that the Farmington Street Railway, Hartford, Conn., will be taken over by the Connecticut Company, New Haven, Conn., which is in turn controlled by the New York, New Haven & Hartford Railroad. The authorized capital stock of the Farmington Street Railway is $189,000, of which $157,000 is outstanding. The bonded debt of the company is $30,000 and the floating debt $35,905.86.

Grand Rapids, Holland & Chicago Railway, Holland, Mich.—Hattie A. Smart, Detroit, Mich., has filed a petition in the Circuit Court in Detroit, asking that a receiver be appointed for the Grand Rapids, Holland & Chicago Railway, and that the consolidation of the Grand Rapids, Holland & Lake Michigan Railway with the Grand Rapids, Holland & Chicago Railway be declared void.

Illinois Traction System, Champaign, Ill.—The Illinois Traction System has increased its authorized capital stock from $13,000,000 to $16,000,000 by adding to the number of shares already authorized 20,000 shares of common stock and 10,000 shares of preferred stock.

Long Island Electric Railway, Jamaica, N. Y.—The Public Service Commission of the First District of New York has approved the application of the Long Island Electric Railway for the reduction of its capital stock from $2,100,000 to $600,000. The Long Island Electric Railway was originally organized with an authorized capital of $600,000. In 1899 the property was consolidated with the New York & North Shore Railway as the New York & North Shore Railway with an authorized capital stock of $2,100,000. The agreement of consolidation stated that the capital stock of the Long Island Electric Railway was $600,000 and the New York & North Shore Railway $1,500,000. In addition, the property of the New York & North Shore Railway was encumbered by mortgage bonds amounting to $1,261,000. After consolidation default took place in the payment of interest upon these bonds and the mortgage securing the same was foreclosed. After this foreclosure the only property remaining in the ownership of the New York & North Shore Railway was the property which had been acquired by the Long Island Electric Railway prior to consolidation. In 1903 the name of the corporation resulting from the consolidation was changed to the Long Island Electric Railway. The present company has obtained the surrender to it of all of the stock of the original

New York & North Shore Railway amounting to $1,500,000 par value. The application of the company was for permission to cancel this stock.

Maryland Electric Railways, Baltimore, Md.—It is reported that plans are being considered for merging the Baltimore & Annapolis Short Line Railroad, the Maryland & Pennsylvania Railroad, operating a steam road between Baltimore and the Pennsylvania State line, and the Maryland Electric Railways, Baltimore, with the last company as the probable holding company. Alexander Brown, of Alexander Brown & Sons, Baltimore, is said to be interested.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe of the United States Circuit Court has granted an order in the case of the Morton Trust Company against the Metropolitan Street Railway, the New York City Railway Company, and the receivers of both, making Adrian H. Joline and Douglas Robinson, receivers of the Metropolitan Street Railway, parties defendant with the Morton Trust Company to a bill of complaint brought by the Twenty-third Street Railway line. The judge has also denied the application of the Morton Trust Company for the right to sue in the State Supreme Court, and has directed that any action be brought in the Federal Court. The Twenty-third Street Railway has also secured permission to sue the receivers of the Metropolitan Street Railway and William W. Ladd, receiver for the New York City Railway, in the United States Circuit Court, and make them parties defendant with the Mercantile Trust Company to its bill of complaint. The controversies in which the Twenty-third Street Railway became involved refer to an issue of $250,000 debenture bonds, held by the trust companies, and for other moneys expended for maintenance and operation. The Public Service Commission of the First District of New York has approved an agreement between the receivers of the Metropolitan Street Railway and the Central Crosstown Railroad, providing for the operation of the Eighth Street and Fourteenth Street crosstown lines. Under an agreement made more than a year ago, the receivers of the Metropolitan Street Railway agreed to operate the lines for one year and to pay certain amounts for the privileges. Operating for a year under this agreement, the receivers found the financial obligations too heavy, so a new agreement was made. This released the receivers from the obligation to pay the interest of 5 per cent on the three-year notes of the Central Crosstown Railroad, totaling $2,500,000; also from the burden of the franchise tax. This makes a total reduction of $120,000 over the first agreement, or approximate, $210,000 per year than was paid by the Metropolitan Street Railway before the receivership. The receivers, however, are to pay the interest on the funded debt and the fixed charges and other obligations involved by outstanding leases and other contracts.

Southwestern Traction Company, London, Ont.—Formal application was made on Aug. 23 by Messrs. Fraser and Moore, acting for Messrs. Thompson, Tilley and Johnston, of Toronto, who represented the London & Western Trusts Company, trustee for the bondholders of the Southwestern Traction Company, London, Ont., for the sale of the railway company's line, which extends from London to Port Stanley, a distance of 28 miles. The bondholders have secured an order for the sale of the property at London on Oct. 20, 1909.

Springfield (Mass.) Street Railway.—The Railroad Commission of Massachusetts has fixed Sept. 8, 1909, as the date for the hearing on the application of the Springfield Street Railway for permission to take over the Western Massachusetts Street Railway.

Third Avenue Railroad, New York, N. Y.—A number of stockholders of the Third Avenue Railroad met in New York on Aug. 31, 1909, and organized a permanent committee to investigate the use by the Third Avenue Railroad of $10,000,000 which Frederick W. Whitridge, receiver of the company, has testified was not expended in the electrification of the road, so far as he could ascertain. An executive committee was chosen consisting of William N. Amory, chairman; Charles G. Goodhue and H. E. Colby. It was stated that it is probable that J. Aspinwall Hodge and Leslie G. Ferguson will be retained as counsel by the committee.

Toledo Urban & Interurban Railway, Toledo, Ohio.—The Toledo Urban & Interurban Railway has been sold under foreclosure to the Toledo, Bowling Green & Southern Railway, Findlay, Ohio, for $40,000. Under the terms of the sale the old bondholders of the Toledo Urban & Interurban Railway will exchange their holdings for bonds in the Toledo, Bowling Green & Southern Railway as soon as the sale is confirmed by the Common Pleas Court, which reconvenes Sept. 20. It is announced that there are no immediate plans for the extension of the Toledo, Bowling Green & Southern Railway from Findlay to Cincinnati, but this project, it is believed, ultimately will be consummated.

Traffic and Transportation

Interstate Commission Asked to Enforce Through Rates Between Steam and Electric Roads

On Aug. 13, 1909, the Southern California Sugar Company filed a complaint with the Interstate Commerce Commission against the San Pedro, Los Angeles & Salt Lake Railroad, the Atchison, Topeka & Santa Fe Railway, the Southern Pacific Company and the Pacific Electric Railway for discriminating against it in the matter of freight rates to the Missouri River and other Eastern points.

The Southern California Sugar Company is organized under the laws of California and manufactures and sells sugar from sugar beets. Its factory is at Delhi, on the Pacific Electric Railway, in Orange County, California. The freight shipments of sugar from the factory of the company, so its officers say, will amount to 10,000 tons annually, on which freight charges in excess of $100,000 will be paid, based on the through rates to other sugar factories, and $20,000 to $25,000 additional if the company is required to pay two freights.

The Pacific Electric Railway has a system of side tracks in the yards of the Southern California Sugar Company, and is properly and adequately equipped to transport freight between the company's factory and the points where the Pacific Electric Railway connects with the San Pedro, Los Angeles & Salt Lake Railroad, the Atchison, Topeka & Santa Fe Railroad and the Southern Pacific Company; namely, with the San Pedro, Los Angeles & Salt Lake Railroad at Long Beach, Burnett, Clearwater, Fruitland, Los Angeles and other points; with the Atchison, Topeka & Santa Fe Railroad at Slauson Junction, Los Angeles, Los Nietos and other points, and with the Southern Pacific Railroad at Los Angeles and other points. The Pacific Electric Railway has been ready and willing to make through joint freight rates from Delhi Station with each and all of the railroads, to points outside of California, but it is alleged that the steam railroads have refused to make any joint rates, although often requested to do so, and particularly for sugar manufactured by the Southern California Sugar Company. This the Southern California Sugar Company alleges is a discrimination against it in favor of other sugar factories in California, of which there are nine in operation. In its complaint the Southern California Sugar Company says, in part:

"The complainant has no other railroad connection at its factory than the Pacific Electric Railway, and cannot load upon any of the railroads against which complaint is made. It is therefore compelled to pay two railroad rates for the shipment of its sugar to jobbing points of the Missouri River and the East, to wit: the rate charged other sugar factories by the said roads and the local rate charged by the Pacific Electric Railway, whereas its competitors are required to pay only one through rate as made and published by the Transcontinental Freight Bureau. The Pacific Electric Railway has nearly 600 miles of standard-gage track, and is fully equipped to handle, and does handle and transport, freight, express, telegraph and United States mail service. The Pacific Electric Railway has recently continued its line from Delhi, at which point the factory of the complainant is built, to Huntington Beach, and the said extension is over and through the territory from which the Southern California Sugar Company obtains its raw product. No other railroad is built in that territory, and it is impossible to ship raw product to the company's factory over any other line than that of the Pacific Electric Railway. The opportunity has been extended to each and all of the roads against which complaint is made to construct spurs and tracks in and upon the grounds of complainant. All of the roads against which complaint is made are members of the Transcontinental Freight Traffic Association; the Southern Pacific Railroad and Atchison, Topeka & Santa Fe Railroads make through joint rates with other electric railroads in California in the territory covered by the Pacific Electric Railway."

The Southern California Sugar Company asks that an order be entered by the Interstate Commerce Commission requiring the railroads against which discrimination is alleged to make and publish through joint rates in conjunction with the Pacific Electric Railway from its factory at Delhi to all points outside of California, along its and connecting lines, equal with the rates made from other sugar factories in California. The complaint concludes:

"Whereas, the Southern California Sugar Company will begin operations and be prepared to ship sugar on July 25, 1909, and as it has frequently requested the said steam roads to make a joint through rate on sugar long prior to the date of publication of the present East-Bound Tariff No. 3-G, to wit: April 14, 1909, and

"Whereas, the said roads refused to make such joint through rate at that time and at all times since Jan. 1, 1909, and now advise the complainant that the matter will be taken under consideration at the meeting of the Transcontinental Railway Association, which meets at Atlantic City in September, 1909, and

"Whereas, the complainant has no assurance that favorable consideration will be given its requests,

"It is therefore requested that an order be made requiring the said steam roads to accept the through interstate business of the Southern California Sugar Company from the Pacific Electric Railway, upon through joint rates, the same as are made by said steam roads on sugar shipments from all other sugar producing points in California, and that said order be made immediately effective in order that the complainant may not be required to pay additional and exorbitant freight."

Circular on Courtesy

H. A. Nicholl, general manager of the Indiana Union Traction Company, Anderson, Ind., recently addressed a circular to the employees of the company on the subject of courtesy, in which he embodied the gist of a communication addressed some time ago by the Delaware, Lackawanna & Western Railroad to its employees. This letter has since its original publication been used by several companies as a text in addressing their men, as instanced in the case of the communication of the Hartford & Springfield Street Railway to its employees, which was reprinted as modified by that company on page 194 of the Electric Railway Journal of July 31, 1909. Mr. Nicholl in his introduction, said:

"A railway company is known by the manner in which its business is conducted, and by the service it renders the public. By service we mean the treatment the public receives at the hands of the company's employees; the speed, safety and reliability of the train operation; the character of the cars operated; the condition of the track, and the other appointments of the company. If its employees are kind and courteous, if its cars are clean and comfortable, if its track is smooth, and its other appointments are good, then the railway is favorably known. On the other hand, if the conduct of its employees is indifferent or discourteous, no matter how fast, safe and reliable its train operation, how clean and comfortable its cars, how smooth its track, or how perfect its other appointments, the railway is certain to be unfavorably known.

"When a railway is favorably known it is certain to have friends, but when it is unfavorably known it is sure to have enemies. If a railway has the friendship of the general public, it is altogether likely to be successful, and therefore it might be said that the success of a railway—and the success of its employees depends on that of the railway—may be measured by the good will of its patrons and by its standing in the community which it serves.

"This company has always endeavored to give the people in its territory the best practicable service, and it believes that it enjoys the good will of the people it serves. Wishing that the favorable consideration of the public may continue, we desire to impress upon you the necessity of treating all our patrons courteously at all times, and that you each perform the duties devolving upon you to the best of your ability.

"That you may more fully appreciate the benefit derived from the practice of uniform courtesy to all, your attention is invited to the circular recently issued to its employees by one of the large and successful Eastern steam railway companies."

Increase in Wages in Milwaukee

At the annual outing of the employees of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., on Aug. 25, 1909, John I. Beggs, president and general manager of the company, announced that, commencing on Sept. 1, 1909, the pay of all motormen and conductors in the service of the company would be increased to the following rates, platform time: 20 cents per hour, first year's continuous service; 21 cents per hour, second year's continuous service; 22 cents per hour, third year's continuous service; 23 cents per hour, fourth year's continuous service; 24 cents per hour, fifth year's continuous service; 25 cents per hour after five years' continuous service with the company.

Prior to June 1, 1900, the wages of motormen and conductors in the service of the company were 15 cents to 19 cents per hour, the maximum being attained the fourth year. On June 1, 1900, the pay was advanced to 17 cents to 20 cents per hour, the maximum being attained the fifth year. On June 1, 1902, a further advance was made to 18 cents to 21 cents per hour, the maximum being attained the fourth year. On Jan. 1, 1903, wages were again advanced to 19 cents to 22 cents per hour, the maximum being attained the fourth year. On Jan. 1, 1904, the rate of wages was changed to 18 cents to 22 cents per hour, the maximum being attained the fifth year. This change affected only new men entering the service. On Jan. 1, 1906, the pay of all men in the service of the company for 10 years or more was advanced to 23 cents per hour, and on May 1, 1906, the wages of trainmen were made as follows: 19 cents per hour, first year; 20 cents per hour, second year; 21 cents per hour, third year; 22 cents per hour, fourth and fifth years; 23 cents per hour, sixth, seventh, eighth, ninth and tenth years; 24 cents per hour after 10 years' continuous service.

These rates were continued in force until Sept. 1, 1909, when the new schedule went into effect. The new rate of pay is an increase of practically 33 1/3 per cent over the wages in force prior to June 1, 1900.

Fenders Discussed at San Francisco

The Public Utilities Committee of the Board of Supervisors of San Francisco requested the United Railroads of San Francisco recently to equip one of its lines running down Market Street to the Ferry and around the loop with projecting fenders of the basket type.

Owing to the congestion at the ferry, Charles N. Black, vice-president and general manager of the company, stated at the meeting of the committee that in his opinion this type of fender would cause more accidents than it would prevent, owing to the long over-hang when rounding the curves at the ferry loop and that the company would be unwilling to assume the risk without a specific order from the board. Besides the curve at the ferry loop there are many other curves on the system where the same objection would hold. The severe grades in San Francisco also require any type of projecting fender to be carried so high from the rail as to practically make useless the best features of this type of fender.

Successful Excursions at Portsmouth, N. H.

Copies of a circular issued by the Portsmouth (N. H.) Electric Railway to stimulate business between Portsmouth and Hampton Beach, N. H., have been received from F. P. Fosgate, assistant superintendent. Excursions are run each Wednesday evening for a fare of 30 cents for the round trip.

The circular says in part: "No crowding. No jamming. A seat for every patron." Attention is also called to the following conditions: "Everybody must have a ticket. None sold on cars. No money collected by conductors." The distance from Portsmouth to Hampton Beach is 13½ miles. The regular one-way rate is 21 cents and the round trip, 42 cents as compared with the excursion fare of 30 cents for the Wednesday evening occasions. If the weather permits a display of fireworks is made at the beach on the evening of the excursion.

The idea of Mr. Fosgate in issuing the circular in the form indicated was that it would appeal to a class of people who object to riding in a crowded car, and would lead them to acquire the habit of riding on the electric lines. Double-truck open cars are used for the excursions, which have been very popular.

Lincoln (Neb.) Employees Demand Increase in Wages.—The employees of Lincoln (Neb.) Traction Company on Aug. 26 made a demand upon the company for an increase of 1 cent an hour in pay and for one day off each week.

Philadelphia Transit Company to Test Fenders.—The Philadelphia Rapid Transit Company has ordered 10 each of the latest type of Parmenter, H. B. and Providence fenders for the purpose of experimenting with them in actual service.

Application to Justify 10-Cent Fare.—Application has been filed with the Nebraska State Railway Commission for permission to show why the Nebraska Traction & Power Company should charge 10 cents fare between Omaha and South Omaha.

Dishonest Conductor Sentenced in New York.—Richard Kenny, a conductor who entered the employ of the Metropolitan Street Railway, New York, N. Y., on June 3, 1909, and who was detected on Aug. 10 stealing 60 fares out of 177 collected, has been sentenced to two months' imprisonment by the Court of Special Sessions.

Complaint of Speed of Cars.—The New York Public Service Commission, Second District, has served upon the Chautauqua Traction Company the complaint of L. M.

Sweet as to alleged running of cars at Gifford Park, Lakewood, at a dangerous speed and failure to give signal of approach. The company was given 10 days in which to answer the complaint.

Additional Tracks in Traction Terminal, Indianapolis, Ind.—The Indianapolis Traction & Terminal Company is laying the seventh and eighth tracks north from the train sheds to Ohio Street in order to accommodate the increased number of trains during State Fair week. The ninth, tenth and eleventh tracks will be laid ultimately. The increasing business due to the service to the new Speedway park makes this number of tracks necessary.

Stage Lines Must Submit Traffic Schedules.—The Public Service Commission of the First District of New York has adopted an order extending the provision of the order requiring street railways to submit tariff schedules to companies operating stage lines in accordance with the provision of an amendment adopted at the last session of the Legislature, by which stage lines are brought under the jurisdiction of the Public Service Commission under much the same condition as electric railways.

Aldermen of Lawrence, Mass., Investigate Electric Express Service.—The Board of Aldermen of Lawrence, Mass., made a visit to Brockton, Taunton and New Bedford on Aug. 12, to study the operation of the electric express service in those cities. The party was accompanied by David Bruce, superintendent of the Lawrence division of the Boston & Northern Street Railway. A representative of the Lawrence *Sun-American* accompanied the party and interviewed various merchants in Brockton and Taunton regarding their satisfactory experience with the electric express service.

Fare Hearing in Massachusetts.—The Massachusetts Railroad Commission will give a public hearing on Sept. 8, 1909, upon a petition recently filed with the board by a number of citizens of New Bedford, who ask that the fare between all points within the city limits be fixed at 5 cents. The Old Colony Street Railway operates between the city line and Lund's Corner, in the northern portion of the city, and charges a single 5-cent fare. Between Lund's Corner and the other portions of New Bedford the Union Street Railway handles the traffic, and charges a 5-cent fare as a separate organization.

Indiana Railroad Commission Ruling.—The Indiana Railroad Commission has ruled that interurban railways in Indiana cannot under the provision of the Railroad Commission Law of 1907, carry free children gathered from the homes of the poor under the guise of charity. Neither can they carry children and refund the fare paid for their transportation without violating Subdivision 3, Sec. 13 of the Act of 1907, which declares that only children maintained in orphan homes or other charitable institutions may be carried free. The decision resulted from an excursion for poor children conducted by Miss Lydia Stauffer, South Chicago, part of the trip being over the Winona Interurban Railway from Goshen to Warsaw. The amount paid by Miss Stauffer for transporting the children over the Winona Interurban Railway was only $2.15. She suggested to the company that, as the outing was given in the name of charity, it would be appreciated if the company would refund the $2.15 expended for fare. The management asked for time to investigate its right to do this and presented the matter to the railroad commission with the afore-mentioned result.

Crusade Against Rowdyism Continued in New York.—Police Commissioner Baker, of New York, announced on Aug. 28 that he would double the force of men previously assigned by him to suppress the rowdies who have been terrorizing passengers on subway and elevated cars in New York on Sunday recently, and as a result of the efforts of the commissioner and the uniformed police of the Interborough Rapid Transit Company there were few reports of disorderly conduct and only a few arrests were made. Several of the prisoners were sent to the workhouse and a few were fined. In speaking about his appointment of additional men to service on the transit lines, Commissioner Baker said: "This Sunday rowdyism in the subway and on elevated and street car lines must be stopped, and to this end double the force of plain clothes men that were on this special duty on Aug. 22 will be sent out on Aug. 29. Four hundred able-bodied policemen, dressed as citizens, will keep watch all day and during the evening, and when the slightest sign of this kind of disorder arises arrests will be made. These specially assigned members of the force go out with instructions to nail any outbreak at the start, and I look for a goodly clean-up before sundown. On Aug. 22 we made 200 arrests for these disturbances, and few of these rascals escaped the net. This time 400 men will watch for them, and let them look out for themselves."

Personal Mention

Mr. William R. Willcox, chairman of the Public Service Commission of the First District of New York, has returned from Europe, where he spent a month touring France, Germany and Switzerland.

Mr. George H. Brauer has resigned as treasurer of the Oklahoma Railway, Oklahoma City, Okla., and Mr. H. M. Brauer, formerly secretary and auditor of the company, has been elected treasurer, and Mr. J. J. Johnson, formerly assistant secretary, has been elected secretary of the company.

Mr. John A. Cleveland, superintendent of new business for the Saginaw Valley Traction Company, Saginaw, Mich., has been appointed general manager of the company, succeeding Mr. John A. Cunningham, who recently resigned to take charge of personal interests in Kentucky. Mr. Cleveland will take up his new duties on Sept. 1.

Mr. J. E. Woodbridge, formerly editor of the *Electrical World*, is leaving the railway engineering department of the General Electric Company to become connected with the firm of Ford, Bacon & Davis. Mr. Woodbridge will take local charge for this firm of work in and near San Francisco in connection with the completion of the Stanislaus power development and the supply of power to the United Railroads of San Francisco.

Mr. Arthur C. Moore has been appointed auditor of the Oklahoma Railway, Oklahoma City, Okla. Mr. Moore has been connected with the accounting department of the Indiana Union Traction Company, Anderson, Ind., for some time, and for the last three or four years he has served as assistant to the auditor of that company. Mr. Moore succeeds Mr. H. M. Brauer, who was recently elected treasurer of the Oklahoma Railway.

Mr. Harold Ulmer Wallace has resigned as general manager of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., and will be succeeded by Mr. C. N. Wilcoxon, as noted elsewhere in this column. Mr. Wallace will retire from the Chicago, Lake Shore & South Bend Railway on Oct. 1, 1909. He expects to rest for about a month before taking up new work.

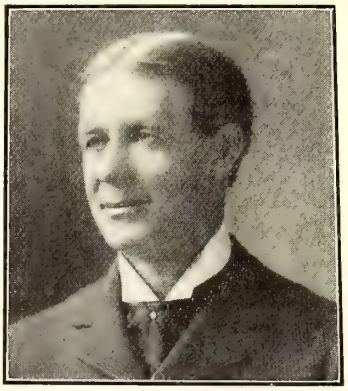
Mr. Bion J. Arnold, Mr. W. C. Rosecrans, who is associated with Mr. Arnold, and Mr. T. G. Seixas, formerly general manager and purchasing agent of the Pacific Traction Company, Tacoma, Wash., recently visited the Cascade Tunnel of the Great Northern Railroad, through which are operated three-phase locomotives. Before leaving the Northwest Mr. Arnold and Mr. Seixas expect to make the peak of Mount Tacoma, and possibly to go into Alaska a short distance.

Mr. H. W. Hudgen has been appointed claim agent of the Oklahoma Railway, Oklahoma City, Okla., to succeed Mr. M. L. Spitler, resigned. Mr. Spitler has been devoting only part of his time to the work of the claim department of the company, and his private practice has increased so rapidly as to require his whole attention. Mr. Hudgen has had an extensive experience in claim department work with steam roads. Since 1903 he has been claim agent for the St. Louis & San Francisco Railroad at Fort Worth, Tex.; Lawton, Okla., and Monett, Mo.

Mr. E. J. Dickson, general manager of the Uxbridge & Blackstone Street Railway, Milford, Attleboro & Woonsocket Street Railway, Interstate Consolidated Street Railway and the Attleboro Branch Railroad, Attleboro, Mass., has been appointed general manager of the Springfield (Mass.) Street Railway, Western Massachusetts Street Railway and the Central Massachusetts Electric Company to succeed Mr. H. C. Page, whose appointment as general manager of the Worcester (Mass.) Consolidated Street Railway and affiliated companies is noted elsewhere in this column. Mr. Dickson was born at Joliet, Ill., in 1872. After obtaining his education he entered the employ of the Chicago, Burlington & Quincy Railroad and was employed at Galesburg and Quincy, Ill., in the mechanical, transportation and freight departments as clerk, chief clerk and stenographer. After 14 years' service with this company Mr. Dickson, in 1901, entered the employ of the Northern Pacific Railroad, with headquarters at St. Paul, as chief clerk to the superintendent of motive power. Subsequently he was appointed to a similar position on the Lehigh Valley Railroad at Bethlehem, Pa. In 1907 Mr. Dickson entered electric railway work under Mr. L. S. Storrs, vice-president of the New England Investment & Security Company, and in September, 1907, he was made vice-president and general manager of the Milford, Attleboro & Woonsocket Street Railway and the Uxbridge & Blackstone Street Railway, with headquarters at Franklin. On Feb. 1, 1908, he was appointed general manager of the Interstate Consolidated

Street Railway and the Attleboro Branch Railroad and transferred his headquarters to Attleboro.

Mr. C. N. Wilcoxon has resigned as general manager of the Cleveland, Southwestern & Columbus Railway Company, Cleveland, Ohio, to accept a similar position with the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind. He will succeed Mr. H. U. Wallace, resigned. Mr. Wilcoxon was born at Muncie, Ind. The early part of his business career was spent in the construction and management of gas and water works systems. In 1893 he accepted a position as general manager of the local street car lines at Muncie, Ind., where he remained until 1898, when he went to Decatur, Ill., as general manager of the Decatur Traction Company. During his association with this property the system was rebuilt and put on a substantial paying basis. In 1901 Mr. Wilcoxon became general superintendent in charge of the operating department of the Western Ohio Railway, Lima, Ohio, where he remained until 1905, when he went with the Cleveland, Southwestern & Columbus Railway. During the time he has been associated with the latter company it has constructed about 75 miles of new track and has rebuilt and practically re-equipped the older part of the lines owned by the system.



C. N. Wilcoxon

Mr. Henry C. Page, vice-president and general manager of the Springfield (Mass.) Street Railway, has been appointed general manager of the Worcester (Mass.) Consolidated Street Railway to succeed Mr. E. G. Connette, who has become chief of the transportation department of the Public Service Commission of the First District, New York. Mr. Page has also been appointed general manager of the Uxbridge & Blackstone Street Railway, Milford, Attleboro & Woonsocket Street Railway, Interstate Consolidated Street Railway and the Attleboro Branch Railroad, to succeed Mr. E. J. Dickson, who has been appointed to succeed Mr. Page with the Springfield Street Railway. In addition, Mr. Page has been appointed general manager of the Worcester & Southbridge Street Railway, Worcester & Blackstone Valley Street Railway, Worcester & Holden Street Railway, Marlboro & Westboro Street Railway and the Quinsigamond Park Company, to succeed Mr. Connette. Mr. Page was born in Brownville, Me., on June 19, 1864, and spent his early life upon his father's farm. At the age of 17 he went to work in Somersworth, N. H., as a clerk in a store. In 1883 he secured a position as a conductor with the Lynn & Boston Railroad, and worked on the horse cars between Chelsea and Boston for three years. He was then appointed assistant superintendent in charge of the operation of all cars running from Chelsea to Boston. In 1890 he was appointed superintendent of the Newburyport (Mass.) Street Railway, which at that time operated a horse car line between Newburyport and Amesbury. During the term of Mr. Page's service with this company the road was equipped with electricity. When the Naumkeag Street Railway was consolidated with the Lynn & Boston Street Railway Mr. Page re-entered the service of the Lynn & Boston Street Railway as division superintendent at Salem and continued in this position from October, 1892, to July, 1900. He was then appointed general superintendent of the entire Boston & Northern Street Railway, a system comprising 450 miles of track. He left that company in April, 1903, to become general manager of the Berkshire Street Railway, Pittsfield. On June 13, 1905, Mr. Page became general manager of the Springfield Street Railway, and on Nov. 8, 1907, he was elected vice-president of the Springfield Street Railway. Mr. Page has always been active in the affairs of the New England Street Railway Club, and in 1907 was president of that body.



H. C. Page

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Quincy, Mount Sterling & Northeastern Traction Company, Quincy, Ill.**—Incorporated to build an electric railway from Quincy to Liberty, Mount Sterling and Rushville. Capital stock, $5000. Principal office, Quincy, Ill. Incorporators: Henry A. Gardner, Henry L. Stern, Henry A. Gardner, Jr.; Abel Davis, William F. Anderson, Julius H. Masser, Herbert J. Friedman, M. M. Hart, G. H. Bent, F. P. Lasier and Charles T. Farson.

***South Bend & Logansport Traction Company, South Bend, Ind.**—Incorporated to construct an electric railway from South Bend to Logansport, via Plymouth and Rochester, a distance of 69½ miles. Capital stock, $400,000. Incorporators: Thomas P. Moredock, Virginius Nicar and P. J. Haulihan, South Bend; Henry F. Coleman, Logansport, and David Pepper, Jr., Philadelphia.

***Kansas City, Harlem & St. Joseph Railroad, Kansas City, Mo.**—Incorporated to build an electric railway from Kansas City across the Missouri River through Clay County to Dearborn in Platte County and thence to St. Joseph, connecting with Union Terminal Railway and also to build a branch line from that point to Tiffany Springs in Platte County. The total length of the main and branch line is to be 53 miles. Capital stock, $530,000. Headquarters, Ridge Building, Kansas City. Officers: Edward J. Ward, Chicago, Ill., president and chief engineer; Daniel O. Ketchum, Kansas City, vice-president; Ralph B. Throop, Chicago, Ill., secretary-treasurer. Directors: Edward J. Ward, Ralph B. Throop, D. O. Ketchum, William H. Dickinson and A. A. Dunham.

***Hampstead & Haverhill Electric Railroad, Manchester, N. H.**—Incorporated under the laws of New Hampshire and Massachusetts to build an electric railway from Manchester to Derry, via Hampstead, and connecting with the electric railways of Massachusetts, making a direct connection from Manchester, N. H., to Haverhill, Mass. Incorporators: Arthur M. Emerson, Hampstead, president; Albert A. McReel, Exeter, secretary and treasurer. Directors: Roswell Annis, Manchester; Henry T. Rosewell, Derry, and George A. Sawyer, Atkinson.

Clarion & East Brady Electric Railway, Clarion, Pa.—Incorporated to build an electric railway from Clarion to East Brady, via Sligo and Rimersburg, a distance of 25 miles. Cars will be operated for both freight and passenger business. Incorporators: G. E. Arnold, R. M. Werner, T. S. Arnold, I. N. Langham and E. W. Witherell. [E. R. J., July 17, '09.]

FRANCHISES

Long Beach, Cal.—The Board of County Supervisors has granted to the Pacific Electric Railway, Los Angeles, a 40-year franchise for an electric railway on East Seventh Street, Long Beach.

Mayfield, Cal.—The Board of Trustees has granted to the Peninsular Railroad, San Jose, a franchise for an electric railway in Mayfield. The Peninsular Railroad was the only bidder and paid $50 for the franchise.

San Diego, Cal.—The San Diego, El Cajon & Escondido Railroad has petitioned the Common Council and the Board of Park Commissioners for an electric railway franchise to enter San Diego. [E. R. J., May 1, '09.]

***Aurora, Ind.**—The City Council has granted to the Engineering & Equipment Company, Aurora, a franchise to build an electric railway, for the use of both passenger and freight transportation, to connect Aurora and Rising Sun.

Newcastle, Ind.—The Newcastle Union Railway, which has a franchise for a street railway system in Newcastle, has applied to the City Council for an extension of two years' time in which to commence work and complete the system. [E. R. J., Feb. 6, '09.]

Boone, Ia.—At a special election recently held in Boone, the Iowa Light & Traction Company was voted a 25-year street railway, lighting and heating franchise.

Oswego, N. Y.—The Town Board has granted to the Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y., a franchise to extend its electric railway through Oswego. The extension will start from Fulton, through Oswego to Syracuse, about 20 miles distant.

***Hendersonville, N. C.**—The City Council has granted a franchise to H. S. Anderson to build an electric railway over certain streets of Hendersonville.

Chattanooga, Tenn.—Bowdre Brown has requested the withdrawal from the City Council of the ordinance granting him a franchise to operate lines over certain streets of Chattanooga. [E. R. J., July 31, '09.]

***Columbia, Tenn.**—Col. Allen Brown, representing local capitalists, and Judge W. B. Turner, representing foreign and local capitalists, have each applied for a franchise to build a street railway in Columbia.

***Stamford, Tex.**—The City Council has granted to B. E. Sparks and associates a 50-year franchise for an electric railway in Stamford. [E. R. J., May 1, '09.]

Wheeling, W. Va.—The City & Elm Grove Railroad has been granted a franchise by the County Commissioners to extend its electric railway around Wheeling Park and Park View.

TRACK AND ROADWAY

Montgomery (Ala.) Traction Company.—This company advises that it is making a number of improvements to its street railway. It is now at work relaying its tracks with heavier rails.

***Eureka, Cal.**—It is stated that prominent capitalists of Humboldt County, headed by William S. Clark, president of the Humboldt Gas & Electric Company, and E. E. Skinner, have taken preliminary steps for the organization of a company that will undertake to build an electric railway between Eureka and Redding. The route of the proposed railway is over 100 miles long.

San Francisco, Vallejo & Napa Valley Railroad, Napa, Cal.—It is stated that this company will immediately construct a 7-mile extension of its electric railway, which already extends from Vallejo to St. Helena, to Calistoga. The company also expects to build another extension into Lake County with termini at Lakeport and Clear Lake. Two preliminary surveys have been made for this extension. One is by a tunnel through Mt. St. Helena and the other is to branch off from the present line at Rutherford, a small station north of Napa, and to extend through the series of valleys into the mountains of Lake County.

San Diego, El Cajon & Escondido Railway, San Diego, Cal.—G. W. Pursell, general manager, advises that this company has been only organized to make preliminary arrangements for the building of an electric railway to connect San Diego, La Mesa, El Cajon, Bostonia, Lakeside, Morton, San Pasqual, Bernardo and Escondido, a distance of nearly 65 miles. It is the intention to form a permanent organization about Sept. 1. Surveys have been completed, and it is probable that construction will be under way about Oct. 1. The proposed railway will be operated by an independent company and not as part of any other system. Arrangements for the power supply have not yet been considered. Officers: G. A. Davidson, Jr., San Diego, secretary and treasurer; G. W. Pursell, San Diego, general manager and purchasing agent; Charles Harlowe, Jr., Oakland, chief engineer. [E. R. J., May 1, '09.]

Connecticut Company, Willimantic, Conn.—This company, on Aug. 26 formally opened its new line between Willimantic and South Coventry, a distance of 6 miles.

Athens (Ga.) Electric Railway.—This company has recently purchased from the Lorain Steel Company about 300 tons of 70-lb. rails, to replace the 60-lb. and 40-lb. rails now in use.

Atlanta, Griffin & Macon Electric Railway, Atlanta, Ga.—As a result of the passage of the Boyd bill by the Senate, it is said that a consolidation will soon be effected by the interests of the Macon Railway & Light Company, Macon; the Central Georgia Power Company, Atlanta; Atlanta, Griffin & Macon Electric Railway, and the Macon, Americus & Albany Electric Railway, the two last named companies holding charters for interurban railways, to connect the cities mentioned in their titles. It is stated that the Central Georgia Power Company will furnish the power for the proposed lines. It is completing the construction of a dam and power plant on the Ocmulgee River which will have a capacity of 21,000 hp.

***Elk City, Idaho.**—It is stated that George Carter, Jackson, Mich, is considering plans to build an electric railway, 30 miles in length, from Elk City to the Clearwater River.

***Aurora, Ind.**—The Engineering & Equipment Company, Aurora, Ind., advises that it will soon be in the market for rails, cross ties, oil engines, generators and other railway equipment to be used in the construction of the company's proposed electric railway which is to connect Aurora and Rising Sun. All except three miles of the survey has been completed and rights of way are being secured. The company has just been granted a franchise to build its line in Aurora. Both passengers and freight will be carried.

Cincinnati, Madison & Western Traction Company, Indianapolis, Ind.—Subsidy elections in aid of the construction of the Cincinnati, Madison & Western Traction Company's line will be held Sept. 28 in Madison, Hanover and Republican Townships. The aggregate amount asked is $67,000, which, added to the amount previously voted, will total $110,000. The proposed railway will connect Madison and Scottsburg. [E. R. J., Aug. 28, '09.]

Des Moines (Ia.) City Railway.—It is stated that this company will shortly begin the construction of 10 miles of new track.

Baltimore & Eastern Shore Railway, Baltimore, Md.—This company has made a formal request of the United States board of engineers for rivers and harbors for a preliminary survey of Chesapeake Bay for the purpose of establishing a channel for a ferry between Bay Shore Park and some point opposite on the eastern shore. This ferry will be used in connection with the proposed electric railway between Baltimore and Cambridge. [E. R. J., Aug. 28, '09.]

Detroit, Lansing & Grand Rapids Railway, Detroit, Mich.—Sealed bids will be received by the chief engineer of the Detroit, Lansing & Grand Rapids Railway until Sept. 15 for all necessary surveys and plans for an electric railway about 62 miles in length from Farmington to Lansing. Headquarters, 706 Union Trust Building, Detroit. F. A. Bean, chief engineer. [E. R. J., Aug. 7, '09.]

Missoula (Mont.) Street Railway.—It is announced that this company is about to award a contract for the construction of 2½ miles of grade for the interurban railway from East Missoula to the entrance of Cedar Street. The grade is to be constructed to connect with the grade recently vacated by the Northern Pacific Railroad between Missoula and Bonner and will be carried to the east banks of the Rattlesnake Creek. [E. R. J., July 24, '09.]

Nebraska Traction & Power Company, Ralston, Neb.—This company announces that it expects to place contracts during the next six weeks for the construction of 5 miles of new track.

Morris County Traction Company, Morristown, N. J.—It is announced that this company proposes to extend its railway at Denville 3 miles to Boonton. Construction will start at once, according to David Gring, president of the company.

New York, Westchester & Boston Railway, New York, N. Y.—This company has placed contracts for approximately 25,000 tons of steel for bridges, viaducts and subways, to the American Bridge Company, of New York. It has also placed contracts for grading and masonry work between 174th Street and the northern boundary of New York City to the O'Brien Construction Company, Waterbury, Conn., and for grading and masonry work in Mt. Vernon, N. Y., to Lathrop & Shea, New Haven, Conn. Office, 65 Beaver Street, New York, N. Y.

Rockland Railroad, Suffern, N. Y.—The Public Service Commission of the Second District has received an application from the Rockland Railroad, which proposes to build an electric railway to connect Tappan, Suffern, Stony Point and Nyack, for permission to issue bonds in the amount of $2,767,000 and for increase of its capital stock from $100,000 to $630,000. and permission to issue stock up to the total of its capital as so increased. The proposed railway is to have a total mileage of 49.62 miles, of which 41.12 are within New York and the balance within New Jersey. [E. R. J., July 10, '09.]

Zanesville & Meigs Valley Traction Company, Zanesville, Ohio.—At the annual meeting of this company, recently held in Zanesville, the following officers and directors were elected: C. T. Gale, Chandlersville, president; Frank P. Ames, Rockland, vice-president; W. G. Lawhead, Zanesville, secretary; F. M. Cruise, Zanesville, treasurer; H. D. Blodgett, general manager; T. W. Jackson, W. W. Patterson, A. H. Needham. The company proposes to build an electric railway from Zanesville to Beverly, via McConnelsville. [E. R. J., July 10, '09.]

Northampton Traction Company, Easton, Pa.—This company is building about 1500 ft. of new track and also a concrete and steel bridge 272 ft. long.

Sunbury & Northumberland Electric Railway, Sunbury, Pa.—The board of directors of this company have voted $1,000,000 bonds for construction and equipment purposes. The company will extend its electric railway from Northumberland to Lewisburg in the near future.

Coal Creek Railway & Light Company, Coal Creek, Tenn.—J. P. Stanton writes that this company was incorporated on Aug. 4 for the purpose of building an electric railway from Coal Creek to Briceville, a distance of about 6 miles. It will also reach the fair grounds. It has not yet been decided when construction will be started. It is the inten-

tion of the company to generate its own power. James Day, chief engineer. [E. R. J., Aug. 14, '09.]

***Tacoma, Wash.**—It is reported that R. Green, San Francisco, Cal., is planning to organize a company to construct a scenic railway to the summit of Mount Ranier, where it is proposed to erect a hotel. It is the intention to secure power for the operation of the line from a power station to be operated by water-power from one of the water-falls.

Washington Traction Company, Walla Walla, Wash.—At a meeting of the stockholders of the Washington Traction Company on Aug. 21, it was decided to increase the capital stock from $3,500,000 to $5,000,000. The company contemplates building a railway from Dayton to Wallula, via Walla Walla. It is stated that the proposition has been financed and that work will be begun not later than Oct. 1. Officers: Gilbert Hunt, president; W. H. Richardson, Dayton, vice-president; B. C. Holt, secretary, and J. C. Armstrong, general manager. [E. R. J., May 22, '09.]

***Wenatchee, Wash.**—It is stated that the Commercial Club of Wenatchee has taken up the proposition of building an electric railway between Wenatchee and Waterville, a distance of about 20 miles. A committee, consisting of George H. Ellis, Jr., E. M. Tupper and W. R. Prowell, has been appointed to look into the feasibility of the project.

Sabraton Railway, Morgantown, W. Va.—This company expects to place, during the next 10 weeks, contracts for the construction of a 1-mile extension to Rock Forge.

Southern Wisconsin Railway, Madison, Wis.—This company expects to build during this season over 1 mile of new track to its railway.

SHOPS AND BUILDINGS

Vincennes (Ind.) Traction Company.—This company announces that it has about completed the remodeling of its car houses and repair shops.

Southwestern Interurban Railway, Arkansas City, Kan.—This company is said to have completed plans for the erection of a new car house near Island Park, Winfield.

Nebraska Traction & Power Company, Ralston, Neb.—Contracts will be awarded by this company, during the next six weeks, for the erection of a car house.

Washington Water Power Company, Spokane, Wash.—This company has awarded a contract to Peter Hughes for the construction of a two-story brick passenger depot on Wall Street between Front Avenue and Post Street, Spokane. The building will be 80 ft. long and will be set back from the street enough to allow tracks on the ground owned by the company.

POWER HOUSES AND SUBSTATIONS.

Athens (Ga.) Electric Railway.—This company expects to purchase, during the next two weeks, a 300 kw 60 cycle railway rotary converter.

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company has recently purchased a horizontal Curtis turbine and a 2000 kw, three phase 25 cycles, 1500 r.p.m., 13,200-volt generator.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—This company is remodeling and enlarging the boiler room of its power plant. It is also being equipped with a 500-hp unit, new coal and ash-handling apparatus and clam grates. A 1500-kw Allis-Chalmers turbine has recently been installed in the plant. In addition the company is extending its district steam and heating mains.

Nebraska Traction & Power Company, Ralston, Neb.—This company expects to place contracts during the next six weeks for the erection of a substation.

New York Central & Hudson River Railroad, New York, N. Y.—George W. Kittredge, chief engineer, announces that this company expects to place contracts during the next two weeks for the erection of a substation at White Plains.

Pittsburgh (Pa.) Railways.—It is stated that this company is asking bids for a one-story brick substation to be built at the south end of the Mount Washington Tunnel. The building will be 70 x 100 ft.

Tazewell (Va.) Street Railway.—This company has installed a new engine in its power house and expects to build an extension to its coal wharf, located at the plant.

Simcoe Electric Railway & Power Company, Midland, Ont.—It is reported that this company is about to commence work on the power plant at Big Chutes, on the Swern River, 30 miles from Midland. The work is in charge of C. H. and P. H. Mitchell, electrical engineers, Toronto, Ont. The company proposes to build an electric railway to connect Penetanguishene, Midland, Victoria Harbor, Waubaushene and Coldwater. Douglas L. White and James Playfield Midland are interested. [E. R. J., April 3, '09.]

Manufactures & Supplies

ROLLING STOCK

Springfield (Mo.) Traction Company is in the market for six single-truck cars.

Mexico Tramways Company, City of Mexico, is building 25 box cars 40 ft. long in its own shops.

Detroit (Mich.) United Railway is building a steel underframe combination switch and work car in its shops.

Coney Island & Brooklyn Railroad, Brooklyn, N. Y., has purchased 175 registers of the No. 15 type from the Sterling-Meaker Company.

Winona Interurban Railway, Warsaw, Ind., expects to buy 18 new cars, two of which will be combination chair and sleeping cars.

Old Colony Street Railway, Boston, Mass., has ordered three express cars from the Laconia Car Company, the trucks for which will be Standard O-60.

Ware & Brookfield Street Railway, Ware, Mass., expects to buy two 20-ft. car bodies, to be mounted on Bemis trucks and to have Westinghouse equipment.

San Angelo (Tex.) Street Railway has purchased five 21-ft. closed motor cars mounted on Brill 21-E trucks from the Dorner Railway Equipment Company, Chicago.

Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., is in the market for some new flat and box cars of standard railroad type or good second-hand cars of 40,000 lb. capacity.

Union Street Railway, New Bedford, Mass., has purchased 12 30-ft. closed cars from the J. M. Jones Sons Company, Watervliet, N. Y. Standard O-50 trucks were purchased for these cars.

Bay City Railway, Green Bay, Wis., has purchased one 14-bench, open Narragansett car, mounted on Wason trucks and equipped with two GE-57 motors from Dorner Railway Equipment Company, Chicago.

Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., has purchased 10 gondola cars of 80,000-lb. capacity from the Haskell-Barker Car Company, Michigan City, Ind., for handling stone from the quarries on the company's line.

Sabraton Railway, Morgantown, W. Va., has purchased trucks from the New York Car & Truck Company, Kingston, N. Y.; four motor equipments complete from the Westinghouse Electric & Manufacturing Company and air brake equipments from the Westinghouse Traction Brake Company.

Maryland Electric Railway, Baltimore, Md., mentioned in the Electric Railway Journal of July 31, 1909, as being in the market for three large cars, has ordered the cars from the Jewett Car Company, Newark, Ohio. American Locomotive Company's trucks and complete Westinghouse equipment were specified.

Illinois Traction System, Champaign, Ill., mentioned in the Electric Railway Journal of May 22, 1909, as being in the market for 30 cars for service into St. Louis, has ordered this number of cars from The J. G. Brill Company. GE-216 motors, K-35-C controllers, U. S. No. 13 trolley bases and Westinghouse automatic air brakes were also ordered. The cars will be so constructed as to be readily convertible for pay-as-you-enter service.

Wheeling (W. Va.) Traction Company has ordered eight semi-convertible cars from G. C. Kuhlman Car Company with semi-steel bodies. The bodies will be 30 ft. long over corner posts, 45 ft. long over bumpers, with an extreme width of 8 ft. 8¾ in. The cars will each seat 44. The bulkhead doors will be telescopic and one platform door at each end corners will fold, while the other will be of the sliding type, operated by the motorman. Brill 27 FE-2 trucks, with 5-ft. wheel base. Westinghouse No. 307 quadruple motor equipment was specified, with K-35 controllers. Mention of this contemplated purchase was made in the Electric Railway Journal of May 19, 1909.

Ohio Electric Railway, Cincinnati, Ohio, has drawn up the following specifications for the six combination interurban cars mentioned in the Electric Railway Journal of June 26, 1909, as being built by the Cincinnati Car Company:

Seating capacity.....58	Curtain material...Pantasote
Bolster centers, length .....38 ft. 6 in.	Hand brakes.....Peacock
Length of body..60 ft. 2 in.	Heating system, Peter Smith Hot Water
Width over sills.. 8 ft. 8⅛ in.	Headlight.....General Elec.
Sill to trolley base 9 ft. 6 in.	Arc and Dayton No. 1559
Body .....Wood	Inc. Dash

Interior trim.....Mahogany
Underframe .....Composite
Air brakes,
Westinghouse AMM
Bolsters, body..Built-up steel
Bumpers.....Steel plate
Car trimmings..Solid bronze
Couplers,
Janney M.C.B. radial
Curtain fix....Curtain S. Co.

The details of the six motor express cars are:

Wheel base..... 6 ft. 10 in.
Length over all.50 ft.
Width inside.... 7 ft. 7¼ in.
Width over all.. 8 ft. 8 in.
Height—Sill to trolley base... 9 ft. 4 in.
Height from top of rail to sills.....45 in.
Body .....Wood
Underframe .....Composite
Air brakes,
West. Automatic
Control system.....K-34
Motors.....Four West. 121
Roofs .....Monitor
Sash fixtures,
Edwards raised
Seats.....H. & K. 99-EE
Step treads.....Mason
Trolley retrievers,
Knutson No. 2
Trucks, type..Taylor M.C.B.

The eight freight trail cars have been specified as follows:

Bolster centers, length .....27 ft. 6 in.
Length of body....38 ft. 6 in.
Width over sills.... 8 ft. 8 in.
Sill to trolley base.....9 ft.
Height from top of rail to sills.....45 in.
Body .....Wood
Interior trim..Pine sheathing
Underframe .....Composite
Air brakes,
West. freight car
Couplers,
Janney M.C.B. radial type
Hand brakes,
Tower freight car type
Trucks.....Standard motor truck, M.C.B., 80,000 cap.

TRADE NOTES

Grip Nut Company, Chicago, Ill., reports that Grip nuts are to be used on 1800 box cars which are being built by the Pullman Company for the Northern Pacific Railroad.

James E. Daly, Inc., New York, N. Y., agent for Empire woolen yarn box packing and dealer in cotton wiping waste, has moved its office from 88 Leonard Street to 10 Union Square.

Peter Smith Heater Company, Detroit, Mich., has received an order from the Louisville (Ky.) Railway for 33 No. 3 type C hot-water heaters to be installed on the cars recently ordered from the St. Louis Car Company.

Alfred J. Thompson, 71 Broadway, New York, N. Y., has formed a selling organization to promote the sale and installation of American machinery in Latin American countries. Resident engineers in each of the principal cities of South and Central America will act as representatives of the organization.

Walpole Rubber Company, Ltd., Granby, Que., has nearly completed its new building, which is 120 ft. x 60 ft., and will have a basement and four stories, three of which are already built. In addition, there is being constructed a paint factory 30 ft. x 40 ft. and a boiler and engine house 20 ft. x 30 ft. This company will manufacture for the Canadian trade a line similar to that of the Massachusetts Chemical Company, of Walpole, Mass., including insulating tapes, Armalac and Insulac compounds and rubber splicings.

Parmenter Fender & Wheel Guard Company, Boston, Mass., since the investigation of the subject of fenders and wheel guards by the Public Service Commission of New York, First District, and the establishment of a high record for the Parmenter apparatus in these tests, has done a large business with the Metropolitan Street Railway, New York. The last order received from the company was for 550 wheel guards, making a total of 1200 Parmenter guards purchased by the Metropolitan Street Railway within the last three months.

Pacific Car & Foundry Company, San Francisco, Cal., has taken over the W. F. Holman Car Manufacturing Company of that city and after enlarging the plant will install a $400,000 branch factory at Portland. Incorporated for $1,000,000, the Pacific Car & Foundry Company is represented by M. J. Hynes, who is president, and also president of the National Bank of the Pacific. Other officers are: J. W. Reiss, former manager of the W. L. Holman Company, who will be manager of the new concern; C. M. Greene, treasurer; W. H. Judson, vice-president; B. W. Buxton and G. F. Martin.

Coleman Fare Box Company, Buffalo, N. Y., has recently received orders for its No. 2 fare boxes from the Buffalo & Lackawanna Traction Company, Buffalo, N. Y., and the Detroit United Railways, Detroit, Mich., as well as an order from the Schenectady Railway Company for 15 small hand fare boxes. All of the patents of the company have now been allowed. In a recent issue of the Buffalo Commercial, E. M. Bassett, Public Service Commissioner of the First District of New York, who has recently been making an inspection of street railways in Buffalo, Niagara Falls, Toronto and other cities, is quoted as saying that the International Railway Company of Buffalo "is standardizing its cars on a pay-as-you-enter type with the best fare box I have ever seen." An opinion of this kind from a disinterested source is very flattering.

ADVERTISING LITERATURE

Western Electric Company, New York, N. Y., and Chicago, Ill., is distributing a bulletin illustrating and exploiting the Sunbeam tungsten miniature lamp for use on voltages between 1½ and 20. These lamps vary in efficiency from .9 watt per cp to 1.33 watts per cp.

W. N. Matthews & Brother, St. Louis, Mo., have published a catalog of wiring and other electrical specialties which they make and sell, in which are included a number of wiring tables and other useful data and a reprint from the *Electrical World* of an article by Anthony Gorham on "Heavy Wire Terminations."

Watson-Stillman Company, New York, N. Y., has collected in Catalog No. 73 an assortment of sheets from its general printed matter showing all of the types of hydraulic tools made by this company for use on steam and electric railways. Among the new tools illustrated are a hydro-pneumatic wheel press, motor driven rail bender, overhead crane and hydraulic beam shear.

Trussed Concrete Steel Company, Detroit, Mich., has published a third edition of its handbook for architects, engineers and builders, containing tables, formulas, drawings and other useful information on the design of reinforced concrete after the Kahn system. The information given covers the design of columns, floor and roof slabs, bridges, sewers, storage bins and other applications of reinforced concrete.

The J. G. Brill Company, Philadelphia, Pa., in *Brill's Magazine* for August, describes the conditions of street railway operation in New Orleans, La., as affecting the type of cars in use. Among the other articles are a description of semi-steel cars for the Milwaukee Electric Railway & Light Company, an article on composition flooring for cars and short descriptions of recent new cars built at the various plants of the company.

Peckham Truck Company, Westminster, London, Eng., has recently brought out a catalog descriptive of the Peckham system of pendulum and radial gear trucks for electric railway cars. A number of important claims are made for this system of trucks, particularly in regard to the saving of power consumed, the cost of maintenance of trucks, motors, car bodies and track, and easy riding. It represents the long experience of Mr. Peckham in truck design and construction.

General Electric Company, Schenectady, N. Y., has issued the following bulletins: No. 4680, which is entitled, "Sign Lighting with Tungsten Lamps"; No. 4688, which describes a compound meter board; No. 4665, which describes the electrical operation of pulp and paper mills. Booklet No. 3839, recently issued by this company, illustrates and describes fan motors for residences and telephone booths. The company is also distributing two booklets containing data relative to the new G. E. tungsten lamp.

H. W. Johns-Manville Company, New York, N. Y., has issued an illustrated folder descriptive of "J-M Asbestoside." The folder also contains a number of views of buildings in which "asbestoside" has been applied. Two interesting views are also given of an actual fire test of rubber roofings and J-M asbestos roofing and asbestoside. The company is also distributing a leaflet describing Brickline asbestos firebrick cement, a compound used for setting up bridge walls and inner courses. The folder contains directions for applying Brickline and a price list.

Wagner Electric Manufacturing Company, St. Louis, Mo., in bulletins issued by it recently has adopted a radical departure from the usual argument of such publications. One, on the subject of alternating-current generators, just received, is typical. It contains a great deal of valuable information to any prospective purchaser of alternating-current generators and is written without reference to the particular design of the Wagner Company, reliance being placed in that regard almost entirely upon carefully selected illustrations and the descriptions which accompany them as captions. Other interesting recent Wagner literature relate to generators, central station transformers, polyphase motors and single-phase motors.

TABLE OF MONTHLY EARNINGS

Notice:—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including Taxes. †Deficit. ‡Includes Ferry earnings up to April 1.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m. July '09	200,392	105,377	95,015	44,052	50,963
	1 " " '08	227,012	115,650	111,361	43,392	67,970
	7 " " '09	1,038,136	623,035	415,101	307,950	107,151
	7 " " '08	1,200,954	669,016	531,938	306,711	225,227
BELLINGHAM, WASH. Whatcom Co. Ry. & Lt. Co.	1m. June '09	30,605	18,039	12,566	8,085	4,481
	1 " " '08	26,129	16,862	9,267	7,970	1,297
	12 " " '09	378,032	219,130	158,902	101,920	56,982
	12 " " '08	363,288	204,893	158,395	93,030	65,366
BIRMINGHAM, ALA. Birmingham Ry., Lt. & Power Co.	1m. July '09	183,186	101,974	81,212	.....	.....
	1 " " '08	170,261	99,775	70,486	.....	.....
	7 " " '09	1,276,482	711,880	564,602	.....	.....
	7 " " '08	1,232,307	714,952	517,355	.....	.....
CHAMPAIGN, ILL. Illinois Tr. System.	1m. June '09	341,192	210,765	130,427	3,542	126,885
	1 " " '08	324,272	188,258	136,013	.....	136,013
	6 " " '09	2,054,218	1,218,122	836,096	19,393	816,703
	6 " " '08	1,913,517	1,138,593	774,924	.....	774,924
CHARLESTON, S. C. Charleston Con. Ry. Gas & Elec. Co.	1m. July '09	71,112	44,188	26,924	13,917	13,007
	1 " " '08	68,988	41,012	27,976	13,817	14,160
	5 " " '09	322,934	197,720	125,214	69 583	55,631
	5 " " '08	323,169	202,759	120,410	69,083	51,327
CHICAGO, ILL. Aurora, Elgin & Chicago Railroad.	1m. June '09	142,568	71,332	71,236	28,892	42,254
	1 " " '08	125,592	62,698	62,894	27,844	35,050
	12 " " '09	1,458,998	796,127	662,871	337,776	325,095
	12 " " '08	1,408,892	788,268	620,624	333,700	286,924
CLEVELAND, O. Lake Shore El. Ry.	1m., June '09	95,825	48,784	47,041	34,478	12,563
	1 " " '08	90,662	51,562	39,100	31,268	7,832
	6 " " '09	474,676	278,375	196,301	206,650	†10,349
	6 " " '08	453,034	279,367	173,667	186,568	†12,901
DALLAS, TEX. Dallas Electric Corporation.	1m., June '09	103,593	67,711	35,883	28,833	7,050
	1 " " '08	88,501	71,654	16,846	29,431	†12,585
	12 " " '09	1,245,732	786,143	459,589	342,819	116,771
	12 " " '08	1,136,113	760,386	375,727	349,160	26,567
DETROIT, MICH. Detroit United Railway.	1m., June '09	710,656	423,826	286,830	*156,997	129,833
	1 " " '08	640,457	*384,191	256,266	137,179	119,087
	6 " " '09	3,710,137	2,251,359	1,458,778	*926,334	532,444
	6 " " '08	3,313,037	*2,110,307	1,203,730	812,973	390,757
DULUTH, MINN. Duluth St. Ry.	1m., July '09	91,658	47,146	44,422	18,417	26,005
	1 " " '08	81,568	44,529	37,039	18,417	18,622
	7 " " '09	544,149	326,509	217,640	128,917	88,723
	7 " " '08	493,418	308,376	185,042	128,917	56,125
EAST ST. LOUIS, ILL. East St. Louis & Suburban Co.	1m., July '09	170,250	92,371	77,879	.....	.....
	1 " " '08	165,451	87,622	77,828	.....	.....
	7 " " '09	1,127,466	639,728	487,739	.....	.....
	7 " " '08	1,143,447	602,974	540,474	.....	.....
EL PASO, TEX. El Paso Elec. Co.	1m., June '09	47,075	27,701	19,375	7,943	11,432
	1 " " '08	41,995	30,397	11,599	7,415	4,184
	12 " " '09	557,317	372,033	185,284	91,267	94,017
	12 " " '08	533,492	376,413	157,079	79,117	77,961
FAIRMONT, W. VA. Fairmont & Clarksburg Tr. Co.	1m., June '09	42,122	12,946	29,176	1,893	27,283
	1 " " '08	36,318	11,698	24,620	1,069	23,551
	6 " " '09	212,293	76,886	135,407	11,373	124,033
	6 " " '08	189,194	70,821	118,373	6,444	111,929
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., June '09	115,981	70,688	45,293	.....	.....
	1 " " '08	110,035	65,442	44,592	.....	.....
	6 " " '09	648,655	390,835	257,820	.....	.....
	6 " " '08	615,201	360,594	254,607	.....	.....
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., June '09	103,308	57,028	46,280	17,190	29,091
	1 " " '08	90,550	66,051	24,499	19,191	5,308
	12 " " '09	1,176,360	662,191	514,169	199,085	315,085
	12 " " '08	1,061,577	611,496	450,082	174,986	275,095
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., June '09	105,803	57,806	47,997	21,218	26,578
	1 " " '08	92,442	53,235	39,207	21,009	18,198
	12 " " '09	1,155,391	664,337	491,054	251,822	239,223
	12 " " '08	1,069,016	625,598	443,418	237,977	205,441
GRAND RAPIDS, MICH. Grand Rapids Railway.	1m., June '09	91,764	42,838	48,926	19,137	29,789
	1 " " '08	85,324	42,789	42,535	18,708	23,827
	6 " " '09	479,809	233,759	246,050	113,711	132,339
	6 " " '08	437,665	234,989	202,676	110,072	92,604
HOUGHTON, MICH. Houghton County Tr. Co.	1m., June '09	27,538	13,183	14,355	6,242	8,114
	1 " " '08	23,343	12,781	10,561	4,624	5,938
	12 " " '09	294,379	160,970	133,410	66,336	67,074
	12 " " '08	257,067	147,937	109,130	57,288	51,842
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., June '09	38,391	21,447	16,944	9,288	7,656
	1 " " '08	35,882	23,876	12,005	9,274	2,731
	12 " " '09	454,335	258,544	195,791	111,018	84,773
	12 " " '08	410,628	250,784	159,844	103,045	56,799
LEXINGTON, KY. Lexington & Interurban Rys.	1m., June '09	51,373	38,186	13,186	.....	.....
	1 " " '08	54,143	34,519	19,642	.....	.....
	6 " " '09	266,513	202,158	64,355	.....	.....
	6 " " '08	269,048	191,661	77,387	.....	.....
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., July '09	361,915	169,018	192,897	106,013	86,884
	1 " " '08	336,889	160,883	176,005	99,989	76,016
	7 " " '09	2,400,421	1,183,578	1,216,842	730,058	486,784
	7 " " '08	2,227,308	1,165,648	1,061,660	691,706	369,954
Milwaukee Lt., Ht. & Trac. Co.	1m., July '09	158,632	37,325	121,307	70,617	50,689
	1 " " '08	145,759	34,237	111,521	64,388	47,133
	7 " " '09	815,163	216,895	598,268	440,913	157,355
	7 " " '08	778,989	210,606	568 383	410,482	157,901
MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., June '09	593,101	260,881	332,220	140,251	191,969
	1 " " '08	553,501	270,019	283,482	128,250	155,232
	6 " " '09	3,250,066	1,622,482	1,627,584	827,758	799,826
	6 " " '08	2,982,849	1,535,590	1,447,259	749,428	697,831
MONTREAL, CAN. Montreal St. Ry.	1m., July '09	345,574	180,412	165,161	49,884	115,278
	1 " " '08	326,524	162,414	164,110	49,345	114,765
	7 " " '09	3,137,547	1,894,815	1 242,731	359,775	882,957
	7 " " '08	2,999,288	1,814,428	1,184,859	368,909	815,951
NORFOLK, VA. Norfolk & Portsmouth Trac. Co.	1m., June '09	164,511	97,269	67,242	.....	.....
	1 " " '08	‡164,527	98,623	65,904	.....	.....
	6 " " '09	923,527	547,490	376,037	.....	.....
	6 " " '08	‡875,620	547,535	328,085	.....	.....
OKLAHOMA, OKLA. Oklahoma City Ry.	1m., July '09	41.468	24,657	16,811	.....	.....
	1 " " '08	26,781	20,899	5,882	.....	.....
	7 " " '09	228,194	145,968	82,226	.....	.....
	7 " " '08	148,384	105,180	43,204	.....	.....
PADUCAH, KY. Paducah Traction & Light Co.	1m., June '09	18,101	10,613	7,488	6,631	856
	1 " " '08	18,496	12,223	6,273	6,848	†575
	12 " " '09	222,535	130,560	91,975	82,381	9,594
	12 " " '08	235,940	143,690	92,250	83,312	8,938
PENSACOLA, FLA. Pensacola Electric Co.	1m., June '09	20,126	11,292	8,834	4,263	4,571
	1 " " '08	19,020	14,020	5,000	4,315	685
	12 " " '09	229,151	136,471	92,681	51,961	40,719
	12 " " '08	216,361	152,928	63,433	50,340	13,093
PHILADELPHIA, PA. American Rys. Co.	1m., July '09	290,669	.....	.....	.....	.....
	1 " " '08	271,613	.....	.....	.....	.....
	7 " " '09	1,661,702	.....	.....	.....	.....
	7 " " '08	1,596,481	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., June '09	12,557	9,755	2,802	1,672	1,130
	1 " " '08	12,152	8,915	3,238	2,264	973
	12 " " '09	126,271	86,522	39,749	24,114	15,635
	12 " " '08	122,041	90,218	31,822	27,585	4,237
PORTLAND, ORE. Portland Ry., Lt. & Pwr. Co.	1m., July '09	424,815	195,141	229,674	123,391	106,283
	1 " " '08	384,170	191,814	192,356	113,741	78,515
	7 " " '09	2,697,593	1,267,566	1,430,027	857,429	572,593
	7 " " '08	2,482,966	1,249,739	1,233,227	810,037	423,185
RICHMOND, VA. Virginia Railway & Power Co.	1m., June '09	179,626	109,206	70,419	.....	.....
	1 " " '08	174,858	125,152	49,706	.....	.....
	6 " " '09	1,014,195	580,711	433,484	.....	.....
	6 " " '08	956,396	648,486	307,910	.....	.....
ST. JOSEPH, MO. St. Joseph Ry., Lt., Heat & Pwr. Co.	1m., July '09	85,392	43,766	41,626	21,636	19,990
	1 " " '08	80,739	38,787	41,952	20,666	21,286
	7 " " '09	543,997	289,554	254,443	148,263	106,180
	7 " " '08	493,796	262,903	230,893	143,337	87,556
ST. LOUIS, MO. United Railways Co. of St. Louis.	1m., July '09	948,240	*597,509	350,731	232,449	118,282
	1 " " '08	898,210	*578,528	319,682	232,852	86,830
	7 " " '09	6,339,810	*4,028,702	2,311,108	1,637,080	674,028
	7 " " '08	6,061,765	*3,946,025	2,115,740	1,628,401	487,339
SAN FRANCISCO, CAL. United Railroads of San Francisco.	1m., June '09	597,484	344,800	252,684	.....	.....
	1 " " '08	551,193	347,037	204,156	.....	.....
	6 " " '09	3,568,904	2,085,332	1,483,572	.....	.....
	6 " " '08	3,341,453	2,209,117	1,132,336	.....	.....
SAVANNAH, GA. Savannah Elec. Co.	1m., June '09	52,134	33,386	18,748	17,343	1,405
	1 " " '08	50,006	30,498	19,508	17,323	2,185
	12 " " '09	605,976	376,034	229,942	209,377	20,565
	12 " " '08	601,157	406,317	194,840	203,895	†9, 055
SEATTLE, WASH. Seattle Elec. Co.	1m., June '09	522,470	313,014	209,456	105,093	104,363
	1 " " '08	358,207	202,875	155,332	93,695	61,637
	12 " " '09	4,955,754	2,955,392	2,000,361	1,179,602	820,760
	12 " " '08	4,384,439	2,593,636	1,790,802	1,018,159	772,643
TACOMA, WASH. Puget Sound Elec. Railway.	1m., June '09	162,057	106,187	55,870	48,292	7,578
	1 " " '08	137,178	82,673	54,505	42,434	12,071
	12 " " '09	1,716,331	1,159,030	557,301	537,360	19,941
	12 " " '08	1,638,448	1,011,786	626,662	497,693	128,969
TAMPA, FLA. Tampa Elec. Co.	1m., June '09	46,639	28,473	18,165	4,709	13,457
	1 " " '08	45,070	31,839	13,231	2,571	10,660
	12 " " '09	574,121	354,919	219,203	54,132	165,070
	12 " " '08	539,777	376,438	163,340	19,962	143,377
TOLEDO, O. Toledo Rys. & Lt. Co.	1m., July '09	226,831	134,221	92,610	75,506	17,104
	1 " " '08	199,328	111,665	87,663	71,751	15,912
	7 " " '09	1,529,417	884,406	645,011	501,075	143,936
	7 " " '08	1,432,486	794,054	638,432	491,887	146,545

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Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

Increasing the Working Time of the Skilled Mechanic

Everybody knows that in an office of any size the man at the desk seldom leaves it to get the score of odds and ends which he may need in the course of the day's work. A push-button circuit leads to a central annunciator and brings a boy for all such errands. The principle of this is almost childishly plain and would not deserve mention were it not for the fact that it is not commonly applied in the electric railway shop. One often sees high-priced, day-paid mechanics stroll leisurely to the supply room several hundred feet away, stop on the trip for an occasional friendly chat with a fellow-employee, lounge around while their requisition is being filled, and finally return to their regular occupation after having lost perhaps 10 to 15 minutes. As this process repeats itself half a dozen times during the day, the loss in labor value is not trifling. At least one company has eliminated this waste of time by installing call circuits in its shops, just as in an office, so that a mechanic will have no more reason for leaving his bench than a bookkeeper his desk. The discipline of the shop is also improved, as the men are given no opportunity to congregate during labor time. The same company also employs apprentices to do all the preliminary work for the motor inspectors, so that the latter's capacity practically is doubled at an extra cost of $4 or $5 a week. When a foreman is wanted in this shop even boys are dispensed with through the simple expedient of a gong signal system which will bring the right man to headquarters without the necessity of seeking for him high and low. In the power houses, substations and shops of another railway a gong is wired in circuit with the trolley at a point some distance away. Hence line, track or power men who wish to depart can attend to inside duties to the last minute, besides remaining under shelter. The foregoing instances do not exhaust the possibilities of labor-time economy, but are sufficient to indicate how office and factory methods can be adapted to the rather mixed conditions of a railway shop.

Improving Traffic Conditions at Transfer Stations

Sooner or later the increase of traffic on electric railway systems where transfer stations are used forces consideration of the problem of improving the conditions under which the travel is handled. Platform area has to be increased or portions have to be fenced off to separate opposing streams of travel, or other changes have to be made. Sometimes the design of the structure, so far as its operating features go, has to be fundamentally altered in part, if not in whole. In a recent case of this kind a station built less than ten years ago had become heavily burdened with travel. In the original arrangement the passengers transferred to and from the local and through cars across platforms common to travel in all directions. The through cars made but a single stop in the station, and then returned by a long loop outside the building. All the local connecting cars were brought into the station on stub tracks parallel to the incoming city car line. The arrangement worked well for several years, until the growth of travel and that expected from a new suburban trunk line to the station rendered modifications imperative. Plans were therefore prepared eliminating one set of stub track dead ends and carrying them into a loop at

one end of the building. Separate loading and unloading platforms were designed for all cars on this side of the station, including the through cars from the city section of the system. Certain platforms are to be extended, and 6 per cent ramps or inclines are to be used in place of some of the stairways. It is expected that by these modifications the station will not only have capacity to handle the traffic which has grown up through the increasing use of the facilities set in motion eight years ago, but will also provide for a considerably greater volume of travel than exists at present. Of course, success with transfer stations depends largely upon the regularity with which the outgoing cars leave. Gaps in the headway cause a congestion of passengers on the platforms. For this reason if a division headquarters is located close by the station, a private telephone line between the platforms and the car house will prove invaluable in fitting the schedule to the movement of traffic. This is a plan followed in the station under consideration.

Opportunity to Study Denver Reports

Members and associate members of the American Street & Interurban Railway Association have now received, with one or two exceptions, all the advance copies of the papers and reports which will be issued in advance of the convention to be held in Denver next October. This satisfactory condition is due to the promptness with which authors of papers and the chairmen of the committees which are to present reports have done their work, but credit should also be given to the presidents and secretaries of the associations for their assiduity in securing the manuscripts promptly from those to whom the duty of preparing reports has been assigned. With the papers in hand at this early date, every opportunity is afforded those who expect to go to Denver to become familiar with the contents of the papers and be better able to discuss them on the floor of the convention.

It would be an excellent plan, when reading these advance papers, for each person to make notes of the ideas which occur to him on the margin of the papers, and then to take these notes to the convention to use as headings for discussion. If this plan is followed conscientiously by even a small number of those who will be at the convention, the discussion will be much more valuable and instructive. No author, we are sure, considers himself omniscient, and if any delegate has good reasons for believing that his methods are more desirable than those recommended in any report, it will be of benefit to all concerned to have him say so. Even if one finds nothing to criticise in the paper before him, it will be of almost if not equal value to the members of the committee presenting the report, as well as to the association, to have affirmative testimony as to the desirability of suggestions made by the committees, as it will be corroborative evidence of the correctness of their recommendations.

Another benefit follows the early publication of papers, which should be utilized much more in the future than in the past. This is the submission of written discussion of the topics treated by those who are not able to go to Denver. Such written discussions form a feature of the proceedings of many of the national scientific associations. In the printed proceedings of the American Institute of American Electrical Engineers, for instance, as much, if not more, space is often devoted to the publication of communications from absent members as to the report of remarks presented from the floor. Of course, the final decision as to the inclusion of these written discussions in the printed reports of the associations or their presentation at the meetings rests with the officers of the associations to whom the communications are addressed. Indeed, it could hardly be otherwise if the size of the proceedings and the duration of the meetings are to be kept within reasonable limits. Precedents in the case of other associations are that communications can be presented in full, in abstract or not at all at either the meetings or in the final reports. But experience has also shown that these written discussions are often of the utmost value. The forum of speakers and auditors is increased to include all members of the association, not simply those in attendance, and the benefit to the industry is enlarged to a corresponding degree. This plan has also the great merit that no one is deprived of the opportunity of obtaining the opinion of the association on a disputed point because he himself is prevented from being at the convention, and it is to be hoped that more will take advantage of this privilege than in former years.

Wisconsin Classification of Accounts and Uniformity

The classification of accounts prescribed by the Railroad Commission of Wisconsin for street and interurban railways, as finally issued, is somewhat different from that which was originally promulgated among the railway companies of that State. Special attention is directed by the commission to the fact that the power accounts prescribed for the railways are identical with those required for the electric utilities. It appears that the commission found it desirable to make the power accounts for street and interurban railways precisely the same as those prescribed for the electric utilities, for the reason that so many of the electric railways are engaged also in providing electric service for light and power. In this way a single set of power accounts will be kept by those companies which furnish both railway and light service, and the total cost apportioned over the two classes of service upon the basis of current utilized. With the exception of the power accounts, which have been treated in the manner indicated, the classification as adopted finally follows closely that prescribed by the Interstate Commerce Commission for electric railways.

With the final promulgation of the Wisconsin system of accounts there are three classifications officially adopted by governmental commissions which represent substantial variations from the old standard classification of the American Street & Interurban Railway Accountants' Association, which was in use for so many years and is still the basis of the accounting system in force on many properties throughout the country. The governmental classifications comprise, in addition to that issued by the Wisconsin commission, the systems adopted by the Public Service Commissions of New York and the Interstate Commerce Commission. The new standard classification of the American Street & Interurban Railway Accountants' Association,

adopted at the 1908 convention in Atlantic City, is, with one exception, identical, as was stated by President Robert N. Wallis in a recent letter addressed to the members, with that promulgated by the Interstate Commerce Commission. This exception is in the treatment of discounts and commissions on securities issued for construction purposes or to raise funds for construction. The Interstate Commerce Commission holds that such discounts and commission are not a proper charge against construction, but the association classification provides that expenditures of this nature should be charged to account No. 41—"interest" in the classification of expenditures for road and equipment.

The important work lying before the Accountants' Association is the gradual production and adoption of complete uniformity in electric railway accounting, so far as it can be attained under existing laws and varying conditions of operation. No matter how far the movement toward uniformity may have advanced prior to the action of commissions in prescribing systems that were substantial departures from the old classification, the immediate effect of the promulgation of the new systems is to check the progress toward uniformity; the ultimate result may be a condition more nearly approaching uniformity than would have been possible without governmental insistence. The Accountants' Association may be a material power in so shaping the experience of the next few years that it will tend toward modifications of the various systems now in force, so that eventually substantial uniformity will be reached, but in the meanwhile several official or association classifications or modifications of them will probably be in general use in various sections of the country.

Boston Railroad Terminals and Electrification

Returning commercial activity in many lines of business raises anew the problems of capacity to handle the anticipated traffic. A few years of trade expansion will find present facilities overwhelmed, unless executive officers of large organizations perfect plans for physical improvements held back by the recent commercial depression. On the great railroad systems of the country the need of enlarged facilities for handling traffic was pressing hard at the beginning of the financial stringency; but as travel fell off the existing equipment became more than adequate to meet the situation, so we have heard less during the past year or two about the immediate necessity for new and vast expenditures to multiply the possible service of the transportation systems. Now the times are rapidly changing toward larger volumes of business, and we are not likely to wait long before hearing the old-time complaints of delayed deliveries, inadequate trackage and crippled motive power.

In this connection the electrification of railroad terminals in the larger cities of the country is sure to be brought to the front by an unmistakable demand that the present steam-hauled service shall give way to what has so clearly been shown to be the best method of moving such traffic in highly congested districts. A significant utterance along this line has recently been made public in Boston by Transit Commissioner Josiah Quincy. Mr. Quincy is *ex-officio* a member of a joint board of sixteen members which is soon to take up the transportation problems of the Boston district in a broad way, reporting to the next Legislature what lines of development are necessary for the immediate future, and planning a comprehensive scheme for the more distant years to come. In his statement Mr. Quincy presents a broad discussion of the superiority of electric over steam traction, and points out that electricity is now a lawful motive power for all forms of transportation in the State of Massachusetts, and that it is the sole practical motive power for two of the three classes of railroads or railways authorized to carry passengers, more than 16,000 electric motors being engaged in this service. The street railways of the State have more mileage than the steam roads; they carry more than four times as many passengers; run more than three times as many car-miles as the latter run train-miles; have nearly twice as many passenger cars, and about three-quarters as much income as their older brethren. Having achieved such dimensions, electric traction is now preparing to invade the steam railroad itself and to dispute the supremacy of the steam locomotive.

Referring to the declaration of the Massachusetts Railroad Commission that the time is fast approaching when electricity as a motive power must be installed on railroads operating in and about Boston, Mr. Quincy emphasizes the spheres of electric locomotive and multiple unit service in meeting the requirements of through and suburban travel, and then passes to the overcrowded condition of the present Boston terminal stations. The need of increasing the capacity of the necessarily limited number of tracks connecting the stations with the outer lines furnishes a powerful additional incentive for the change. The cutting of the present three-minute headway between steam trains to two minutes with electric service would increase the terminal station capacity by 50 per cent. Says the commissioner: "As tracks become congested with traffic under steam operation—and we are certainly approaching this condition both at the South and North Stations—this possible 50 per cent increases in train movements at the most crowded hours becomes a more effective reason for electrification. Further expansion of our terminals being difficult, the problem of adequately accommodating present and future passenger traffic is that of making such readjustments as will permit of a greatly increased effective use of existing space."

It ought not to be necessary at this day to champion the cause of railroad terminal electrification, so far as its technical advantages are concerned, but the problems of transportation are so far-reaching, the amounts of money involved are so great, and the grip of old and established conceptions and methods is so tight that the advantages of the change in specific instances need to receive the widest possible publicity and the most energetic backing by men of standing in the community. The Boston situation is merely typical of others. The requirements of modern life demand the abolition, in thickly populated sections, of steam trains, with their slow acceleration and pollution of the air by smoke. The change must come in time, and the sooner its necessity is turned into active plans for the extirpation of obsolete methods of transportation the sooner will the localities affected attain the fullest measure of engineering civilization.

TRAFFIC FEATURES OF THE LOS ANGELES & REDONDO RAILWAY

The Los Angeles & Redondo Railway, with headquarters at Redondo, a Pacific Coast seaport, operates three lines between its terminal cities: the line from Redondo to Los Angeles, via Englewood, 19.5 miles; via Moneta, 20 miles, and via Strawberry Park, 21 miles. The Englewood line trains make this run in 45 minutes. The larger part of the fast trains are sent over the double-track Englewood line. Tickets are sold at the terminal stations, and local fares are registered with Ohmer fare registers. The American Railway Association's standard code of rules is used in handling all trains.

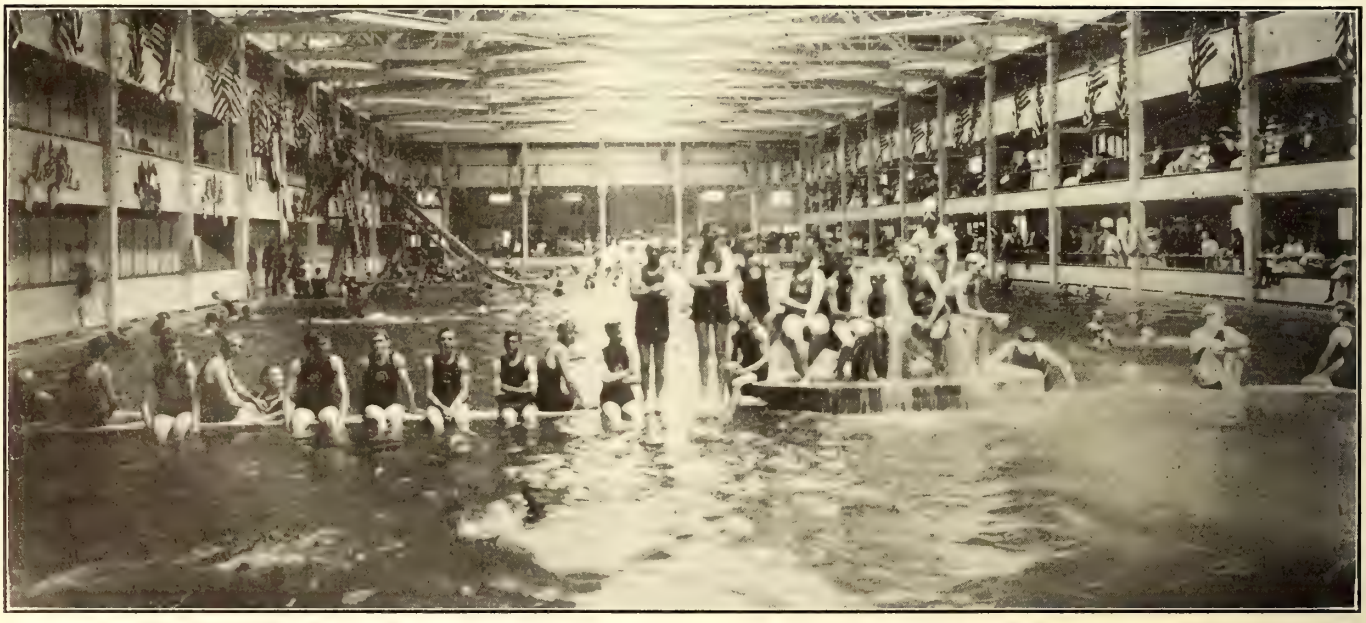
The company has 34 passenger cars, which have been built in its very complete shops at Redondo. A train of



Los Angeles & Redondo Railway—Bath House at Redondo Beach, Showing Breakwater

is double tracked throughout its entire length, the new Moneta line has 3 miles of single track and the Strawberry Park line 7 miles of single track. South from Redondo, the terminus, two lines parallel the ocean beach. One serves three large wharves owned by the company and the other

these cars, coupled for multiple-unit operation, is illustrated on the opposite page. The construction details of the rolling stock as built at the Redondo shops were described in the Electric Railway Review for April 11, 1908, page 445. An order for 10 additional cars has been



Los Angeles & Redondo Railway—Swimming Pool in Bath House at Redondo Beach

reaches Clifton-by-the-Sea, an attractive beach resort, 2 miles south of Redondo.

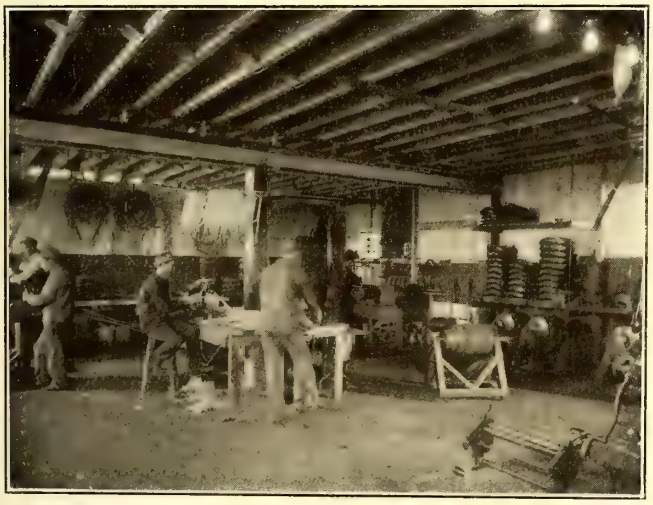
Eighty-one trains are scheduled out of Los Angeles daily, and about half of these trains are made up of two cars. The running time of the locals between Los Angeles and Redondo, about 20 miles, is 52 minutes. The limited

placed with the company's own shop. These cars are to be delivered by July, 1910, and to be built complete, including trucks, in Redondo. The new cars will have a seating capacity for 38 passengers in the closed section and 10 passengers in the open end, and will be equipped with four Westinghouse 38-B motors and Westinghouse multiple-unit

control. The Eclipse fenders are used on all of the company's equipments, and are said to have been the means of saving several lives. Passenger cars are fitted with Lintern markers.

The freight equipment includes three electric locomotives 30 ft. long, weighing about 35 tons, 40 box cars and 65 flat cars, all built at the company's shops. There are also three locomotives used in construction and maintenance work.

The tracks are laid largely on a private right-of-way, having few grades, and are built to a gage of 3 ft. 10 in. The rails are of the 70-lb. standard section, laid on 8-ft. ties. Power is purchased from transmission companies and



Los Angeles & Redondo Railway—Electrical Shop

converted in five substations owned and operated by the railway company. It is distributed to the cars on a standard d.c. overhead trolley.

FREIGHT TRAFFIC

Three freight trains are run daily each way between Los Angeles and Redondo. In addition to this service, a berry train, made up of six cars in the busy season, is run daily. The Wells-Fargo Express Company operates two combination passenger and express cars run in regular service all the year.

A heavy merchandise freight business is carried on in connection with the Pacific Coast steamship companies which use the wharves of the Los Angeles & Redondo Railway Company at Redondo. The steamship companies turn over about 2400 tons of merchandise a month for delivery by the electric railway. Two of these wharves which have electric tracks on them are used exclusively for freight handling. The other wharf serves as a landing for passenger vessels and as a recreation pier. The electric railway line serves as a connecting link between the Santa Fé system and the lines of freight boats touching Redondo. All the freight for the Santa Fé system is loaded and unloaded at the electric railway company's wharves and switched with the company's electric locomotives.



Los Angeles & Redondo Railway—Passenger Wharf at Redondo Beach

The character and amount of business over these wharves are shown in the custom house report for the month of May, 1909, which includes the following figures:

Passengers	1555
Merchandise leaving	501 tons
Oil leaving	12,800 bbl.
Oil received	11,000 bbl.

The imports also include 5,000,000 ft. of lumber, 2,200,000 shingles, 60,700 ties, 1300 poles, 2345 tons of merchandise.

Freight tariffs over the electric railway are filed according to the rules of the Interstate Commerce Commission. The company has a large terminal freight station in Los Angeles at Jefferson and Grand Avenues. Its Los Angeles passenger station is at Second and Spring Streets.



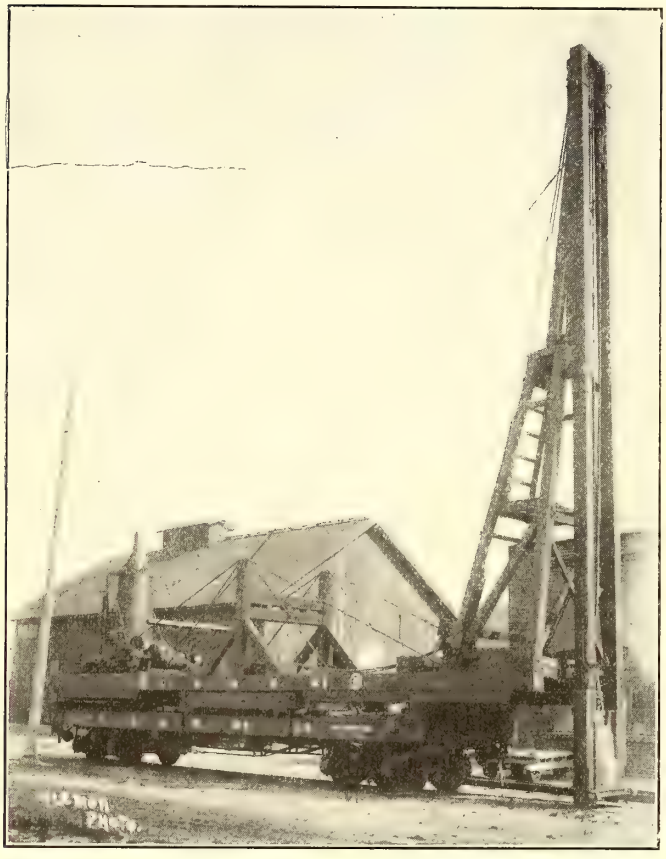
Los Angeles & Redondo Railway—Multiple-Unit Train Built in Company's Shops and Regularly Operated in Service to Redondo Beach

A view is also presented below showing the large pile driver used in the maintenance of the company's wharves. This equipment was designed and built in the Redondo shops. It has a 4500-lb. hammer which can be used in driving 70-ft. piles. The hammer is raised by a winch operated by a two-cylinder, 20-hp steam engine.

One freight pier has four tracks, each laid with three rails for either narrow or standard-gage cars. It extends into the ocean so that vessels 600 ft. long can be docked in 35 ft. of water at low tide.

Among the many attractive features which the railway company has developed at Redondo Beach are a large public bath house, a pavilion auditorium, tent city and excellent dining service.

The auditorium pavilion, owned and operated by the



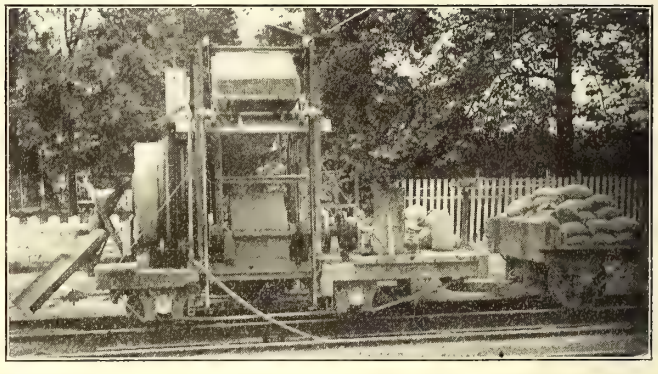
Los Angeles & Redondo Railway—Pile-Driver Car Used in Wharf Construction

company, is 210 ft. x 157 ft. in size, and was built at a cost of $100,000. It is located on the beach close to the water's edge, and is an attractively designed structure, with a seating capacity for 4000 people on the second floor. The first floor of the auditorium building contains a theater and a row of small stores. The main assembly hall has a fine dancing floor of beechwood, which will accommodate 600 couples at one time, and ample provisions for the comfort of the guests are provided in the way of rest rooms, smoking parlor and check room. A broad promenade entirely surrounds the building. The company maintains a band to furnish concerts and dance music each day.

The bath house, a structure 278 ft. x 156 ft., is said to have the largest hot salt water plunge in the United States. The three pools are supplied with a continuous flow of warm sea water, obtained from the condenser discharge of the Redondo Beach power plant of the Pacific Electric Light & Power Company. These three swimming pools are a baby pool, 30 ft. x 70 ft., with a depth of water ranging from 1 ft. to 2 ft.; a high diving pool of like dimensions, with water 9 ft. deep, and a main pool, 157 ft. x 70 ft., with water from 3 ft. to 5 ft. deep. The three pools are built of concrete lined with green glazed tiling, and have a capacity of 485,000 gal. The water is supplied by a 12-in. pipe discharging salt water at a temperature of from 90 to 100 deg. An auxiliary pipe discharges a 6-in. stream of cool ocean water. The building enclosing these pools has four stories and a basement. There are now 950 dressing rooms available for use, and the top floor has been held in reserve. Space is provided there for the addition of 500 dressing rooms. As many as 2000 people ordinarily use the bath house in a day and pay 25 cents each as an entrance fee. The bath house cost $160,000.

CONCRETE MIXER IN MEMPHIS

The shops of the Memphis Street Railway recently have completed the concrete mixing outfit illustrated. The mixer was supplied by the Chicago Concrete Machinery Company, Chicago, Ill., and is designed especially for street railway work. The railway company built the car for carrying this mixer and the special propelling truck. The car which carries the mixer is supported on two axles with 24-in. wheels. These low wheels permit placing the mixing outfit so close to the street that materials can easily be shoveled into the charging skips. A 15-hp motor is used



Concrete Mixer Used in Memphis

to operate the mixing drum and the charging skips. The movement of both is controlled by levers on the platform. The car is moved along the street by a GE-800 motor mounted on a single axle and partly carried by a wrought-iron connection bar. The controller for this motor is mounted on the mixer car platform, near the switches and levers which control the mixing machinery. This separate pair of wheels for carrying the propulsion motor was necessary because of lack of room under the low mixer car platform, due to the small wheels.

According to the *Japan Chronicle,* the Hachioji-Kafu line of the Japanese Middle District Railway is to be electrified. Fifteen motor cars have been ordered from the Osaka Railway Carriage Company.

The public works committee of the Chamber of Deputies of the Argentine Republic has reported favorably on the project of the Western Railway for the construction of a tube railway from the Ouce to the Port of Buenos Ayres. The municipality of Buenos Ayres also has a project for a system of tube lines and the Anglo-American Tramway Company, which operates the surface street railways in that city, has made an offer to build an extensive system of tunnels.

VALUATION OF PUBLIC UTILITIES BY THE RAILROAD COMMISSION OF WISCONSIN

The Wisconsin laws affecting public utilities provide that the Railroad Commission of the State "shall value all the property of every public utility actually used and useful for the convenience of the public." It is also provided by law that the commission in making the valuation may avail itself of any information in possession of the State Board of Assessment. The reason for this latter provision arose in part from the fact that the Railroad Commission and the Board of Assessment for several years have been served by a joint engineering staff, at the head of which is Prof. W. D. Pence, engineer for the two commissions. The importance of the attitude of the Wisconsin laws toward the subject of valuation is further indicated by the provision that the Railroad Commission can make a revaluation, at any time, on its own initiative.

Valuations made by the engineering staff for the Railroad Commission are considered in the decisions of the commission concerning rates charged for public utility services and are, therefore, matters of vital concern to the utility corporations of the State. It is understood that the position of the commission is that the valuations at which the engineering staff arrives constitute evidence for consideration in all proceedings bearing on the adequacy of rates. As submitted by the staff, the valuations are regarded as somewhat tentative and always subject to revision if the justice of change is made plain.

Ordinarily in making a valuation a complete inspection of all the physical property of the corporation is undertaken, and every effort is made to ascertain original costs and to determine particularly in what manner and to what extent values are affected by conditions that are peculiarly local. The staff is so organized that the principal branches of the work are referred to different heads of departments, who, with their assistants, make complete reports, which, when combined, form the basis of the final conclusions embodied in the tentative valuation submitted to the commission.

Professor Pence, in discussing the advisability of regarding the valuations reported by the staff as tentative, stated to a representative of this paper recently that while it is believed that the methods followed yield the fairest estimates obtainable, precedents have to be created in many instances and, therefore, neither the staff nor the commission is willing to regard these valuations as necessarily conclusive until a final decision in each case is rendered by the commission.

Heads of the various departments of the engineering staff principally concerned in the work of valuations explain the methods followed, as indicated below.

OVERHEAD EQUIPMENT

W. F. Sloan, who has charge of the field inspection and estimates of overhead and telephone equipment, said that in most cases actual field inventories of the physical property are made. In the valuation of the railway property of the Milwaukee Electric Railway & Light Company, however, it was found that the records of the company were nearly complete. The valuation staff, therefore, secured the company maps and copied the official records and checked the equipment in the field by inspection. In this case the staff did not inspect by personal visit all of the apparatus and equipment. Over 90 per cent of the overhead work and over 10 per cent of the manholes were inspected personally by members of the staff. The intent was that the staff should be assured by actual inspection that the records of the company were substantially correct, and enough field work was undertaken to substantiate this fact. With the other properties in the State, which are all smaller, the practice is to plot the location of the poles on large insurance maps. In valuing the wiring, 80 per cent is allowed for copper and 20 per cent for insulation. During the inventory of properties through the State interesting facts were learned bearing on the average life of different parts of the equipment. By digging down 6 in. or 8 in. below the surface, the staff inspected various poles carefully. As a result of this inspection, extending to practically all parts of the State, an extreme variation of 10 to 20 years in the life of wooden poles is assumed, but the average is about 12 to 18 years. Due to conditions peculiar

THIS SPACE FOR BINDING

Wisconsin Street Railway Appraisal of 190..... W. B. A. FORM 621 *Sheet No.* .....

Name of Road ..... **TROLLEY EQUIPMENT** *Compiled by* .....

Name of City ..... *Date* .....

Location ..... *From* ..... *To* .....

Material.	Amount.	Kind.	Length.	Date Installed	Cond. %	Cost New.	Cost New Minus Scrap	Col. (1) × Col. (2)	Scrap Val.	Present Val. (3) − (4)
				1			2	3	4	5
Poles.										
Wire.		Trolley								
	Labor on Trolley									
Equipment.										
Special Work.		Cost of Curves								
		Labor on Curves								
		Lightning Arresters								
		Section Insulators								
		Riser Box								
		Bridge Box								

Data Collected by ..... Total, ... Total, ...

Date .....

Location ..... *From* ..... *To* .....

Poles.										
Wire.		Trolley.								
	Labor on Trolley									
Equipment.										
Special Work.		Cost of Curves								
		Labor on Curves.								
		Lightning Arresters.								
		Section Insulators.								
		Riser Box.								
		Bridge Bridge.								

Total. _____ Total. _____

Wisconsin Valuations—Form for Appraisal of Trolley Equipment

to certain localities, it was found that poles in one community had a very short life, and in another a life far in excess of any which the staff had been justified in assuming as normal. The dates of purchase and installation of the poles are secured in each case.

In valuing telephone properties an inventory of the overhead equipment is made in about the same manner as that followed for electric lighting and power overhead equipment. Dates of purchase of telephone apparatus and all other available information bearing on the cost or life are secured.

In making these valuations the staff has endeavored to ascertain as far as possible the scrap value of the material and the approximate minimum percentage of value at which service could be maintained profitably. The staff also determines the service value of the equipment, estimating the age if not known.

BUILDINGS AND OFFICE EQUIPMENT

R. M. Fuestel has direct charge of the field inspection of buildings and office equipment. In making valuations of these classes of property the practice is to sketch a plan

of the power station, showing the inside dimensions, and to prepare absolute contractors' estimates covering all parts. The contractors' profit is figured on each item. Local costs and pr fits on materials are taken into account on each unit in the different communities. The practice is to take the cost of reproduction of buildings new and then tentatively depreciate the same according to a 4 per cent sinking-fund curve; but in the final valuation the figures thus obtained are modified to accord with the observed conditions. The general practice of the engineering staff of calculating a five-year average price for each unit is not followed altogether in the valuation of buildings and office equipment. In this case, a two-year average price is applied to almost all building materials, except steel work, for which a five-year average price is calculated. The first change from the general rule of the five-year average price was made in computing the cost of lumber, and there has been no contest on the action of the staff in adopting two-year average prices for materials of this character. A complete inventory is made of office furniture.

The custom in starting the work of valuation is to interview reliable contractors in the community, getting such information concerning the local costs of labor and materials and conditions affecting building as they are willing to give. No serious difficulties have been met in securing this information. The following lives have been assumed usually, although there are variations from these figures:

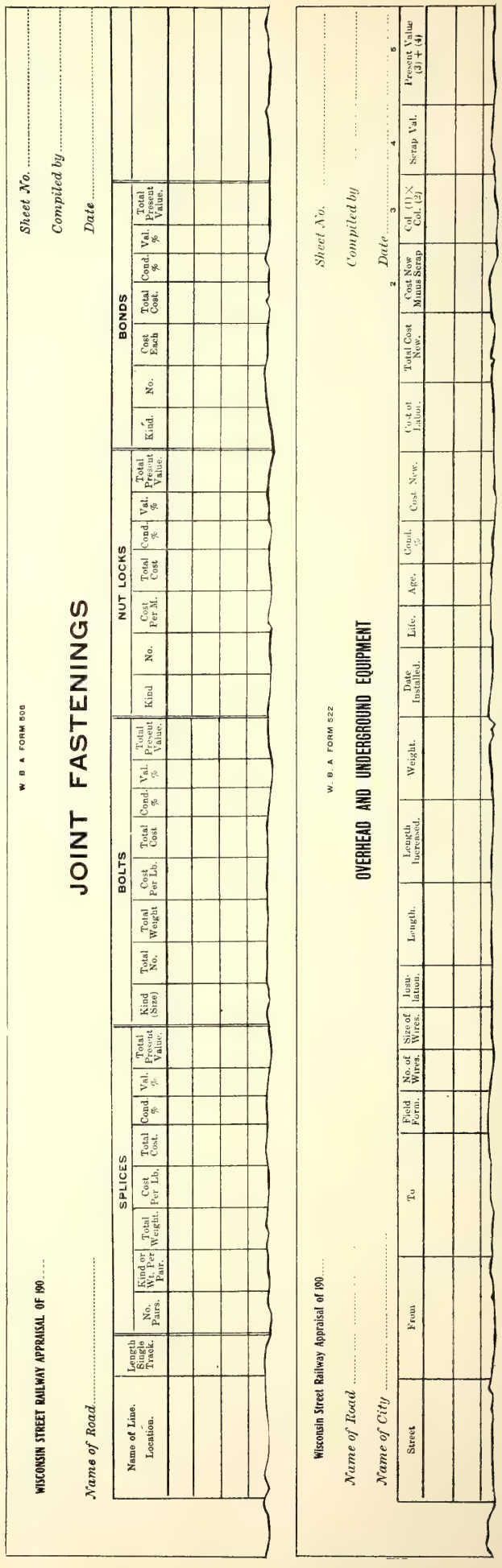
	Years.
Average brick structure	50
First-class stone and concrete structure	75
Frame passenger station	35
Coal sheds and outbuildings	20 to 25

No scrap value is figured in the majority of the buildings. It is considered that when they are torn down the cost of wrecking would absorb any value that might be left in the material. In the inspection and the final determination of the life of the structure the practice which the management has followed as to maintenance of the property is given proper consideration.

POWER STATION AND ROLLING STOCK EQUIPMENT

R. W. Harris, who has direct charge of valuations of rolling stock and electric power station equipment, stated that in valuations of rolling stock the first step was to learn how many cars were owned by the company, and then to inspect them thoroughly. If possible, a ride is taken on every car. After this is done a study of the methods of maintaining the cars is made, especially the method of washing the cars. A photograph is taken of each type of car and the estimated life and minimum service value of the different types are calculated. The life of a truck is assumed to be 20 years and of a car body 15 years. Railway motors of modern types are allowed a life of 20 years, and of obsolete types, 15 years. The minimum service value of a modern type of car is assumed to be 35 per cent of the cost value new, and of an obsolete type, 20 per cent.

When valuations of power station equipment are made a detailed inventory is drawn up, covering the complete plant. Every machine is inspected. The name-plate data are taken. The statistical record compiled for every machine gives the age and goes particularly into the conditions of maintenance. Every unit is assumed to be in "good," "fair" or "poor" condition. "Good" condition represents standard maintenance. "Fair" is 10 per cent less than "good." If a machine is badly run down and very much overloaded, the report calls the maintenance "poor," which means 20 per cent less than "good." A similar course is followed with the switchboard, after which a sketch is made of the buildings. When the complete inventory of the power sta-


WISCONSIN STREET RAILWAY APPRAISAL OF 190....
W. B. A. FORM 506
JOINT FASTENINGS
Name of Road.....
Sheet No. .....
Compiled by.....
Date .....
SPLICES
BOLTS
NUT LOCKS
BONDS
Name of Line. Location.
Length Single Track.
No. Pairs.
Kind or Wt. Per Pair.
Total Weight.
Cost Per Lb.
Total Cost.
Cond. %
Val. %
Total Present Value.
Kind (Size)
Total No.
Total Weight
Length.
Insulation.
Size of Wires.
No. of Wires.
Field Form.
To
From
Kind
No.
Cost Per M.
Total Cost
Date Installed.
Weight.
Length Increased.
Cost Each
Total Cost.
Kind.
Wisconsin Street Railway Appraisal of 190....
W. B. A. FORM 522
OVERHEAD AND UNDERGROUND EQUIPMENT
Name of Road .....
Name of City .....
Sheet No. .....
Compiled by .....
Date .....
Street
From
To
Life.
Ages.
Cond. %
Cost New.
Cost of Instal'n.
Total Cost New.
Cost New Minus Scrap
Col. (1) × Col. (2)
Scrap Val.
Present Value (3) + (4)

Wisconsin Valuations—Forms for Data Regarding Joint Fastenings and Overhead and Underground Equipment

tion equipment has been completed, the staff returns to the office of the company undergoing valuation and places a value on each individual piece of apparatus. In fixing these prices it is believed that average conditions are secured by following the general practice of the staff in calculating five-year averages. After fixing the five-year average value the final price, which may involve some deviation up or down from the average value, is reached. Various conditions of actual purchase may have an effect on cost value that may cause marked deviation in the final price adopted. After the contract or original value is secured and the various elements affecting price are considered the present value is fixed. The cost value as calculated includes the cost new and the freight plus the expense of installation. In figuring the present value, use is made of the unit cost minus the scrap value, leaving the wearing value to be depreciated according to age and conditions of operation.

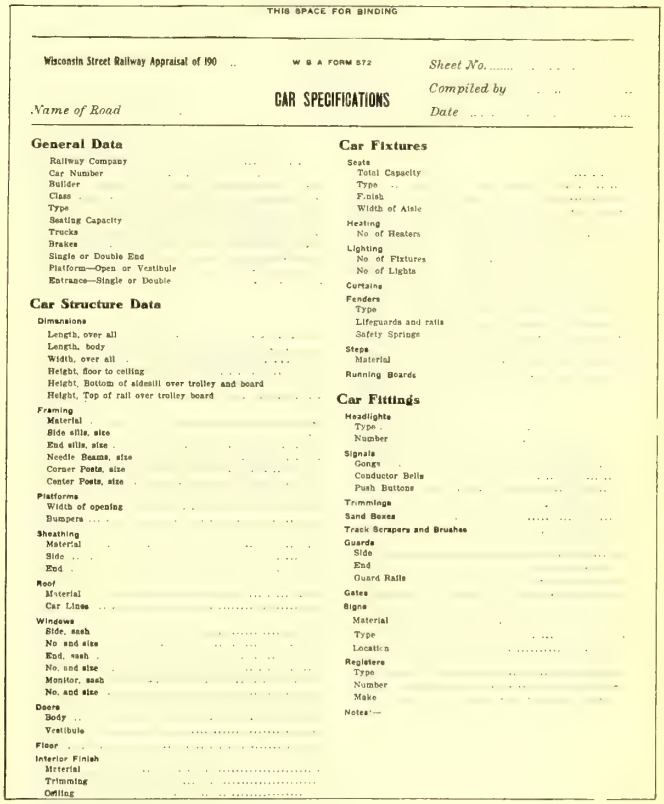
MECHANICAL

Prof. J. G. D. Mack, chief mechanical inspector of the commission, has under his direction the valuation of mechanical equipment and material. Forms are provided so that a complete inventory may be made of the mechanical apparatus if used by any one who is not familiar with the property. It is necessary that the inventory shall be so made that the equipment may be traced by the description on the form. It is considered that inspectors will not be able to compute the present value to within 10 per cent of the true condition. Books are provided in order that the inventory of the piping may be made complete. Thirty per cent is usually added to the cost of piping, new, as calculated, to cover the expense of freight and erection.

BUILDING SITES AND RAILWAY RIGHT-OF-WAY

W. E. Miller, assistant engineer and office engineer, said that in valuing the right-of-way of electric railways the practice is to make a map of the property by towns and to send to the county seat and ascertain the assessment of similarly situated lands by the latest tax rolls available. Usually this assessment was made one year prior to the one in which the valuation is prepared. From these data the assessment for a certain strip along the line of the road is learned. From the total acreage and the total assessed value in certain adjacent strips of lands the total assessment value per acre is derived. The records of the State Board of Assessment give the assessment ratio based upon exhaustive field investigations of actual transfers for the year. Then the average assessed value per acre is divided by this ratio and the result is assumed to be the true market value per acre based on sales for the year in the assessment district. The cost of acquiring land used for railway right-of-way is assumed to be 2½ times the local value for farming purposes, and by multiplying the true market value per acre, as ascertained in the manner outlined, by 2½, the valuation for railroad purposes is obtained.

The following illustrations indicate the practice followed in making valuations or right-of-way for railways: By 11 transactions land aggregating 9.93 acres was purchased for a consideration of $1,750, making the average price per acre to the railway $176.13. The assessed value of land aggregating 1676.59 acres, used for farming purposes and located on both sides of the railway, was $110,565, or an average of $65.93 per acre. From the records of the statistician of the State Board of Assessment the assessment ratio was ascertained, by which the staff was able to find the assumed real value per acre. By dividing the assessed value by the ratio the true value for ordinary purposes is ascertained. Thus, $65.93 divided by 0.793 gives $83.14. The latter figure, it was held, represented the true value of land in that district for farming purposes as determined by farm sales. To this value was applied the ratio of 1 to 2½ already mentioned. Since the railway company in this case paid $176.13, its land cost about 2⅛ times the nominal market value obtained in the manner above outlined. In another similar instance there were seven separate transactions for land aggregating 10.88 acres used for right-of-way purposes. The total cost was $1,785, and the average price per acre $164.36. At approximately the same time it was found that the assessed value on the tax rolls for 2526.75 acres was $160,770, or an average per acre of $63.62. The records of the State Board of Assessment showed an assessment ratio for the district of 86.78 per cent. By dividing $63.62 by 0.8678 the real market value per acre was ascertained to be $73.32. In this case it is known from the company's records that it actually paid $164.36, so that this land cost about 2¼ times the market



THIS SPACE FOR BINDING

Wisconsin Street Railway Appraisal of 190 .. W. S. A. FORM 572 Sheet No. .....

Name of Road CAR SPECIFICATIONS Compiled by ..

Date ....

General Data

Railway Company
Car Number
Builder
Class
Type
Seating Capacity
Trucks
Brakes
Single or Double End
Platform—Open or Vestibule
Entrance—Single or Double

Car Structure Data

Dimensions
Length, over all
Length, body
Width, over all
Height, floor to ceiling
Height, Bottom of sidesill over trolley and board
Height, Top of rail over trolley board

Framing
Material
Side sills, size
End sills, size
Needle Beams, size
Corner Posts, size
Center Posts, size

Platforms
Width of opening
Bumpers

Sheathing
Material
Side
End

Roof
Material
Car Lines

Windows
Side, sash
No. and size
End, sash
No. and size
Monitor, sash
No. and size

Doors
Body
Vestibule

Floor

Interior Finish
Material
Trimming
Ceiling

Car Fixtures

Seats
Total Capacity
Type
Finish
Width of Aisle

Heating
No. of Heaters

Lighting
No. of Fixtures
No. of Lights

Curtains

Fenders
Type
Lifeguards and rails
Safety Springs

Steps
Material

Running Boards

Car Fittings

Headlights
Type
Number

Signals
Gongs
Conductor Bells
Push Buttons

Trimmings

Sand Boxes

Track Scrapers and Brushes

Guards
Side
End
Guard Rails

Gates

Signs
Material
Type
Location

Registers
Type
Number
Make

Notes:—

Wisconsin Valuations—Form for Securing Data Regarding Cars

value. The two instances here cited chance to show ratios less than 2½, which latter ratio was derived from extended investigations over the entire State.

In making valuations of land used for location of power stations and like purposes a diagram is usually drawn showing the total value of real estate in the city in question from 1901 to 1907, inclusive, for instance. If the tax rolls are not made out for 1908, the value of all land in the city is determined from the summary of values of real estate found in the tax rolls and from the corresponding assessment ratios. The value of all the land in the city is learned and these values are reduced to diagrammatic form. There has been almost a uniform upward tendency in the value of real estate in the communities of Wisconsin, and, therefore, it is assumed by the engineering staff that real estate continued to rise in value in 1908 at the same general rate as during the several preceding years. Unless evidence to

the contrary is found, it is assumed that the value of all the real estate throughout the city, and therefore of the tract under investigation, increased in the same proportion; for example, in one specific instance, where the calculation was made by this method, it was determined that the 1908 value would be 9.1 per cent more than in 1907. The figures in the method outlined apply only to land for improved real estate and to unimproved land, a separate valuation being made for the buildings. After the value is fixed in this way from prices of surrounding lots, it has been the usual practice in valuing large tracts to add 10 per cent for the extra cost of acquiring the property in small pieces to bring it under single ownership. There is variation from this practice in the valuation of private right-of-way for railroads in large cities. For property of this kind 10 per cent is usually added for the larger tracts of land and 33 1/3 per cent for strips of 100 ft. in width or less.

The members of the staff whose names are given in the foregoing article have all had experience in railway or other public-utility properties, and some of those mentioned had experience in important appraisals of large properties prior to their connection with the staff. A complete set of printed forms has been provided for use by the staff in collecting and tabulating the data for the valuations.

THROUGH TICKETS BETWEEN CROYDON AND LONDON

For more than a year a frequent service of motor omnibuses, operating from Oxford Circus, London, to South Croydon, and paralleling for a considerable distance the Croydon Corporation Tramway's main line, south of the terminus at Norbury on the County of London boundary, made a very serious inroad into the Corporation Tramway's traffic. A gap of about 1½ miles existed between Norbury and the terminus of the London County Council Tramways system at Streatham, and this break was responsible for diverting to the motor omnibus line a large volume of traffic, as many passengers from Croydon de-

And / Between	Streatham Council Offices	Streatham Library	Telford Avenue	Brixton Station	Angell Road Brixton Road	Swan Stockwell	Fitzalan Street Kennington	Vauxhall Circus	Waterloo Bridge Embankment	Victoria Station	John Carpenter Street Blackfriars
	D.	D.	D.	D.	D.	D.	D.	D.	D.	D.	D.
Purley	3½	4	4½	5	5½	5½	6	6	6½	6½	7
"Red Deer"	2½	3	3½	4	4½	4½	5	5	5½	5½	6
"Greyhound"	2	2½	3	3½	4	4	4½	4½	5	5	5½
West Croydon Station	1½	2	2½	3	3½	3½	4	4	4½	4½	5
Thornton Heath Pond	1	1½	2	2½	3	3	3½	3½	4	4	4½

Fare Zones and Through Rates of Fare, Croydon to London

sired to travel to points beyond the Norbury terminus. Last year the London County Council obtained the passage of an act authorizing the construction of a connecting link between Streatham and Norbury, and, with the view of meeting, in some degree at least, the competition of the motor omnibus service, A. L. C. Fell, chief officer of the London County Council Tramways, and T. B. Goodyer, tramways manager of the Croydon Corporation, recommended to their respective Councils the adoption of an extensive system of interchange of traffic to enable passengers to travel over the joint systems with a through ticket. Passengers, however, must change cars at the connecting point, Norbury. The basis of the through traffic arrangement adopted is that the amounts apportioned between the two systems are strictly proportional to the fare zones traversed on the lines of each system.

As the motor omnibus competition was more keenly felt by the Croydon lines, that corporation agreed to quote several special cheap fares effective only as part of a through ride to or from points in London.

The accompanying table shows the through traffic zones and fares on the respective systems.

It will be observed that passengers can travel from



Through-Service Advertising Sign on Trolley Pole

Purley, at the extreme end of the Croydon system, to Blackfriar's Bridge, on the London County Council, on a through ticket costing 7d., for a ride of 13½ miles. Of this amount the Croydon Tramways receive 3d. for a haul of 6 miles and the London County Council Tramways receive 4d. for a haul of 7½ miles.

Considerable thought was given to the design of the through ticket put into use. It was especially desired that the officers of each system should have a record of the amount of fares, both payable to and receivable by each other. Samples of the duplex tickets issued by the Croydon Tramways are reproduced. The ticket issued by the London County Council Tramways is exactly similar to that issued by the Croydon Tramways, except, of course, that the order of the fare stages is reversed.

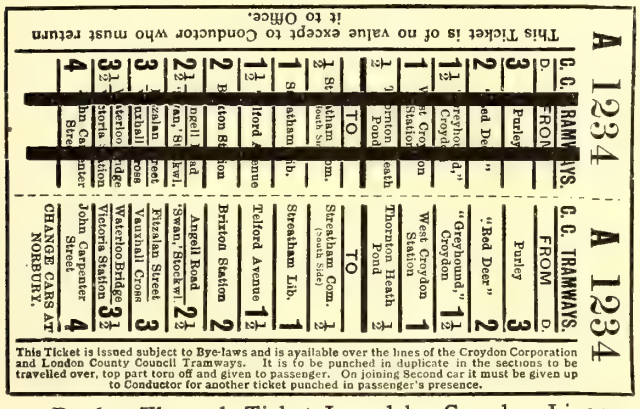
The following is extracted from the instructions issued to the conductors of the Croydon lines:

These tickets will be punched twice, in duplicate; first, in the section at which the passenger boards the car, and, secondly, in the section on the London County Council system to which the passenger desires to travel. They are perforated, and, after punching, the top part is to be torn off and handed to the passenger.

Passenger Boarding Car at—	Requiring to Ride to, say—	Will have Through Ticket Punched in Duplicate—½		The Conductor will issue the top part of ticket, and collect from passenger the sum of—	
		In Croydon Section	In London Section		
Purley	Streatham Library	Purley	Streatham Library	4d. — —	Being the sum of the two Fares.
"Red Deer"	Brixton	"Red Deer"	Brixton	4d. — —	
"Greyhound"	Waterloo Bridge	"Greyhound"	Waterloo Bridge	5d. — —	
W. Croydon Station	Victoria	W. Croydon Station	Victoria	4½d. — —	
Thornton Heath Pond	John Carpenter St.	Thornton Heath Pond	John Carpenter St.	4½d. —	

When a passenger from Croydon boards the London County Council Car at Norbury the conductor of that car

collects the through ticket held by the passenger and issues an ordinary ticket, punched in the section which has previously been paid for and punched by the Croydon conductor. The London County Council conductor turns in at its cash value the through ticket and receives credit for the same. Similar routine is observed by the Croydon conductors in collecting and accounting for the through



Duplex Through Ticket Issued by Croydon Lines

tickets issued on the London County Council cars. Each conductor on both systems retains the duplicate, or bottom portions, of the tickets issued, after perforation, and hands them in to the office at the end of his run. The following day the tickets are examined by the ticket office staff, and the proportions of fares payable to each system are ascertained. Balances are settled between the two companies at regular periods in the same manner as clearing house balances are settled between banks.

Work on the new tramway connection was begun in the early part of the present year, and was completed in July. On July 31 the line was opened, and the through traffic arrangement put into effect.

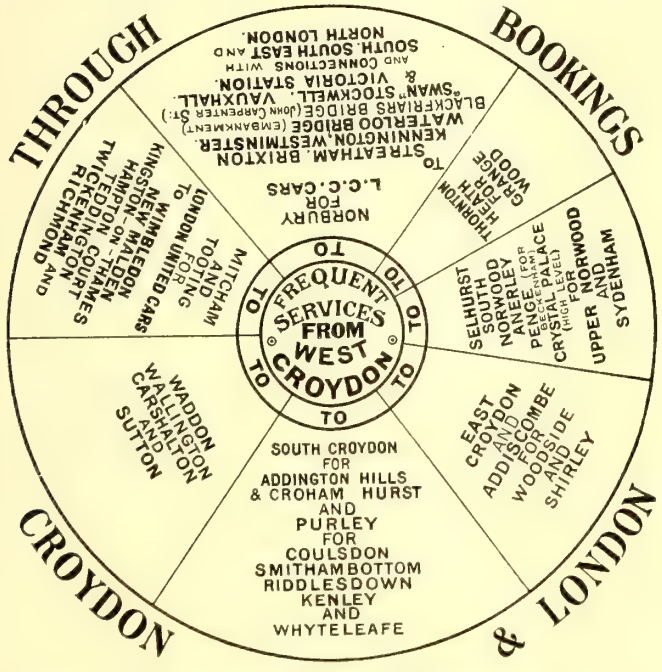


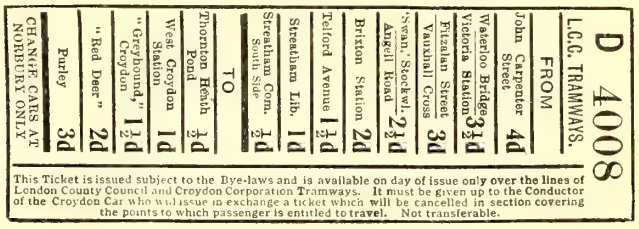
Diagram of Connections of Croydon Tramways Printed on Back of Traffic Circular

The through service over the new tramway extension is being largely patronized, and the passengers appear to appreciate the facilities offered. The motor omnibus traffic has fallen off considerably. This is not to be wondered at, as the two systems are operating connecting cars at intervals of two to three minutes.

The following figures show the joint issues of the through tickets for the first week:

Saturday, July 31	3,424
Sunday, Aug. 1	3,175
Monday, Aug. 2, Bank Holiday	7,911
Tuesday, Aug. 3	5,045
Wednesday, Aug. 4	4,102
Thursday, Aug. 5	3,756
Friday, Aug. 6	3,260
Total	30,675

With the view of stimulating car traffic to and from London, Mr. Goodyer has had a number of route signs



Half of Duplex Through Ticket Issued by London Lines

fixed on the trolley poles at several important points between Purley and Norbury, and also an effective sign on the front of the tramway office building at Thornton Heath Pond. One of the signs is reproduced. The signs on the trolley poles vary in size, from 39⅝ in. x 22⅝ in. to 47⅛ in. x 22⅝ in., according to the amount of reading matter appearing on them. The sign on the front of the office building is 6 ft. 6 in. x 6 ft. 6 in. These signs are illuminated at night and show up with great brilliancy.

STORE ROOMS OF COLUMBUS RAILWAY & LIGHT COMPANY

The Columbus (Ohio) Railway & Light Company separates its storerooms according to departments. The light and power stock is kept in one storeroom, the stores pertaining to track and roadway in another, and those belonging to the maintenance of equipment department in still another.

A different practice is followed in each store room in making inventories. A complete inventory of the lighting supplies is made once a year. It requires four months to complete the work, which is done by the regular storekeeper, who takes one section of the store room at a time. With the maintenance of equipment stock, a continuous inventory is taken; it requires about 10 months to go over this store room. An inventory is made of the track and roadway stock in the spring before the stock is replenished, and again in the fall when the work of the season has been completed.

Three storekeepers and two stock bookkeepers are employed by the company. One stock bookkeeper is located at the lighting department store room. In the stock books the goods are classified alphabetically. When any stock is shown on the books as low, the stock bookkeeper, who keeps a record of quantities as well as values, makes a personal visit to the store room. Actual cost values, averaged about once a month, are used in the stock books. When any discrepancy is found, the loss is adjusted immediately instead of waiting until the end of the year. Alfred V. Burington, chief accountant of the company, in furnishing the foregoing information, stated that the value of the respective stores averaged about as follows: Lighting and power, $100,000; track and roadway, $55,000, and maintenance of equipment, $40,000.

APPRAISAL OF PHYSICAL PROPERTY OF THE CONEY ISLAND & BROOKLYN RAILROAD

In a report of a hearing before the New York Public Service Commission, First District, concerning the valuation of the tangible property of the Coney Island & Brooklyn Railroad, published in last week's issue of the Electric Railway Journal, page 377, the main figures presented by the commission were given. The article stated that since the report of the appraisal was compiled the existence of various additional items of physical property, which might properly be included in the appraisal, had been proved. The figures as given out, however, contained no allowance for these additional items of tangible value. It was stated, in the testimony offered on behalf of the Commission, that no value had been allowed to cover franchise rights in the value of a going concern, etc. A list of these intangible values, as stated in the Electric Railway Journal of June 19, 1909, page 1122, was given by Frank R. Ford, of Ford, Bacon & Davis, engineers for the company, in a communication to the commission.

DIGEST OF COMMISSION'S APPRAISAL

The detailed appraisal of the physical property of the company is contained in a report of 185 pages, divided among subjects with separate totals as follows: Track, $729,852.80; track, special work, $241,882.30; paving, $421,474.73; overhead trolley construction, $145,965.63; overhead feeders, $110,632.25; underground conduit and cables, $336,324.49; power plants and substations, $733,393.07; buildings, $579,983.80; rolling stock, $1,383,461.50; real estate, $187,800; miscellaneous, $103,679.77.

To the total of all of these items, excepting real estate and miscellaneous, an aggregate of 15 per cent was added to cover the following: Incidentals, 5 per cent; organization, 5 per cent; engineering, 5 per cent.

In showing the reproduction value of the track a summary is given of the main items comprising the total amount determined on this part of the property. The summary is then amplified in the following pages. The total value for track is reached in the following manner:

Estimates, 1 to 10		$674,769.46
Excavation		3,818.10
Fill		6,323.00
Plank crossings		249.60
		$685,160.16
Deduct for track occupied by special work	$47,435.37	
Deduct for track owned by B.R.T. (Neptune Ave.)	7,768.18	55,203.55
Total for straight track in street		$629,956.61
Straight track in car barns and yards		28,356.44
Add for track in Jay Street now torn up		3,702.14
Add for track on Front St., between Washington and Adams,		1,487.36
Total for straight track		$663,502.55
Allowed for general contractor—10 per cent		66,350.25
Grand total		$729,852.80

The detailed estimates, 1 to 10, covering varying lengths of track, are valued at rates running from $1.34 to $3.77 per foot. In computing the excavation, values ranging from 20 to 40 cents per yard are allowed. The allowances for the fills are either 50 cents, $1.00 or $1.50, depending on the character of the material. The plank crossings are figured at $40 per thousand feet, B. M. The reference to track in Jay Street, now torn up, relates to track which is to be restored immediately.

The track for which the largest estimate is allowed, $3.77 per foot, comprises 67,972.26 ft. and is described as follows:

L. S. 90-lb. rail, 206-60-ft. lengths. Ties, 2 ft. 00 in c.c. 12 whole angle bars. Tie rods 6 ft. 0 in. c.c. Granite paving, asphalt on one side with concrete base.

The cost to construct one mile of single track of this description, which is typical of the detail estimates of cost for this part of the property contained in the report, is stated as follows:

Excavation, 2,787 cu. yds. at $1.30	$3,623.10
Ties, 2 ft. 00 in. c.c. 2640 at $0.70	1,848.00
Rail, L. S., 90 lb., 206-60-ft. lengths, 141.4 tons at $39.00	5,514.60
Rail joints, 176 at $3.00	528.00
Tie rods, 880 at $0.30	264.00
Spikes, 31 kegs at $4.00	124.00
Double bonds, labor included, 352 at $1.50	528.00
Track laying, 5280 ft., at $0.32	1,689.60
Concrete, 882 cu. yds. at $6.00	5,292.00
Hauling, 160 tons at $2.00	320.00
Extra stock and losses	200.00
Total cost per mile	$19,931.30
Total cost per foot	3.77

Details are given regarding the straight track in car barns and yards. The allowance for this track extends from $0.88 to $1.68 per foot. The cost to reproduce this track is computed on a mile basis. As in the instances of the straight track built on the surface, there are variations in the allowances for the different items entering into the expense of construction of track in car barns, yards and shop.

The estimate for track special work is reached by calculation of the cost of the detail items at $219,893, to which is added $21,989.30, as allowance for general contractor, 10 per cent, making the total of $241,882.30. The sub-headings under "Track Special Work," with the allowances for the items, are as follows: Steam and electric crossings, $12,005; crossovers, turnouts, etc., $35,138; special work in car houses and yards, 43,440; curves, $37,310; double track crossings, $9,150; double track branch offs, $26.560; special layouts, $48,660; cross bonding, $7,630. The locations are stated in each instance except with reference to the cross bonding. The values for all of these classes of property except the cross bonding are the values new.

The allowance for paving is divided as follows; Granite, $336,007.14; asphalt, $25,398.13; cobble, $19,453.58; paving tracks to be restored in Jay Street, $2,300; total, $383,158.85. To the last named amount there is added an allowance of 10 per cent for general contractor, making an aggregate of $421,474.73. The cost to reproduce the granite is computed at $2.30 per square yard. The sheet asphalt is figured at $1.50 per square yard and for the additional cost of asphalt block over sheet asphalt, $1.50 is allowed for certain paving and $0.67 for other work. The cobble paving is valued at $0.65 per square yard. The total includes also an addition for paving in the tracks to be restored in Jay Street, $2.30 per square yard for granite paving.

The allowance for overhead trolley construction consists of the following items: Poles, $78,916.03; hardware, tangent track, $8,004.30; hardware, special work, $9,021.90; miscellaneous, $14,351.08; trolley wire, $22,402.72; total, $132,696.03; allowance for general contractor, 10 per cent, $13,269.60; grand total, $145,965.63.

In valuating the iron poles the 5-in., 6-in., 7-in. poles were figured at 661 lb. each and the 6-in., 7-in., 8-in. poles at 834 lb. each. The aggregate weight of these poles was valued at $3.22 per cwt. The cost of setting the iron poles in place was fixed at $15.25 each, divided as follows: Excavation, $2; concrete, 1 yd., $8; hauling, $2; repairing curb, $1.25; painting, $0.50; trimmings, $1.50. Two lots of chestnut poles in place were valued, respectively, at $12.50 and $6.50. The wooden poles valued at the larger sum were set in rock and the allowance was divided between $8 for excavating rock, hauling and setting and $4.50 to cover the cost of the pole. The smaller sum allowed for wooden poles was for poles set in earth

and was divided as follows: Excavating earth, hauling and setting, $3; cost of pole, $3.50.

The inventory of overhead hardware on tangent track is shown in complete detail, with unit prices. The labor on 828 spans is figured at $2.50 each, and on 46 brackets at $4.25 each. An allowance of $500 is made for stores loss during construction. The inventory of hardware for overhead special work is shown in similar detail. To the list as compiled an allowance of $500 is added for stores loss and breakage during construction. To the total thus secured 100 per cent is added for labor in installation of this material.

The miscellaneous overhead trolley construction shows as its largest item $11,126 for wood trough in place at $1 per foot.

Details of the value fixed for trolley wire show calculations by running track feet, with allowances of 3 per cent for sag and waste and additions for special work. The total number of feet all sizes, and this figure reduced to miles are shown. The following weights in pounds per foot are shown: No. 0, 0.3195; No. 00, 0.4029; No. 0000, 0.6405. The value per pound is computed at $0.1975 and the labor cost is placed at an average of $60 per mile.

Overhead feeders in place are computed at $94,438.42, and the hardware at $6,136.36, a total of $100,574.78, to which is added 10 per cent allowance for general contractor. To the lineal feet of the 500,000 circ. mil cable, 5 per cent was added for sag and corners, and the weight was computed at 1.9 lb. per foot. The same allowance for sag and curves was made for No. 0000 cables, the weight of which was figured at 0.08 lb. per foot. The total number of pounds of triple braid or power cable was figured at 16 cents per pound. Labor costs were computed as follows: 500,000 circ. mil at $75; No. 0000 at $50. To the total obtained on these items there was added an allowance of $1,000 for extra labor, installing on structure, anchoring poles, etc. The locations of the overhead feeder cables, with the length in each case, are given. To the costs of hardware for the overhead feeder cables $500 was added to cover store loss, breakage, etc. This sum was about 10 per cent of the total value shown by the inventory. The cost of labor in placing crossarms was computed at 50 cents each.

The reproduction value of underground conduit and cables was divided as follows: Underground ducts, $144,039.29; high-tension cables, $95,873.60; 600-volt feeder cables, $61,676.08; negative return, $4,160.57. To the total thus obtained 10 per cent was added for general contractor. In valuing the underground ducts a division was made as between new ducts since July, 1907, and old ducts previous to July, 1907. In addition to the physical inventory value of the new ducts, $66,964.50, an allowance is made of $7,035.50 for "removing obstructions, extras and incidentals." The physical inventory value of the old ducts is stated at $61,122.33 and $8,916.96 is added for "removing obstructions, extras, incidentals, etc." The ducts, manholes and iron pipe are valued at cost.

The 11,000-volt transmission cable is valued at $1.265 and $0.875 per foot in place. The inventory value of the underground feeder cables is $57,776.08 and $3,900 is added to this sum to cover labor and material for connections at substations and power houses. The bare copper return cable is valued at $0.163 per lb. in place, a total of $3,062.57, while $1,098 is added for the labor of installing the cable and bonding to the track.

The allowance of 10 per cent for general contractor on power plants and substations is based on $666,720.98, making the total valuation for this class of property $733,393.07.

The replacement value is figured for the mechanical and electrical equipment of the old Smith Street power plant. Concerning the electrical equipment in the old Smith Street plant the report says: "The old equipment is considered as a stand-by to the new equipment. The generators appear to be in good operating condition." The inventory of the new Smith Street plant shows some allowances for extras. The apparatus in the new plant is said to be in "first-class operating condition." The equipment listed for the DeKalb Avenue substation was installed in 1908 and "is in first-class operating condition." The same statement is made concerning the equipment in the Kings Highway substation. The estimate for the electrical apparatus and crane in the latter substation does not include any allowance for engineering and superintendence.

To the physical value of buildings used in operation of the road the usual allowance of 10 per cent for general contractor is added. There are four buildings not now used in the operation of the road, which would cost to reproduce to-day $70,048, but this figure is not included in the total making the value of the property as appraised for the commission. The detail costs for the buildings do not include any percentage to cover organization, engineering and incidentals.

The total value allotted for rolling stock is reached without the inclusion of an allowance for general contractor. The appraisal of the car bodies was revised on March 31, 1909, to conform to revised prices submitted by The J. G. Brill Company in a letter dated March 28, 1909. The unit prices of car bodies new range from $1,270 to $2,100. The unit prices of trucks new extend from $205 to $290. Motors without gears or pinions are figured from unit prices new of $204 to $609. Gears are valued at $13.50 and pinions at $2.50. An additional price of $1,083 is allowed for double hand brakes. The sum of $8,590.40 is allowed for glazing and painting vestibules. The estimated unit prices new for service car bodies were taken as the total cost to reproduce.

The detailed appraisal of revenue car bodies shows the costs, with a few exceptions, as they appear on the records of the Coney Island & Brooklyn Railroad as compared with the costs to reproduce in 1909, as submitted by The J. G. Brill Company.

The real estate is included at its assessed value.

Detailed appraisals are given for furniture and fixtures and other items classified under "miscellaneous." Scrap and second-hand machinery, implements and apparatus, fixed tools, floating tools, supplies and horses, harness and wagons are included in this classification.

According to a recent Government report, the total amount of water-power in Canada available for generation of electrical energy is 25,680,000 hp. Only 517,000 has been developed.

On Aug. 23 the cable cars on the Highgate Hill line on the outskirts of London were operated for the last time. The line has been purchased by the London County Council, and will be converted to an underground electric conduit system. This was the first cable line built in Europe and was opened about 25 years ago. It is claimed that no persons have been killed by or on the cable cars since they began operation.

TICKET ACCOUNTING FORMS OF THE UTICA & MOHAWK VALLEY AND THE ONEIDA RAILWAYS

An interesting method of keeping records of supplies of ticket forms and ticket sales has been devised by Albert Eastman, general express and passenger agent of the Oneida Railway and the Utica & Mohawk Valley Railway, for use on these two systems, which now maintain 30 ticket-selling stations and use upward of 500 different forms of tickets.

The record of tickets as they are received from the printers, record of ticket supplies on hand and the record of ing number in the "tickets supplied" column with the closing number in the "tickets received" column. A distinctive feature of this ticket record system is the method of "cutting" the edges of the leaves to provide a thumb index. Fig. 1 shows a partial group of the sheets for keeping records of the ticket forms handled at the Syracuse station. The bottom sheet shows the station name "Syracuse," and each sheet above is used as a record of one form of ticket sold by the Syracuse agent, the index to the complete form appearing at the right-hand edge. The top sheet contains the record of the round-trip tickets reading Syracuse to Utica, Form No. 10, the price of which is $1.40. A complete

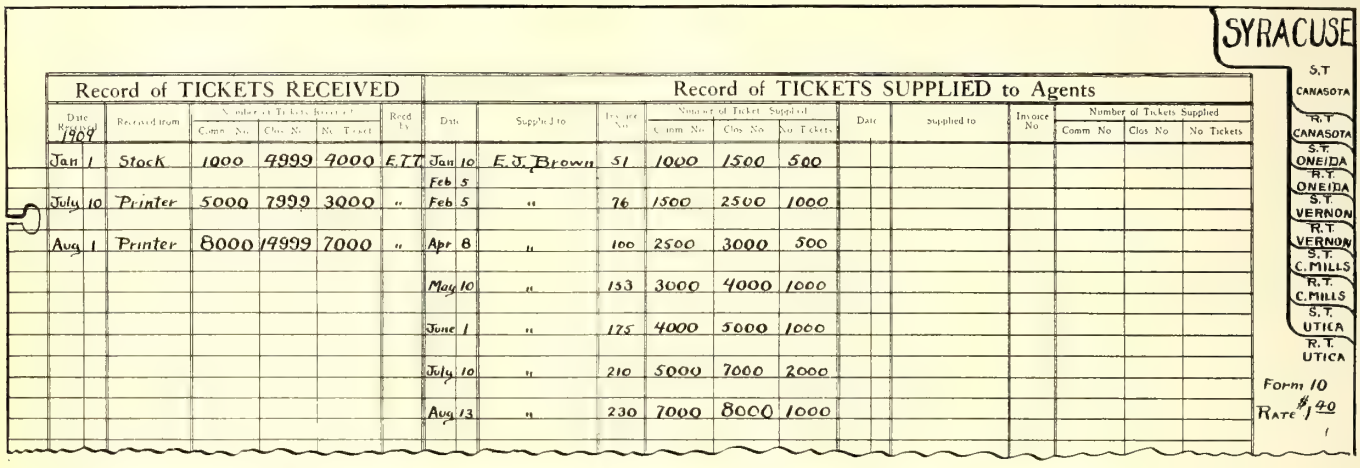


Fig. 1.—Group of Loose Leaves for Keeping Records of Tickets Received and Supplied to Agents

tickets issued to local agents are kept in the general passenger agent's office in a loose-leaf book, several leaves from which are reproduced in Fig. 1. The separate sheets are about 17¾ in. long by 12 in. wide. The left-hand portion of the leaf, comprising about one-third of the sheet, is used for a record of tickets received from the printer. The column headings provide for entering the date received, name of firm which did the printing, the commencing number, closing number and number of tickets group of sheets for any one station contains the records for every form of ticket handled at that station reading to all other stations. At the present time on the Oneida Railway the greatest number of different forms handled at any one station does not exceed 30, and the loose leaves, which are 12 in. deep, permit 36 index cuts on the edge. If more than 30 forms are handled at any station, it would be necessary to increase the depth of the sheet from top to bottom or else make narrower "steps."

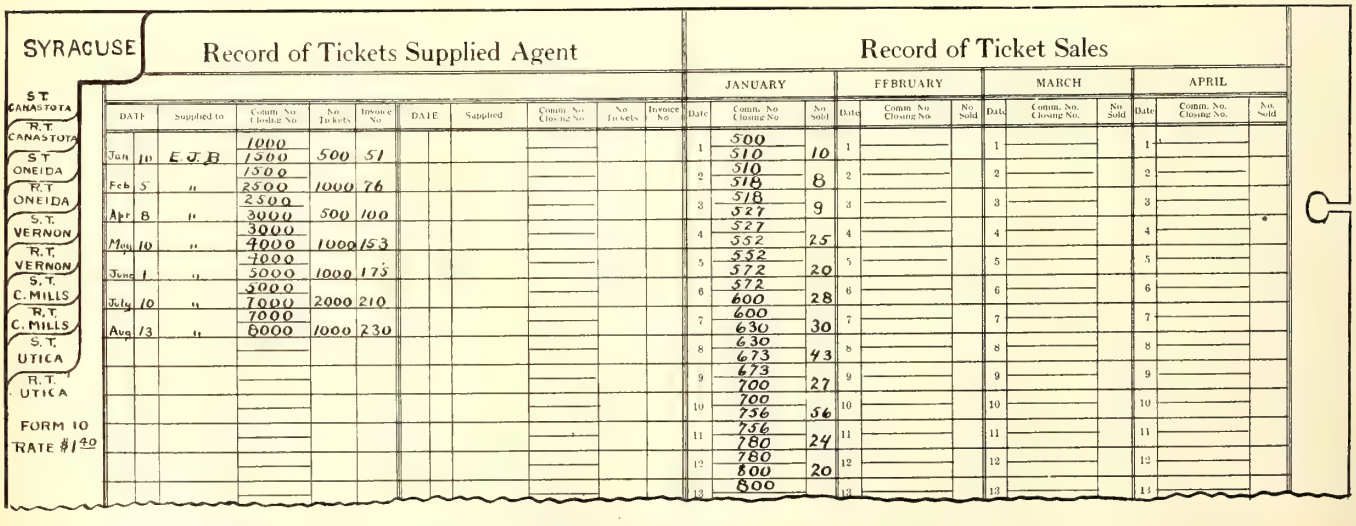


Fig. 2.—Group of Loose Leaves for Keeping Records of Tickets Supplied to Agents and Daily Sales

in the shipment. The balance of the sheet is used for the record of tickets supplied to agents and gives the date issued, name of agent to whom issued, invoice number, commencing number, closing number and number of tickets supplied to the agent. Each sheet therefore provides a constant inventory of the supply of each form of ticket used. The general passenger agent can tell just how many tickets of any form are on hand at any time by comparing the clos-

The same method of indexing could be secured by the use of tabs or projections along the edge, but it is believed that the system of cutting the edges gives a more convenient and a neater arrangement.

Fig. 2 is a reproduction of a group of sheets from the "record of sales" book, which is kept on practically the same system, except that the index is at the left-hand edge. The left-hand side of the sheet gives the record of tickets

ONEIDA RAILWAY CO.

INVOICE NO. 288

PASSENGER DEPARTMENT

UTICA,..... 190

.....Agent at.....

Enclosed herewith find the following tickets ordered on your Requisition No.....

DESCRIPTION OF TICKETS			NUMBER OF TICKETS		
Form No.	Style	Destination	Commencing No.	Closing No.	No. of Tickets

Tickets counted and forwarded by.....

Receiving Agent must count tickets received on this invoice and if correct sign the receipt attached hereto and return to Passenger Department, Utica. DO NOT MAKE ANY ERASURES OR CORRECTIONS ON THIS INVOICE. In case of any discrepancy advise Passenger Department promptly.

THIS INVOICE TO BE RETAINED BY AGENT

I have received tickets as shown on invoice No. 288 and find them correct.

.....
Agent

..... 190 .....
Station

Fig. 3—Ticket Invoice

ORIGINAL
To be forwarded to Auditor Daily.

Utica and Mohawk Valley Ry.

AGENT'S DAILY TICKET REPORT.

Station..... *Date*..... 19....

DESTINATION	Form No.	Kind	Commencing No.	Closing No.	Number Sold	Rate	Amount	
Little Falls		Single						
"		R. Trip						
Herkimer		Single						
"		R. Trip						
Ilion Sta. (W.S.)		Single						
"		R. Trip						
Frankfort		Single						
"		R. Trip						
Utica		Single						
"		R. Trip						
Clinton		Single						
"		R. Trip						
Rome		Single						
"		R. Trip						
Summit Park		R. Trip						
Utica Park		R. Trip						
Joint Baggage	3	G. B. O.						
Misc.								
Money Books								
					TOTAL			

Agent

Fig. 4—Ticket Agents' Daily Report of Sales

supplied to the agent. Then follow columns for entering the daily sales of this form of ticket for each day in the year. The left-hand page in the book takes the record through April, and the columns for the remaining months of the year are continued on the right-hand page, the sheets being so printed that the back of each left-hand page contains the proper columns and alignment for continuing the record of the preceding left-hand page. Thus there is shown at one glance a complete daily record of ticket sales for an entire year for each form of ticket sold from any one station to any other station.

The entries of ticket sales on these sheets are made from the daily report of tickets sold, which each station ticket agent is required to send in each day.

Two copies of the books containing the record of tickets received and supplied to agents (Fig. 1) are kept, one in the general passenger agent's office and one in the auditor's office, thus giving a double check. The record of sales book (Fig. 2) is kept in the auditor's office.

U. & M. V. RY. CO.

DEPOSIT MEMORANDUM TO GO TO CASHIER WITH CASH

To be used in connection with Daily Ticket Report. Form 223.

No...... .....*Station*

Ticket Sale Remittance for

..... *19*

Currency (Bills)	
Coin:-Dollars	
Halves	
Quarters	
Dimes	
Nickels	
Pennies	
Voucher	
"	
"	
"	
Check	
"	
"	
"	
"	
"	
Total	

Agents will honor only such vouchers as may be signed or approved by an Executive Officer of the Railway Company

Checks must not be accepted except on specific instructions of the Treasurer of the Railway Company

U. & M. V. RY. CO.

☞ ENCLOSE WITH REMITTANCE TO CASHIER.

THIS RECEIPT WILL BE RETURNED BY CASHIER —TO—

..... *Agent*

..... *Station*

TICKET SALE REMITTANCE FOR

..... *19*

No...... *Amount, $*.....

Agents MUST fill up the above blank ready for Cashier's Receipt and when returned it must be kept on file for use of Auditor.

Received *19*

..... *Cashier*

Fig. 5—Agents' Daily Report of Cash from Ticket Sales

This loose-leaf method of keeping records of tickets is believed to offer many advantages over the bound-book system, particularly in the flexibility of making the entries and convenience in reference. The expense of the complete set of binders and leaves for a year's supply is said to be about one-quarter of the cost of bound books for keeping the same records.

When a local ticket agent is running short of any particular forms of tickets, he makes an order or requisition on the general passenger agent, stating the form numbers and the number of tickets of each form required.

When the tickets requested are forwarded from the general passenger agent's office to the ticket agent they are accompanied by an invoice, reproduced in Fig. 3. This lists and describes the tickets and gives commencing and closing numbers of the shipment. The invoice is made in triplicate. The original is sent to the agent with the tickets and the duplicate remains in the general passenger agent's book, while the triplicate is sent to the auditor. From

these invoices the entries in the "record of tickets supplied to agents" (Fig. 1) are made. The original of the invoice has at the bottom a perforated stub, which is detached by the ticket agent upon receipt of the tickets, and returned to the general passenger agent as a receipt. The ticket agent retains the original; the stub receipt is pasted at the bottom of the corresponding duplicate invoice in the general passenger agent's office as a permanent record that the ticket agent has received the tickets described.

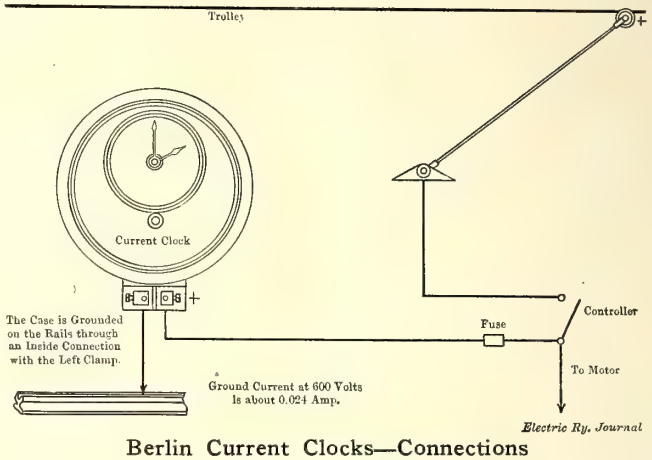
Fig. 4 is the ticket agent's daily ticket report, and shows the numbers of each form of ticket sold each day, together with the commencing number, closing number, rate and amount. This report is made in duplicate. The duplicate remains in the ticket agent's book, and the original is forwarded to the auditor's office. From this is made up the "record of ticket sales" (Fig. 2).

Fig. 5 is a form used by the ticket agent in connection with the form shown in Fig. 4, in making his remittances of cash received from ticket sales. The report is made in duplicate. The duplicate remains in the ticket agent's book, and the original is forwarded to the cashier with the cash. The right-hand portion of the original constitutes a receipt, which is signed by the cashier and returned to the ticket agent, who attaches it to the corresponding duplicate in his book as a permanent record.

RESULTS WITH CURRENT RECORDING CLOCKS ON THE GROSSE BERLINER STRASSENBAHN

Several years ago the Grosse Berliner Strassenbahn, in common with several other German electric railways, began to install wattmeters on some of its cars to see whether the automatic control thus imposed on the motormen would lead to better running and decreased power consumption. By the end of 1907 the Berlin company had over 250 wattmeters in service, but since February, 1908, all wattmeters have been removed and every car on the system has been equipped with a clock which runs only when current is passing through the controller. The change from the complex wattmeter to this simple clock was made after experiments with both instruments on the same car had proved that those with the lowest watt readings also had the lowest current-time reading. In fact, the clock was considered superior to the wattmeters as a gage of the skill of the motormen in using current for several reasons. In the first place they are of much simpler construction than the wattmeters, consequently the mechanism is more reliable and less costly to maintain. Again, as the wattmeters record the slight differences in car weights, journal lubrication and track condition, they do not give directly the comparison sought between the performances of motormen. It was estimated that if wattmeters were used on all the cars 40 skilled men would be required to tabulate the readings and make the proper allowances for differences of the character mentioned. These reasons were sufficient to stop the experiments with wattmeters and to cause their replacement by clocks.

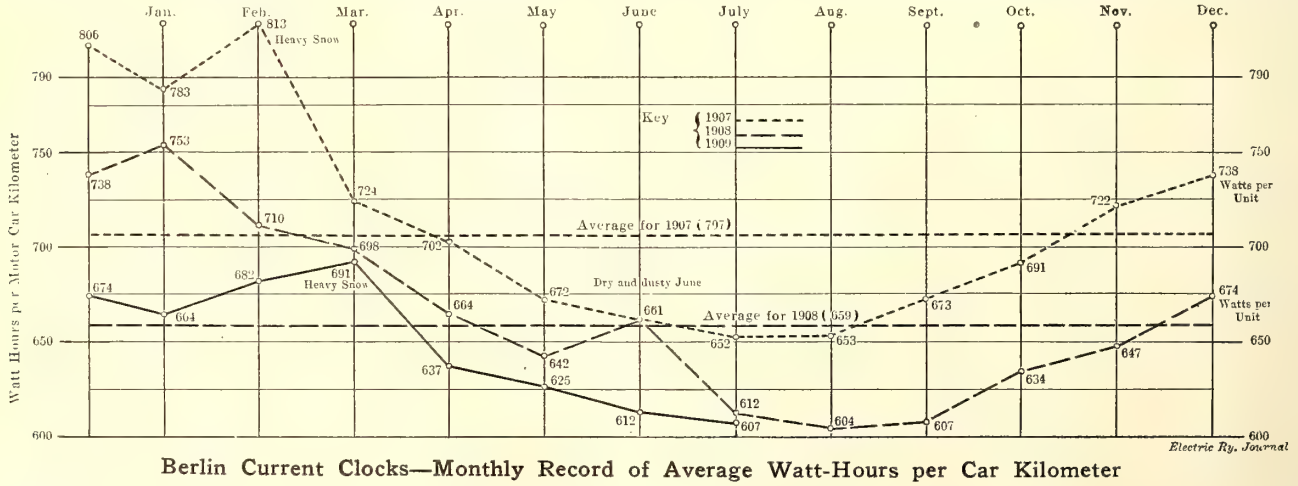
The current recording clock is operated by a spring, like any clock, and will run for more than a month without further attention. The accompanying wiring diagram shows that it is connected in parallel with the controller.



Berlin Current Clocks—Connections

The clock is supplied with a pair of coils which, when magnetized by the shunted current, pull up the armature which holds the balance wheel. As soon as the balance wheel is released the clock begins running and continues to do so until the interruption of the current causes the armature to stop the balance wheel as before. The entire timepiece is of simple construction and can be grounded for potentials up to 600 volts. The manufacturers of this clock guarantee its accuracy for two years. The total cost per installed unit is slightly less than $10.

The somewhat mysterious character of the wattmeter had made the motormen rather distrustful of control devices in general, but no exception is taken to a clock which anybody can understand. As a matter of fact, the company did not attempt the introduction of the clocks on a large scale until their purpose had been privately explained to the standing committee of the employees, known as "Vertrauens maenner" (trusted men), and until the proper relations between the running and coasting time had been broadly determined by the motormen instructors for each route.



Berlin Current Clocks—Monthly Record of Average Watt-Hours per Car Kilometer

APPLICATION OF THE SYSTEM

The application of the system is shown in the accompanying reproduction of a current clock record blank. When a motorman starts in for the day he is given one of the forms on which to record the time he started from the terminal, the car numbers, with or without a trailer, and the line number. In the following columns he records the hours and minutes reading of the current clock. The difference between successive readings gives the number of minutes that current was on the line over given routes.

Motorman No. _____ Week Day _____

Schedule Run No. _____ CURRENT CLOCK RECORD Date _____

Starting Time	Car No.		Line No.	Time Indicated			Elapsed Current Time	Weather	Conductor No.	Remarks relative to Condition of Traffic, Defects in Equipment, etc.
	Motor	Trailer		When Starting from	Time Hrs.	Min.				

Berlin Current Clocks—Front of Motormen's Record Blank

It will be noted further that a report on the weather is included, and room is provided for statements relative to defects in equipment.

The principle of marking the efficiency of the men in their use of "current-hours" is based in the first instance on the average time previously determined for the given route through a 14-day test with different men and cars at various hours. This average has a 5 per cent leeway plus and minus. Should the number of minutes, as figured on the back of the record form, be within the range the report is marked "O." If the time is exceeded, the excess is shown in red, and if decreased the decrease is shown in blue. Sunday records are not considered because of the irregularity of traffic, and likewise no attention is paid to the first run of the day because of fewer stops and less vehicles. In such cases, and in heavy snow falls, or when breakdowns are proved, the records are simply marked "X." Separate averages are used for winter, summer and

cordingly. Men who are too "blue" are particularly liable to have collisions. It will be seen from this that the disciplinary value of the current clock is secured without the use of a direct premium system. As a matter of fact, no motormen can become eligible to the pension fund until they have given two years of satisfactory service, and, besides, the men are well aware that the higher-paid instructors are selected from among those with the best clock records. The present method of comparison is fully understood by the motormen, who often ask for copies of their records.

Only 13 people employed in four offices are required to keep the records for some 3000 employed motormen. The work is so simple that the personnel consists partly of very young men and partly of pensioners, who are glad to work for the moderate wages of 60 M to 80 M ($15 to $20) a month. The original records are kept for three months and then destroyed.

Total Time in Direction	A with Trailer	A without Trailer	B with Trailer	B without Trailer	Line No.	No. of Trips	Notes
Average Time in Direction							

Total Time of Schedule Run.

Current Minutes

Berlin Current Clocks—Back of Motormen's Record Blank

periods when vehicle traffic is known to be extraordinarily heavy. The necessity for changing the average is easily determined from the reports of the best motormen. When their figures begin to rise, it is evident that some allowance must be made for a new factor in the operation of the cars, which is investigated and provided for.

The reports from the record forms are transferred monthly to a book in which the minus and plus entries are made in blue and red inks. A glance over a few months clearly shows the running characteristics of a motorman.

The curve sheet on page 402 shows the value of the current clocks in reducing the power consumption and even the net power cost despite a considerable increase in mileage. As summarized in the company's annual report for 1908, the cost of power in that year was only 21.07 per cent of the total expenses against 22.47 per cent in 1907. The curves show that in 1907 the average power required per calculated motor car kilometer (a trailer kilometer is considered as one-third of a motor car kilometer) was 70 watts and only 659 watts in 1908. The same curve, com

pleted, for 1909 up to the end of June shows that the reductions are still continuing. The difference in the percentage of the cost of power for the years 1907 and 1908 quoted above does not show the true saving because the motor car kilometers in 1907 were 71,811,914 as compared with 76,639,250 in 1908.

Shortly after the introduction of the clock system it became noticeable that many motormen were reaching their terminal points ahead of time. Consequently the company, instead of buying new cars and engaging more crews for 1909, increased the schedule speed fully 10 per cent. It has been estimated that in 1909 this change will save 350,000 marks ($87,500) through avoiding the purchase of 80 new cars and hiring 300 men. Two other important savings are in the reduction of armature troubles and brake-shoe wear. Armature repairs have actually dropped 20 per cent to 30 per cent, despite the prophecy that the clocks would have the opposite effect. This one saving covers the cost of the entire record staff and stationery. The brake-shoe wear naturally has been lessened because the men take the maximum advantage from coasting, and thus there is little kinetic energy left to be wasted during braking.

The use of the current clocks in Berlin has been largely due to K. Otto, chief engineer of car equipment.

CAR HOUSE FIRE IN NEW YORK

The car barn and shop of the Union Railway at the Boston Road and 175th Street, New York, which is used for making running repairs to the cars of that company, was destroyed by fire on Sept. 1, causing a loss unofficially estimated at $200,000. The Kingsbridge power station of the company adjoins the barns and the power cables extending from the power house to the street were burned. Power was shut off from 10:45 p. m. on Sept. 1 until 6:45 a. m. on Sept. 2. As soon as the fire had subsided enough to make it possible to go to work, splicers began to repair the cables. In all, 42 cars were destroyed, 38 of which were closed cars not in service, and four were sweepers. As shown in the accompanying engraving, the entire building was reduced to a mass of ashes and twisted iron. It was with difficulty that the flames were kept from spreading to the power house. The elevated portion of the "subway" passes the property of the company at this point, and the operation of trains on the structure had to be suspended temporarily during the fire on account of the intense heat. The timbering on the structure caught fire in one or two places, and it was necessary for the firemen to turn their attention to it temporarily. The engraving shows a side view of the building and the burned power cables.



Ruins of 175th Street Car Barn of Union Railway Company, New York

CONVENTION NOTES

A traffic circular has just been issued by the Denver (Col.) City Tramway Company giving particulars of some of the features of the city and inviting all electric railway men to attend the convention of the American Street & Interurban Railway Association and manufacturers to make exhibits. The circular carries a sketch of the Convention Hall.

The Central Electric Railway Association has appointed a special committee to take up the question of a special train for the Denver Convention. The following committee has been appointed: A. A. Anderson, general manager, Indianapolis, Columbus & Southern Traction Company; A. L. Neereamer, secretary Central Electric Railway Association; W. S. Whitney, general passenger agent, Ohio Electric Railway; F. D. Carpenter, general manager, Western Ohio Railway.

The Burlington route, over which the special convention train from Chicago to Denver will be run, has published a very attractive circular in regard to this train. The circular contains a schedule of the times at which the train is expected to leave Chicago and arrive at Denver and intermediate points, an account of the equipment of the train, prices of railroad rates and Pullman rates, and some particulars of trains which are to be used for the return trip. An announcement is also made of the fares from Chicago to Los Angeles and San Francisco, should anyone desire to extend his trip to the Pacific Coast. The circular is addressed to the members of the American Street & Interurban Railway Association and its affiliated associations and is signed by J. M. Roach, president Chicago Railways Company and chairman of the committee, and by the other members of the committee in charge of this train, to whom requests for reservations should be made.

In addition to the manufacturers mentioned in the lists of intending exhibitors, published in the Electric Railway Journal for Aug. 14 and Sept. 4, the following companies have applied for exhibit space at the Denver Convention:

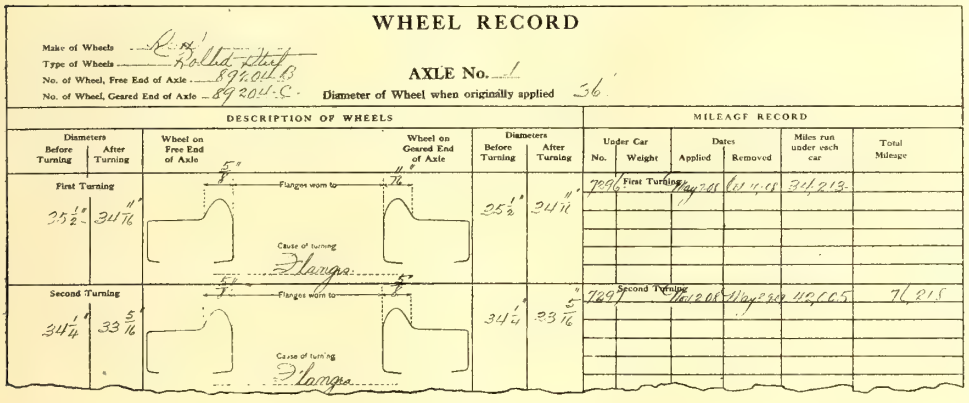
Avery Scale Company, Milwaukee, Wis.
Barber Car Company, York, Pa.
C. A. Wood-Preserver Company, Austin, Texas.
St. Louis Malleable Casting Company, St. Louis, Mo.
Traction Lubricating Company, Chicago, Ills.

W. L. Conwell, chairman of the committee on the Pennsylvania special train from New York to Denver, has announced that arrangements have been made by the committee for a special train over the Pennsylvania Railroad returning from the convention. The train will leave the latter part of the convention week and will first go to Colorado Springs. It will return from Denver to Kansas City on the Santa Fé Railroad and from Kansas City to St. Louis on the Chicago & Alton Railroad. The route from St. Louis to New York will be over the Pennsylvania Railroad. Further particulars of this train will be made public later.

CAR WHEEL RECORDS IN DETROIT

Sylvester Potter, master mechanic of the Detroit United Railway Company, has developed an interesting method of keeping car wheel and axle records of cars operated by that company. Every set of wheels is known by its axle number, which is stamped on the axle, with the date the axle was placed in service. A record is then kept in the master mechanic's office of the date on which the wheels were put in service, and of all work done on them when returned to the shops for repairs, as well as of the mileage run by each set of wheels. When the wheels are no longer fit for service the record sheets show the complete history of the wheels. The wheels are then pressed off the axle, and the axle, which retains its original number, is fitted with a new set of wheels and is again placed in service.

By referring to the accompanying illustration, which is a reproduction of one of the original records on file at the master mechanic's office, it will be noted that the original diameter of the wheels used on axle No. 1 was 36 in. After they had been in service under car No. 7296 from May 7, 1908, to Oct. 10, 1908, and had run a distance of 34,213 miles, they were sent to the shops to be turned down. When the wheels were calipered it was found that the tread on both the free and the gear ends of the axle had worn down to 35.5 in. in diameter, while the flange of the former was worn to 5/8 in. and the flange of the latter to 11/16 in. After the wheels were turned the records show that they were again placed in service under car No. 7297 on Nov. 2, 1908, with a uniform diameter of 34 11/16 in. and with other specifications conforming to the standard of 1⅛-in. flange, ¾-in. throat and 3-in. tread. The wheels were again sent to the shops on May 29, 1909, after running 42,005 miles on the first turning and a total of 76,218 miles since they were first placed in service. The record card includes spaces for entering the sizes of the wheels before and after six turnings.


WHEEL RECORD

Make of Wheels — Rolled Steel

Type of Wheels —

No. of Wheel, Free End of Axle — 89204-B

No. of Wheel, Geared End of Axle — 89204-C

AXLE No. 1

Diameter of Wheel when originally applied 36

DESCRIPTION OF WHEELS

MILEAGE RECORD

Diameters Before Turning	Diameters After Turning	Wheel on Free End of Axle	Wheel on Geared End of Axle	Diameters Before Turning	Diameters After Turning	Under Car No.	Under Car Weight	Dates Applied	Dates Removed	Miles run under each car	Total Mileage
First Turning 35½"	34 11/16"	5/8" Flanges worn to 11/16" Cause of turning Flange		35½"	34 11/16"	7296 First Turning		May 7 08	Oct 4 08	34,213	
Second Turning 34¼"	33 5/16"	5/8" Flanges worn to 11/16" Cause of turning Flange		34¼"	33 5/16"	7297 Second Turning		Nov 2 08	May 29 09	42,005	76,218

Detroit Wheel Record

If one of the wheels is defective it is sent to the scrap pile and its mate is turned down and held in reserve for use with another wheel of the same diameter. The records of these wheels are prepared from reports made to the master mechanic by the shop foreman.

Some interesting data of car-wheel mileage is shown on the record blanks which the company keeps on file in its office. A compilation of the data secured on 107 axles carrying 36-in. Standard rolled steel wheels, an average life of 116,133 car-miles per set was shown at an average cost for a pair of wheels of $0.333 per 1000 car-miles. These figures were made without taking into consideration the value of the scrap metal of the wornout wheels.

COMMUNICATIONS

CONCERNING COURTESY

PHILADELPHIA & WESTERN RAILWAY COMPANY
UPPER DARBY, Sept. 6, 1909.

To the Editors:

Some time ago a treatise, entitled "Concerning Courtesy," was published in various newspapers and journals and credited to the Delaware, Lackawanna & Western Railroad. That communication evidently appealed strongly to railroad officials, for quite a number issued it, with slight variations, but some failed to give credit to the company with whom the essay originated. Webster defines courtesy as "An act of civility or respect; an act of kindness or favor performed with politeness." Manifestly, it is not "an act of civility or respect" to use the product of another's brain without giving credit, and it is absurd to advocate courtesy through such a medium, for real courtesy is based upon honesty and sincerity.

In the original the language, precepts and philosophy—with a dash of flattery—runs quite harmoniously until, in conclusion, various reasons are offered to demonstrate that courtesy pays, but to advocate courtesy because it pays is to incite one by a mercenary and selfish motive, and gives an implied right to be discourteous when it is evident that courtesy does not pay. Courtesy is right and churlishness is wrong. Courtesy arises from benevolence, good will and love for mankind, but to advocate courtesy as an investment because it pays is like advocating honesty as a policy, which is a vicious suggestion, because honesty is better than policy.

Railroads are relatively merchants; they sell a commodity called transportation, and they should sell it with all the attendant wholesome comfort and grace possible. A dirty, unkempt person, a filthy tobacco chewer, or a rough, discourteous man has no more right in passenger service than he has in a bank or store. It is the duty of railroad managers to insist upon unvarying consideration being shown to their patrons, especially to a poor woman with her little brood, to the ignorant, helpless foreigner, and particularly to the aged, crippled and infirm. But it is also imperatively the duty of railroad officials to play the game fair with their employees and with the public. If wrongs exist, right them; but one must look on men and affairs with clear vision to see things in their right relations. Many railroad officials who decry the labor organizations to-day unconsciously laid the foundations for them; first, by ignoring flagrant wrongs that ought to have been righted, and, second, by tolerating malevolent employees, whose pernicious influence taught men to think more of their so-called rights than their duties. This may not seem germane to the subject of courtesy, but it lies at the root of it, for courtesy is kindness, justice, fair play and considerate appreciation of what is due others.

The railroad official who aims to inculcate courtesy should exemplify it individually in all the relations of life, not simply to superiors and equals, but to subordinates. It is possible to be quite right and at the same time quite disagreeable, and at times we lack influence with ourselves, but

it is incumbent upon every official to begin with himself, and if he can deserve his own self-respect he has accomplished a great deal. Cheerfulness and courtesy smooth the sharp edges and make association between all sorts and conditions of men tolerable. One may manifest courtesy awkwardly and do violence to the conventionalities, but if it is characterized by sincerity it will find grateful appreciation.

A man, in criticising a street railroad system somewhat notorious for discourteous employees, said, "We have no reason to expect anything better, for the president is a hog." There we have the cause and the effect in a sentence; if a railroad employs and retains discourteous employees, we must look higher up for the source. If you would have good servants, be good masters. Emerson said, "Every great institution is the lengthened shadow of one man." That truth is particularly applicable to railroads, for if the spirit of real courtesy characterizes the intercourse of officials, it is bound to permeate the ranks of the employees.

To meet an employee, to note the atmosphere on entering an office, the tenor of a letter, and sometimes the tone of voice on a telephone, will often reveal the influence that emanates from the higher sources and unconsciously permeates the ramifications of an organization.

Courtesy embraces fair play, right relations, respect, consideration, sympathy, kindliness, reverence and sincerity. It is a divine element that a man imbibes from his mother. Like mercy, "it blesseth him that gives and him that takes."

"A poor man served by thee shall make thee rich,
A sick man helped by thee shall make thee strong;
Thou shalt be served thyself by every sense
Of service which thou renderest."

W. H. Simms,
Vice-President and General Superintendent.

A CENTRAL RATING FIRE INSURANCE BUREAU

Birmingham Railway, Light & Power Company
Birmingham, Ala., Aug. 31, 1909.

To the Editors:

I notice that in a recent issue you discuss the present anomalous condition of fire insurance and refer to the plan of establishing a central rating bureau for all electric railway and lighting risks. This is a subject which has been considered by the insurance committee of the American Street & Interurban Railway Association, and I believe that the plan would be advantageous to all concerned. The proposition for the establishment of such a bureau was, I believe, first made by the insurance committee, but from information I have received from many parts of the country I learn that the proposal does not meet with favor among insurance men. This, perhaps, is due to the fact that the question is not understood by them, as the conditions have not been fully set forth.

The local agents oppose the plan because they fear business will be taken out of their hands and handled by brokers in the large centers, thereby depriving them not only of the control of the business, but of all or a part of their revenue from premiums. Some of the insurance companies also object because they fear that lines which they now control will be taken out of their hands and rates will be established which will be unsatisfactory to them. So far, no one has been in position to speak authoritatively on the subject so far as our interests are concerned and to answer these objections.

I believe that the association should clearly define its position on this question, and should urge the appointment by the insurance interests of a central rating bureau of experienced and capable insurance men, with power to make rates and decide upon general or special forms on all traction and lighting fire insurance. This bureau should deal with the matter of rates and forms only, and the American Street & Interurban Railway Association should designate a committee to deal with the rating bureau when appointed. In order that this committee's work shall be effective, every member company should pledge the committee its active support, so that all action taken by it shall have the moral backing of the entire membership of the association. The committee should also go on record at once as approving the placing of all insurance locally—that is, by the local managers—and in this connection I believe that the committee should declare its disapproval of the placing of insurance through large central brokerage offices, to the exclusion of local agents.

After the proposed central rating bureau is appointed, the association, through its appropriate committee, should at once establish friendly relations with it, and should assume from the start that the members of the rating bureau are practical, conservative business men, placed there not only to protect the interests which they represent, but also to conserve those of the assured. The members of the rating bureau will be named by the stock companies, both foreign and domestic, and we should recognize these companies as our logical insurance writers. If we fail to secure fair treatment at their hands, the association will find other means of protecting the interests of its members. If these relations are established, the association will be in a position to present the claims of each of its member companies for a consideration of their insurance conditions, and, where necessary, can urge member companies to make such improvements to their property as will justly entitle them to reductions in rates.

It has also been suggested that the association, through its insurance committee, could employ one or more inspectors who would go from place to place, advising with the managements of the railway companies on insurance conditions relating to their properties and securing definite information that would assist the insurance committee in dealing with the rating bureau. If this suggestion is adopted, these inspectors would make a careful study of each property and recommend the improvements that would decrease the fire hazards and thus secure reductions in rates.

If a central rating bureau is established and a committee of the association operates along the lines suggested above, backed in its work by the member companies, much can be accomplished for the benefit of each of the members of the association, and an important branch of our business, which we are now handling indifferently or not at all, will receive intelligent and forceful treatment which will certainly bring results.

A. H. Ford,
President.

The annual conference of the Municipal Tramways Association of Great Britain will be held in London, Sept. 22 to 24.

The Public Service Commission of New York, Second District, reports that of the 58,197 steam railroad trains run in the State during May, 94 per cent arrived on time at division terminals. In June 55,551 trains were run and 92 per cent were on time. The May record is the highest percentage yet reported.

ELECTRIC LOCOMOTIVES FOR THE BRITISH COLUMBIA ELECTRIC RAILWAY

The accompanying illustrations show one of three locomotives recently supplied the British Columbia Electric Railway by Dick, Kerr & Co., Ltd., of London. The electrical equipment was manufactured at their electrical works at Preston, and the trucks and mechanical portion generally at their general engineering works at Kilmarnock. The locomotives are of the articulated truck, four-axle

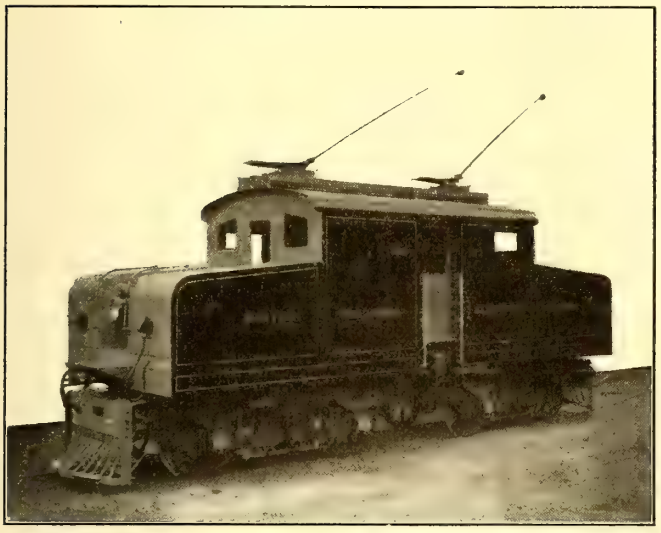


Fig. 1—British Columbia Locomotive—Side View

type, with one motor mounted upon each axle. The maximum rated tractive effort is 16,000 lb. drawbar pull, and the maximum instantaneous effort is 25,000 lb. The hinge connecting the trucks has lateral flexibility but vertical rigidity, so that the rear trucks resist any tendency to tilt under the action of the forward truck, and vice versa. Hence the center pins and cab platform framing are not subjected to any longitudinal stress, except that due to their

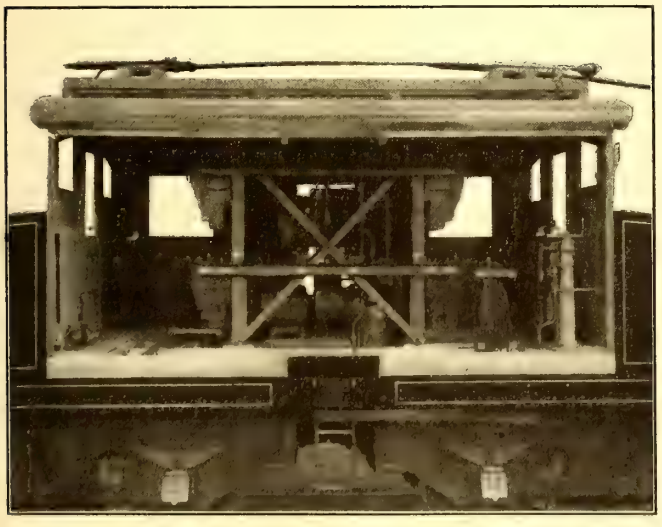


Fig. 2—British Columbia Locomotive—Interior of Cab

own inertia when starting and stopping. Suitable arrangements allow the trucks to radiate when passing round a curve.

The spring suspension is of the locomotive type, the weight being carried by semi-elliptic springs resting on the journal box saddles.

Fig. 1 shows the general appearance of the locomotives, and Fig. 2 gives a view of the interior of the cab. Here can be seen the two master controllers, one at each end of the cab, the contactor boxes, circuit breakers, switches, etc. The control equipment is of the standard Dick-Kerr multiple unit type, with series magnets operating the various contactors. The resistances are placed in the sloping ends of the superstructure.

The motor equipment consists of four D.K. 12-A motors. When operating on a 600-volt circuit each motor will give a tractive effort of 4040 lb. on the periphery of the 42-in. wheels and a speed of 15 m.p.h. at the one-hour rating. Each motor is fitted with reduction gears having a ratio of 3.64 to 1. The armature bearings of the motors are lubricated by oil rings, the axle bearings by wicking.

The motors are arranged for forced ventilation, the air being blown into the motor shell at the end farthest from the commutator and passing out at suitable openings provided at the commutator end. The air for ventilation is obtained from a centrifugal blower situated in the center of the cab. The controller for operating the blower motor is situated at the right of the master controller. The loco-

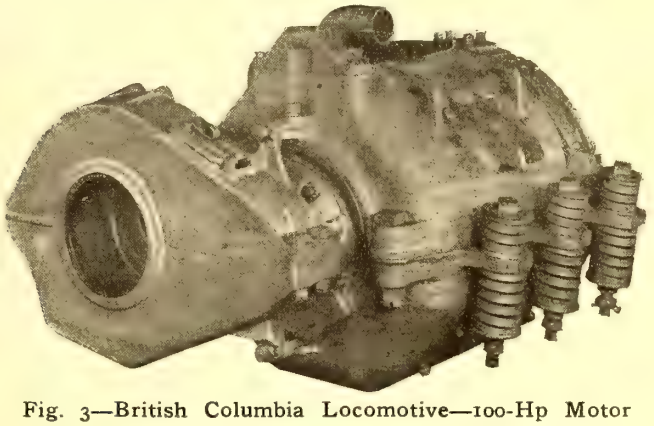


Fig. 3—British Columbia Locomotive—100-Hp Motor

motive is also fitted with combined straight and automatic air brake. The compressor for the brake equipment is mounted above the motor driven blower in the cab. The control is the Dick-Kerr multiple-unit type.

The following data may be of interest:

Diameter of driving wheels	42 in
Total wheel base	24 ft. 6 in
Wheel base of each truck	8 ft. 0 in
Length over all	35 ft. 7 in
Length of main cab	16 ft. 5 in
Height of cab above rail level	14 ft. 1½ in
Width of cab	9 ft. 8 in
Total weight of locomotive	50 tons

BERLIN SCHEME FOR RETURNING LOST ARTICLES

The Berlin, Germany, street railway company is considering the adoption of a numbered paster system for the convenience of absent-minded passengers who leave their property in the cars. These pasters would be marked with a specific number, and would be of such size that they could be easily attached to inconspicuous parts of umbrellas, canes and the like. Those using the pasters must agree to bear the expense of having the articles returned to their homes by the lost and found department. The latter, of course, is to keep a record of the names and addresses of the persons to whom numbers have been assigned. The importance of the proposed scheme may be estimated from the fact that over 36,000 umbrellas were left in the cars of the Grosse Berliner Strassenbahn last year. This enormous number is due to the Continental habit of carrying either a cane or umbrella at all times.

ELECTRIC RAILWAY LEGAL DECISIONS

LIABILITY FOR NEGLIGENCE

Minnesota.—Master and Servant—Injury to Servant—Res Ipsa Loquitur—Negligence—Presumption—Machinery—Inspection—Evidence.

The application of the maxim "res ipsa loquitur" does not ordinarily depend upon the relation between the parties, except indirectly, so far as that relation defines the measure of duty imposed on the defendant. Under certain circumstances it may apply in an action brought by a servant against a master for injury caused by an agency of the master.

Quære—whether it would so apply where the dangerous agency was in the actual physical control of the experienced servant and in operation by him?

The maxim at most raises a prima facie case of negligence, which is rebuttable. No presumption of negligence necessarily follows the plaintiff through the case, so as to compel the submission of the question of fact to the jury.

An electric passenger carrier fulfils its duty, so far as the controller of an electric car is concerned, if the controller is shown to have been of standard character, made by a reputable manufacturer, in good condition, and to have been subjected to such inspection as is reasonable and practicable. The carrier is required to inspect with adequate care, but not to dismantle complicated machinery for purposes of inspection.

Here plaintiff, a man of at least ordinary intelligence, an instructed and experienced motorman, was injured while operating an electric car for the defendant at a terminal where the cars turned round a loop. The car ran upon the curve of the loop at full speed and was derailed and capsized. Thereby plaintiff received the injuries here complained of. The issue was whether a shock of electricity, passing through him from his left hand, on the handle of the controller, and through his foot, resting upon a metallic part of the car, produced temporary paralysis, by reason of which he was deprived of control of his car. It is held:

That the presumption of negligence conceded was rebutted by affirmative testimony, inter alia, as to the safe use of the car for 20 days before and months after the occurrence of the accident, during which the car was shown to have been in the same condition as at the time of the accident, and by the facts shown as to its purchase and inspection.—(Jenkins v. St. Paul City Ry. Co., 177 N. W. Rep., 928.)

Mississippi.—Street Railroads—Injuries to Pedestrian—Sufficiency of Declaration—Allegations of Negligence.

A declaration, alleging that defendant had removed the dirt from under the ties of the track at a place much frequented by the public as a crossing, and did not light the place to warn pedestrians of its unsafe condition, and intestate stumbled and fell onto the track at a point at the end of a curve, so that the headlight did not show his position, and was killed by a passing car, which ran at a rapid rate around the curve, so as to amount to gross negligence, stated a cause of action, and was not demurrable for failure to allege that the crossing was provided by defendant, or was used as a crossing with its knowledge, or was used as a crossing by the public generally; nor was it demurrable on the ground that it did not allege facts showing a duty upon defendant to maintain the crossing in a safe condition for pedestrians.

A count alleging that defendant removed dirt from under the ties of its track at a place in the most populous part of the town, most used by the public, and did not light the place, so that intestate fell onto the track because of its unsafe condition, and was struck by a car after the motorman saw, or could have seen, his helpless condition, and that the motorman was guilty of wanton negligence under the circumstances, was not demurrable for not alleging that the crossing was provided by defendant, or was used as a crossing with its knowledge, or that it was used as a crossing by the public generally.

An allegation that defendant's motorman discovered intestate on the track in time to have stopped the car before striking him, had the brakes and machinery been in working order, was not demurrable for not alleging in what manner they were defective.—(Smith v. Gulfport & Mississippi Coast Traction Co. (No. 13,757.) 48 S. Rep., 295.)

Missouri.—Street Railroads—Regulation and Operation—Obstructions in Streets—Personal Injuries—Questions for Jury—Contributory Negligence.

In an action against a street railroad company for injuries to an automobilist through running into an excavation made by defendant in the street, the evidence held sufficient to support a finding of negligence on defendant's part in failing to maintain proper warning signals.

In an action against a street railroad company for injuries to an automobilist through running into an excavation made by defendant in the street, the question of plaintiff's contributory negligence, held, under the evidence, one for the jury. (Ripley vs. Metropolitan St. Ry. Co., 111 S. W. Rep., 1180.)

Nebraska.—Street Railroads—Public Crossings—Negligence—Persons Crossing Track—Degree of Care—Injuries to Persons on Track—Actions—Questions for Jury—Contributory Negligence.

A street railway company is guilty of negligence if it fails to give proper warning of the approach of its cars to a public crossing, or if it operates such cars at an unusual and excessive speed at said point.

A pedestrian about to cross the tracks of an electric street railway at a public crossing is not under a duty to observe the same degree of watchfulness and care as when attempting to cross an ordinary steam railway.

Defendant maintains a double track street railway on Tenth street in Omaha. Cars north bound use the eastern track, and those south bound the western one. S., about 8 o'clock in the evening of a winter day, alighted west of the track from a south-bound car at a street crossing. S. was familiar with the manner in which defendant operated its cars on said streets. He waited for an instant, and glanced to the south until said car had been propelled some 8 or 10 feet. Not seeing or hearing a north-bound car, he crossed the street without further looking or listening, and was run down on the eastern track by a north-bound car. The testimony tended to prove that said car was running at a speed of 20 miles per hour, and that no warning was given of its approach until within about 10 feet of Howard street, and almost at the instant of the collision with plaintiff. Held, that it was for the jury, and not the court, to determine whether plaintiff was guilty of contributory negligence. (Stewart vs. Omaha & C. B. St. Ry. Co., 118 N. W. Rep., 1106.)

New Hampshire.—Electricity—Injuries Incident to Production—Negligence—Question for Jury—Evidence—Res Gestæ—Materiality—Street Railroads—Agents of Companies—Existence of Relation.

In an action for injuries by contact with electrically charged wires strung across a street without a license therefor, as required by Pub. St. 1901, c. 81, evidence held to require the submission to the jury of the issue of negligence.

In an action for injuries by coming in contact with electrically charged wires strung across a street while plaintiff was engaged in moving a house through the street, evidence of the declarations of a third person, who came and took charge of the wires, in response to a request made on the superintendent of the railway company maintaining some of the wires, made as part of the res gestæ, are admissible as bearing on plaintiff's exercise of due care in attempting to raise the wires from the roof of the house at the time of the accident.

Where, in an action for injuries by coming in contact with electrically charged wires strung across a street without a license therefor, as required by Pub. St. 1901, c. 81, it appeared that no attempt was made, at the time of the injury, to disconnect the wires or to remove their supports, the failure to show that written notice was served on defendant, as required by section 14 of the chapter, did not defeat a recovery.

On the issue whether the superintendent of an electric railway company had authority to direct an employee of the railway company and of a power company to take charge of their high-tension wires strung across a street, evidence held not to show such authority, so that the power company was not liable for injuries sustained in consequence of the act of such employee. (Clough vs. Rockingham County Light & Power Co. et al., 71 Atl. Rep., 223.)

New Jersey.—Carriers—Injury to Passenger—Collision with Team—Negligence—Contributory Negligence—Assumption of Risk—Duty to Protect Passengers.

Whether a motorman, who, on a down grade, shut off his power, and allowed the car to drift, and thus approached so close to a wagon traveling in front of him on the tracks that he was unable to prevent a collision, injuring a passenger, the wheels of the wagon skidding when the driver attempted to leave the track, was negligent in operating his car, is a question for the jury.

For a passenger to ride on the front platform of a street car is not such negligence, as matter of law, as will prevent recovery by him for injury from collision of the car with a wagon.

A passenger, by standing on the front platform of a street car, assumes only such risks as are incident to the

ordinary operation of the car, not those arising from causes ab extra.

An instruction that, as to passengers, it is the duty of a carrier to use a high degree of care to protect them from danger while on its cars, is proper. (Brackney vs. Public Service Cor., 71 Atl. Rep., 149.)

Oregon.—Discovery—Examination Before Trial—"Party"—Subjects of Examination—Carriers—Injuries to Passengers—Street Railroads—Premature Start—Contributory Negligence—Failure to Warn—Res Ipsa Loquitur.

B. & C. Comp. section 826, authorizing the taking of the deposition of a "party" to an action before trial, does not authorize the taking of the deposition of the secretary of the defendant corporation where such secretary was not individually a party.

B. & C. Comp., section 826, subd. 1, authorizing the taking of a deposition of a party before trial, only authorizes his examination with reference to matters pertinent to the issue, and does not contemplate compelling the party to disclose the names of his witnesses, the manner in which he expects to establish his case, or confidential reports or communications of his agent in relation to the controversy.

In an action for injury to a street car passenger while alighting from a moving car, evidence held insufficient to sustain a verdict, either on the theory of defendant's negligence in suddenly starting the car while plaintiff was alighting, or in failing to warn her that the car had not stopped.

Where plaintiff attempted to alight from a moving street car, without any necessity or invitation, and was injured, she was negligent as a matter of law.

The conductor of a street car was not negligent in failing to warn plaintiff against attempting to alight before the car stopped, where the conductor did not know and had no reason to believe that she intended to do so.

That a passenger in a street car was injured by alighting before the car stopped did not of itself constitute a prima facie case of the carrier's negligence. (Armstrong vs. Portland Ry. Co., 97 Pac. Rep., 715.)

Pennsylvania.—Carriers—Injury to Passengers—Contributory Negligence.

Where a passenger alights from an electric car at a place where there are platforms along the tracks, and goes behind the car from which he alights, and is struck by a car on the next track, he cannot recover, where he did not look for it, and took the chance of crossing in front of it.

That a passageway was provided by an electric car company from a platform on which passengers alighted to a platform on the other side of the tracks does not relieve the passenger, alighting from one car on the platform and passing behind such car over such passageway onto another platform, from the duty of looking for a car approaching on the other track, over which he knows cars constantly pass. (Yevsack vs. Lackawanna & W. V. R. Co., 70 Atl. Rep., 837.)

Rhode Island.—Appeal and Error—Review—Questions of Fact—Expert Medical Testimony—Damages—Excessive Damages—Personal Injuries.

In an action for personal injuries, as to the extent and cause of which the medical experts testifying for each party disagree, it is for the jury to pass upon the weight of the medical testimony, as well as the other evidence, and their finding thereon, warranted by evidence, will not be reviewed.

In an action by a woman for personal injuries, if her injuries caused a retroversion of the uterus, which rendered a major surgical operation necessary to effect a cure, a verdict for $4,156 was not excessive. (O'Malley v. Rhode Island Co., 70 Atl. Rep., 915.)

Texas.—Carriers—Injury to Passengers—Setting Down Passenger—Instructions—Conformity to Issues and Evidence—Trial—Assuming Facts—Refusal of Requests—Special Charges Embraced in Main Charge.

In an action by a passenger against a street railway company for injuries received while alighting from a car, a requested charge that it was the conductor's duty to see and know that no person was in the act of alighting or was otherwise in a position that would be perilous by starting the car, etc., was properly refused; the law imposing on the company merely the duty to exercise through its employees the highest degree of care for the safety of its passengers.

For the same reason a requested charge, introduced by the statement that "it is the duty of the conductor in charge of the car * * * to see and know that all passengers in the act of alighting had succeeded in doing so in safety," was properly refused.

In an action by a passenger against a street railway company for injuries received while alighting from the car, where the issue as to whether the company stopped the car so as to allow plaintiff an opportunity to alight was not made by the pleadings nor raised by the evidence, a requested charge raising the issue was properly refused.

In an action by a passenger against a street railway for injuries received while alighting from a car, where the only evidence upon which plaintiff could rely for a verdict as to how the accident happened was his own and his wife's that he was thrown from the car, and that his foot became fastened in the step, a charge that if plaintiff voluntarily stepped from the car, and was not thrown therefrom, and his foot did not become fastened in the step, defendant should recover, was not prejudicial as charging that plaintiff was negligent, instead of submitting the question to the jury, since, if the jury found as charged, plaintiff had no case, and a verdict for defendant was necessary.

It is not error to refuse special charges substantially embraced in the court's main charge. (Bryant v. Northern Texas Traction Co., 115 S. W. Rep., 880.)

Virginia.—Carriers—Accident to Train—Collapse of Bridge—Hidden Defect—Evidence—Carriage of Passengers—Personal Injuries—Negligence—Acts Constituting Negligence—"Inevitable Accident"—Trial—Instructions—Presumption of Carrier's Negligence.

Evidence held to sustain the theory that the collapse of a street railway company's bridge was caused by a hidden and internal defect in the weld of a cord which supported the entire structure, and which broke at the place where welded, which defect could not have been detected by the utmost scrutiny.

Where an accident arises from a hidden and internal defect, which a thorough examination would not disclose, and which could not be guarded against by the exercise of a sound judgment and the most vigilant oversight, the carrier is not liable for an injury to a passenger resulting therefrom.

An accident is inevitable if the person in connection with whom it occurs neither has, nor is legally bound to have, sufficient power to avoid it or prevent its injuring another; and in such a case, the essential element of legal duty being wanting, the person cannot be held negligent.

The slightest neglect against which human prudence and foresight might have guarded, and by reason of which an injury may have been occasioned, renders a carrier liable for an injury to a passenger.

In an action by a passenger against a carrier for injuries resulting from the collapse of a bridge, a requested charge that plaintiff, to establish defendant's negligence, must show more than a probability of a negligent act, and cannot recover if it is just as probable that the accident resulted from one of two causes, for one of which defendant was not responsible, was properly modified to state that plaintiff, to establish defendant's negligence, must show more than a probability of a negligent act, but that, when plaintiff had shown that she was injured by the breaking down of the bridge and overturning of the car, it was sufficient proof of defendant's negligence, and that the burden of proof was then on defendant to establish by a preponderance of evidence that it has been guilty of no negligence whatsoever which caused the accident, and that the damage has been caused by inevitable casualty or by some cause which human care and foresight could not prevent.

The presumption of a carrier's negligence does not arise from the abstract fact of an accident to a passenger, but whether it exists depends upon the nature of the accident, which must be such as does not in the usual course of things happen to passengers when due care is exercised by the carrier. (Roanoke Ry. & Electric Co. vs. Sterrett, 62 S. E. Rep., 385.)

Washington.—Railroads—Injuries to Persons at Crossings—Duty to Look and Listen—Contributory Negligence.

A person about to cross the track of a steam railway, or an interurban electric railway, on which trains are customarily operated at a high speed, must stop, look and listen, unless such acts would avail nothing.

Where persons approaching an electric railway crossing saw a train approaching, but supposed that it was a local train which would stop at a station which it would pass shortly before reaching the crossing, while in fact it was an express which did not stop there, and they drove on the crossing without stopping, and collided with the train, they were negligent, and a recovery for their injuries was barred.

Where a person of years of discretion approached a railway crossing with her father, who was driving, it was incumbent on her, as well as on him, to stop, look and listen, and where she did not try to stop the horse, or have her father do so, or attempt to do anything to protect herself, and was not prevented fro mdoing so, her recovery for injuries caused by collision at the crossing is barred. (Cable vs. Spokane & Inland Empire R. Co. (two cases), 97 Pac., Rep., 744.)

News of Electric Railways

Cleveland Traction Situation

The City Council of Cleveland met on the evening of Aug. 30, but did not reply to the communication of the Cleveland Railway in which it was proposed that Judge R. W. Tayler should draft an ordinance to include all the conditions of the Baker franchise which have been agreed to, this franchise to be passed by the Council and submitted to the voters at once for approval. The company proposes to defray the expenses of a referendum and has offered to deposit sufficient money with the city clerk to cover the cost of a special election. The members of the Council and Mayor Johnson at the meeting on Aug. 30 went into a secret conference, and from what was said after the caucus, it is inferred that the administration will not agree to the proposal of the company. The communication from the company follows in part:

"Replying to your favor of Aug. 27, we can see no reason to change our views concerning the matters therein discussed, as set forth in our letter of Aug. 26.

"We think, moreover, that a more serious question confronts us. It is the desire of the company, and we assume likewise of the Council, that our negotiations should be ended and an ordinance prepared and submitted to the people on or before Nov. 2, the date of the general election. Only 63 days remain. It is only fair to say that we think this will be impossible under the present plan of procedure, and, if it is to be accomplished, some other plan must be adopted.

"We know of no one in whom the Council, the company and the general public have greater confidence than Judge Tayler. We respectfully ask that you join with us in requesting Judge Tayler to act under the following method of procedure:

"That he prepare an ordinance adhering strictly to the fundamental principles of the Tayler plan, as heretofore agreed upon between the Council and the company; that is, that the company may be granted a franchise to operate its existing railway, rendering to the public such service as the Council may from time to time require, at actual cost, including a return to the company of 6 per cent per annum on the true and just valuation of its property; such ordinance to incorporate all the provisions of the Baker ordinance heretofore agreed upon, and to be changed, if at all, only in those sections concerning which we are at variance.

"The valuation to be determined by Judge Tayler, or, if he declines, by three disinterested arbitrators.

"The ordinance to provide that the company may accept the same on, but not before, say the sixteenth day after its passage.

"We now agree to accept such an ordinance, and respectfully ask that you join with us in carrying out such a plan. This will enable the people at once to vote upon an ordinance without any expense to the city, drawn upon the Tayler plan, bearing the approval of Judge Tayler, accepted by the company, and, with the possible exception of a few sections, meeting with the approval, as heretofore expressed, of the Council. This will place the final responsibility for accepting or rejecting such an ordinance where the Legislature intended it should be left, with the people."

The city administration has shown its position on these questions by refusing to accept the proposition of the Cleveland Railway to enact and submit to a referendum vote an ordinance to be drawn by Judge R. W. Tayler on or before the date of the next general election, Nov. 2, 1909. The reply of the Council committee of the whole to this proposition says that the Council will not abdicate its functions, intimating that such an action as proposed by the company would not be legal. Further, the reply states that in addition to submitting the valuation of the property to Judge Tayler, he would be made sole arbiter in the question of fare, the East Cleveland controversy, the interurban controversy, the license provision and the selection of arbitrators.

The administration has proposed that the drafting of an invalidity clause be placed in the hands of a committee of attorneys, consisting of Judge Lawrence, S. H. Tolles, Judge R. W. Tayler and the city solicitor and that the city and the company jointly request Judge Tayler to proceed to value the property. The administration suggests that it will amend the Baker ordinance by writing into it all the provisions that have been agreed during the last negotiations, and in addition will allow the present provisions in that ordinance relative to East Cleveland and the interurban railways to stand, unless some agreement satisfactory to the city is reached between the company and the other parties concerned before the ordinance is acted upon by Council. It is also proposed that the time after which the city may name a purchaser for the property will be extended from seven to eight years, and that in the matter of arbitration each side shall select an arbitrator without limitation, and that the third man, however chosen, shall not be an official or employee of the city or an official or stockholder of the company. The letter states that the city is ready to proceed to an early settlement along these lines.

If Mayor McQuigg and his ticket are re-elected in East Cleveland no other course will be possible than to carry out the agreement with that village. Mr. McQuigg claims that the village has a contract with the Cleveland Electric Railway to carry residents of East Cleveland to the Public Square in Cleveland for 25 years, and that more than 12 years of that contract remains; further, Mr. McQuigg says this agreement provides that the fare which prevails on Euclid Avenue in Cleveland shall be the compensation for carrying East Cleveland people, no matter whether under the old franchise or a new one. Mr. McQuigg says that the old company made the village of East Cleveland possible by building a line through it; that it always carried people for a straight fare; that it never asked for a modification of the contract, and that the business was profitable until the 3-cent management secured control of the system. The primaries on Aug. 7 will practically tell the story in East Cleveland, as a nomination is equivalent to an election there.

Up to Saturday, Sept. 4, the Cleveland Railway had made no reply to the last communication of the administration. Horace E. Andrews, president of the company, has refrained from making any comment upon the attitude assumed by the administration.

Transit Affairs in New York

Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., has sent a reply to Chairman Willcox of the Public Service Commission regarding the criticism of the Interborough Rapid Transit Company's offer to build subway extensions, in which he said:

"I acknowledge the receipt of your letter of Aug. 27, in answer to my letter addressed to you on the date of June 30 last, relative to the proposed extension of the rapid transit facilities in the city by the Interborough company. I am glad to note that we are agreed upon the fundamental proposition that the subway extensions should be developed upon a comprehensive plan for the accommodation of the citizens of the entire city, and that present development should lay down the foundation for such future extensions as the increased needs of the public may require.

"It was designed in our letter of June 30 to meet this very end, and it was our conviction, after a long study of the situation, that the plan therein set forth was best calculated to accomplish this purpose. We realize, however, as stated in our letter, that in so complex a situation there was room for difference of opinion. I am, therefore, glad to note that you are disposed to accept the overtures for a conference, and shall be pleased to meet you for further discussion at such time as you may appoint.

"We have no pride of opinion on the subject of any specific plan, and are therefore prepared to enter into this conference with an open mind, having in view, however, the prime consideration that the convenience of the public should always be consulted, so as to procure for them for a single 5-cent fare the maximum passenger transportation."

Headed by Isaac Stern, of Stern Brothers, a delegation of business men in the Twenty-third Street dry goods district called on the Public Service Commission on Sept. 2 and requested that Twenty-third Street be made an express station on the proposed Broadway-Lexington Avenue route. According to the plans, a local station was to be provided at Twenty-third Street, the express stations on the route south of the Grand Central Station being designed only for Canal Street and Forty-second Street.

The Public Service Commission has adopted an order for a hearing before Commissioner Bassett to ascertain the precise situation as to an order issued on April 10, 1908, for certain improvements at the Gates Avenue station of the Lexington Avenue elevated line of the Brooklyn Union Elevated Railroad. The original order required a widening

of the stairway from the gallery to the island station platform and also an additional stairway on the north side of Lexington Avenue to the gallery. The company prepared plans for a stairway wider than the one ordered, and opposition followed from property owners and business men in the neighborhood, who objected to having so much of the sidewalk taken. The borough president refused a permit, and an injunction was obtained by property owners, so that the stairway has not been built, and the present order was adopted to see if some satisfactory plan could not be formulated.

The Chicago Wage Controversy

Thomas E. Mitten, president of the Chicago City Railway, announced on Sept. 1 that he would accept an amended wage schedule which was presented to the contending parties by Walter L. Fisher, the city's traction expert. Mr. Fisher has been active in the wage controversy and has attended all of the sessions looking toward a settlement and submitted several plans with the object of adjusting the matter. Mr. Fisher's latest plan is based on a wage scale effective for a period of four years from Aug. 1, 1909, as follows: Men who have been in the service of the company for one year on a salary of 27 cents per hour are to receive under the new contract 28 cents an hour during the first year, 29 cents an hour during the second year, 29.5 cents an hour during the third year and 30 cents an hour during the fourth year. New men are to receive 23 cents per hour for the first three months, 25 cents an hour for the next nine months, 26 cents per hour for the second year and 1 cent per hour increase during the third, fourth and fifth year of service. The committee representing the employees of the Chicago City Railway announced that it was satisfied with the schedule as suggested, and Sept. 7 the committee submitted the plan to a referendum vote of the employees for acceptance.

John M. Roach, president of the Chicago Railways, declined to accept the new Fisher plan. He stated that the company could not afford to pay the salary called for, but expressed himself as being willing to arbitrate the question for a flat rate of wages for men in service on the lines controlled by his company. On Sept. 2 the employees of the Chicago Railways adopted resolutions offering to arbitrate the question of an increase in wages on the basis of a one-year contract from May 31, 1909, to May 31, 1910, with the understanding that the arbitration is to be founded on a flat rate of wages ranging from 27 cents to 30 cents per hour. It is not expected that the placing of the settlement of the differences between the Chicago Railways and its employees in the hands of a board of arbitration will be decided upon until the result of the referendum vote by the employees of the Chicago City Railway is known.

Philadelphia Transit Talks

Transit Talk No. 9 of the Philadelphia (Pa.) Rapid Transit Company was dated Aug. 12, 1909. The subject was: "Where One-third of Our Earnings Go." The talk follows:

Taxes on corporations come largely out of those who buy their product.

The street railway company, which sells its product (transportation) to the "average man" is taxed over 12 per cent of its gross receipts, while the big manufacturing companies, like the steel companies, which sell their product to the rich, are taxed very lightly or not at all.

The theory is that manufacturing should be encouraged because it employs labor on a large scale. Let us see.

The United States Steel Corporation, out of one year's gross receipts of $757,014,768, paid wages of $160,825,822, or 21 per cent. The Philadelphia Rapid Transit Company, out of receipts of $18,288,763, paid out in wages $3,833,684, or 21 per cent—the same as the steel company.

According to the theory referred to, we should be as lightly taxed as the steel company. But we were not—far from it!

The Philadelphia Rapid Transit Company pays heavier taxes than does any other traction company in the United States; that is, it contributes a much larger proportion of its gross earnings to the public treasury than is asked of transportation companies elsewhere.

In Pittsburgh the traction company tax amounts to 4 per cent of gross receipts; in Milwaukee, 6 per cent; in New York the Interborough pays 6⅔ per cent; in other cities the rate is even lower. We pay over $2,500,000 a year in taxes, or over 12⅔ per cent of our gross receipts.

Isn't there something wrong in this? Because, as we said at the start, the tax is paid in the last instance by the purchaser.

Transit Talk No. 10 was dated Aug. 17, 1909, and was published in part in the ELECTRIC RAILWAY JOURNAL of Aug. 20, 1909, page 299. Transit Talk No. 11 was published in the ELECTRIC RAILWAY JOURNAL of Aug. 28, 1909, page 334. Transit Talk No. 12 was dated Aug. 24, 1909. The subject was "The Trailer Cars." The talk follows:

About Oct. 1 we shall begin running our new trailer cars.

Sixty trailer trains are being equipped for service, and 20 of them will be assigned to the Lancaster Avenue and Baring Street lines. The others will be placed on lines where they are most needed.

The leader cars of the trains will be pay-within cars. This type of leader has been selected for purposes of safety. With the pay-within car as leader there can be no attempts to board or leave the forward car after the train is in motion.

This was the source of danger when trailer cars were formerly in service. A mis-step usually meant a fall under the wheels of the trailer car.

The results of exhaustive tests have convinced us that all the old drawbacks have been eliminated by the mechanical equipment and safety devices of the new trailer car. Separate motors on the rear cars and an improved air-brake system make it possible for motormen to operate the trailers with the precision of steam or subway trains. The old starting jerk and stopping jolt are no longer to be feared, and every precaution has been taken to insure absolute safety.

Our return to the use of trailer cars to relieve traffic congestion morning and evening has attracted no little interest in the transportation world. We cannot do away with rush-hour crowding, but we hope to lessen it. The old system of street car trains was defective. We have overcome these defects.

The type of trailer car we have evolved is a distinct departure from anything now in use. You will be the judge of its serviceability, and we think you will like it.

Transit Talk No. 13 was dated Aug. 26, 1909. The subject was "Accidents." The talk follows:

How to alight from a street car safely has been told so often that there should be no need to repeat the simple rule to be followed. But so many accidents continue to happen because passengers, especially women, insist upon alighting in the wrong way, that it seems necessary to publish this reminder:

In getting on or off a car, always take hold of the front handle. In getting on or off the front platform, take hold of the upright at the dashboard. If you are leaving or entering by the back platform, take hold of the upright attached to the body of the car. In that way, if you should slip and the car should start, you can save yourself; but if you have grasped the wrong handle you will probably be thrown.

Here is page No. 1 from our book of Rules and Regulations for Conductors and Motormen:

"The safety of the public is the first consideration in the operation of a railroad, therefore the utmost care must be exercised at all times to prevent accidents. Very much depends on the care of the motorman. He should always be on the alert to avoid danger, and his attention should never be diverted from his duties. He should keep his eye constantly on the track before him to prevent accidents or injuries to persons who may not at the moment be able to get out of the way of the car.

"The conductor's duty in the safe operation of a car is to allow ample time for passengers to get on and off the car before pulling the bell. If old and feeble, allow them time to be seated, as a fall on the car can be of as much consequence as a fall off. Keep your hand from the bell cord while assisting on or off those who may require it. Realize the fact that you are the conductor of the car, and this implies that you are a safe and competent person."

This is one of the 109 rules in the book—all aimed to make street-car travel safe. But the best rules will not always prevent accidents if the passenger does not use ordinary care.

Meeting of Central Electric Accounting Conference

A preliminary notice of the meeting of the Central Electric Accounting Conference to be held at Indianapolis on Sept. 11 was published on page 375 of the ELECTRIC RAILWAY JOURNAL of Sept. 4, 1909. M. W. Glover, chairman of the conference, states that Room 210 in the Traction Terminal Building, Indianapolis, has been selected as the place for holding the meeting, and that the time has been fixed at 12:30 p. m.

The following subjects have been listed for discussion and members are urged to attend and requested to come to the meeting prepared to discuss them:

1. The Advantages of Uniform Methods of Accounting.
2. Methods of Computing Car-Hours and Car-Mileage, with Especial Reference to Passenger and Freight Trailer Cars, Non-Revenue Mileage, Mileage in Terminal Cities, Blockades and Lost Running Time.

Picnic at Portland, Ore.—Employees of the Portland (Ore.) Railway, Light & Power Company had on Aug. 16 the third of a series of picnics given during the summer by the management.

Southern Pacific Company Not to Withdraw Motor Cars.—H. J. Small, general superintendent of motive power of the Southern Pacific Company at San Francisco, Cal., writes that the motor cars which have been operated by that company between Stockton and Sacramento and Stockton and Fresno have not been withdrawn, and that he knows of no good grounds for the statement made in certain newspapers that the cars were not a success on long hauls.

Meeting of the New York Railroad Club.—The New York Railroad Club will resume its sessions with a meeting on Sept. 17 at the building of the United Engineering Societies, 29 West Thirty-ninth Street. The committee appointed to nominate officers for the ensuing year will present its report, and Frederick C. Syze, trainmaster of the Baltimore & Ohio Railroad, will present a paper on "Surprise and Efficiency Tests of Employees Charged with the Operation of Trains."

Picnic of the Brooklyn Rapid Transit Employees.—The Brooklyn Rapid Transit Employees' Benefit Association held it annual picnic at Schuetzen Park, Glendale, L. I., on Sept. 3. It was estimated that more than 5000 people, including members of the association, their wives, children and friends, were in attendance. The Brooklyn Rapid Transit Band and the Brooklyn Rapid Transit Fife and Bugle Corps furnished the music during the day. A number of valuable prizes were awarded to the winners in the series of athletic events that had been arranged.

The Hudson & Manhattan Railroad Extension in New York.—The Hudson & Manhattan has announced that the stations on its line at Twenty-eighth Street and Sixth Avenue and Thirty-third Street and Sixth Avenue will be completed by May 1, 1910, and that on that date the company will operate trains from the temporary terminal at Sixth Avenue and Twenty-third Street to Sixth Avenue and Thirty-third Street. The consents of more than half of abutting property owners have been secured for the proposed extension of the company's line from Thirty-third Street and Sixth Avenue to the Grand Central Station at Fourth Avenue and Forty-second Street.

Reductions in Assessments in Chicago.—Both the Chicago City Railway and the Chicago Railways asked the board of review to reduce their personal assessments as made by the assessors. The assessors fixed the value of the property of the Chicago City Railway at $19,700,000 and that of the Chicago Railways at $20,000,000. The Chicago City Railway asked for a reduction of $8,477,000 and the board of review finally fixed the figures at $16,889,999. The board of review in considering the application of the Chicago Railways for a reduction fixed upon the sum of $15,000,687. A further reduction of $1,578,868 from this amount has been asked by the company, however.

Commission on Revision of Sherman Law Adjourns.—The commission appointed by President Taft to consider proposed changes in the Sherman law and the interstate commerce act has adjourned, to meet later in the autumn at Washington. The draft of the changes that will be recommended to Congress by the President will not be completed until near the conclusion of the meeting at Washington. A rough draft has been completed, however, and copies of it will be sent to the members of the commission who were not present at the recent session, and a copy will also be sent to the President. It is considered likely that the first draft will be amended as the result of the study it will receive at the hands of the members before the next session of the commission.

Outing of New York Employees.—On Aug. 24 the employees of the Second Avenue Railroad and the Central Park, North & East River Railroad, New York, N. Y., held a joint outing at Donnelly's Park, College Point, Long Island. Among the many athletic features of the outing was a baseball game between the employees of the companies, which resulted in favor of the team representing the Second Avenue Railroad. The outing was attended by 222 men. George W. Linch, the receiver of the Second Avenue Railroad and general manager of the Central Park, North & East River Railroad, and John Beaver, financial representative of the Second Avenue Railroad and secretary and treasurer of the Central Park, North & East River Railroad, were in attendance as representatives of the companies.

Consideration of Kansas City Ordinance Urged by President Corrigan.—Bernard Corrigan, president of the Metropolitan Street Railway of Kansas City, has published the following notice to the public in the daily press regarding the ordinance now under consideration: "Eighty thousand copies of the proposed contract (ordinance) between Kansas City and the Metropolitan Street Railway Company have been distributed. Any person who has not seen a copy will confer a favor on the company by advising it of that fact, and a copy will be forwarded to such person by return mail. Every voter and other person interested in Kansas City is requested to read this ordinance and advise his councilman what he thinks about the matter. After ample time has been given to consider the ordinance it will be submitted to the Council for its action thereon."

Olive Green Standard Color of Rhode Island Company.—The Rhode Island Company has adopted olive green as a standard body color. The city cars have been green for a number of years and the suburban cars brown. The green used heretofore, however, has been of a slightly lighter shade. A. E. Potter, general manager of the company, writes that the green paint heretofore used was too light to be durable, but that the change to a deeper or olive green would hardly be noticed unless two cars, one painted with the old color and the other with the new, were standing close together for comparison. Olive green will also be adopted for the suburban lines of the company instead of brown, whenever it is necessary to repaint the suburban cars. The standard color of the cars of the Connecticut Company has been yellow for some time.

Gift to Institute Library.—The Western Electric Company has presented to the library of the American Institute of Electrical Engineers a most valuable addition in the shape of a patent specification library. This gift constitutes the largest accession since the original creation of the library by Dr. S. S. Wheeler with the Latimer Clark collection. The patent library which the Institute thus acquires contains no fewer than 461 substantial leather-bound volumes containing approximately 100,000 specifications. These specifications begin with May 30, 1871, and run to December, 1908, thus covering the entire period of activity which includes the telephone, the electric light, electric railways and the electric motor. From May 30, 1871, up to the last day of 1887 the volumes are complete, containing all the specifications issued by the Patent Department, certified. From July, 1887, up to Dec. 1, 1908, the volumes contain all the electrical specifications which are not certified. The original set cost more than $4,000, and duplicates of these specifications, if now purchased from the Government and bound, would cost between $4,000 and $4,500. Edward Caldwell, chairman of the library committee of the Institute, has already taken the matter in hand as to proper care and installation of the library, so that the members may derive the greatest possible benefit from having such a collection at their disposal, and has also taken measures to complete the set to date.

Proposal for Subway in Chicago.—It has been announced in Chicago that the engineering and contracting firm of George W. Jackson, Inc., will shortly submit to the City Council a proposition to build an extensive subway system estimated to cost approximately $80,000,000. The company will agree to finance the undertaking itself, and it is understood that the first move in the negotiations will be a request from Mr. Jackson's organization to have the financial standing of his company and its ability to complete the task investigated by a committee representing the City Council. The plans, as thus far announced, differ radically, in one particular at least, from those repeatedly proposed for Chicago, in that the new scheme contemplates subway routes in underground construction all the way from the downtown district to points five to seven miles from the heart of the city, while the older propositions contemplated subways in the business districts only, the surface cars using them, coming to the street level after crossing the river, and, in the case of the south side, after getting beyond the congested business section. Eight loops, it is reported, are proposed in the downtown district, and from these lines are to extend to the south side in Wentworth Avenue, State Street and Cottage Grove Avenue to Seventy-third Street. Southwesterly it is proposed to place a tube in Archer Avenue, and on the west side in four main east and west streets, extending out as far as Fifty-second Avenue. The north side lines in Sedgwick and North Clark Streets would extend to Lawrence Avenue, and the line to the northwest section of the city in Milwaukee Avenue to Fortieth Avenue. The company proposes also to equip the lines and to operate them. It stands ready also to place a municipal ownership option in its contract with the city, so that the latter might acquire the system at any time on terms to be agreed upon.

Proposed Elevated in Philadelphia.—The Philadelphia Suburban Elevated Railroad has filed an application for a charter in Pennsylvania and has announced that it proposes to construct an elevated railroad in Philadelphia. The incorporators are: S. S. Neff, C. W. Haines, John H. Hawkins, Coates Coleman and A. L. Phillips. The officers are: S. S. Neff, president; C. W. Haines, vice-president; F. T. Finch, secretary, and Coates Coleman, treasurer. Edwin O. Lewis is counsel. The company is to have a preliminary capital of $1,000,000. The main line, according to the plan, is to cover a distance of 20 miles and will consist of a single-track line on Twelfth Street and Thirteenth Street, between Johnson Street in the northern part of Philadelphia and Glenwood Avenue to the north; double track from Twelfth Street and Glenwood Avenue to Wayne Junction, with connections at the North Philadelphia station with the Germantown & Chestnut Hill branch of the Pennsylvania Railroad and a physical connection also at Wayne Junction with the Germantown & Chestnut Hill branch of the Philadelphia & Reading Railroad. The road will also be built to Frankford and at Gray's Ferry physical connection will be made with the Baltimore & Ohio Railroad and the Philadelphia, Washington and Baltimore branches of the Pennsylvania Railroad. The National and American League baseball parks and Fairmont Park will be located along the route of the proposed line. The main terminal will be on Market Street between Twelfth Street and Thirteenth Street, where it is proposed to afford a direct connection with the terminal of the Philadelphia & Reading Railway. The company states that it has also arranged for a physical connection with the Philadelphia & Western Electric Railway and for through service by that company over the elevated railroad to the center of the city. Mr. Neff, the president of the company, is president of the Interstate Engineering & Supply Company, and during his railroad career has been connected with the Pennsylvania Railroad, the Union Loop of Chicago, the Boston Elevated Railway, the Brooklyn Rapid Transit Company, the Mexico Tramways and other roads.

Financial and Corporate

New York Stock and Money Markets

September 8, 1909.

After the holiday the stock market opened lower and uncertain on account of the disquieting reports from the bedside of Mr. Harriman. Before the market opened, London had been actively selling Harriman shares and the first sales in this market were many points below the previous close. On the day's trading there was not much loss, the last sales being about on a par with the first. The sympathetic recessions of outside issues were unimportant. Before the holiday the market had been very dull, but prices were strong with an advancing tendency. Traction stocks have been inactive with small price changes.

The money market continues to be easy with rates practically unchanged. Quotations to-day: Call, 2¼ to 2½ per cent; 90 days, 3¼ per cent.

Other Markets

There has been some renewal of activity in Philadelphia Rapid Transit stock, but very little change in prices. Other shares have been dull.

The active traction shares in the Boston market have been both the issues of Massachusetts Electric. There has been liberal trading in these and prices have advanced sharply. In the case of the preferred there has been a 4-point improvement. Top for each issue was 79 for preferred and 17¾ for common.

The Chicago market has been dull since last report and traction shares have been out of the trading. Chicago Subway has been the only point of interest, and that has been declining. It sold as low as 17½ to-day.

In the Baltimore market, United Railways 4s closed to-day at 88½ and the incomes at 58¼.

In last week's auction of securities in New York, $1,000 Lexington & Eastern Railway Company 5 per cent bond was sold at 58.

Quotations of various traction securities as compared with last week follow:

	Aug. 31.	Sept. 7.
American Railways Company	46	a46
Aurora, Elgin & Chicago Railroad (common)	47½	*47½
Aurora, Elgin & Chicago Railroad (preferred)	92½	*92½
Boston Elevated Railway	129¼	129¼
Boston & Suburban Electric Companies	*18	*18
Boston & Suburban Electric Companies (preferred)	*70	*72½
Boston & Worcester Electric Companies (common)	a13	a13
Boston & Worcester Electric Companies (preferred)	a55	a54
Brooklyn Rapid Transit Company	78⅞	78½
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	86¼	86⅞
Capital Traction Company, Washington	136	a136½
Chicago City Railway	a180	a180
Chicago & Oak Park Elevated Railroad (common)	*3	*3
Chicago & Oak Park Elevated Railroad (preferred)	*12	*12
Chicago Railways, ptcptg, ctf. 1	a112	a111
Chicago Railways, ptcptg, ctf. 2	a38½	a39
Chicago Railways, ptcptg, ctf. 3	a26	a26
Chicago Railways, ptcptg, ctf. 4s	a10	a10½
Cleveland Railway	*78	*78
Consolidated Traction Company of New Jersey	a77½	a77½
Consolidated Traction of N. J., 5 per cent bonds	a106½	a106½
Detroit United Railway	69¼	a75
General Electric Company	169⅛	166
Georgia Railway & Electric Company (common)	a94⅛	*94½
Georgia Railway & Electric Company (preferred)	a88	*87
Interborough-Metropolitan Company (common)	14⅝	14¼
Interborough-Metropolitan Company (preferred)	47	46½
Interborough-Metropolitan Company (4½s)	83½	82½
Kansas City Railway & Light Company (common)	a48	a48
Kansas City Railway & Light Company (preferred)	a82	a82
Manhattan Railway	140	a143½
Massachusetts Electric Companies (common)	15½	16½
Massachusetts Electric Companies (preferred)	74½	78
Metropolitan West Side, Chicago (common)	a18	a18
Metropolitan West Side, Chicago (preferred)	a50	a50
Metropolitan Street Railway	a24	a24
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	83	83¼
Northwestern Elevated Railroad (common)	a20	a20
Northwestern Elevated Railroad (preferred)	a71	a71
Philadelphia Company, Pittsburg (common)	47½	48
Philadelphia Company, Pittsburg (preferred)	44	a44½
Philadelphia Rapid Transit Company	30⅜	30
Philadelphia Traction Company	90½	91¼
Public Service Corporation, 5 per cent col. notes	a100¼	a100⅛
Public Service Corporation, ctfs.	a93½	a94
Seattle Electric Company (common)	115	*114½
Seattle Electric Company (preferred)	107	107
South Side Elevated Railroad, Chicago	*a56	54½
Toledo Railways & Light Company	*10½	a10¼
Third Avenue Railroad, New York	23¾	22
Twin City Rapid Transit, Minneapolis (common)	108¼	109
Union Traction Company, Philadelphia	54	54
United Railways & Electric Company, Baltimore	13	a13¼
United Railways Inv. Co., San Francisco (common)	38½	a41
United Railways Inv. Co., San Francisco (preferred)	59	62
Washington Railway & Electric Company (common)	44½	a47
Washington Railway & Electric Company (preferred)	90½	a92
West End Street Railway, Boston (common)	96	97¾
West End Street Railway, Boston (preferred)	106½	106½
Westinghouse Electric & Manufacturing Company	86	85
Westinghouse Elec. & Mfg. Co. (1st pref.)	130	a140

a Asked *Last sale

Investigation of Bridge Operating Company

The Public Service Commission of the First District of New York, as noted on page 332 of the ELECTRIC RAILWAY JOURNAL of Aug. 28, 1909, recently approved the proposed transfer of the stock of the Bridge Operating Company by the receiver of the New York City Railway to the receivers of the Metropolitan Street Railway. At the same time the commission ordered an investigation of the affairs of the Bridge Operating Company. This investigation was begun with a hearing by the commission on Aug. 31, with Milo R. Maltbie of the commission presiding and H. M. Chamberlain as counsel.

Edwin W. Winter, president of the Brooklyn Rapid Transit Company; C. D. Meneely, secretary and treasurer of that company, and G. I. Hunt, auditor of the Bridge Operating Company, were sworn by the commission as witnesses on Aug. 31. Mr. Meneely testified largely regarding the organization and history of the company, and presented a statement showing how the capital had been expended. He said that 20 cars had been purchased at a cost of $72,632; that a terminal had been erected in Brooklyn at a cost of $1,003 and that $27,021 had been expended on the track and roadway. This totaled $100,656. He said that the Bridge Operating Company was managed by the Brooklyn Rapid Transit Company, through its operating company, the Brooklyn Heights Railroad, and that the Brooklyn Heights Railroad accounted to the New York City Railway as joint owner of the stock of the Bridge Operating Company.

Mr. Winter volunteered a statement regarding the desire of the city and the hesitancy of his company to operate cars on the Williamsburgh Bridge. The Bridge Operating Company, Mr. Meneely has sworn, did not own any trackage although there was a charge of $27,000 for that item. President Winter explained this by saying that during the early days of the company the city changed its plan for trackage and that his company upon the request of the city administration paid for two temporary terminals before the final terminal was installed. He said that he thought his company had been weak when it consented to do this. He recalled a meeting in the Mayor's office in 1904, which he and H. H. Vreeland, president of the Metropolitan Street Railway, attended, and said that the Mayor was very anxious to have the cars cross the bridge. He said he regarded the profits of the Bridge Operating Company as only one item of bridge operation, and that all through the lines were run at a loss. The local business is the only one that pays. He declared that his company had lost $5,500,000 by running its cars over the Brooklyn Bridge up to Dec. 31, 1908.

G. I. Hunt, the auditor of the Bridge Operating Company, was the next witness. He was asked to explain in detail a voucher put in by the New York City Railway for $14,000 worth of work. The voucher was not itemized, and Mr. Hunt was unable to recall the details. The hearing will be continued.

Geo. D. Yeomans, of counsel for the Brooklyn Rapid Transit Company, filed a statement with the commission in which he said: "Although we are ignorant of the proceeding in which the Public Service Commission desires to look into the Bridge Operating Company and its affairs, we wish to have it appear upon the record that the Bridge Operating Company, through its attorneys, denies that the Public Service Commission, First District, State of New York, has any jurisdiction over the Bridge Operating Company or its affairs, and reserves the right to raise the question of jurisdiction in this or any subsequent proceeding.

"Considering the results of the operation of all the lines of the Brooklyn Rapid Transit system and the Metropolitan Street Railway system, which is now operated in place of the New York City Railway, in connection with the operation of the Bridge Operating Company's cars on the Williamsburgh Bridge, and crediting to the companies of the Brooklyn Rapid Transit system and to the Metropolitan Street Railway system the amounts received by each as the profits arising from the Bridge Operating Company's operation, amounting to a total of about $100,000 per annum, there is a net loss to the companies of the Brooklyn Rapid Transit system of over $200,000, and to the Metropolitan Street Railway of over $100,000 per annum."

Merger of Subsidiary Companies in San Francisco

The Railroad & Power Company of Maine was recently incorporated as an additional step in the general plan for the perfection of the street railway system of San Francisco. The new company is to be the holding company for the Stanislaus Power & Development Company and the San Francisco Electric Railways, which is to acquire and

operate street railways in San Francisco, and will also hold $10,000,000 of the $18,000,000 of common stock of the United Railroads of San Francisco, which will be sold to it by the United Railways Investment Company. The Stanislaus Power & Development Company is to acquire the properties of the Stanislaus Electric Power Company and the Tuolumne Water Power Company under a plan of reorganization, which provides for the issuance of a first mortgage on the property to furnish funds for the acquisition and completion of the plant and transmission lines and the payment of existing obligations, and also an issue of $6,000,000 second mortgage 5 per cent bonds to be exchanged for the $6,000,000 first mortgage bonds of the Stanislaus Electric Power Company.

In 1910 the Stanislaus Power Development Company will, it is believed, be in a position to deliver power to the United Railroads, and it is expected that when the property has been fully developed there will be a large amount of surplus power to sell. At the annual meeting of the stockholders of the United Railways Investment Company in May, 1909, there was authorized $10,000,000 of new preferred stock, $1,000,000 of which, together with $1,000,000 of the common, was to be issued in exchange for the stock of the Stanislaus Power & Development Company, increasing the common stock outstanding to $20,400,000 and the preferred to $16,000,000. The stock of the Stanislaus Power & Development Company thus acquired will be turned over to the Railroad & Power Development Company.

The Railroad & Power Company of Maine will finance whatever power and electric railway development may eventually be undertaken by the United Railroads. The Stanislaus Power Company and the San Francisco Electric Railways, which took over the Parkside Transit Company, will be absorbed by the Railroad & Power Company. All development of power and any extensions which may eventually be decided upon will be taken care of by the new company.

The Union Trust Company, of San Francisco, has filed for record a mortgage for $10,000,000, executed in its favor by the San Francisco Electric Railways. The Union Trust Company is to dispose of bonds, or such portions as may be needed for the construction and extension of the Parkside Railway It is said it is proposed to build the line to San Mateo and possibly to Santa Clara County.

Another link in the chain of corporations is the Sierra & San Francisco Power Company, which was incorporated in May, 1909, to be merged with the San Francisco Electric Railway Company. The Sierra & San Francisco Power Company purchased the Stanislaus Electric Power Company as a basis of the merger for $6,000,000. That represented the settled value of the water rights, reservoir sites and possibilities of the property, which was not extensively developed. To this initial expense there will be applied for development purposes an issue of bonds in the sum of $10,000,000. The local auxiliary plants to be joined under the general designation of the Sierra & San Francisco Power Company will increase the value of the property to $20,000,000, the sum at which the new concern was capitalized.

Receiver for Metropolitan Securities Company

On Feb. 11, 1909, William W. Ladd, receiver of the New York City Railway, secured a judgment from the United States Circuit Court against the Metropolitan Securities Company for $5,271,582. The Circuit Court of Appeals subsequently confirmed this judgment. In proceedings supplementary to the execution of this judgment, Judge Holt, of the United States Circuit Court on Sept. 2 appointed S. Sidney Smith temporary receiver of the Metropolitan Securities Company, and fixed Sept. 14 as the date for hearing the application to make the receivership permanent.

United States Marshal Henkel, on a return filed with the court on Sept. 1, 1909, stated that he was unable to find any property of the Metropolitan Securities Company in the judicial district, but Receiver Ladd, in the supplementary complaint, tells of properties placed in his possession by the defendant on April 12, 1909, as judgment pending the hearing upon the writ of error by the Circuit Court of Appeals. He says under stipulation that the Metropolitan Securities Company deposited with him $1,027,500 in cash on which the interest has accrued, making the total at the date of the entry of the order upon the mandate of the higher court $1,031,738; also, that the Metropolitan Securities Company further deposited with him as additional security certain securities of practically no value and a few securities which have some market value; and two promissory notes. One of the notes, he said, was made by the Third Avenue Railroad for $107,100 and the other made by the New York City Railway to the Metropolitan Securities Company on which the Metropolitan Securities claims $234,000 was advanced.

Mr. Ladd informed the court that he had brought a suit on his own behalf as judgment creditor of the Metropolitan Securities Company against the Interborough-Metropolitan Company, and other stockholders of the defendant company, liable under the statutes of the State of New York to an amount equal to that unpaid on the defendant company's capital stock, approximately $7,500,000.

The Interborough-Metropolitan Company has issued a statement in which it says:

"The appointment of a receiver for the Metropolitan Securities Company is ancillary to the judgment recently affirmed by the United States Circuit Court of Appeals in the suit of Ladd, receiver of the New York City Railway, against the Metropolitan Securities Company and has been expected. It does not change the situation so far as the Interborough-Metropolitan Company is concerned or in any wise affect the Interborough Rapid Transit Company, which operates the subway and elevated systems. The Metropolitan Securities Company is simply the holding company of the stock of the New York City Railway. The Interborough-Metropolitan Company is a stockholder in the Metropolitan Securities Company. The question as to whether further appeal will be granted from the judgment as a result of which the present receiver of the Metropolitan Securities Company has been appointed is one that will be considered shortly by the courts."

Report of Interborough Rapid Transit Company for Year Ended June 30, 1909

In applying to the New York Stock Exchange to list additional bonds, the Interborough Rapid Transit Company, New York, furnished a statement of earnings for the year ended June 30, 1909. This statement compared with the report to the Public Service Commission of New York for the First District for the year ended June 30, 1908, follows:

Year ended June 30	1909	1908
Total earnings from railway	$25,775,392	$24,699,505
Total railway operating expenses	10,747,443	10,722,695
Taxes accrued	1,799,807	1,586,466
Operating income	$13,228,142	$12,390,344
Other income	1,384,644	579,965
Total net income	$14,612,786	$12,970,309
Interest on funded debt	10,010,750	1,250,000
Rentals	.....	8,011,665
Amortization of debt, disc't & exp	12,213	7,984
Dividends on stock, 9 per cent	3,150,000	3,150,000
Balance, surplus over dividends	$1,439,823	$550,660

Albany & Hudson Railroad, Hudson, N. Y.—The Public Service Commission of the Second District of New York has approved the plan and agreement for the reorganization of the Albany & Hudson Railroad submitted by ex-Governor Myron T. Herrick of Ohio; Clinton L. Rossiter, vice-president of the Long Island Loan & Trust Company, and R. A. C. Smith, president of the American Mail Steamship Company, a reorganization committee representing a large number of stockholders and bondholders of the company. The plan of reorganization provides for the issuance of $2,100,000 preferred and $1,275,000 common stock to be exchanged for the present outstanding stocks and bonds. The new company also asked for authority to issue a mortgage of $1,500,000, the greater portion of which is to be used in double tracking the road between Rensselaer and Kinderhook and the purchase of the bridge connecting Albany and Rensselaer.

Chicago, Aurora & DeKalb Railroad, DeKalb, Ill.—William Forkell & Company, Chicago, Ill., are offering at par and interest $200,000 first mortgage 5 per cent gold bonds of the Chicago, Aurora & DeKalb Railroad dated Sept. 1, 1909, and due Sept. 1, 1929, but redeemable at par and interest on any interest date. The American Trust & Savings Bank, Chicago, is trustee under the mortgage securing the bonds. The bonds are issued to provide funds to equip with electricity the company's line between Aurora and DeKalb, 31 miles distant.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—The creditors' committee of the Columbus, Delaware & Marion Railway, consisting of Guy M. Walker, New York; N. S. Keith, Cincinnati, and W. H. Netherland, Louisville, has prepared a trust agreement under which the holders of claims against the company and against John G. Webb, president of the Columbus, Delaware & Marion Railway, agree in consideration of Mr. Webb's assignment of all his property to the committee as trustees to deposit their claims with the Cincinnati Trust Company as depositary and give the committee full authority to take at its discre-

tion whatever action may be necessary to preserve the equities in the railway.

Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company, Seneca Falls, N. Y.—The Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company has been authorized by the Public Service Commission of the Second District of New York to execute to the West End Trust Company, Philadelphia, a mortgage of $2,500,000 under the corporate name of Geneva & Auburn Railway. The corporation is authorized to issue at present $500,000 of 5 per cent 30-year bonds, to be sold at not less than 90. Of this amount $400,000 is to be used for the discharge of outstanding bonds and $100,000 for improvements and the acquisition of property. It is proposed to build an extension to Cayuga Lake.

Kingston (N. Y.) Consolidated Railroad.—Application has been made to the Public Service Commission of the Second District of New York by the Kingston Consolidated Railroad for permission to make a new mortgage to the Manhattan Trust Company, New York, as trustee, to secure an issue of $250,000 bonds, of which $75,000 is to be issued at once and the remainder reserved for future requirements.

Montgomery County Rapid Transit Company, Norristown, Pa.—The Bankers' Corporation, Philadelphia, on Aug. 24 filed a bill of equity asking the court to sell the 8-mile electric railway between Trooper and Skippack operated by the Montgomery County Rapid Transit Company, Norristown, to satisfy the bondholders. The bill states that the company has defaulted in the payment of interest on bonds secured by a $500,000 mortgage. The road is now in the hands of two receivers, Daniel M. Anders and Henry J. Farquhar.

Philadelphia (Pa.) Rapid Transit Company.—At the annual meeting of stockholders of the Philadelphia Rapid Transit Company, which is to be held on Sept. 15, directors will be elected for the ensuing four years. The proposed change, making the rental under lease of the Lehigh Avenue Railway equal to 6 per cent on the stock, will be considered. Requests for proxies were sent out by Secretary R. B. Selfridge. The transfer books will close Aug. 15 at 3 p. m. and reopen Sept. 16 at 10 a. m.

Public Service Corporation of New Jersey, Newark, N. J.—Thomas N. McCarter, president of the Public Service Corporation of New Jersey, has announced that in pursuance of the policy of the company of segregating its various interests as far as may be desirable, it has been determined to transfer control of all the gas companies owned and controlled to one company, the Public Service Gas Company, with $10,000,000 authorized stock as a holding company. Some two years ago all the railway properties in any way controlled by the Public Service Corporation were either merged into or leased to the Public Service Railway, a corporation the capital stock of which is nearly all held by the Public Service Corporation.

Railways Company General, New York, N. Y.—The directors of the Railways Company General have declared a dividend of 10 per cent, payable on Sept. 15 to stock of record on Aug. 31. This is the initial dividend on the stock of the company. The official statement of the company regarding the dividend follows: "Believing that the Railways Company General is now in a position to declare regular dividends, the committee recommends to the board of directors that they declare a cash dividend of 10 per cent out of profits and that they announce the policy of declaring quarterly dividends of 1 per cent beginning with the quarter ending Sept. 30, 1909, with a further division at the end of each fiscal year of such portion of the profits as seems advisable."

Second Avenue Railroad, New York, N. Y.—Judge Lacombe of the United States Circuit Court has handed down an order granting the application made by Davies, Stone & Auerbach, solicitors for the Guaranty Trust Company, and Quigg, Baldwin & Pierce, counsel for the Second Avenue Railroad, for an extension of time for the taking of testimony in the foreclosure proceedings brought by the Guaranty Trust Company until Nov. 9, 1909. The complainant is allowed until Sept. 9, 1909, for the taking of testimony, the defendant until Oct. 9, and the complainant from that time until Nov. 9, 1909, to take testimony in rebuttal.

Tarrytown, White Plains & Mamaroneck Railway, White Plains, N. Y.—Sutro Brothers & Company announce that bondholders of the Tarrytown, White Plains & Mamaroneck Railway who have not availed themselves of the offer of Sutro Brothers & Company to exchange their bonds under the plan outlined previously by the firm will be given an opportunity up to and including Sept. 12 to make such exchange. The sale under foreclosure of the property and franchises of the Tarrytown, White Plains & Mamaroneck Railway will take place on Sept. 17.

Union Railway, Gas & Electric Company, New York, N. Y.—Babcock, Rushton & Company, Chicago and New York, offer for subscription at 95 and interest the 5 per cent bonds of the Union Railway, Gas & Electric Company to yield 5.34 per cent. The Union Railway, Gas & Electric Company controls the street railway and interurban lines, gas, electric lighting, power and heating property in Springfield, Peoria, Rockford, Freeport and Belvidere, Ill.; Evansville, Ind., and Beloit and Janesville, Wis.

Western Ohio Railway, Lima, Ohio.—Arrangements have been made with Hayden, Miller & Company, Cleveland, Ohio, by the Western Ohio Railway for the issue of $360,000 of three-year notes bearing 6 per cent interest to liquidate part of the floating debt of the company. The notes are secured by $500,000 of first mortgage bonds, 2700 shares of preferred stock and 5000 shares of common stock. The company will create a sinking fund of $1,000 a month for the first year, $1,500 a month the second and $2,500 a month the third year to retire the notes.

Yonkers (N. Y.) Railroad.—The Public Service Commission of the Second District of New York has authorized Leslie Sutherland, receiver of the Yonkers Railroad, to issue $65,000 of 6 per cent two-year receiver's certificates, in order to discharge or refund the certificates issued in 1908.

The attempt at public utility legislation at the session of the Connecticut Legislature recently closed failed, and the prospects are that the matter will reappear as the foremost issue of next year's campaign. During the session the progress of events in connection with this matter was noted from time to time in the ELECTRIC RAILWAY JOURNAL, but the extraordinary proceedings which marked the entire consideration of this matter justify a review of the proceedings, especially as the subject was reconsidered after the judiciary committee had rejected the measure originally introduced. Governor Woodruff began the agitation to establish a commission in 1907, urging the appointment of a body to succeed the railroad commission, with increased powers. Toward the end of the session he threatened to call an extra session should the Legislature refuse to act, but compromised on a committee of five to draft a bill to be presented in 1909. The bill proposed by this body substituted for the railroad board a commission of five men with salaries of $5,000 each with jurisdiction over gas, electric, railroad, electric railway, express, telephone and water companies. This bill was introduced, and, as previously noted, the judiciary committee reported it unfavorably to the lower house. But the lower house was unwilling to accept the finding of the committee, and the bill was referred to a special joint committee by both houses. A majority and a minority report followed. The former approved a bill drawn by Senator Barnum. This proposed that the Railroad Commission be retained vested with its present authority, but provided for a separate body to supervise the electric light, telephone and water companies. The minority measure was quite drastic. It provided for a commission of five members with salaries of $4,000 each and would have abolished the Railroad Commission. One member of the commission was to be a lawyer and another a civil engineer of standing. Under the terms of this bill reports were to be made to the State by all the companies within the jurisdiction of the act, and the commission was to supervise issues of securities. On Aug. 3 the Senate passed the Barnum bill by three votes, a motion to substitute the minority bill being defeated by one vote. On Aug. 5 the matter came before the House, which refused to amend the bill passed by the Senate by striking out all after the enacting clause and substituting for it the minority bill of the select committee on public utilities, by the close vote of 104 to 103. Before further action was taken the House adjourned and final action on the matter was thus postponed. On Aug. 10 the House refused by 117 votes to 113 to substitute an amended Whiton-Chandler bill for the Barnum bill on public utilities, and then indefinitely postponed the Barnum bill itself, thus effectually blocking further progress.

Attorney-General O'Malley of New York has secured from Governor Hughes the appointment of two extraordinary special terms of the Supreme Court in the Sixth and Seventh Judicial districts to determine the pending certiorari proceedings to review special franchise tax assessments involving about $41,000,000 in unpaid taxes. One is to be held by Justice Coman of Morrisville at Binghamton, beginning Oct. 11, and the other by Justice Sutherland of Rochester at Canandaigua, beginning Oct. 12.

Traffic and Transportation

Air Brakes Compulsory Only on New Cars in Milwaukee

The Railroad Commission of Wisconsin in a letter addressed recently to Jos. P. Carney, an Alderman of Milwaukee, intimates that any attempt to force the Milwaukee Electric Railway & Light Company to equip its cars now in service with air brakes would not stand the test of reasonableness in the courts if attacked by the company. It is stated now that sentiment is increasing among the Aldermen that the offer of John I. Beggs, president of the Milwaukee Electric Railway & Light Company, to equip cars with air brakes in accordance with his letter to Edward Hinkel, city clerk, should be accepted in the same broad spirit in which the offer was made. The letter of the commission to Mr. Carney follows in full:

"Your letter of Aug. 18 arrived in the absence of Prof. Meyer, which will explain its not having been answered more promptly.

"We note what you have to say regarding the proposed franchise to be granted the Milwaukee Electric Railway & Light Company, and have to say that Chapter 310, of the laws of 1909, requires street railway companies to equip cars weighing over 40,000 lb. with air brakes of modern design, to be approved by the commission. Other cars may be required to be equipped with such brakes upon order of the commission. At the time the order referred to in your letter was made it was deemed advisable, under the testimony, to limit the order to new cars. Anything beyond this, under the showing made, might have exceeded the limit of reasonableness within the law and met with reversal in the courts.

"Of course, there is nothing to prevent the company from equipping all its cars according to the proposed amendment, but if the company should decline the franchise with such condition attached, the improvement of the service suggested by the engineers of the commission could not be enforced. Unless the company will accede to the demand it would seem that the general public interest would be promoted by granting a franchise which would result in as early relief of the congestion in traffic as practicable, and if the air brakes desired are indispensable to the operation of the cars with reasonable safety, that matter could be submitted to the commission for determination. Of course, all requirements of the commission in the matter would have to stand the test of reasonableness in the courts if attacked by the company. Unless the situation were materially different from what it was according to the testimony upon the former hearing, no further requirements would be ordered.

"The Legislature has provided by general law for the equipment of street cars with air brakes, which seems adequate to meet any situation and to protect the public when necessity for such equipment arises. It would seem, under the circumstances, that the public interest requires that the company proceed to execute the proposed plans of bettering the service without unnecessary delay. As the general law is broad enough to safeguard the public in the matter of air brakes and other safety appliances when necessity demands their installation, no amendment to the franchise, designed to accomplish what may be accomplished under the general law if necessary, ought to be made which can be used as a pretext for failure to act on the part of the company.

"The matters of service and rates are subject to regulation at all times and franchise provision can not stand in the way of commission requirement, the adoption of new devices for the protection of the public at any time in the future.

"As a general proposition it is not wise to attempt to deal with railroad operations for definite periods by contract, as, in the progress of the art, new inventions bring about radical changes in the cost of transportation and methods and safety of operation. The general law is framed to meet the conditions as they arise, and the company may be required to adopt modern appliances from time to time as public convenience and safety may require. This feature of the law is certainly commendable."

Attempt to Enforce Blue Law Against Sunday Operation in Eau Claire, Wis.

The Common Council of Eau Claire, Wis., passed a resolution recently requesting the chief of police and the sheriff of the county to enforce the famous "blue law" of the State prohibiting all kinds of labor except works of necessity or charity. This action of the Council was prompted by the fact that the so-called "lid" has been enforced on all the saloons recently, so far as opening on Sunday is concerned. This enforcement was begun last winter as a result of the agitation for no license at the spring election in Eau Claire, and so much feeling was stirred up against the saloons, all of which had been open all day on Sunday for many years, that the Council passed a resolution requesting the police of the city to enforce the Sunday law, which forbids the opening of saloons on Sunday. At the April election the city voted for license by a large majority and since then the saloons have endeavored, without success, to persuade the mayor and police to close their eyes to the Sunday opening of the saloons. Having failed in these efforts, it is understood that the saloon interests used their influence with a majority of the Common Council to pass a resolution requiring the strict enforcement of the Sunday closing law which was passed by the Legislature of 1856 and has been a dead letter in the State most of the time since. Apparently the idea was that if the enforcement of this obnoxious law could be secured, there would be such a sharp reaction in the other direction that public sentiment would consent to the opening of saloons as heretofore.

However, the passage of this resolution by the Common Council calling upon the police and sheriff to enforce the "blue law" strictly, created a reaction in the direction least expected by the saloon interests. Public sentiment was overwhelmingly against it and the Council was made the butt of newspaper ridicule. Under instructions from the police and fire commissioners the police publicly made the announcement that they would do nothing to enforce the law. The sheriff of the county took the view that as a county officer he was not expected to follow the instructions of any City Council and if any element in the county wanted the enforcement of the strict Sunday law the proper course was for the citizens to swear out warrants on the day following the violation of the law. The result of this decision on the part of the police and sheriff was that the resolution of the Council was completely ignored and street cars were operated as usual, and restaurants, cigar stores and ice-cream parlors were open as heretofore. The net result of the Council's action therefore is to leave the situation exactly as it was before, except that public sentiment is more strongly in favor, than heretofore, of the strict enforcement of the Sunday closing law in regard to saloons.

Trail Cars in Philadelphia.—The Philadelphia Rapid Transit Company put trail cars in operation on the Thirteenth and Fifteenth Streets line on Sept. 1. On Oct. 1 it is intended to place trail cars more generally in service.

Temporary Trolley-Railroad Crossing Authorized.—The Public Service Commission of the Second District of New York has authorized a temporary crossing of the Huntington Railroad over the tracks of the Long Island Railroad at Farmingdale at grade. The crossing is made, however, subject to the condition that a change may be ordered at the pleasure of the commission.

Express and Freight Service of the Washington, Baltimore & Annapolis Electric Railway.—Under the arrangement which has been made by the Washington, Baltimore & Annapolis Electric Railway with the Electric Express Company for the transaction of freight and express business, for the immediate present less than carload shipments only will be handled from Baltimore, but arrangements are now being made whereby cars will be handled in and out of Baltimore. Under the contract between the railroad company and the electric company, express and freight cars will be run over the lines of the railway, and will also use the baggage compartment cars for package and express business. There will be service every two hours for package and light freight business between Baltimore and Washington, and 11 trains daily in and out of Annapolis for Washington and Baltimore.

Seats for Motormen in Connecticut.—The act passed at the recent session of the Legislature of Connecticut requiring that seats be provided for motormen will go into effect on Oct. 1, 1909. The measure as passed follows: "Section 1. Every company owning or operating a street railway in this State shall cause each of its cars having an air brake, and when running outside the territorial limits of any city or borough, to be provided with a seat or stool for the use of the motorman operating such car or the person having the motive power of the same under control; provided, that the railroad commissioners may except from the provision of this act any line or parts of a line or any cars of such a company if, after public hearing, they shall find that the presence of such seats upon such line, part of a line, or cars would endanger or inconvenience any person or persons traveling or being legally upon such lines or cars. Sec. 2. Any company owning or operating any such car which shall neglect or refuse to cause the same to be provided with a seat or stool for the use of the motorman operating the same or the person having the motive power of such car under control, shall forfeit to the State $25 for each day of such neglect or refusal."

Personal Mention

Mr. August Westermeyer, auditor of the Sheboygan Light, Power & Railway Company, Sheboygan, Wis., has been elected treasurer of the company to succeed Mr. Ernest Gonzenbach, who has become president and general manager of the company. Mr. Westermeyer has been connected with the company for eight years. He entered the employ of the company as clerk and was promoted step by step to his present position. He is a native of Sheboygan and is 31 years old.

Mr. J. W. Tompkins, superintendent of the Lafayette division of the Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind., has been appointed superintendent of the interurban division of the company, vice Mr. M. E. Emerson, resigned; Mr. S. J. Ryder, superintendent of the Logansport division of the company, has been appointed superintendent of the Lafayette division, vice Mr. J. W. Tompkins, transferred, and Mr. I. A. Battenberg, chief dispatcher of the Bluffton division, has been appointed superintendent of the Logansport division, vice Mr. S. J. Ryder, transferred.

Mr. E. G. Connette, who retired on Sept. 1 as general manager of the Worcester (Mass.) Consolidated Street Railway to become chief of the transportation department of the Public Service Commission of the First District of New York, was tendered a farewell reception at his office in Worcester on Aug. 28, by the employees of the company. During the afternoon a committee of the men, with Mr. George W. Dunlop, superintendent of power of the company, as chairman, presented Mr. Connette with a pair of diamond-studded gold cuff links emblematic of the Mystic Shrine, of which Mr. Connette is a member, as a token of esteem.

Mr. John A. Cleveland, superintendent of new business of the electric lighting companies in Saginaw and Bay City, Mich., has been appointed manager of the Bay City Traction & Electric Company and the Bay City Gas Company, and not the general manager of the Saginaw Valley Traction Company, as stated in last week's issue of the ELECTRIC RAILWAY JOURNAL. Mr. J. F. Collins is general manager of the Saginaw Valley Traction Company as well as of the Bay City Traction & Electric Company, the Bay City Gas Company, the Bartlett Illuminating Company and the Saginaw City Gas Company. In his new position Mr. Cleveland succeeds Mr. J. A. Cunningham, who resigned as of Sept. 15 to give attention to his personal interests, and will remove to Henderson, Ky.

Mr. Carl A. Sylvester has been appointed general manager of the properties of the Boston (Mass.) Suburban Electric Companies, comprising the electric railways in the Newton, Waltham, Lexington, Wellesley and Natick districts at the west of Boston, to succeed Mr. Matthew C. Brush, who, as announced in the ELECTRIC RAILWAY JOURNAL of Aug. 21, has been appointed general manager of the Buffalo & Lake Erie Traction Company. For the last three years Mr. Sylvester has been assistant general manager of these properties in close association with Mr. Brush. Mr. Sylvester was born in Newton Centre, Mass., received a public school education in his native city, and was graduated from Harvard College in 1902. He immediately entered the employ of the Newton system of street railways and worked in the shops and in the operating and construction department, with power station service in addition. He was made assistant general superintendent of the Boston Suburban Electric Company in 1903 and later entered the general offices of the company in connection with the purchasing of supplies and as acting paymaster. He then became clerk to the president, and in 1904 was made assistant to the general manager, receiving the title of assistant general manager in 1906. Mr. Sylvester is a member of the New England Street Railway Club. He will assume his new duties about Oct. 1, having jurisdiction over the Newton & Boston Street Railway, Lexington & Boston Street Railway, Middlesex & Boston Street Railway, Norumbega Park, Lexington Park and the Suburban Manufacturing Companies.



C. A. Sylvester

Mr. Ernest Gonzenbach has been elected president of the Sheboygan Light, Power & Railway Company, Sheboygan, Wis., to succeed the late Dr. F. A. C. Perrine. Mr. Gonzenbach was formerly vice-president and treasurer of the company. His present title is president and general manager. He has resigned as treasurer of the company, and Mr. August Westermeyer, heretofore auditor of the company, has been elected to succeed him as treasurer. Mr. Gonzenbach was elected president of the company as a mark of appreciation of the results attained by him in his former offices. For five years, or ever since he became connected with the company, Mr. Gonzenbach has handled the physical, political and financial situations practically alone. During his term of service with the company the gross earnings have almost doubled and the net earnings have more than trebled. Mr. Gonzenbach's election to the presidency will not mean any change in the policy or personnel of the company beyond that mentioned in the case of Mr. Westermeyer. A portrait and biographical sketch of Mr. Gonzenbach were published in the ELECTRIC RAILWAY JOURNAL of Jan. 30, 1909, following his election as president of the Northwestern Electrical Association.

Mr. Matthew C. Brush, whose resignation as vice-president and general manager of the properties controlled by the Boston Suburban Electric Companies to become general manager of the Buffalo & Lake Erie Traction Company, the Jamestown, Chautauqua & Lake Erie Railroad, the Chautauqua Steamship Company and the Lackawanna Traction Company, with headquarters in Buffalo, to take effect about Oct. 1, was noted on page 304 of the ELECTRIC RAILWAY JOURNAL of Aug. 2, 1909, is one of the most widely known electric railway executive officers in the East, and is a past president of the New England Street Railway Club. He was born in Stillwater, Minn., and was graduated from the Armour Institute in 1897, and from the Massachusetts Institute of Technology in 1901 with the degree of M.E. After serving in various capacities for several years with the Union Pacific Railroad and the Chicago, Burlington & Quincy Railroad, Mr. Brush joined the staff of the Boston Suburban Electric Companies in 1904 as assistant to the president. At that time these organizations consisted of nine street railways, two parks and a gas company. Within eight months Mr. Brush was appointed general manager of the Newton Street Railway, the Newton & Boston Street Railway, the Lexington & Boston Street Railway, the Westboro & Hopkinton Street Railway and the Norumbega Park Company. In the fall of 1905 he was appointed vice-president and general manager and later a director of these properties, and in 1906 received the same title in the organization of the Suburban Manufacturing Company, which was formed to build a large concrete power station at Waltham at a cost of about $300,000. Mr. Brush's work since he has been connected with the Boston Suburban Electric Companies has been characterized by constant efforts to place the allied properties on a sound and comprehensive operating basis, and the companies are now a strong centralized group from the operating as well as the financial standpoint. A feature of the administration has been co-operative publicity, combined with a policy of meeting employees and the public and removing all possible causes of misunderstanding. Aside from improving the schedules, and the quality and punctuality of the service, Mr. Brush carried through successfully the first campaign to secure 6-cent fares in a large way on any New England system, and it is significant that at the latest hearing before the Massachusetts Railroad Commission, when the company petitioned the commission for authority to continue the charge of one cent per transfer, no one appeared in opposition. A noteworthy accomplishment of the administration was described in the ELECTRIC RAILWAY JOURNAL of June 26, 1909, page 1152, in connection with the rebuilding of the Norumbega Park Theatre in eight days after its destruction by fire. Mr. Brush is a member of Newton Club, Fales Club, Waltham Business Men's Association, a Delta Kappa Upsilon past president, and associate member of the American Street & Interurban Railway Association.



M. C. Brush

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Indiana Northwestern Traction Company, Indianapolis, Ind.**—Incorporated to construct an electric railway from Hammond to Lafayette via intermediate towns. The company will carry on both a freight and passenger business. Headquarters, Monticello. Capital stock, $50,000. Directors: William Buckner, C. D. Meeker, Jacob D. Timmons, Monticello; Geo. W. Goff, Rensselaer, and Geo. A. Haskell, Chicago, Ill.

***Tippecanoe & Monticello Interurban Railway, Monticello, Ind.**—Incorporated in Indiana to construct and operate a system of interurban railways to connect Fowler, Lafayette, Battle Ground, Ash Grove, Delphi, Brookston, Chalmers, Wheeler, Reynolds, Monticello, Norway, Idaville, Burnettsville, Buffalo and Logansport. Headquarters, Monticello. Capital stock, $100,000. Incorporators: Thos. W. O'Connor, Willis White, Monticello; Chas. E. Turner, Detroit, Mich.; Jos. A. C. Blackburn, and Wm. B. Felker, Rogers, Ark.

***Philadelphia & Suburban Elevated Railroad, Philadelphia, Pa.**—Application has been made by this company for a charter to build an elevated electric railway in Philadelphia on Twelfth and Thirteenth Streets and with connections to cover a distance of 20 miles. The main terminal of the proposed elevated railway is to be on Market Street, between Twelfth Street and Thirteenth Street. Capital stock, $1,000,000. Incorporators: S. S. Neff, president; Casper W. Haines, vice-president; Coates Coleman, treasurer; J. H. Hawkins and A. L. Phillips.

FRANCHISES

Santa Barbara, Cal.—The City Council has granted to the Santa Barbara Consolidated Railway a franchise to extend its Oak Park line from Fourth Street to Oak Park.

San Diego, Cal.—The Board of Park Commissioners has granted to the San Diego, El Cajon & Escondido Electric Railway a permit to operate an electric railway through the City Park. The permit forbids freight transportation in the park. [E. R. J., Sept. 4, '09.]

***Marshalltown, Ia.**—H. W. Darling, Chicago, Ill., is said to have applied to the City Council for a street railway and lighting franchise.

***Battle Creek, Mich.**—H. C. Hawk, representing the Post Land Company, has applied to the Board of Supervisors for a franchise permitting the construction and operation of an electric railway through its property just west of the city in Battle Creek township. The line is intended to be a loop about 6 miles in length.

St. Louis, Mo.—The County Court of St. Louis County has granted to James D. Houseman a franchise to construct an electric railway from Jefferson Barracks to Spanish Lake. It will also extend through Manchester, Webster Groves, Clayton, University City, Wellston, Ferguson, Florissant and several other towns. The franchise provides for branch lines to Fenton and other towns. [E. R. J., Aug. 14, '09.]

Clovis, N. M.—The City Council has granted a franchise to E. J. Howard, J. D. Hammett and A. R. Hammett, Moberly, Mo., to construct an electric railway system in Clovis. The franchise provides that work shall commence before Jan. 1, 1910. [E. R. J., July 17, '09.]

Forest Grove, Ore.—The United Railways, Portland, has been granted a 25-year franchise by the City Council to extend its railway into Forest Grove. [E. R. J., Aug. 28, '09.]

Gettysburg, Pa.—The Hanover & McSherrystown Street Railway, Hanover, has petitioned the Town Council of Gettysburg for a franchise to enter the borough with a line which is to be built from McSherrystown, thus affording railway communication between York and Gettysburg. The Council has appointed a special committee to consider the proposal.

Logan Utah.—The City Council has granted to David Eccles, president of the Ogden (Utah) Rapid Transit Company, a franchise to extend the street railway from the Logan depot to the Agricultural College, a distance of 3 miles.

Menomonee Falls, Wis.—The Milwaukee Electric Railway & Light Company has applied to the Board of Trustees for a franchise to extend its electric railway through Menomonee Falls. The company proposes to build an extension from Milwaukee to Beaver Falls.

TRACK AND ROADWAY

***Phoenix, Ariz.**—It is stated that H. P. DeMund, W. D. Fulwiler and Elliot Evans are interested in a plan to build an electric belt line to connect with the end of the new extension of the Indian School line of the Phoenix Railway, and then, by a loop of 12 miles, to end at Six Points and connect with the Grand Avenue line.

Oakland & Antioch Railway, Oakland, Cal.—At a meeting of the directors of this company recently held in San Francisco, it was voted to authorize a bonded indebtedness to raise funds with which to construct an electric railroad from Oakland to Antioch by way of Walnut Creek, Concord and Bay Point. Surveys for the line, which will be 47 miles in length, were reported complete and final locations made. A. W. Maltby is interested. [E. R. J., Aug. 21, '09.]

Northwestern Street Railway, San Bernardino, Cal.—Fred Durham, president of this company, writes that preparations are being made for beginning work on this new street railway within two months. It will be about 2¼ miles long and will connect Rialto and San Bernardino. Three cars will be operated at first. Headquarters, 316 Katz Building, San Bernardino. Capital stock, authorized, $130,000; issued, $50,000. Bonds have been authorized to the amount of $45,000. Officers: Fred Durham, San Bernardino, president; Morris Katz, San Bernardino, vice-president; C. W. Durham, Redlands, secretary; W. S. Boggs, San Bernardino, treasurer; E. G. Durham, Redlands, general manager; C. J. Clarke, West Highlands, superintendent. [E. R. J., Aug. 28, '09.]

Peninsular Railway, San Jose, Cal.—It is stated that this company will begin at once the construction of an electric railway from San Jose north to Stanford University, a distance of 17 miles.

Santa Rosa & Clear Lake Railroad, Santa Rosa, Cal—Rights- of-way for this electric railway from Santa Rosa to Clear Lake are now being secured. The railway will have a scenic route and will be operated by gasoline motor cars. [E. R. J., March 13, '09.]

Sonoma & Lake County Railroad, Santa Rosa, Cal.—It is stated that this company has secured the right-of-way through Alexander Valley and on the Preston for its proposed electric railway which is to extend from Santa Rosa to Lakeport. J. E. Fulton, Lakeport, general manager. [E. R. J., July 31, '09.]

People's Railway, Wilmington, Del.—This company has begun the construction of the proposed new line to Marshallton. The connection with the company's present system will be just outside Brandywine Springs Park, at the Cedars, where the Kennett Square road formerly entered. The length of the new line will be about half a mile.

***Boise, Idaho.**—James Adams, a capitalist of Boston, Mass., is said to be the chief promoter of an enterprise for the building of an electric railway from the business center of Boise across the Eighth Street bridge and running out on the bench for several miles and then in a westerly direction to Kuna.

De-Kalb Midland Railway, Chicago, Ill.—An engineering corps in charge of R. H. Baldwin and O. F. Cole has begun making the final surveys for the new railway which is to connect De Kalb and Sandwich. Work was started at Sandwich and will be carried on north to De Kalb. It will be 28 miles in length. [E. R. J., July 10, '09.]

Oil Belt Traction Company, Oblong, Ill.—This company has increased its capital stock from $100,000 to $500,000. This proposed railway will start at Charleston, and, passing through Casey, Bellaire, Oblong, Hardinville and Bridgeport, have its southern terminal at Mt. Carmel. The roadbed is now ready for rails between Oblong and Bridgeport. N. L. Upson, manager. [E. R. J., July 31, '09.]

Indiana Union Traction Company, Anderson, Ind.—This company has awarded contracts to the Central States Bridge Company, Indianapolis, for the erection of a bridge at Anderson, and to the Indiana Bridge Company, Muncie, for the construction of a bridge at Yorktown.

Vincennes, West Baden & Louisville Traction Company, Vincennes, Ind.—It is stated that surveys are now being made, under the direction of Jerome Johnson, for the proposed electric railway to be built between Jasper, Petersburg and Vincennes, 48 miles. The Vincennes, West Baden & Louisville Traction Company has been voted $50,000 in subsidies and has been granted a permit by Congress to build a bridge across the White River, 1 mile north of Petersburg. [E. R. J., May 22, '09.]

Centerville Light & Traction Company, Centerville, Ia.—This company is said to have awarded the contract for the grading of a 7-mile extension from Centerville to Mystic to Barton J. Sweatt, Boone; for the overhead material to the Westinghouse Electric & Manufacturing Company,

Pittsburgh, Pa., and the Ohio Brass Company, Mansfield, Ohio; the wire to the American Steel & Wire Company, Chicago, Ill., and the Wasco Supply Company, St. Louis, Mo. Kaye & Carter, Minneapolis, Minn., and Lee Lord & Company, Peoria, Ill., will supply 18,000 ties and 400 poles.

Tri-City Railway, Davenport, Ia.—J. F. Porter advises that this company expects to complete 8 miles of track during the next two months.

Davenport & Manchester Interurban Railway, Davenport, Ia.—At a meeting of the directors of this company in Davenport on Aug. 26, arrangements were made to call a meeting of the stockholders on Oct. 5 to reorganize the company. The present organization was merely temporary. It is stated that the capital stock will be increased to between $500,000 and $600,000 and that it will take approximately $2,000,000 to construct the road. The proposed railway will be 91 miles long, but 27 miles of it will be constructed first, between Manchester and Monticello. After this has been constructed the remainder of the proposed line will be built from Monticello to Stanwood, through Olin and Tipton and finally to Davenport. It is probable that gasoline motor cars will be operated. F. W. Rank, Moline, Ill, secretary. [E. R. J., June 19, '09.]

***Glasgow, Ky.**—It is stated that Charles Vandenburgh, representing Eastern capitalists, is at work securing the necessary franchises and right-of-way for an electric railway to connect Glasgow and Horse Cave, a distance of 18 miles.

Winchester, Ky.—Beverley R. Jouett, Winchester, confirms the report that he is interested in the proposed electric railway which is to extend from Winchester through Middletown to Sharpsburg, a distance of about 28 miles. Mr. Jouett states that the people living along this route expect to donate the right-of-way and a bonus of from $75,000 to $100,000 to secure the railway. The promoters are now at work on the right-of-way and bonus, and until these have all been signed up, nothing will be done. [E. R. J., Aug. 28, '09.]

Peninsula Traction Company, Cambridge, Md.—J. H. Burgess, Cambridge, is quoted as saying that negotiations have been made with New York capitalists to finance the Peninsula Traction Company to the extent of $1,500,000. The proposed railway will extend from Claiborne to Ocean City, about 85 miles, and from Cambridge to Seaford, Del. The terminus will be either Queenstown or Rock Hall. From the terminus the company proposes to operate a steamboat line. [E. R. J., May 1, '09.]

Detroit, Lansing & Grand Rapids Railway, Detroit, Mich.—This company has filed a mortgage to the Union Trust Company, Detroit, as trustee, to secure an issue of $5,000,000 of 5 per cent, 30-year bonds. The company proposes to build an electric railway from Detroit to Grand Rapids via Lansing, 135 miles. Grading has been started. Office, 706 Union Trust Building, Detroit. [E. R. J., Aug. 28, '09.]

Michigan & Chicago Westbound Railway, Kalamazoo, Mich.—This company has filed for record at Kalamazoo a $3,000,000 mortgage in favor of the Chicago Title & Trust Company. The proceeds are to be used in building an electric railway between Kalamazoo and Grand Rapids. Alfred H. Brown is said to be interested in this projcet. [E. R. J., Aug. 7, '09.]

North Missouri Central Railway, Mexico, Mo.—W. D. Ball is reported to have begun work on the final survey of the North Missouri Central Railway, projected from Mexico to Columbia, and from Columbia to Jefferson City, via Ashland. The line will be surveyed between Columbia and Ashland first. The total length of the proposed line will be 63 miles. O. F. Spaete, St. Louis, president. [E. R. J., July 31, '09.]

Springfield (Mo.) Traction Company.—This company advises that it has recently purchased material to be used in the construction of 5 miles of new track.

Pulaski, N. Y.—E. D. Bennett, Pulaski, confirms the report that he is interested in the projected electric railway between Sidney and Treadwell, and states that the matter, is as yet, only in a preliminary stage. The line, as projected, will be about 21 miles long. Application was recently made to the Sidney Board of Trustees for an electric railway franchise. [E. R. J., Aug. 21, '09.]

Geneva & Auburn Railway, Seneca Falls, N. Y.—It is stated that this company is planning to build an extension to Cayuga Lake, at a cost of $50,000.

Enid & Central Oklahoma Traction Company, Enid, Okla.—This company advises that it contemplates starting construction on its proposed railway by Oct. 1. It will extend from Enid to El Reno, 65 miles. The company also expects to furnish power for lighting to towns along the route. Headquarters, Chamber of Commerce Building, Enid. Capital stock, $1,000. Officers: W. S. Whittinghill, president; M. T. McMahon, vice-president; R. W. Whittinghill, secretary; C. E. Burkhart, treasurer, all of Enid. [E. R. J., Aug. 14, '09.]

Municipal Traction Company, Cleveland, Ohio.—This company is planning to lay the tracks on Prospect Avenue with new rails and the work will be started during this month. Rails have been ordered and the improvement will cost about $50,000. Considerable work is also being done in East Cleveland in the way of relaying track.

Rainy River Radial Railway, Ottawa, Ont.—Notice is given of the intention of this company to apply to Parliament for a charter to build a railway from the international boundary to Fort Francis to the Lake of the Woods at the mouth of Big Grassie River with branches to Long Sault Rapids.

Baker Interurban Railway, Baker City, Ore.—This company announces that it is making surveys and preparing plans for the new railway to be built from Haines to North Powder and Rock Creek. About 58 miles have already been surveyed. It is the intention to start work within a few weeks. The motive power will be either electricity or gasoline. It is proposed to erect repair shops at Baker City. Capital stock, $50,000. Officers: T. B. Neuhausen, Portland, president; A. K. Bentley, Portland, secretary and general manager; Anthony Mohr, Baker City, treasurer and purchasing agent; A. E. Hammond, Portland, chief engineer. [E. R. J., Aug. 21, '08.]

Ephrata & Lebanon Street Railway, Lebanon, Pa.—It is announced that this company has secured all right-of-way for its proposed electric railway from Ephrata to Lebanon, a distance of 22 miles. The plan is to operate gasoline motor cars. The company will apply for a charter within a few days. S. D. Erb, Ephrata, president, and F. H. Shaw, Lancaster, consulting engineer. [E. R. J., March 6, '09.]

Duquesne & Dravosburg Street Railway, Pittsburgh, Pa.—This company has decided to increase the capital stock from $18,000 to $100,000, and begin construction on its proposed 3-mile railway at once. [E. R. J., July 31, '09.]

***Chicago & Wisconsin Valley Railway, Madison, Wis.**—Capitalists of Madison are said to be planning a new interurban railway along the Wisconsin River to be known as the Chicago & Wisconsin Valley Railway, to connect Madison and Wausau, via Portage, Lodi, Stevens Point and Grand Rapids. Engineers will begin work soon on a probable route.

SHOPS AND BUILDINGS

Oakland (Cal.) Traction Company.—It is stated that this company is preparing to remodel its car house and enlarge the yards on the Haywood division of its electric railway at Elmhurst.

Illinois Traction System, Peoria, Ill.—This company is building a large addition to its shops at Decatur, consisting of a large wood mill, a blacksmith shop and foundry and an oil house.

Tri-City Railway, Davenport, Ia.—This company has under way the construction of a new storage shed with a capacity for 50 cars.

Union Street Railway, New Bedford, Mass.—It is stated that this company contemplates the erection of an addition to its Weld Street car house.

Conestoga Traction Company, Lancaster, Pa.—This company is building a car house, about ½ mile east of Parkersburg with a capacity of 10 cars. The company is also building a substation and a waiting room. These buildings are located on the Lancaster and Coatesville division of this railway.

POWER HOUSES AND SUBSTATIONS

Fort Dodge, Des Moines & Southern Railroad, Fort Dodge, Ia.—This company is installing additional equipment in its powerhouse at Fraser, at an estimated cost of $20,000. Among the equipment being installed is a 600-hp boiler, with automatic stokers.

Conway (Mass.) Electric Street Railway.—This company, which is controlled by the Boston & Maine Railroad, is reconstructing the dam on South River near Conway Junction. The power generated from this will be used both for operating the railway and for electric lighting. The dam will store 120,000,000 gal., and will be 125 ft. high.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—This company has completed plans for a new power plant to be built at Farmington, which will supply all of the power needed for the regular operation of its trains between Salt Lake City and Ogden. The power plant at Lagoon, which is being erected, is expected to be in operation by Nov. 1. H. A. Strauss, consulting engineer.

Manufactures & Supplies

ROLLING STOCK

Visalia Electric Railroad, Exeter, Cal., is in the market for two 57-ft. 3-in. motor cars.

Illinois Tunnel Company, Chicago, Ill., will purchase 50 electric locomotives, it is reported.

Union Railway, New York, N. Y., suffered a loss of 38 closed cars and four sweepers recently in a fire.

Jacksonville (Ill.) Railway & Light Company is having two cars built at the shops of the Danville Car Company.

Bluffton, Geneva & Celina Traction Company, Bluffton, Ind., is considering the purchase of some gasoline motor cars.

Dayton, Covington & Piqua Traction Company, Dayton, Ohio, expects to buy some trail cars for freight and express service.

Oklahoma Railway, Oklahoma City, Okla., contemplates buying eight combination passenger, baggage, express and smoking cars.

Rochester (N. Y.) Railway has placed an order for 25 pay-as-you-enter cars with the G. C. Kuhlman Car Company, it is reported.

El Paso & Fort Hancock Railway, El Paso, Tex., contemplates purchasing some rolling stock but has not definitely decided on the type of car.

Chicago (Ill.) City Railway is preparing specifications for 50 pay-as-you-enter cars which will probably follow closely the design of those purchased in 1907.

Gallatin Valley Electric Railway, Bozeman, Mont., has purchased one Baldwin electric locomotive, as mentioned in the Electric Railway Journal of May 8, 1909.

Connecticut Company, New Haven, Conn., is in the market for 20 double-truck trail cars at present, and contemplates, it is reported, ordering a larger number later.

Gary & Interurban Railway, Gary, Ind., has placed an order for four 4-motor cars with the McGuire-Cummings Manufacturing Company, Chicago. These cars are to be duplicates of the cars ordered by the company in 1908.

Rockford & Interurban Railway, Rockford, Ill., has ordered four pay-as-you-enter cars from the American Car Company. Mention of this contemplated purchase was made in a previous issue of the Electric Railway Journal.

Chicago & Oak Park Elevated Railroad has placed an order with the McGuire-Cummings Manufacturing Company for the trucks to be used under the 20 cars, details of which were given in the Electric Railway Journal of Aug. 21, 1909.

Illinois Traction System, Champaign, Ill., is having a private observation trailer built at the Danville Car Company's shops and is considering the addition of some combination mail and express cars, 56 ft. in length. Last June the company received eight 53-ft. standard trail cars from the Danville Car Company.

Pittsburgh (Pa.) Railways has drawn up the following specifications on the double-truck pay-as-you-enter cars ordered from the St. Louis Car Company, as mentioned in the Electric Railway Journal of Aug. 7, 1909:

Seating capacity 56	Interior trim .....cherry
Weight .....16,000 lb.	Underframe ..... composite
Bolster centers, length..21 ft. 6 in.	Couplers ..Van Dorn No. 27
	Curtain fix....Curtain S. Co.
Length of body.....33 ft.	Gongs ....St. Louis Car Co.
Length over vest..45 ft. 8 in.	Hand brakes .....Peacock
Width over sills..8 ft. 1½ in.	Headlights ..... Kirby-Neal
Width over posts at belt, 8 ft. 1½ in.	Sanders ..... Robinson
	Seats .....St. Louis
Sill to trolley base..8 ft. 6 in.	Trucks ..... Brill
Body.....wood, steel sides	Ventilators ..... Perry

The 30 pay-as-you-enter cars ordered from The J. G. Brill Company are practically the same as above cars.

Lawrence Railway & Light Company, Lawrence, Kan., has specified the following details for the seven 21-ft. single-truck cars, reported in the Electric Railway Journal of July 31, 1909, as being ordered from the St. Louis Car Company:

Seating capacity 32	Curtain fix....Curtain S. Co.
Length of body.....21 ft.	Curtain material .....Crown
Length over vestibule..31 ft.	Fenders ..... Eclipse
Width over sills..8 ft. 1⅛ in.	Heaters ..... Consolidated
Width over posts at belt.. 8 ft. 2 in.	Headlights ..... Dayton
	Motors.....2; Bullock Yoke
Height top rail to sills.. 2 ft. 7½ in.	Suspension.
	Seats.....St. Louis reversible
Body ..... wood	Seating material ..Pantasote
Interior trim..... mahogany	Step treads ..... Mason
Underframe ..... wood	Trucks ..... Brill, 21-E
Couplers ..... Tomlinson	

TRADE NOTES

Consolidated Car Heating Company, New York, N. Y., has received an order from the Buffalo, Lockport & Rochester Railway for electric heaters on six cars.

Western Electric Company, New York, N. Y., announces that it is prepared to furnish Sunbeam tungsten lamps in voltages between 200 and 250. The lamps are made in four sizes, rated at 45, 70, 112 and 180 watts. They are of the well known Sunbeam quality, and have given up to date equally as good satisfaction as tungsten lamps for 110 volts.

American Ship Windlass Company, Providence, R. I., has received an order from the Philadelphia Electric Company for 14 Taylor underfeed stokers to equip all of the boilers in its Christian Street plant. These stokers are of the 7-retort type and are duplicates of two equipments which were put in service at this plant nine months ago for test.

Harrisburg Foundry & Machine Works, Harrisburg, Pa., through A. M. Morse, Chicago district manager, reports among recent sales of Fleming-Harrisburg engines for direct-connected electric generating sets, the following: Lake Shore & Michigan Southern Railroad, Toledo, Ohio; Lehigh Valley Railroad, Bound Brook, N. J.; Delaware, Lackawanna & Western Railroad, Buffalo, N. Y.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., reports that its business in August reached an amount equal to that of July, which was $3,000,000, the largest in two years. The recent order from the Chicago Railways Company for 1400 street-railway motors has just been supplemented by an additional order for 200 motors of the same type. The Pittsburgh Railways Company has also placed an order for 240 100-hp motors, in addition to other railway machinery. The Maryland Electric Railway Company will extend its single-phase equipment at Baltimore, and has also entered an order for additional power-house apparatus.

Wonham, Magor & Sanger, New York, N. Y., have recently made very large sales of the "H-B" life guard on the strength of the excellent showing which this safety device made in the Public Service Commission's tests of fenders and wheel guards at Schenectady last year. The Metropolitan Street Railway, New York, during the last six months have ordered 1200 guards, and more than 3000 guards have been sold to other street railways in Greater New York, including the Third Avenue Railroad; Union Railway; Richmond Light & Railroad Company; Westchester Electric Railroad Company; Tarrytown, White Plains & Mamaroneck Railway, and the New York City Interborough Railway. Orders have also been received from street railway companies in Chicago, Boston, Savannah, Montreal, Vancouver, B. C., and Edmonton.

ADVERTISING LITERATURE

Western Electric Company, Chicago, Ill., has issued Bulletin 8A, in which are described and illustrated the company's Sunbeam incandescent lamps.

J. G. Brill Company, Philadelphia, Pa., has issued a handsomely illustrated catalog of several types of electric railway snow plows and sweepers which it makes.

Coleman Fare Box Company, Buffalo, N. Y., has issued a folder illustrating its fare box and giving 12 reasons why the box should be installed for pay-as-you-enter service on any type of car.

Forsyth Steel Tie Company, Pittsburgh, Pa., has issued a pamphlet in which its steel and concrete cross ties, railway forgings and other products are illustrated and described. All the illustrations are printed from line engravings which have been especially prepared to bring out the details of the various devices.

Buffalo Foundry & Machine Company, Buffalo, N. Y., has issued a publication devoted to its products in general and illustrating the facilities of its plant and a publication devoted exclusively to its vacuum drying apparatus. Both contain excellent half-tone engravings and considerable information about the company, its facilities and methods of operation. The circulars are introduced with a check on the Economy Savings Bank made payable to the company to which the circulars are addressed for "thrown away dollars." The covers are made to represent a pass-book issued by the Prosperity Trust Company, Buffalo, N. Y., in account with the company to which the circulars are addressed.

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Trolley Service at Summer Resorts

Surprise is sometimes expressed by electric railway patrons at summer resorts that the fare limits are often much shorter than in other parts of the system. The cars appear well patronized, so the careless observer overlooks the conditions which justify a higher rate than can be maintained to other points where the traffic is more continuous. The value of an electric railway service to a summer colony is difficult to over-estimate, even where many of the inhabitants depend largely upon private vehicles for their transportation. The frequency of the trolley service contrasted with the usual number of steam railroad trains, or steamboat movements, per day through a given resort shows that electric traction is far more valuable in encouraging a general circulation of travel between adjacent communities than other agencies. In the winter season—for two-thirds of the year, in fact—the traffic on lines serving summer resorts is apt to be far below that required to pay operating expenses. Hence a rate as high as 2 or 3 cents per mile may be perfectly admissible in a summer resort district, so that a frequent, reliable, fast and, above all, a safe service can be rendered to the traveling public. Maintenance is more difficult in such territory; the cost of power and operating labor is apt to be relatively high, and depreciation is more rapid than on systems where the regular traffic supports a more complete organization. Where there are complaints against the rate per mile it will pay to emphasize these points publicly.

Beautifying the Grounds

The advantages of beautifying the grounds about the shops and other buildings, while no doubt fully appreciated by the majority of managers, have not been considered attainable in the early years of most electric railway enterprises. Steam railroads have devoted time and money to work of this description, and the Brooklyn Rapid Transit Company has effected notable improvement in the appearance of its properties. That more could be done by many roads in this direction, however, than has been accomplished in the past, and without the expenditure of an excessive amount of money, is evident from careful consideration of the subject. Presentation in this issue of the attractive results secured by the Indiana Union Traction Company affords testimony regarding the opportunities of this character of which interurban as well as urban properties may avail themselves. H. A. Nicholl, general manager of the company, decribes the benefits arising from improvement of the property in this way as twofold: the influence extends to the public and to the employees. Similar gains may be obtained by other lines and the possibilities which are open are well worth investigation.

Color Scheme for New Types of Cars

The successful introduction of any innovation in street car service hinges largely on the campaign of education which is carried on prior to the change and as long afterward as is necessary for the general public to become thoroughly familiar with the new order of things. The prepayment system of fare collection when first begun in any city is a distinct novelty to the local population. Passengers must become accustomed to having their fares

ready when boarding the cars in order to avoid delays in loading and congestion on the rear platform. Signs are usually displayed prominently on the front of prepayment type cars to give some warning to passengers that such a car is approaching. One large street railway system in the East, which has introduced these cars in a limited way as an initial experiment, has painted its prepayment cars a color different from its long-established and well-known standard. This class of car can therefore be easily distinguished while still a long distance away, and the result is said to have been most satisfactory in avoiding confusion and facilitating prompt fare collection. The practice of painting cars running on different lines distinctive colors is not new, but it is open to the objection that confusion is created when, for any reason, it is necessary to change the cars in an emergency from one line to another. This objection does not apply to the practice of painting cars of different types distinctive colors, as the color signifies nothing which would prevent the car from being used anywhere on the system. If an entire line is to be operated with cars of a new type, the distinctive color scheme is not so advantageous perhaps, except when the old style cars of several other lines run over the same tracks for some distance in the congested centers. After a time, when the entire system has been equipped for prepayment fare collection, it is an easy matter to return gradually to the old standard color if desired.

Economies in Current Consumption

Viewed in a broad way, the cost of the energy required in railway operation is a minor factor in the final result. The major question is the acquisition of traffic and it is usually economy to subordinate every other factor to it. At the ordinary rates at which the energy used on an electric railway system is reckoned, one additional passenger per mile of run will more than compensate for a large waste of energy. It has, therefore, usually proved to be a sound policy to spend energy freely if by so doing the traffic can be increased. Large and comfortable cars, well lighted and well heated in winter, operated on a liberal schedule and making good time, have over and over again been proved to pay in increased earnings for what at first appeared lavish and even extravagant use of energy. Yet if energy can be saved in any material degree without foregoing any gain in traffic, the saving is worth trying for, because the total cost of energy on a large system reaches figures so large that even a small percentage of saving is well worth the trouble. One of the places where such a saving can be made by the use of current by the motorman is in car operation. Remarkable results along these lines are being secured in Berlin, Germany, and we shall probably refer again to this subject in an early issue. But there are other places where a company can make a saving in energy, which, while not large, is well worth while. Some of these possibilities will be considered this week.

One of them is in the lighting of cars. It seems a small item, but in fact it is a very perceptible fraction of the energy used for operating the car. Even a quarter or half a kilowatt amounts to something material when applied to several hundreds, or even scores, of cars for six or eight hours per day. Of late some effort has been directed toward the design of metallic filament lamps for car lighting. The main question here is that of renewals, depending on the strength of the lamp filaments which at present leaves much to be desired. Nevertheless, the metallic filament lamps made for 50 volts or so are still relatively strong, and, if supported with proper care in deadening vibration, seem to stand the strain quite well. They are also relatively insensitive to voltage changes, which improves the light. But at present it looks as if the best results in energy saving by this device would be obtained in train-lighting systems where lamps of as low as 30 volts can be conveniently used with corresponding increase in filament strength. A tungsten lamp at this pressure giving about 20 cp on about 1 amp is excellently strong and has a life long enough to more than make up for its first cost. So far as saving energy is concerned, the metallic filament lamps do the work on about half the consumption of ordinary carbon lamps, but the real net saving hinges on the replacement cost, which as yet is indeterminate.

Another very important source of saving can be the heating system, intelligent administration of which is singularly rare. We have referred to this subject before, but its seasonableness warrants another reference to it. Electric heaters should be in full use very seldom and then for brief periods only, either of very extreme cold or of preperation for a run. The waste caused by a careless use of the heaters is startling when reduced to dollars and cents, and is not only a loss, but is often a real discomfort to the passengers. There is no doubt that a car which has stood in a cold car house all night is often uncomfortably cool when put into service on a frosty morning. But if the heaters are applied at the full current strength for a short time to warm up the interior as a preliminary, the car can then be kept at a very comfortable temperature, except during very cold days, by a mild application of current. The question of temperature at which a car should be run is admitted to be one on which there are many diverse opinions among passengers. But, after all, it is a subject on which passengers can be educated, and at the beginning of the winter season it is well to try and do so. It is much better to utilize the reserve capacity of a railway power station to propel cars rather than to have it float out of open ventilators and doors in the form of heat.

Operating Difficulties and Publicity

There is no question that if the traveling public appreciated more generally the peculiar difficulties of operation which have to be overcome on the majority of local systems of electric railways there would be a notable reduction in the number and character of service complaints. The average seasoned operating man is used to criticism, just or unjust, passed upon the facilities which he supplies; but the advantages of eliminating all the unreasonable complaints that one can are none the less very great. The policy of meeting complaints fairly and squarely is not open to adverse criticism. Nevertheless, every complaint has the effect of a grain of sand in the smooth machinery of transportation, deflecting the attention of the men that it reaches from the broader phases of their work, and while wholesome when justified by the circumstances, it inevitably costs the company both time and money before a permanent disposition can be made of it.

Recognizing the value of educating the public to a definite appreciation of operating conditions, not a few managers

have turned the daily press to good account lately in explaining the causes of irregularities in the service, calling attention to changes brought about by construction conditions, emphasizing the safety of travel over lines equipped with automatic or semi-automatic signals, and in general making clear to the layman those practical aspects of car or train handling which are every-day matters to the company, but which are decidedly hazy to the majority of the patrons. Some of the matters treated in local publicity work of this kind may be utilized generally in other cities in the effort to prevent misconceptions of a company's efforts and working objects.

Delays in the car service, discourtesy on the part of employees, defects in the equipment or poor handling of the controller and braking apparatus, failures to reach the usual stopping place, loss of memory in fare collections and omission to notify passengers at the proper time for them to leave are all troublesome causes of complaint on the part of the public. Accidents, their prevention and minimizing, their reasonable explanation when necessary for the restoration of confidence and their relations to the quality of the general service comprise a basis for not a few complaints. Many of these factors in the quality of the service can be controlled by an operating company; others cannot, and the fact should be made clear in all cases wherever the company's most careful judgment could not obviate the source of the trouble. Not seldom are the causes of delay magnified. Actual records of intervals between car movements and of arrival and leaving times are worth much in cases of dispute. Intervals often seem longer to the waiting passenger than they actually measure by the watch. The exact statement of the elapsed time between cars after a breakdown, combined with a concise description in a few terse words of what the company did to restore the service, makes very useful reading matter in the daily press of a critical community. A thorough explanation of the influences of drawbridge openings, the provision of extras and setbacks to maintaining the regularity of the service, the precautions taken against accidents at crossings, junctions, sharp curves and on heavy grades; emphasis laid on the great complexity of an electric railway timetable in comparison with steam schedules; the organization and indicating equipment available, all furnish good subjects for the explanatory publicity of operating conditions which helps to make a tolerant and reasonable patronage and an unhampered service.

Interborough Annual Report

Operations of the Interborough Rapid Transit Company, of New York, during the year ended June 30, 1909, reflect some of the tendencies which have marked the development of the business of this company at other periods; the gross earnings of the subway division showed the satisfactory gain of 18.93 per cent as compared with the preceding year, while on the Manhattan elevated division the results are measured by a decline of 1.29 per cent. These percentages represent substantially the extent of the changes in the number of passengers carried by the subway and elevated divisions, respectively, although the actual decrease in the total of passengers hauled on the elevated lines was 2.33 per cent. T. P. Shonts, the president, states that the improvement on the subway lines was due to development of new territory, which is progressing at a rapid rate in the thinly populated districts tributary to the subway's outlying terminals. Indications on the elevated division were considerably better at the end of the year than the report for the full 12 months indicates. In the first six months of 1909 the gross revenue of the elevated division increased $186,441, overcoming more than one-half of the decrease of $367,123 reported for the preceding half-year. No detailed figures of traffic are contained in the report.

While the result of combination of the large increase in subway earnings and the small decrease in revenue from the elevated properties was a net gain in gross earnings of 7.13 per cent, much more than this percentage was saved for the net earnings, owing to a material reduction in the percentage of gross required for operating expenses. The operating expenses are not divided in the report to show the proportions devoted to transportation and maintenance, respectively, but Mr. Shonts enumerates the principal factors to which he attributes the reduction. Among these are economies resulting from changes in the organization; the correction of defective design in subway equipment, lessening maintenance costs; and saving in the amount paid for injury and damage claims. The total accident cost during the year was $327,505, which is equivalent to 1.3 per cent of gross earnings from operation, and represents a decrease of $50,925, or 13.4 per cent, from the record of the previous year. This percentage of accident cost would be extremely low for a surface street railway, but no comparison of this character can be instituted with fairness to a subway and elevated property. As the report says that 347 cases were tried and settled in the year, it is evident that the aggregate expense on this account was incurred largely on account of petty claims.

Excluding taxes, the operating ratio was 41.69 per cent, as compared with 44.57 per cent in the previous year. With the addition of taxes, this ratio reached 48.68 per cent in 1909 and 51.16 per cent in the preceding year. Mr. Shonts calls attention to the three distinct forms of taxation to which the company is subject, including the Federal income tax imposed by a recent act of Congress, and says that the burden of taxation is a serious obstacle in the way of development of rapid transit facilities in New York.

The gain in net earnings from operation, which amounted to 12.68 per cent over the preceding year, was derived from an increase on the subway division that reached the high figure of 31.67 per cent and from a decrease of 1.05 per cent on the elevated division.

Among the most important features of the operation of the company during the year which Mr. Shonts discusses are the improvements effected in the property. Some, which were of a permanent nature, were charged to current earnings. The additions and betterments chargeable to capital account aggregated $1,817,707, and include, among other noteworthy improvements, the installation of automatic speed control signals at express stations on the subway and additions to increase the power supply of the Fifty-ninth Street power house. In the expectation of further increase in traffic during the next winter, the purchase of 350 cars has been authorized, of which 250 are for the subway division.

FREIGHT SERVICE OF THE TOLEDO & WESTERN RAILROAD

The Toledo & Western Railroad is almost unique among electric railways in its consistent development of freight business by methods of management and operation that are substantially identical with those followed by steam railroads. Various articles in previous issues of the Street Railway Journal have described the development of the freight traffic of this company, notably the following: Nov. 29, 1902, page 862; Dec. 20, 1902, page 978, and Sept. 2, 1905, page 326. Since the publication of these articles, the freight service has continued to increase in importance and it is still the principal feature of the business of the company.



Toledo & Western—Grain Elevator at Metamora, Ohio



Toledo & Western—Grain Elevator at Pioneer, Ohio

While the traffic possibilities open to the usual interurban electric line have been utilized, the real development of this property has followed more closely the custom of steam railroads than the methods by which the usual electric railway is raised to a position where its traffic is sufficient to make the company successful.

The adoption of steam methods in general, rather than those of the interurban electric railway, is due to business appreciation of the traffic possibilities in the territory served. C. F. Franklin, president and general manager of the company, secured his railway training entirely with steam lines. At the time of his election to this office an investigation showed him the wisdom of encouraging the location of industries, particularly as part of the line traverses a district that is without any other railroad facilities. As a result of persistent work in this direction a number of industries have been located on property adjacent to the line of the railway.

Unlike most electric railways, the Toledo & Western Railroad has direct affiliations with connecting steam lines. Its position in these matters is that it is strictly a railroad which uses electricity instead of steam as motive power. It furnishes the industries which rely upon its service exactly the same facilities that are offered by any steam railroad to shippers. It has standard freight cars fitted with M.C.B. automatic couplers and equipped for the most part with air brakes. The company has 21 box cars, 36 gondola cars, 24 stock cars and 12 flat cars.



Toledo & Western—Standard Freight Train with Electric Locomotive

As indicating the preponderance of freight cars in the

equipment of the company, the passenger equipment comprises 15 motor and 2 trail cars. Four express cars owned by the company are used for handling package freight business, the volume of which is relatively light in comparison with the regular freight traffic. One car is fitted up as a United States railway post office, and is operated in precisely the same way as similar cars are operated by steam railroads. The equipment includes also five electric locomotives and one steam locomotive, which are used altogether in the freight service of the company. The company has 4-track Fairbanks-Morse scales for weighing cars and a 5-ton stock wagon scale at every station. The 22 station agents serve jointly the freight and passenger departments in each case.

In conformity with steam railroad custom, the Toledo & Western Railroad is a member of the American Railway Association, the Master Car Builders' Association, the Association of American Railway Accounting Officers and the Freight Claim Association.

Of the total freight business handled by the company a large part is in carloads. Cars are interchanged freely between the company and the various steam lines with which physical connection has been made. Although the company operates its passenger, express and mail cars directly into the business district of Toledo, the carloads of freight are switched to the lines of the Toledo Terminal Railroad, a steam property, by which they are hauled to connections with other lines or to a terminal point, accessibly located in the city of Toledo.

In the calendar year 1908 the Toledo & Western Railroad handled a total of 6759 carloads of freight. To indicate the increase in business the record of 1904 may be given. In that year 3068 carloads were handled; the business, therefore, has been more than doubled in four years. Of the 1908 total, 1250 cars were loaded with merchandise and 1019 with sugar beets. The largest number of carloads of any one commodity handled in 1904 was 591, representing the sugar beet traffic of the company for the year. An accompanying statement, published on page 426, shows the carload business of the company during the years 1904, 1905 and 1908.

Making allowance for the small amount of mileage operated, the diversity of the character of the commodities handled in carloads will compare favorably with the corresponding statement of the average steam railroad, which, of course, has a much greater extent of territory and population upon which it draws for traffic. The business received from canning factories, a sugar refinery, cooperage factories and grain elevators is of special importance. The country through which the road operates afforded sufficient facilities to make the prospects for success in these industries reasonably good, and the railroad company has con-



Toledo & Western—Side Track at Pioneer, Ohio



Toledo & Western—Freight Siding and Standard Freight and Passenger Station

stantly been, as indicated, an active force in soliciting and encouraging the location and development of plants and factories. The sugar refinery exists because of the production of sugar beets on farms which are accessible to the railroad. One grain elevator, having a capacity of 25,000 bushels, secures its power for operation from the railroad.

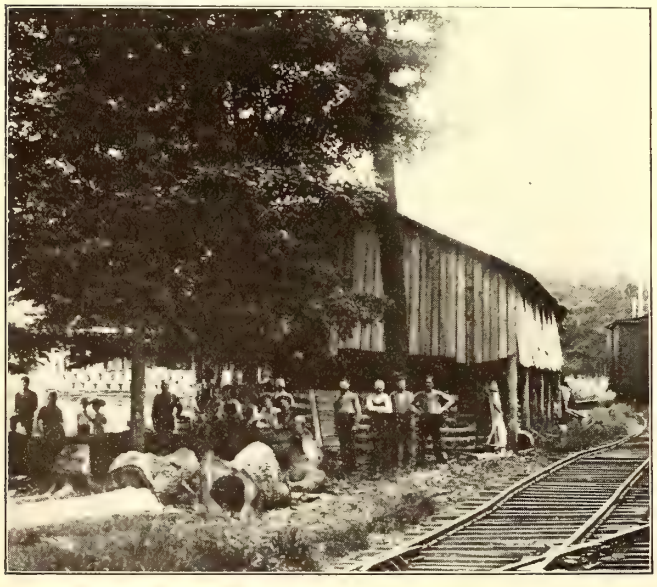
In the territory tributary to the line of the company



Toledo & Western—Connection with Steam Railroad

there are 18 cities and towns where substantial industries are located. In addition to the more pretentious industries, the company also secures considerable business in shipments of live stock and from creameries and cheese factories situated in various parts of the territory which are especially well adapted for dairy farming.

The experience of the company with the sugar business



Toledo & Western—Stave Mill at Pioneer, Ohio

is interesting. Low rates are received for the sugar beets, but the refined sugar is business of a more profitable character. The Toledo & Western Railroad secures not only the beet sugar business, but also carloads of refined sugar. During the season of 1908-09 there were hauled from Blissfield, Mich., a total of 188 carloads of sugar, as compared with 157 carloads in the preceding season.

Formerly the freight rates of the Toledo & Western Railroad were on a somewhat lower average basis than those of existing steam railroads. A change was made recently, however, whereby the rates were increased generally, making them substantially equal to those of the steam roads. The company uses the classification of ac-

STATEMENT OF CARLOAD FREIGHT HANDLED BY THE TOLEDO & WESTERN RAILROAD IN 1904, 1905 AND 1908.

	1904.	1905.	1908.
Stone	458	725	587
Logs	365	261	211
Stock	139	555	618
Beets	591	720	1,019
Sugar	...	35	266
Hay and straw	195	130	426
Grain	235	308	352
Lumber	206	210	275
Coal and coke	337	421	710
Brick	53	286	...
Brick and tile	...	...	174
Staves, heading and listings	149	125	323
Sewer pipe and tile	49	25	...
Sewer pipe	...	...	45
Canned goods	17	25	28
Cement and plaster	55	99	85
Paper	8	15	6
Wood	24	22	31
Handles	...	17	7
Machinery	22	96	21
Miscellaneous	108	140	156
Household goods	21	16	42
Posts	24	27	39
Ties	...	15	2
Sand and gravel	12	200	37
Merchandise	...	...	1,250
Beet pulp	...	5	49
Total	3,068	4,478	6,759

counts prescribed by the Interstate Commerce Commission for steam roads. The method of accounting for the freight business is that followed by steam railroads, and the standard forms of local and interline waybills are used.

Freight trains are operated as second and third-class trains. The rules of the company provide:

Second class or freight trains will keep entirely out of the way of first class trains and must clear the first class trains five minutes. First class train will not wait at meeting points for second class trains unless ordered to do so by special orders.

Third class or local freight trains will keep entirely out of the way of first and second class trains and must clear all first and second class trains five minutes.

Two through freight trains are operated daily in each direction between Toledo and Pioneer, Ohio, and Toledo and Adrian, Mich.

GAPS IN THE TROLLEY LINES BETWEEN HUDSON, N. Y., AND CHICAGO

Much interest has been manifested in the diary of J. S. Moulton, published in the Electric Railway Journal of Aug. 28, 1909, page 321, describing a trip from Hudson, N. Y., to Chicago by electric railway. A number of inquiries have been made as to the exact length and location of the gaps still existing. Between Fonda, N. Y., on the Fonda, Johnstown & Gloversville, and Little Falls, on the Utica & Mohawk Valley, a distance of 30 miles, no electric railway is in operation or under construction. The next and last gap is between Chili, Ind., 10 miles north of Peru, and Warsaw, a distance of about 25 miles. This link is nearly completed and will probably be opened for traffic in a few weeks. It is possible to travel by electric railway from Chicago north to Sheboygan, Wis., 135 miles, and west to Freeport, 121 miles. Between Paris, Ill., and Ridge Farm is a break of 20 miles in a through electric railway journey from New York State to St. Louis, Mo.

THE PARK TERMINAL CAR HOUSE, BALTIMORE

Recent car house construction of the United Railways & Electric Company, of Baltimore, has been described in the columns of this paper. The latest addition to the handsome and modern car houses of the company will be known as the Park Terminal Car House, for which ground was broken July 19. Owing to its location, opposite Druid Hill



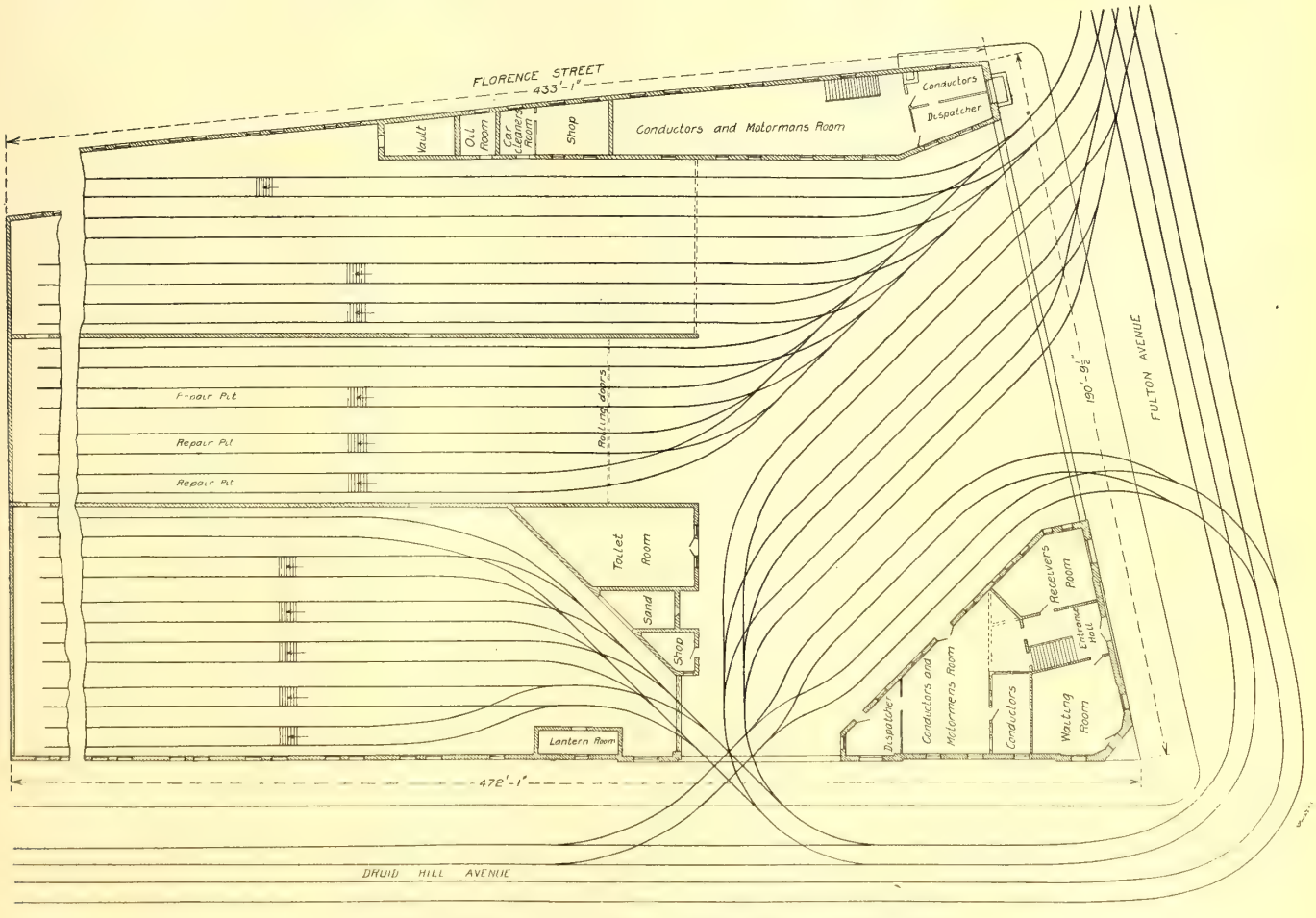
Park Terminal Car House—Exterior View

Park, careful attention was given to its architectural features. The lot upon which it will be erected has a frontage on Fulton Avenue of 190 ft. 9½ in., and a depth of 433 ft. 1 in. on Florence Street, and 472 ft. 1 in. on Druid Hill Avenue. The exterior walls of the building will be of handsome brick set off with terra cotta trimmings. The division walls, columns, roof and ceilings are all to be reinforced concrete. The building will be one story in height, with the exception of the Fulton Avenue front, which will contain a second story, extending back 203 ft. 3 in.

The car house is also the terminus of five important street car lines. This required a careful study of the operating conditions, which resulted in devoting approximately one-fourth of the floor area in the front portion of the house to terminal loop tracks. The track work has been so arranged that cars on the five different lines can pull in, be "trimmed" and have their "layover" entirely within the car house. At the same time the operation of no one line, in this respect, will interfere with the operation of any of the other lines.

The floor plan shows the general arrangement of the various car house features. By utilizing portions of the ground area resulting from the special track construction layout, three separate groups of rooms have been developed, each devoted to a different set of needs. Thus, as the car house is at the terminii of several lines, one room has been set apart to be used by the public as a waiting room. It has been arranged to cover the sidewalk in front of this room with an attractive awning, extending to the curb. The roof will be of corrugated metal and will be supported by I-beams projecting from the face of the wall and chains extending from the upper story wall to the outside of the awning. Adjoining the public waiting room is the main entrance and stairway leading to the second floor. Next, on the right as one enters the building, are quarters for five receivers, so that there can be a separate receiver for each line, if necessary. Directly behind the waiting room is a large room for motormen and conductors, with a smaller room in which conductors can make their returns. Connected with the former room is the dispatcher's office.

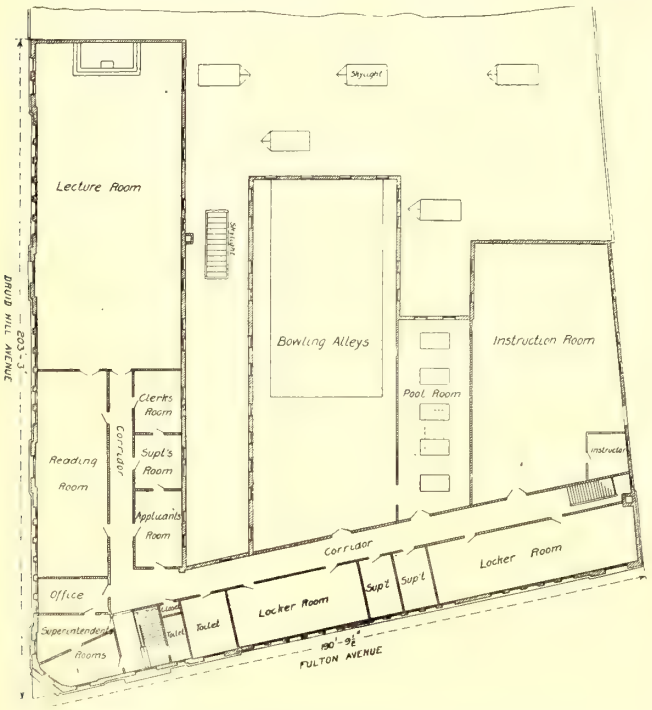
In the second group of rooms on Florence Street are, first, the dispatcher's office, then a small room for conductors to make their returns; next a large room for mo-



Park Terminal Car House—Track Plan of First Floor

tormen and conductors. A portion of this last room will be cut off by a partition extending from floor to ceiling, so that it can be used as a lunch room. Next is a room for shopmen, with the shop foreman's office, then a room for the car cleaners; then quarters for storage of oil and grease. The latter are equipped with automatic measuring tanks, which are located in the ground below the floor. Finally, there is the vault, the size of two rooms, for the storage of transfers and other papers. To facilitate the handling of heavy boxes, etc., this vault will be equipped with an interior elevator of about 200 lb. capacity.

The third group of rooms occupies the middle of the front section and is devoted to a number of special car house needs. One room is used for the storage of sand; next is a shop room for the mechanical department; then a lantern room equipped with an automatic measuring tank



Park Terminal Car House—Plan of Trainmen's Quarters on Second Floor

set in the ground below the floor, so that the tank can be filled from the outside.

The car storage section is divided by fire walls into three sections; at the end of each section will be a roller steel door. Access between the different sections, when the roller steel doors are down, is provided by means of double automatic sliding doors. The car storage section is designed to hold 103 45-ft. double-truck cars. Each track is arranged with pits, all of which have radiators and drain pipe connections fitted with check valves.

The plan of the second floor shows the arrangement of the rooms there, one feature being the accommodation in the way of locker rooms, lecture room and bowling alleys for the men.

The building is equipped with sprinklers throughout, both roof and aisle, with a 50,000-gal. tank and two 7500-gal. pressure tanks. The company has not yet decided upon the type of sprinkler to be used.

The architects are Baldwin & Pennington; the general contractor is J. Henry Miller; the contractor for the rolling doors was the Kinnear Manufacturing Company, of Columbus, Ohio; the contractors for the granite work, terra cotta and other building materials are local Baltimore dealers.

BRUSH TENSION

BY C. W. SQUIER, ENGINEER OF MECHANICAL DEPARTMENT, BROOKLYN RAPID TRANSIT COMPANY

The question of brush tension and its relation to the life of brushes and the cost of maintaining railway motors is receiving more attention from railway engineers than ever before. The electric roads that have established a standard brush tension for motors, and instructed the repair men to be sure that it is maintained, are experiencing a marked reduction in commutator and brush troubles. The manufacturers of brushes are also finding that their brushes give better satisfaction when a uniform tension is maintained, and are advocating this wherever they find their brushes being used without some standard pressure.

There are three things which are chiefly affected by the amount of pressure placed on the brushes. These are: The wear of commutators and brushes, the heating of commutators and brushes, and the flashing of motors. The wear on the commutators and brushes is of two kinds—that due to the friction between the brushes and the commutator and that caused by the burning away of the brushes and commutator, due to sparking. Both are affected to a considerable extent by the chattering of the brushes and vibration of the motor parts. Thus, with the same brush tension, the wear will vary considerably, due to the condition of the roadbed, the frequency of crossovers, etc., the type of motor suspension and whether the commutators are slotted or non-slotted. To obtain the best results, the pressure must be varied to meet these conditions. The wear due to friction is directly proportional to the pressure placed on the brush; that is, the greater the pressure, the greater will be the wear. The burning away of the brushes and commutator is inversely proportional to the pressure per square inch of contact surface. Heavy pressure produces better contact between the brushes and commutator bars, and so causes less sparking. Some recent tests have shown that in service the wear due to burning is much greater than that due to friction, and, as a result, the wear of the commutator and brushes follow each other; that is, the brush which wears most rapidly also produces the greatest commutator wear. Some figures taken from these tests may be of interest.

The following are average figures for five different types of brushes, a number of each type having been installed for test purposes. The brush tension was from 5.2 lb. to 6.4 lb. per square inch of brush contact surface:

Brush wear per motor per 1000 car-miles.	Reduction in circumference of commutator per 1000 car-miles.
.648 in.	.089 in.
.63 in.	.0817 in.
.54 in.	.0745 in.
.188 in.	.0084 in.
.111 in.	.0065 in.

To obtain the wear per brush divide the figures by six.

These figures indicate that the greatest wear of the commutators and brushes was due to the burning caused by sparking, as with the same pressure, smoothness and lubrication properties the brush wear due to friction alone is greater for soft brushes than for hard brushes, while the commutator wear is less with the soft brushes. The excess wear of brushes due to sparking is further shown by the average wear obtained by brushes when installed in an interpole motor as compared with the same quality of brush in a non-interpole motor under the same conditions of pressure per square inch of contact surface and amount of current commutated. A comparison of some figures obtained from three tests made under these conditions

shows the average brush wear for the interpole motor to be only one-quarter that of the non-interpole motor.

	Average wear per brush in inches per 1000 car-miles.
Interpole motor, non-slotted commutator	.01165
Non-interpole motor, non-slotted commutator	.0423
Non-interpole motor, slotted commutator	.05354

The problem of securing proper brush tension to give minimum wear consists in having sufficient pressure to produce a proper contact and prevent excessive burning, while at the same time the pressure should not be so great as to cause excessive wear due to friction.

The heating of commutators and brushes is due to four principal causes: First, the heat generated in overcoming the electrical resistance of the brushes and commutator bars. Second, the heat generated in overcoming the electrical resistance at the point of contact between the two. Third, the heat caused by sparking at the brushes. Fourth, the mechanical heating due to friction of the brushes.

The first of these is not affected by the pressure placed on the brushes and need not be considered here. The second and third are closely related. Heating due to these causes will be reduced somewhat by an increase of brush tension, but this will also increase the heating due to friction. So, to obtain the point of minimum heating, it is necessary to balance one against the other. It will be found that the tension for minimum heating will correspond with that for minimum wear of brushes and commutator.

Regarding flashing as affected by brush tension, several cases have come to the attention of the writer in which motors with a brush tension of 3.2 lb. per sq. in. ran satisfactorily during the shop test, but when placed in service immediately developed flat commutators and flashing. By increasing the tension on the brushes of these motors to 6 lb. per sq. in. of contact surface, no further trouble was experienced, although these motors have now been in service for over a year. It is evident that the low brush tension was not sufficient to keep the brushes in proper contact when subjected to the vibration caused by the cars running over the tracks under service conditions.

The following table shows the practice of some of the principal electric railways in the United States regarding brush tension per hammer:

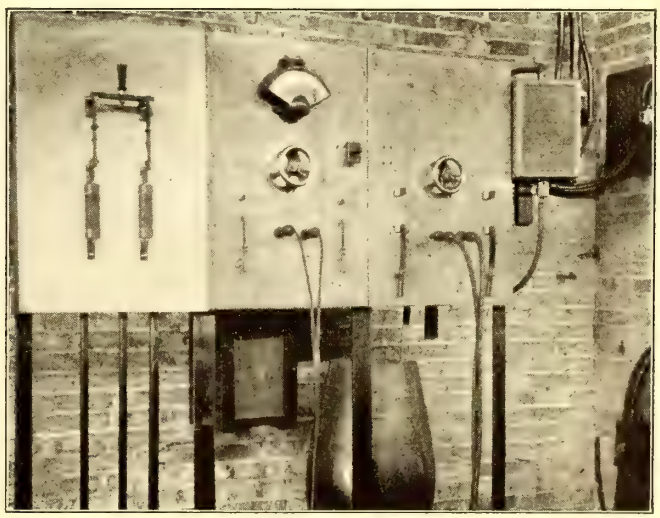
Boston Elevated Railway Company	6 to 7 lb.
Brooklyn Rapid Transit Company	6½ to 8 lb.
Capital Traction Company, Washington, D. C.	4½ to 5½ lb.
Chicago City Railway Company	about 6 lb.
Chicago Railways Company	no standard
Cincinnati Traction Company	no standard
Hudson & Manhattan Railroad Company	4½ lb.
Interborough Rapid Transit—New York Subway	6 to 8 lb.
Interborough Rapid Transit—Manhattan Elevated	4 to 6 lb.
International Railway Company, Buffalo:	
General Electric 1000 motors	7 lb.
General Electric 64 motors	4 lb.
General Electric 74 motors	4 lb.
General Electric 57 motors	7 lb.
General Electric 800 motors	4 lb.
Long Island Railroad Company	no standard
Massachusetts Electric Company:	
General Electric 90 motors	9 lb.
All other motors	7 lb.
Metropolitan West Side Elevated Railway, Chicago	6 to 7 lb.
Milwaukee Electric Railway & Light Company	7 lb.
New York Central Railroad Company:	
Electric locomotives	8 lb.
Motor cars	6 lb.
Northwestern Elevated Railway Company, Chicago	4 lb.
Philadelphia Rapid Transit Company	8 lb.
Pittsburgh Railways Company	14 lb.
United Railways Company, St. Louis	no standard
United Railways & Electric Company, Baltimore:	
Westinghouse 3 motors	4½ lb.
Westinghouse 12A motors	4½ lb.
Westinghouse 49 motors	5 lb.
Westinghouse 38 motors	4 lb.
Westinghouse 56 motors	6 to 6½ lb.
Westinghouse 101B motors	5 lb.
Westinghouse 101D motors	5½ to 6 lb.
General Electric 80 motors	5 to 5½ lb.
General Electric 90 motors	5½ to 6 lb.
General Electric 1000 motors	5½ lb.
General Electric 800 motors	6 lb.
Municipal Traction Company, Cleveland	7 lb. per sq. in.
South Side Elevated Railroad Company, Chicago	4½ to 5 lb. per sq. in.

SIMPLE TEST BOARD AT WHEATON

A simple but complete motor testing board has just been installed at the Wheaton shops of the Aurora, Elgin & Chicago Railroad by E. P. Doyle, master mechanic. With this equipment it easily is possible to give railway motors very thorough heating and voltage tests. The good results to be obtained from making these tests are well known.

An accompanying engraving shows the control board. Current for testing is available from a lighting circuit at 2300 volts. A transformer lowers this potential to 110 before the current is delivered to the board. There are three panels on the board, as follows: No. 1, for fusing and switching the current supply; No. 2, for voltage tests; No. 3, for heating tests.

For the voltage tests which range up to 1500 volts the 110-volt current is stepped up by a transformer and regulated through resistance grids, the controller for which is mounted back of the middle panel of the board. In mounting the resistance controller the shaft was extended through the board and a new dial and wheel were placed in front. This dial is graduated to indicate the voltage across the



Test Board at the Wheaton Shops of the Aurora, Elgin & Chicago Railway

testing leads. The range of voltage is from 0 to 2300 volts. The voltage used in testing also is indicated by an a.c. voltmeter mounted on this voltage test-panel. Ordinary plug terminals with long cables are used to reach the work tested. Armatures are tested at 1000 volts and fields at 1500 volts.

For the a.c. load tests current is taken from the 2300-volt mains and transformed by two 20-kw transformers to 220 volts. At the latter pressure it is delivered to the terminal plugs of the heating test panel. In series with this circuit is a water-barrel resistance, placed on the shop floor directly behind the board. The movable electrode of the water barrel is regulated by a hand wheel on the front of the control board, and the amperage flowing is read directly from an ammeter mounted near one end of the panel.

When an armature is to be given a heat test it is placed in a special stand, on which is mounted a yoke with brush-holders. Brushes are set on the commutator and, for a GE-66 motor armature, a current of 150 amp is passed through the coils for 30 minutes, at which time operating load conditions are reached. Under this test a short-circuited coil will show in about 15 seconds.

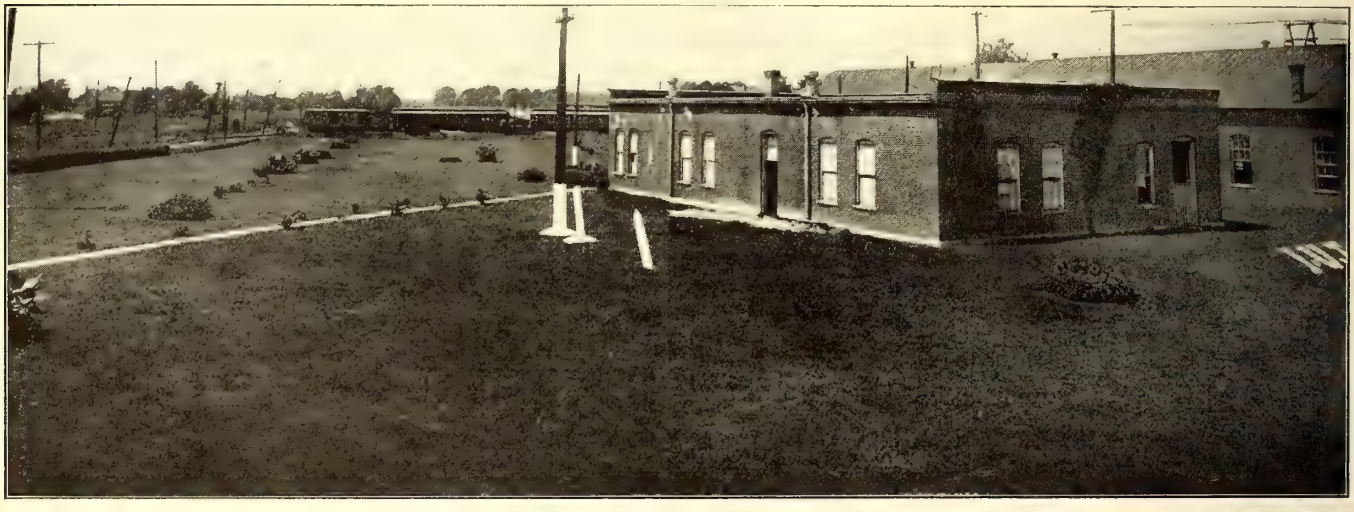
WORK OF THE INDIANA UNION TRACTION COMPANY IN BEAUTIFYING GROUNDS

The Indiana Union Traction Company has effected improvement in the appearance of its grounds during the present year by planting grass and setting out flower beds, and also hedges, at various important points on the system.

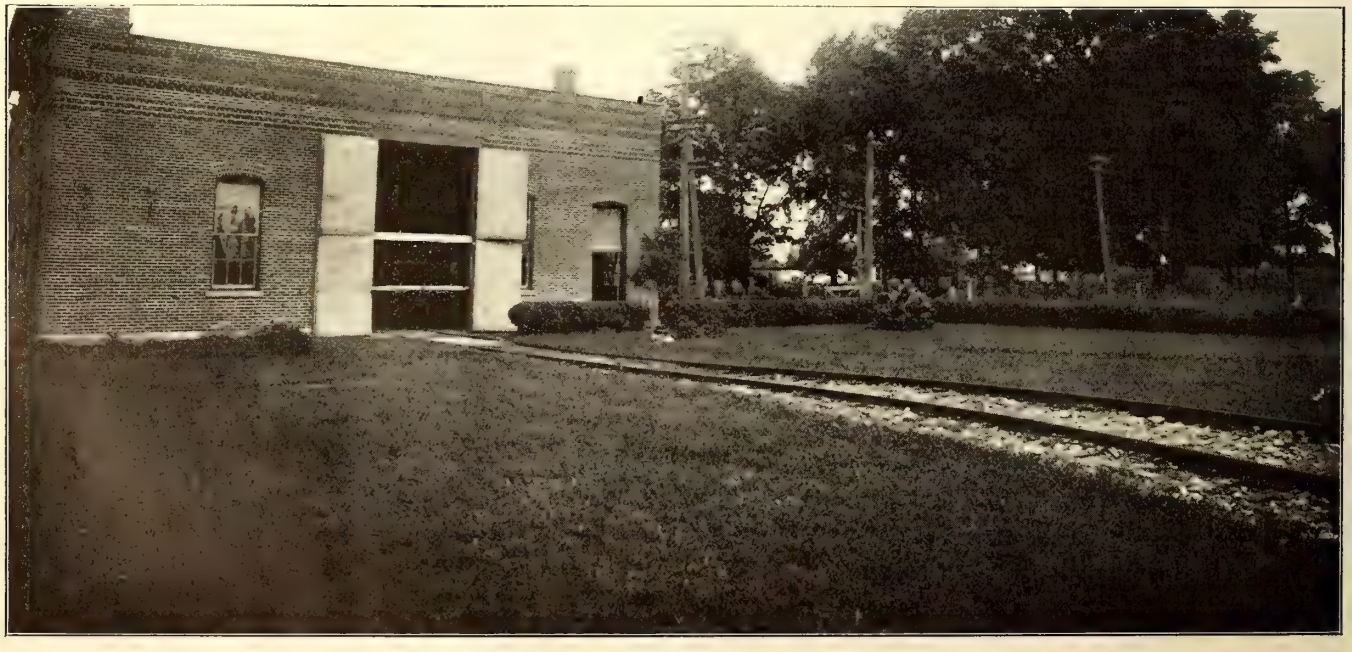
Some of the results of the work which has been done on the lines of this company in this respect are shown in the accompanying photographs. These photographs do not represent by any means all of the work of this nature which has been done. At various other points on the system equally satisfactory results have been accomplished.

The photographs which are presented give some indication of the results attained at Anderson, Kokomo, Marion, Muncie and Eaton. The photographs illustrating these features of the development of the Indiana Union Traction Company, received through the courtesy of H. A. Nicholl, general manager, included also illustrations of satisfactory results at Broad Ripple and at Tipton. Mr. Nicholl, in writing of the advantages resulting from improvements of this character, states that, in his opinion, the beautifying of the shops, shop grounds, power houses and station properties raises the value of the property in the estimation of the people, and also increases the tendency of the men to be neat and careful in handling not only the buildings and grounds, but also the equipment that is intrusted to their care. Mr. Nicholl adds that the work of beautifying has been done through the heads of departments, who have been more than delighted to accomplish the desired results. The main work was carried on through W. C. Sparks, superintendent of roadway, who has charge of the beautifying of all the grounds of the company. R. C. Taylor, superintendent of motive power, and G. H. Kelsay, superintendent of power, have had their men give considerable help in the work, and they are also entitled to a great deal of credit, Mr. Nicholl states.

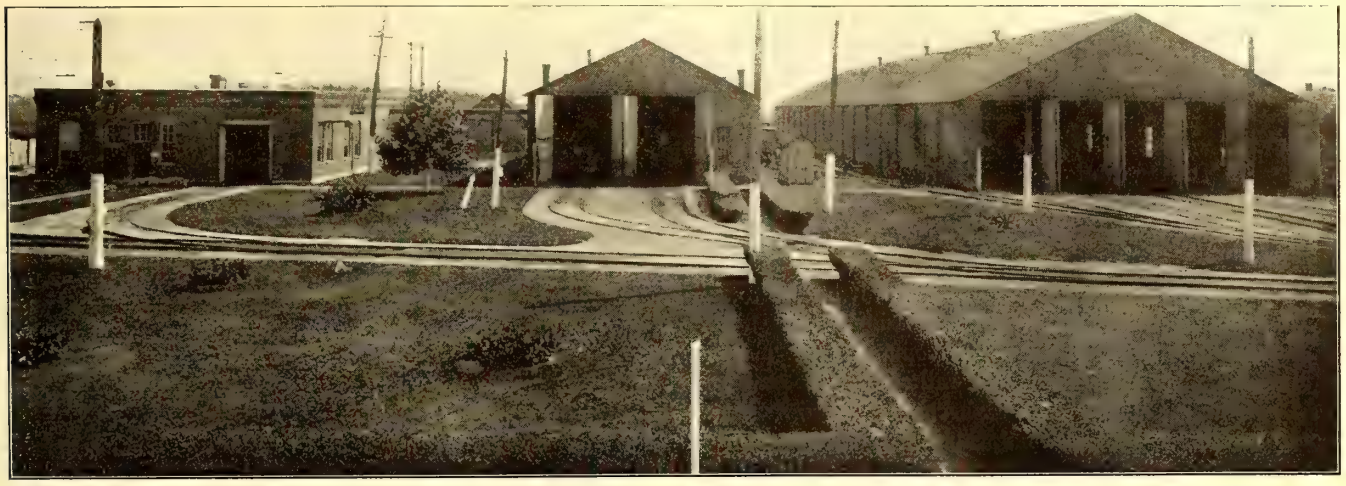
The Brooklyn Rapid Transit Company has done successful work of this character at its shops. Illustrations of the improvements effected in the appearance of the grounds about the shops of this company were published in the Electric Railway Journal of Sept. 12, 1908. In this connection, attention is called to communications from general managers of various urban and interurban companies on this subject published in the issue of Oct. 10, 1908, page 902.



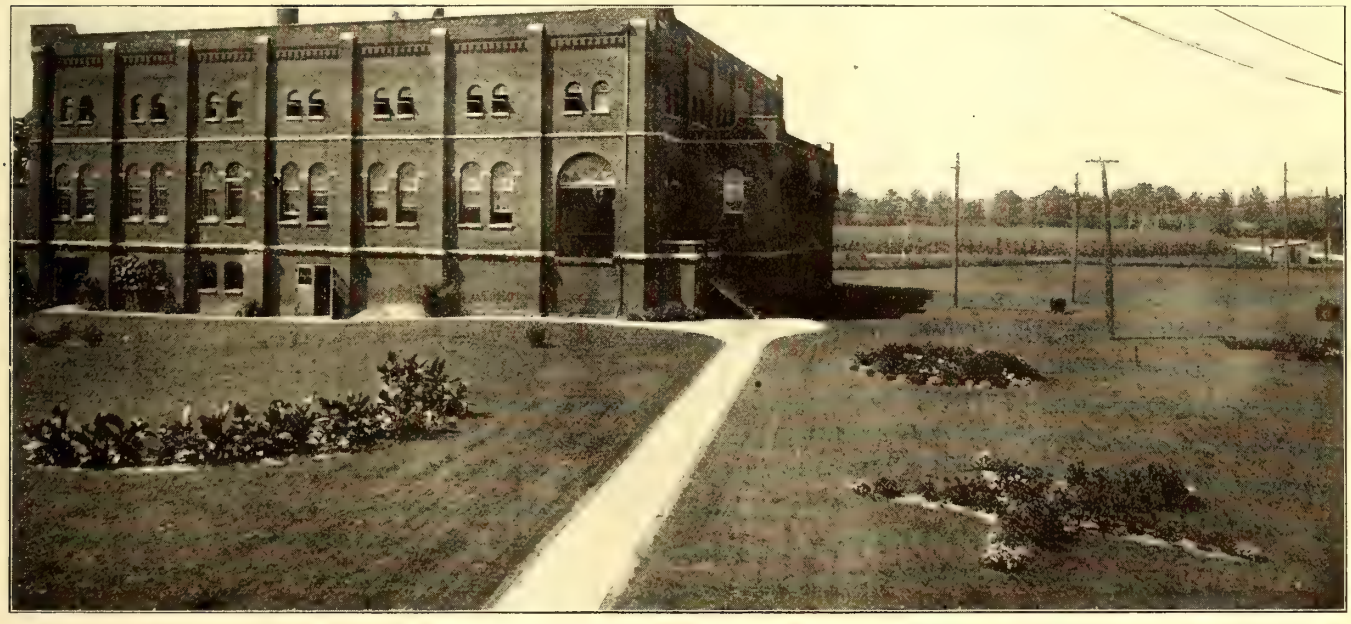
Indiana Union Traction—Substation at Muncie



Indiana Union Traction—Substation at Kokomo



Indiana Union Traction—Shops and Substation at Marion



Indiana Union Traction—Power House at Eaton



Indiana Union Traction—Improvement Beside Power House at Anderson

THE NEW SPECIFICATION FOR HARD DRAWN COPPER WIRE

BY EDWARD N. LAKE

While the result of the letter ballot of the American Society of Testing Materials upon the proposed standard specifications for hard drawn copper wire has not as yet been announced, it is quite probable that it will receive the requisite number of votes to make it the standard of the society for one year. In the meantime, it has been published and is, therefore, open to discussion and comment by those who are interested. The comments given herewith are intended to be suggestive rather than critical, and are from the standpoint of the purchaser's engineer, with special reference to wire and cable for electric railway use, and may easily be somewhat biased in favor of the purchaser.

Since eight of the ten members of the committee were manufacturers' representatives, it is certain that as a result of their wide experience the values and limits will be technically correct, but the requirements will be from the standpoint of the manufacturer, and may easily be a little biased on that side. Assuming that these two biases exist, it is perhaps their resultant which is the straight line of the standard requirements which will ultimately be found acceptable to both purchaser and manufacturer.

As a definition it may be stated that a specification is a part of a purchase contract, and defines that which is purchased. If it is not definite it is not, according to this definition, a specification.

The progressive stand of the committee in eliminating the twist tests, wrap tests and elastic limit tests, which have for years been a part of copper wire specifications, will, no doubt, be concurred in by a large majority of engineers interested in the purchase of hard drawn copper wire and cable. With a given tensile strength, conductivity and elongation, the characteristics of the wire are established, more definitely and positively than can be done by the uncertain and widely variable results of the above-mentioned tests. There are, however, some other features of the proposed specification, which, while they may represent an equally progressive stand on the part of the committee, will not, it is believed, be agreed to so readily at this time.

Taking the points in the order of the paragraphs as they appear, the comments and suggestions are as follows:

3. The wire, in all shapes, must be free from all surface imperfections not consistent with the best commercial practice.

Suppose that the purchaser's inspector is making a mill inspection of a lot of trolley wire and finds the wire is "die marked" to an extent which he believes will be objectionable to the purchaser's engineer to whom he reports. The mill superintendent tells him the wire is all right and in accordance with the specifications. Here is an honest difference of opinion, and if the specification requirement is sufficiently definite these two men should be able to settle this difference positively, on the spot and without delay. As the paragraph now stands, it is not sufficiently definite so that this can be done without the delay necessary to communicate with the higher authority to whom each man reports.

6. All testing and inspection shall be made at the place of manufacture. The manufacturer shall afford the inspector representing the purchaser all reasonable facilities to enable him to satisfy himself that the material conforms to the requirements of these specifications.

The purchaser may wish to waive mill inspection, the efficiency of which is often questioned. If he has the assurance that the tests will be made, and if he is provided with properly signed and approved copies of the results of the tests, it is believed that this will often be just as satisfactory both to purchaser and manufacturer as to send a man to the mills to see the making of the tests. A clause providing for the making of certain specific tests by the manufacturer's testing experts and for written reports of such tests would meet with the approval of a large number of purchasers.

7 (a). Size shall be expressed as the diameter of the wire in decimal fractions of an inch, using not more than three places of decimals; i.e., in mils.

The three place decimals for expressing the diameter are discussed under paragraph 8.

7 (b). Wire is expected to be accurate in diameter; permissible variations from nominal diameter shall be:

For wire 0.100 in. in diameter and larger, 1 per cent over or under.

For wire less than 0.100 in. in diameter, 1 mil over or under.

For power distribution uses it is believed that most purchasers would not object and would in many cases prefer that this be 1 per cent under and 2 per cent over.

Paragraph 8. Table. First five sizes only are given here:

Diameter, inches.	Area, circular mils.	Tensile strength, lbs. per sq. in.	Elongation in 10 ins. per cent.
0.460	211,600	49,000	2.7
0.410	168,100	51,000	2.6
0.365	133,200	53,000	2.4
0.325	105,600	54,500	2.3
0.289	83,520	56,000	2.1

The standard copper wire table of the committee on units and standards of the American Institute of Electrical Engineers has been in use now about 16 years, and is therefore very generally used by electrical and other engineers, has been printed in a large number of trade catalogs and handbooks in this country and abroad and is the present accepted standard in this country. The following shows the differences in five of the sizes between the proposed and present standards:

Diameter in Inches.		Area in Circular Mils.	
Proposed.	A.I.E.E.Std.	Proposed.	A.I.E.E.Std.
.460	.460	211,600	211,600
.410	.4096	168,100	167,800
.365	.3648	133,200	133,100
.325	.3249	105,600	105,500
.289	.2893	83,520	83,690

Any engineer, inspector or shop mechanic accustomed to the use of the ordinary micrometer or slide rule will, it is believed, find it easy to measure the fourth place decimals of the A. I. E. E. standard with an accuracy that is sufficient for all practical purposes.

It may be granted, however, for the present that the three place diameters are the most practical for commercial uses. Still, in view of the fact that these specifications are not only for the use and convenience of a limited number of factory men, but are also for the use of a large number of purchasers and purchasers' engineers, would it not be desirable, instead of adopting abruptly a new and arbitrary standard, to use for the present the existing standard, make a recommendation for a change and take steps to secure the co-operation and possibly the joint action of the American Institute of Electrical Engineers committee and the committee on power distribution of the American Street & Interurban Railway Engineering Association.

For the convenience of a very large number outside of wire manufacturers' organizations who are not constantly using the figures representing wire sizes, it would be highly desirable to include in this table the B. & S. nominal gage numbers. The term "0.365 trolley," for example, will not in the minds and usages of street railway men readily take

the place of the present "No. 00 trolley," nor will the "No. 0000 grooved trolley" readily give place to the recommended "211,600 circ. mil grooved trolley."

What is the use of making such minor changes in present practices for the convenience of a few men in the factory organizations, when the tens of thousands of men in the purchasers' organizations will either be obliged to revise their usages or, what is more likely, will add the old to the new, and out of it will come confusion instead of standardization.

It is also believed that the weights per 1000 ft. should be added, with a clause covering permissible variations over and under the standards for any coil or shipment.

9. Electric conductivity shall be determined upon fair samples by resistance measurements at a temperature of 20 deg. C. (68 deg Fahr.). The wire shall not exceed the following limits:

For diameters 0.460 in. to 0.325 in., 900.77 lb. per mile-ohm at 20 deg. C.

For diameters 0.324 in. to 0.040 in., 910.15 lb. per mile-ohm at 20 deg. C.

The majority of the large manufacturers have in their testing laboratories conductivity apparatus graduated in conductivity, Matthiessen's standard. Here again is a long-recognized standard, to which practically the only objection which can be urged is that sometimes copper is found that will show 101 per cent or 102 per cent conductivity. It may be stated, however, that none of the manufacturers will contract to furnish any large lot of wire of 100 per cent conductivity, so that this objection is apparently based upon the deep-seated human objection to permitting anything to appear perfect or a little better than perfect. A rational and practical thing to do would be to place the two standards side by side for the present, and in a short time the less desirable one will be dropped automatically.

15. The wire entering into the construction of stranded cable shall, before stranding, meet all the requirements of round wire, hereinbefore stated.

If a purchaser has bought some hard drawn bare copper stranded conductors of, say, 400,000 circ. mils, and his inspector finds when he reaches the mill that it has been made up of 37 strands of .102 diameter, equal to 384,948 circ. mils, what in the proposed specification will be the definite basis for acceptance or rejection?

Would it not be advisable to include a statement of the relation and permissible variation between actual and nominal circular mils and a standard stranding table?

16. The tensile strength of stranded cable shall be at least 90 per cent of the total strength required of the wires forming the cable.

For hard drawn cables of 7, 19 and 37 strands of standard pitch this, it is believed, should be increased to 95 per cent.

17. Brazes, made in accordance with the best commercial practice, will be permitted in wire entering into cable; but no two brazes in wire in the cable may be closer together than 50 ft.

The term, "in accordance with the best commercial practice," is not a definite requirement. If it is stated that a given length of the brazed wire shall be equivalent to an equal length of the unjointed wire in electrical conductivity and mechanical strength, this would be a definite requirement.

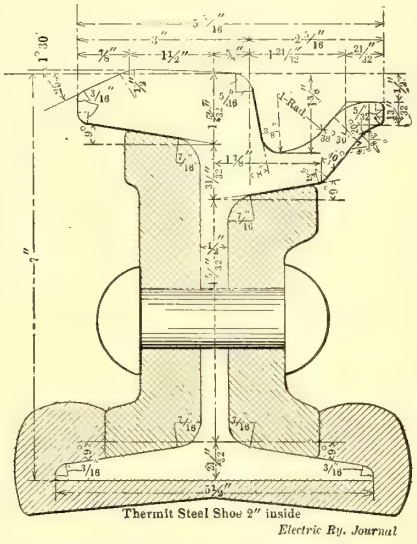
It is suggested further that for trolley wire all brazes shall be made in the rod or wire at least two or three drawings larger than the finished size.

In several places in the specification the term "fair samples" is used, which is indefinite. It would, it is believed, be better to replace this expression by some definite statement as to the number of samples per coil or per reel and how they shall be selected.

Since the interests of purchaser and manufacturer are identical in the one paramount consideration, viz., that of securing the best practicable standard commercial products at the lowest cost and usually in the shortest possible time, it will not be difficult to reach a basis for specification requirements and inspection that will be mutually satisfactory. In the meanwhile it is believed that more can be accomplished ultimately by the co-operation of the several societies than by independent and abrupt action on the part of one society.

NEW RAIL AND JOINT AT CLEVELAND

The Cleveland traction system has recently ordered 500 tons of the new section of rail illustrated. This rail and the joint illustrated therewith are to be standard for the future reconstruction and new work in the heavily traveled streets of Cleveland. The flangeway of the rail, it is noted, is 1⅜ in. deep with a 1-in. radius near the root of the flange. Thus it will provide space for the accommodation of interurban car wheels of M.C.B. contour. The design of the rail is said closely to follow that of the 7-in. standard of the American Street & Interurban Railway Association, with the exception that the Cleveland rail weighs 103 lb. per yard, while the No. 3 half-Trilby rail recommended by the association weighed 122 lb. per yard.



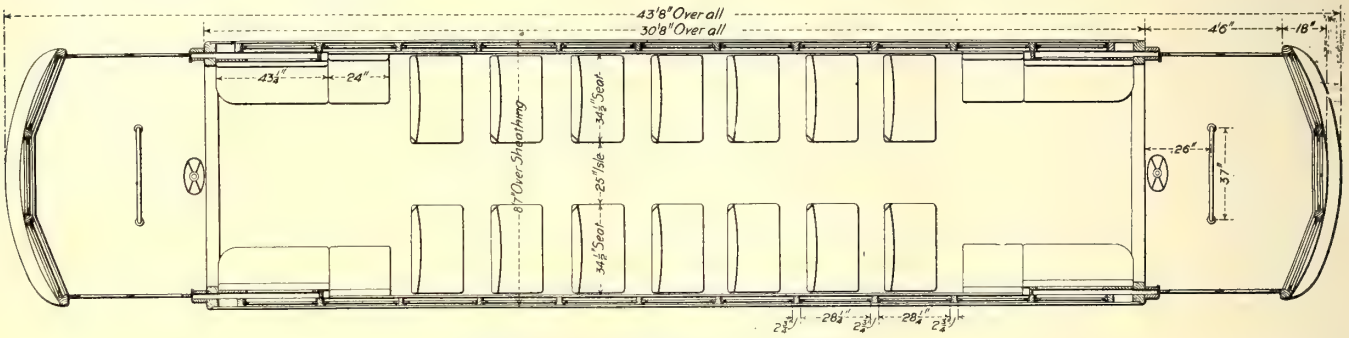
Cleveland Joint with Thermit Steel Shoe

A new method of splicing rails of such weight, designed by Charles H. Clark engineer of maintenance of way, comprising the riveting of heavy plates at the joints and welding the bases of the rails with thermit, will be followed. As shown, the joint will comprise two channel-section plates 1 in. thick, drawn tightly together on either side of the ½-in. web by eight 1-in. rivets. The joint plates are 30 in. long and the rail ends are drilled 3-3-3-3. The rivet holes in the plates and rails are to be round and of such size that they can be reamed for drive-fitting the hot rivets. A special 18-in. crab riveter, manufactured by the Chester B. Albree Iron Works Company, Pittsburg, will be used in placing the rivets. This riveter will be hung from a work car, so that it may easily be swung over a joint. It will be operated by air at 100 lb. pressure.

After the track joints have thus been connected with the heavy plates and hot rivets, the rail ends will be bonded with a thermit shoe 2 in. wide extending around the base of the rail and close to the bottom of the joint plates. This method of bonding, known as the Clark joint, has been extensively used, fully 15,000 such joints having been installed within the last three years in several large cities in Western New York and in Cleveland. Mr. Clark states that up to the present time not one of these joints has broken in service.

PAY-WITHIN CARS IN WASHINGTON, D. C.

The Capital Traction Company, of Washington, D. C., is now operating 11 pay-within cars on its city and suburban lines between the Treasury Building, at Fifteenth Street and New York Avenue, in the center of the city, and Chevy Chase Lake, Md. Four more cars of this type are under construction, and will be put in service as soon as received from the builders. These are the first new cars to be built especially for the application of the pay-within system of fare collection, and are also the first of this type to be put in service outside of Philadelphia, where the pay-within principle has been applied to a large number of rebuilt double-truck cars. Hence an extended description of their salient features will be of interest.



Washington Pay-Within Cars—Floor Plan

In remodeling the old semi-convertible cars in Philadelphia certain limitations as to width and length of platforms were imposed, affecting in some slight degree the ease and rapidity of loading and unloading. The platform dimensions of the new Washington cars, however, were not restricted in any way, and the design may be said to represent the best possible arrangement and proportions for the service to be given and the amount and character of the traffic on the line over which the cars are operated.

As will be seen from the floor plan of the cars, the platforms are divided transversely by a partition railing, which provides a hand hold for passengers who may be standing on the platform. This railing also serves to protect the motorman on the front platform from the crowding of passengers.

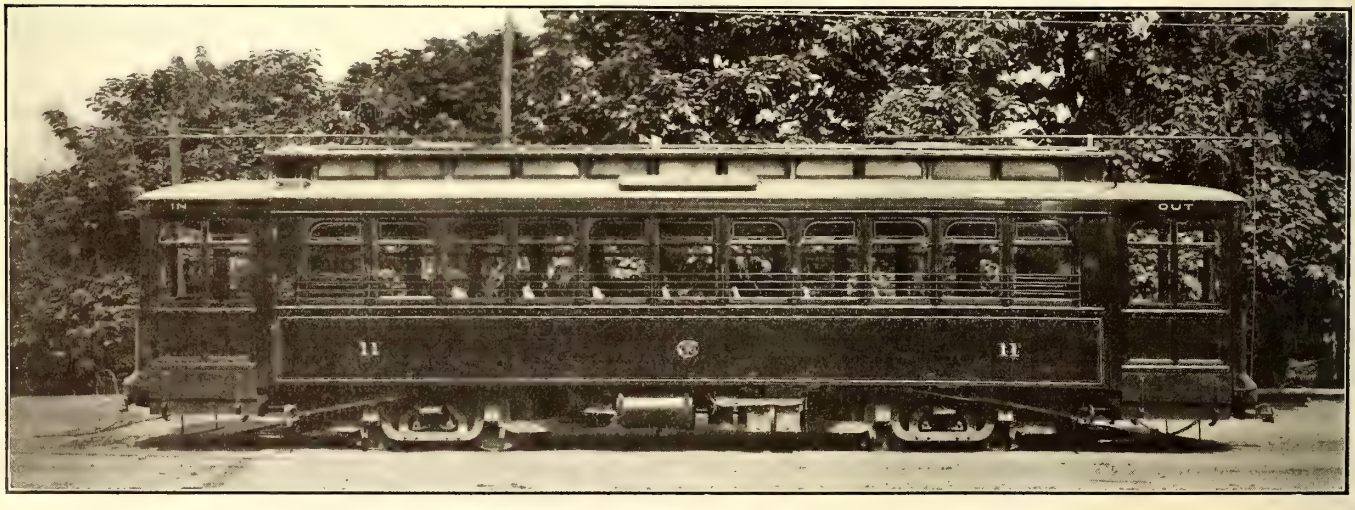
From the Treasury Building to the suburban loop terminal at Rock Creek, in the northwestern part of the city, the cars run over the Fourteenth and U Street line, which carries very heavy traffic and is operated with the underground conduit system. From Rock Creek to Chevy Chase Lake the double-track suburban line occupies the center of a macadamized boulevard and is operated with an overhead trolley wire. It passes through a thickly populated suburban district, and terminates at one of the most popular summer resorts around Washington. Large crowds visit Chevy Chase Lake every day and evening during the summer months, and on Saturdays, Sundays and holidays the capacity of the line is taxed to the utmost.

During the hours of light traffic through cars are operated on 15-minute headway from the Lake to the Treasury Building, and tripper cars, running in to the Rock Creek loop, are alternated with the through cars, giving a 7½-minute headway. In the evenings and on holidays, when travel is heavy, additional trippers are put out until a 3-minute service is maintained. The new pay-within cars are used on the through runs, and 13-bench, double-truck open cars are used for the tripper runs during the summer months.

Two 5-cent fares are charged for the through trip to Chevy Chase Lake. The dividing point between fare zones is at the Maryland-District line, about 3 miles beyond the Rock Creek loop.

It will be seen from this general description of the traffic to be handled that the conditions in Washington are quite different from those in Philadelphia, where the pay-within car was first developed. Comparatively long-distance summer pleasure travel and winter travel alike must be made comfortable; a second fare must be collected while the car is passing through the neutral zone; large numbers of passengers must be loaded and unloaded at the outlying terminal, and also at the stub-end terminal down-town; and all the usual problems of handling heavy local city travel, as well, must be met.

The prevention of boarding and alighting accidents, while handling large crowds of women and children, was one of



Washington Pay-Within Cars—Exterior View

the strongest inducements for the adoption of the pay-within type of car. The possibility of dropping the side, front and rear sash and thus completely opening the car from end to end was also considered a great advantage, as these cars are intended to take the place of cross-seat open cars in the summer. With both the front and rear platforms completely closed in when the doors are shut, it is perfectly safe for the conductor to leave his post and pass through the car, collecting the second fare while in the neutral zone.

The new cars, which are of the semi-convertible type, have the following general dimensions:

Length over corner posts	30 ft. 8 in.
Length over vestibule	42 ft. 8 in.
Length over bumpers	43 ft. 8 in.
Length of platform	6 ft. 0 in.
Width over posts	8 ft. 7 in.
Width over sills and side sheathing	8 ft. 7 in.
Height from floor to ceiling	8 ft. 2 in.
Height from bottom of sill to top of roof	9 ft. 0 in.
Height from rail to bottom of sill	2 ft. 5 in.
Height from rail to top of step tread	15 in.
Height from first step to platform floor	14 in.
Height from platform floor to car floor	8 in.
Wheelbase of trucks, 33-in. wheels	4 ft. 6 in.
Truck centers	19 ft. 0 in.

The cars are very substantially constructed. The side sills are composed of long leaf yellow pine, 4 in. x 6⅜ in., with a ⅜-in. x 20-in. steel plate bolted on the outside. This plate has a 4-in. x 3-in. x ⅜-in. angle riveted to the inside of the bottom edge and a 2-in. x 1½-in. x 5/16-in. angle riveted to the outside of the bottom edge. This outside angle forms a seat for the poplar filler and vertical side sheathing. The end sills are composed of 4¾-in. x 8-in. oak plated on the outside with a ¼-in. x 11-in. steel plate. The cross framing is composed of white oak timbers 3¾-in. x 6⅜-in., plated with 6-in. x 3/16-in. steel plates.

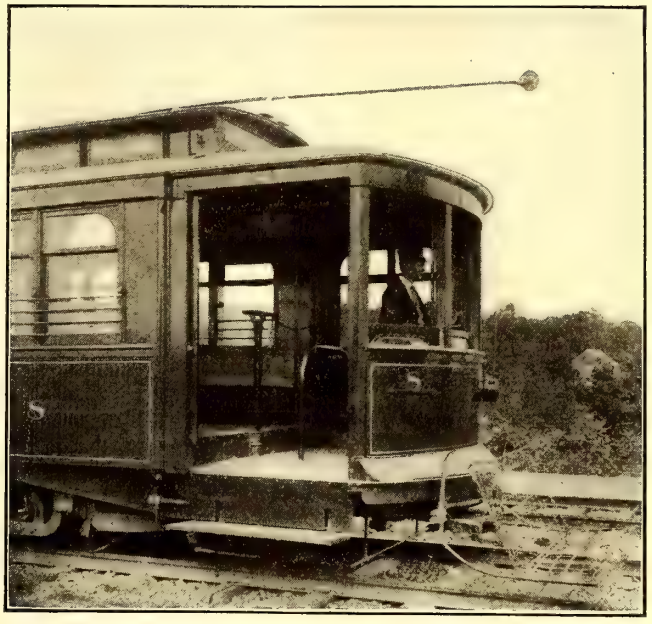
The 6-ft. 0-in. platforms at each end of the car are supported on four knees, the two outside members being composed of ¼-in. steel plates, with 1½-in. x 1½-in. x ¼-in. angles riveted to the bottom edge and 2-in. x 2-in. x ⅜-in. angles riveted to the top edge. These angles form stiffeners for the plates. The outside knees extend back to the body bolsters under the side sills and are securely anchored thereto. The two center knees are formed of 3-in. x 5-in. x ⅜-in. angles, which also extend back to the body bolsters and are anchored there. They are also secured to the end sills by hook bolts.



Washington Pay-Within Cars—Interior View

The bumpers are of the angle-iron type, formed by 6-in. x 4-in. x 7/16-in. angles. They are covered on top with 16-gage sheet steel placed at an angle of about 45 deg. to keep passengers from standing on them.

The body truss rods are composed of steel bars 2½-in. x 5/16-in., in section bent downward at each end of the car at an angle of about 40 deg. They have 1⅛-in. round ends passing along the side sills and anchored to combination malleable iron truss rod seats and corner frame brackets, which are securely bolted to the side and end sills. The truss-rod struts are of malleable iron, placed so as to obtain maximum stiffness. The body bolsters are of the built-up steel truss pattern, both top and bottom members being composed of ⅞-in. x 9-in. steel plates.



Washington Pay-Within Cars—Front Platform with Door Open

The sides of the cars are sheathed below the sash rest with ⅝-in. x 2-in. vertical poplar sheathing. The roof is of the monitor deck type, with detachable type hoods at each end. There are 11 windows on each side, divided in two parts. The upper part is arranged to raise in the roof and the lower part is arranged to drop into a pocket clear of the sash rail. The pockets are provided with dust caps hinged to the posts so that the opening is always covered, whether the sashes are up or down. The upper side sashes are embossed in a neat design.

The cars are finished throughout with Honduras mahogany, stained dark and rubbed with an oil finish.

There are seven Hale & Kilburn No. 199-A steel seats on each side of the car. These seats are 34½-in. wide, giving an aisle 25-in. wide. There are also four longitudinal seats, one at each corner of the car, occupying the space of two side windows. All seats are upholstered with hard enameled canvas-lined rattan.

Each end of the car is equipped with Van Dorn No. 5 ball and socket type radial couplers. Hand brakes at each end of the car are fitted on the bottom with the Sterling brake mechanism, and on top with vertical brake wheels. Each end of the car is equipped with G. E. luminous arc dash headlights. A Hunter illuminated sign is placed in the end deck window. There is also a four-sided box sign on each side of the car on a level with the lower deck. Two International Type R-7 single registers are used, one for cash fares and one for tickets.

These cars are arranged for pay-within double-end operation. The vestibules are equipped with single Hale & Kilburn steel sliding doors on each side, sliding into pockets in the sides of the car body, and are operated by compressed air. The engines operating the doors are located under the longitudinal corner seats and are readily accessible by lifting up the seat cushion. The register rod runs through the center of the car and is fitted with operating handles opposite each side window. At each end of the car the rods are provided with two knobs, so that the conductor can operate the register from his normal position in front of the door operating stand.

The cars are mounted on Standard Motor Truck Company's O-50-type trucks, having 4 ft. 6 in. wheel base and 33-in. steel wheels. The motor equipment consists of four Westinghouse 101-B motors with K-29 type control. All the power wiring under the car is in an armored-iron conduit, while the car cables, which are Roebling's solid waterproof type, are placed in transite-lined boxes under the seats. In addition, the underframe is thoroughly protected above the motors by ¼ in. of transite material. The air-brake equipment is of the Westinghouse semi-automatic type.

The cars were built by the Cincinnati Car Company, under the pay-within patents owned by the Pay-Within Car Company. The latter furnished the steel doors and pneumatic door and step-operating devices.

MEETING OF THE CENTRAL ELECTRIC ACCOUNTING CONFERENCE

The tenth meeting of the Central Electric Accounting Conference was held in Indianapolis, Ind., on Sept. 11, 1909. In the absence of the secretary, Walter Shroyer (Indiana Union Traction Company) was appointed acting secretary. The president, M. W. Glover (Ohio Electric Railway) presided.

The minutes of the last meeting were approved. W. H. Forse, Jr., treasurer, Indiana Union Traction Company, submitted the report of the executive committee, announcing the appointment of A. F. Elkins, auditor, Columbus, Delaware & Marion Railway, as a member of the committee to succeed R. J. Thompson, Indianapolis & Louisville Traction Company, resigned. He also reported that the treasurer had received from 29 roads remittances covering the assessment made at the last meeting, and a resolution was passed reimbursing the treasurer for expenses incurred, and authorizing the printing of the official list of members, the constitution, by-laws, rulings and recommendations as adopted at the first nine meetings of the conference. The report of the committee was adopted.

The report of the secretary and treasurer showed 35 active members on the official roll.

On motion of Mr. Forse, the president was authorized to appoint a committee to represent the Central Electric Accounting Conference at the meeting of the American Street & Interurban Railway Accountants' Association in Denver, Oct. 4 to 8, 1909, and to notify the secretary and president of that association accordingly.

The first subject listed for discussion, "The Advantages of Uniform Methods of Accounting," was taken up, and Mr. Forse addressed the conference on this subject and called attention to the work of the Accountants' Association and the conference to this end, citing the action taken by the conference at previous meetings and the good accomplished thereby. The subject was also discussed by S. C. Rogers (Mahoning & Shenango Railway & Light Company), J. D. Maynes (Illinois Traction System), C. E. Thompson (Chicago & Milwaukee Electric Railroad) and others, the universal opinion being that the adoption of uniform blanks and uniform methods of settlement between lines in this conference had been of great benefit and had placed the lines in this section in a position to assist the Accountants' Association materially in accomplishing the end to which it is working—the promotion of uniformity in accounting methods throughout the United States.

The second subject discussed was, "Methods of Computing Car-Hours and Car-Mileage, with Especial Reference to Passenger and Freight Trailer Cars, Non-Revenue Miles, Mileage in Terminal Cities, Blockades and Lost Running Time." This subject was discussed by E. D. Gault, Mahoning & Shenango Railway & Light Company), L. T. Hixson (Terre Haute, Indianapolis & Eastern Traction Company), E. J. Skehan (Muncie & Portland Traction Company), Walter Shroyer, C. E. Thompson, S. C. Rogers and others, the discussion showing that the lack of uniformity in the methods of computing mileage statistics rendered them of little value for comparative purposes between lines. Mr. Glover stated that in his opinion this was one of the most important questions before the conference. The committee appointed to represent the conference at Denver was instructed to report to the next meeting of the conference the result of the discussion of this subject at the Denver convention, with a view to the adoption of any recommendations made by the American association. One feature brought out in this discussion was the diverse conditions existing on many lines regarding deadhead mileage, non-revenue service, etc., making uniformity difficult.

A. L. Neereamer, secretary of the Central Electric Railway Association and chairman of the Central Electric Traffic Association, was present by invitation, and addressed the conference on the relations between the traffic and accounting departments, laying stress on the importance of harmony between the two departments, particularly as to matters in which they are jointly interested. He suggested the appointment of a committee of the conference to meet a similar committee of the Traffic Association to discuss questions arising which affect both departments. His suggestion was adopted, and the auditing committee of the Central Electric Railway Association, consisting of Messrs. Shroyer, Elkins and Glover, was appointed to represent the conference.

Mr. Neereamer spoke of the good accomplished by the conference in adopting uniform blanks, and stated that he had received numerous calls for samples, which he was able to fill.

Messrs. Forse, Rogers and Glover urged all members who could possibly do so to attend the Denver convention in order that the lines in the central section should be well represented.

It was decided to hold the next meeting at Dayton, Ohio, on Dec. 11, 1909, when the annual election of officers will take place. The meeting then adjourned.

A Boston financial paper estimates that in the proposed new subway system for New York City a total of more than 100,000 tons of structural steel and steel rails will be required. This will involve an expenditure of upward of $2,000,000 for the steel alone. The new subway will probably require 1200 cars, which will consume 18,000 tons of steel of various shapes, estimated to cost at the mills $550,000.

HEARING ON VALUATION OF CONEY ISLAND & BROOKLYN RAILROAD

George A. Damon was the only witness at the hearing on Sept. 8 before the New York Public Service Commission, First District, in the case involving the valuation of the Coney Island & Brooklyn Railroad. Commissioner Bassett presided.

Mr. Damon testified that he was first assistant to Bion J. Arnold, consulting engineer for the commission, and was in charge of the work of the appraisal department. He represented Mr. Arnold in the absence of the latter, and was employed directly by him and not directly by the commission. He had been Mr. Arnold's assistant for 14 years, and for the last 10 years had been managing engineer of The Arnold Company. He was familiar with and had been connected with the work of reporting upon and appraising the street railway properties in Chicago.

Mr. Damon named the properties with the construction of which he had been identified, and said that in his capacity as managing engineer he had charge not only of the estimates but also of carrying out a large amount of construction work and checking the actual cost with the first estimates. He had had wide experience in that connection.

Testifying as to the report of the appraisal, an abstract of which was published in last week's issue of the ELECTRIC RAILWAY JOURNAL, page 398, Mr. Damon said that the details of the reproduction values of the buildings of the company were included in a record, part of which had been introduced in evidence. The figures showing the detailed estimates were not included in full in the exhibit that had been placed in evidence. These estimates were made by a corps of building experts, who went personally to each building and made up a complete bill of materials from the buildings themselves, with sketches to show each kind of material used in the construction. To these estimates of material or actual measurements of material unit prices had been applied on the basis of the prices for which it would be possible to get the material put in place by a sub-contractor. The totals were shown in recapitulation upon a sheet, showing in each case the cost of reproducing each part of each building by means of a sub-contract.

Mr. Damon then gave the details of the items comprising the total reproduction value of each building. Regarding one building he said that the structure was out of use and of course it had a scrap value, but whether or not it had any larger value would depend on whether or not it could be sold to advantage. It was not now used in the operation of the road. Behind the estimated values in detail as enumerated were the field notes of the men, but Mr. Damon had not introduced those as evidence because they would be too voluminous.

In response to a question from Commissioner Bassett, Mr. Damon said that he had thus placed figures of the estimated reproduction value on the tangible property of the company so far as he had been able to identify it. There were a number of other values that should be understood in considering the total. In the first place, there were added to all of the items of construction nature—such as track, track special work and bonding, overhead trolley construction, overhead feeders, underground conduit cables, power plants, substations and buildings and structures—a profit of 10 per cent, and this 10 per cent allowance was intended to include all of the general contractor's overhead charges, such as insurance, his office expenses and regular charges of a general contractor. In addition to that percentage to all of the items that had been placed in the book, with the exception of the real estate and the miscellaneous items, there was added a percentage totaling 15 per cent.

This may be considered to be divided into three parts. One part covers incidentals, including contingencies, incomplete inventories and the loss and wastage of material during construction. Another part of the 15 per cent may be considered to cover the cost of the administrative expenses of the company shown in the book under the title "organization," which Mr. Damon thought might be better known as administrative cost, as it had nothing to do with the organization of the company. This part included the expenses of the company for rent, officers' salaries, State and city permits and fees, property owners' and local consents and the legal expenses in connection only with construction, superintendence and inspection, accounting department, printing and storeroom expenses. Another part of the 15 per cent was to cover engineering, including cost of designing and testing of all construction and equipment items.

These items had been included in the figures shown in evidence, but there were still some other items which Mr. Damon thought should be included, but which had not yet been prepared in figures. Those items would be of the nature of development expenses, though Mr. Damon hardly thought that term was broad enough to cover them all; but they would be such items as interest during construction, taxes during construction, etc. He could list a great number that would come under that general phrase, but thought those would serve to typify what he meant by development expenses.

The hearing was adjourned until Sept. 15, in order to permit the presentation of testimony by both Mr. Arnold and Mr. Damon.

BERLIN CAR AND OMNIBUS ACCIDENT STATISTICS

The Grosse Berliner Strassenbahn, Berlin, Germany, has published some accident records which cover the years 1908 and 1907. They are of particular interest owing to the comparison made with the accidents due to omnibuses. During 1908, the street railway system carried 490,007,872 passengers, and had 1967 accidents, of which 258 were fatal. The omnibus lines carried 121,557,699 passengers in 1908. For every 1,000,000 passengers carried, the fatal and serious accidents compare as follows: On the surface cars, 0.526 in 1908 and 0.570 in 1907; on the omnibuses, 0.470 in 1908 and 0.610 in 1907. If all platform accidents due to the passengers' negligence are eliminated from the comparison, it appears that the cars are safer than the omnibuses, as per the following figures on serious accidents per 1,000,000 passengers transported: On the surface cars, 0.336 in 1908 and 0.350 in 1907; on the omnibuses, 0.410 in 1908 and 0.450 in 1907. As might be expected, the trackless omnibuses run over more pedestrians than the street cars. This is shown in the following figures giving the serious accidents of this kind per 1,000,000 passengers: On the surface cars 0.24 in 1908 and 1907; on the omnibuses, 0.34 in 1908 and 0.47 in 1907. The total number of car accidents showed a decrease from 2151 in 1907 to 1967 in 1908 despite a 5 per cent growth in travel and a slight increase in schedule speeds. The total number of car miles was 72,760,772 in 1908, and 68,066,709 in 1907.

The citizens of Freemantle, West Australia, have voted in favor of raising a loan of approximately $100,000 for the construction of a municipal tramway system.

COMMUNICATIONS

RAIL CORRUGATION

Philadelphia Rapid Transit Company
Philadelphia, Pa., Sept. 8, 1909.

To the Editors:

I have read with interest the abstract of Mr. Peterson's paper on causes of rail corrugation printed in the Electric Railway Journal for Aug. 28, and also the comments by George L. Fowler in the issue of Sept. 4. My own opinion of the cause of rail corrugation has not changed since the publication of my views on this subject in the issue of the Street Railway Journal for May 18, 1907, page 865. I still believe that corrugation is caused by vibrations of the rail or movements of the whole track structure. The wheels of motor or other power-driven cars have a tendency to slip or skid because of the rapid vibration of the rails. The inertia of the car prevents the wheels from instantaneously following these vibrations, and the friction thus produced results in wear, varying with the wave length of the vibrations. The movement or vibration of the rails may result from one of four causes, namely, the vibration or lateral bending of the web of the rail; rails loose on their supports; ties loose on their foundations; the vibration or movement of the foundation immediately under the track structure. For several years we have been acting on the supposition that this theory of vibration is correct and have taken suitable precautions to prevent vibration wherever corrugation has appeared. At the present time there is very little rail corrugation on the tracks of the Philadelphia Rapid Transit Company that would be apparent to the casual observer. The worst examples of this trouble are on cast manganese rail at the entering ends of long radius curves, and this we attribute to our having had the web of the 9-in. girder rail, of which the curves are built, made too thin for the speed and service at those points.

H. B. Nichols,
Engineer of Way.

HIGH-TENSION STRAIN INSULATORS

The accompanying engraving illustrates the construction of a new form of strain insulator for high-tension transmission and trolley lines which is made by the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., and is designated as type C. Its dielectric strength is 40,000 volts and its ultimate tensile strength is above 30,000 lb. For service voltages up to 12,000 and for mechanical stresses up to 10,000 lb., or even 15,000 lb. in special cases, this type of insulator has been successfully used. As will



High-Tension Strain Insulator

be seen from the sectional illustration, a pull on the eye-bolt produces a compression of the insulating cone. This cone is constructed of sheet mica compressed under heavy pressure, and it will withstand very large stresses. The outside tube is of porcelain and is 20 in. long, to afford ample protection against leakage in any weather. No fragile petticoats are used, and owing to its small size the insulator is quite inconspicuous. The porcelain tube acts only as a weather seal for the interior and is not subjected to any mechanical stress.

The Westinghouse Electric & Manufacturing Company also makes a full line of wood strain insulators capable of standing up under a tension of 4000 lb. and a voltage of from 150 to 11,000. The end caps are furnished with eyes, clevises or tapped lugs to adapt the insulators for dead-end anchor guy or steady strain service.

CONVENTION NOTES

Robert N. Wallis, president of the Accountants' Association, has sent out a letter to all members of that association inviting them to be present at a "get-together" luncheon which will be held at the Savoy Hotel, Denver, Wednesday, Oct. 6. The cost will be $3 per plate. All those who expect to attend this gathering are earnestly requested to write at once to Mr. Wallis, Fitchburg, Mass.

A. L. Whipple, chairman of the entertainment committee, has just returned from Denver, where he has been perfecting arrangements for the entertainments to be conducted by the Manufacturers' Association during the convention week for the benefit of the delegates. A complete program of the entertainment will be published at an early date. It is not the intention of the entertainment committee ordinarily to provide entertainment during the days while there are sessions, but there are so many side trips to be taken in and about Denver that the committee thought many of the delegates would be apt to absent themselves during the week. On this account it has been deemed advisable, and with the approval of President Shaw arrangements have been made to provide for an official excursion over the Moffat Route on Friday, Oct. 8. This is a new steam railroad now being built from Denver to Salt Lake City, and 214 miles have been completed. It is expected to take the delegates over the first 65 miles of the road, including the section to the top of the Continental Divide —11,660 ft. above the sea. The party will leave Denver at 8:30 a. m., and by noon the delegates will stand upon the divide, surrounded by banks of perpetual snow. This is far above the timber line, and is said to be higher than any standard-gage railroad has ever before been constructed. The first 47 miles of the trip lie over the wonderful scenic route between Denver and Boulder Park, and have an average grade of 2 per cent. From Boulder Park to the summit of the divide an average grade of 4 per cent is maintained, and the train rises to the crest of the mountains by intricate windings, ascending higher up on the slope of the divide by a series of loops and curves that is amazing. On the way to the crest it passes through 54 tunnels, most of them being but a few car-lengths long, which have been cut through the shoulders of the mammoth mountains to provide a pathway for the trains. The trip will be one long to be remembered by those who participate in it.

In addition to the manufacturers mentioned in the lists of intending exhibitors, published in the Electric Railway Journal for Aug. 14, Sept. 4 and Sept. 11, the following companies have applied for exhibit space at the Denver convention:

Electric Railway Equipment Company, Cincinnati, Ohio.
Standard Steel Works Company, Philadelphia, Pa.
Standard Motor Truck Company, Pittsburgh, Pa.
The Planet Company, Chicago, Ill.
American Mason Safety Tread Company, Boston, Mass.

The electric tramway system in Tucuman, Argentine Republic, will be opened for traffic in October.

NOTES ON TRANSPORTATION TO DENVER CONVENTION

After careful consideration, the committee in charge of the New York-Denver special over the Pennsylvania Railroad has decided to adhere to the original leaving time of the train, namely, 3:55 p. m. on Friday, Oct. 1, instead of 9:55 a. m. on Oct. 1, as announced in the Electric Railway Journal for Aug. 28. The return to the original hour was made to allow those who wish to see the naval parade in New York on Oct. 1 to do so.

W. L. Conwell, chairman of the committee in charge of this train, has just issued a circular letter giving more in detail the arrangements made for the return trip, announced briefly last week. As stated at that time, the route of the eastbound special will be via the Santa Fé Railway, Denver to Kansas City; the Chicago & Alton Railway, Kansas City to St. Louis, and the Pennsylvania Railroad, St. Louis to New York. The trip from Colorado Springs to New York will be on fast schedule, without further stop-overs, with the view to reaching home as soon as possible after the sightseeing in Colorado has been concluded. The return itinerary provides for departure from Denver about midnight on Friday, Oct. 8, reaching Colorado Springs before daylight Saturday, Oct. 9, leaving there after supper same evening and arriving in New York early Tuesday morning, Oct. 12. The sleepers will be parked for occupancy in Denver early Friday evening and in Colorado Springs for convenient access and occupancy whenever desired from the time of the arrival on Saturday morning until departure that evening. Passage on the special return train is not limited to those who travel westbound on it, but to any who are in attendance at the convention. It must be understood, however, that as the diverse route privilege east of Chicago and St. Louis is granted in connection with round-trip tickets sold at the low rate authorized for the convention, it will be possible only for those holding tickets of Pennsylvania Railroad issue to return from St. Louis to New York on the special train, although all whose tickets read returning via the Santa Fé and the Chicago & Alton may accompany the special train party from Denver to St. Louis. Any person, therefore, wishing to join the party returning from Denver must be sure when purchasing his round-trip tickets to see that they read for return via the Santa Fé to Kansas City, the Chicago & Alton to St. Louis, and via the Pennsylvania Railroad from St. Louis to his starting point if he expects to return via the Pennsylvania Railroad on his eastbound trip; otherwise his route east of St. Louis will have to conform to the requirements of the line issuing ticket at his starting point. As the arrangements for this return special train movement on fast schedule indicated above are contingent upon there being a sufficient number in the party to warrant the railroad companies in providing such special service, those desiring accommodations should advise the committee promptly.

Secretary Swenson, of the American Street & Interurban Railway Association, is issuing this week Convention Bulletin No. 4, which is devoted principally to a statement of the railroad and Pullman rates to Denver and the special trains to be run at the time of the convention. The principal cities of the country are tabulated, and the exact round-trip railroad fares and Pullman fares for berth, compartment or drawing room are given. An official statement is also made of the privileges of choice in the return trip permitted by the railroad companies.

A list of the committees appointed by President Shaw to arrange for all of the special trains or special car accommodations to Denver at the time of the convention is also given. Briefly, they are as follows:

New England States—Special train to Denver and Pacific Coast and return, in charge of Charles S. Clark, of Boston.

New York City—Special train over the New York Central lines, in charge of a committee of which C. Loomis Allen is chairman; also a special train over the Pennsylvania Railroad, in charge of another committee, of which W. L. Conwell is chairman.

Chicago—Special train over the Chicago, Burlington & Quincy Railroad, of which J. M. Roach is in charge.

The Southeastern States—W. H. Glenn, Atlanta, is organizing a special party.

Central States—Special train, in charge of a committee, of which R. I. Todd, Indianapolis, is chairman. The route will probably be through St. Louis on the trip to Denver, and via Chicago on its return trip.

St. Louis, Kansas City and Surrounding Territory—Arthur S. Partridge is chairman of the committee for this territory, and will reserve Pullman accommodations for those who desire to attend the convention.

Central Northwestern States—A special car will be run from Davenport (Ia.) to Denver over the Chicago, Rock Island & Pacific, leaving Davenport at 2:02 p. m., Oct. 2, and arriving at Denver at 2 p. m., Oct. 3. The committee in charge consists of A. W. Warnock, Minneapolis, and P. P. Crafts, Clinton.

Southwestern States—D. A. Hegarty, Little Rock, Ark., is arranging for a car to take delegates from the Western States, including Texas, Arkansas and Oklahoma.

California—Two or more special cars will leave on the night of Friday, Oct. 1, and arrive at Denver 7 a. m., Oct. 4. Charles N. Black, San Francisco, is chairman of the committee in charge of these cars.

Seattle and the Far Northwest—It is expected by E. E. Potter and E. F. Seixas, of Tacoma, to have two or more special cars for the use of those in the Far Northwest who desire to go to Denver at the time of the convention.

Mr. Swenson also announces that the return limit of railroad tickets is until Oct. 31, so that it will be possible for those who wish to do so after the convention to visit Pike's Peak, Cripple Creek, Colorado Springs and other places reached by side trips from Denver.

The committees in charge of the two special trains from New York have made reservations for the following persons, who expect to attend the convention:

RESERVATIONS ON PENNSYLVANIA SPECIAL TRAIN.

Azel Ames, Kerite Ins. Wire & Cable Co., New York.
Victor Angerer, Wm. Wharton, Jr., & Co., Philadelphia, Pa.
Mrs. Victor Angerer.
R. D. Apperson, Lynchburg Trac. & Lt. Co., Lynchburg, Va.
F. B. Archibald, National Lock Washer Co., Newark, N. J.
E. H. Baker, Galena Signal Oil Co., New York.
W. P. Barba, Midvale Steel Co., Midvale, Pa.
W. K. Beard, Electric Railway Journal, Philadelphia, Pa.
H. W. Blake Electric Railway Journal, New York.
S. T. Bole, The J. G. Brill Co., New York.
N. W. Bolen, Public Service Ry., Newark, N. J.
L. L. Brinsmade, West. Elec. & Mfg. Co., New York.
Mrs. L. L. Brinsmade.
R. D. Brixey, Kerite Ins. Wire & Cable Co., New York.
H. De H. Broch, Standard Steel Works Co., Philadelphia, Pa.
J. W. Brown, West Penn. Rys. Co., Connellsville, Pa.
J. G. Buehler, Columbia Mach. Wks. & Malleable Iron Co., B'klyn, N. Y.
T. W. Casey, Pay-As-You-Enter Car Corp., New York.
C. C. Castle, Hildreth Varnish Co., New York.
A. T. Clarke, United Rys. & Elec. Co., Baltimore, Md.
T. M. Cluley, Union Electric Co., Pittsburgh, Pa.
W. L. Conwell, West. Elec. & Mfg. Co., New York.
T. Cooper, West. Elec. & Mfg. Co., Philadelphia, Pa.
C. L. Crabbs, Brooklyn Rapid Transit Co., Brooklyn, N. Y.
E. A. Craig, West. Trac. Brake Co., Pittsburgh, Pa.
W. C. Cuntz, Penna. Steel Co., Steelton, Pa.
Mrs. W. C. Cuntz.
H. S. Dailey, Meikelham & Dinsmore, New York.
R. E. Danforth, Public Service Ry., Newark, N. J.
Mrs. R. E. Danforth.
Misses Danforth.
J. S. Doyle, Interborough R. T. Co., New York.
F. J. Drake, Lorain Steel Co., Philadelphia, Pa.
H. V. Drown, Public Service Ry., Newark, N. J.

E. J. Dunne, Pub. Service Ry., Newark, N. J.
C. R. Ellicott, West. Trac. Brake Co., New York.
S. P. S. Ellis, Lorain Steel Co., Pittsburgh, Pa.
H. C. Evans, Lorain Steel Co., New York.
Mrs. H. C. Evans.
W. H. Evans, Buffalo, N. Y.
Thomas Farmer, Jr., Cons. Car Heating Co., New York.
N. M. Garland, Ohio Brass Co., New York.
William Gable, Natl. Brake & Elec. Co., New York.
H. R. Goshorn, Philadelphia R. T. Co., Philadelphia, Pa.
Mrs. H. R. Goshorn.
W. G. Gove, Brooklyn Rapid Transit Co., Brooklyn, N. Y.
Alfred Green, Galena Signal Oil Co., Brooklyn, N. Y.
E. M. Grove, McConway & Torley Co., Pittsburgh, Pa.
Henry Gulick, Gulick-Henderson Co., Pittsburgh, Pa.
W. F. Ham, Wash. Ry. & Elec. Co., Washington, D. C.
Mrs. W. F. Ham.
J. W. Hancock, Roanoke Ry. & Lt. Co., Roanoke, Va
A. N. Hargrove, The J. G. Brill Co., Philadelphia, Pa.
Geo. H. Harries, Wash. Ry. & Elec. Co., Washington, D. C.
G. M. Haskell, The J. G. Brill Co., Philadelphia, Pa.
C. S. Hawley, Cons. Car Htg. Co., New York.
Ross F. Hayes, Curtain Supply Co., New York.
C. T. Herrick, Williamsport Pass. Ry., Williamsport, Pa.
Hugh Hazelton, Hudson & Manhattan R. R., New York.
Charles Hewitt, Phila. Rap. Transit Co., Philadelphia, Pa.
Mrs. Charles Hewitt.
James Heywood, Philadelphia R. T. Co., Philadelphia, Pa.
Mrs. James Heywood.
J. M. High, The Pantasote Co., New York.
L. F. Hoffman, Public Service Ry., Newark, N. J.
R. C. Hoffman, Jr., R. C. Hoffman Co., Baltimore, Md.
W. J. Jeandron, New York.
P. N. Jones, Pittsburgh Rys. Co., Pittsburgh, Pa.
George Keegan, Interborough R. T. Co., New York.
W. R. Kerschner, Allentown, Pa.
F. A. Keyes, Am. Steel & Wire Co., New York.
Mrs. F. A. Keyes.
C. B. Keys, General Electric Co., New York.
C. S. Kimball, Wash. Ry. & Elec. Co., Washington, D. C.
Mrs. C. S. Kimball.
A. S. King, Sterling Varnish Co., Pittsburgh, Pa.
R. W. King, Wash., Alex. & Mt. Vernon Ry., Washington, D. C.
Mrs. R. W. King.
T. J. King, Gt. Falls & Old Dom. R. R., Washington, D. C.
C. O. Kruger, Phila. Rapid Transit Co., Philadelphia, Pa.
J. C. Kyle, West. Elec. & Mfg. Co., Baltimore, Md.
H. N. Latey, Latey & Slater, New York.
W. H. Lawton, Wash., Alex. & Mt. Vernon Ry., Philadelphia, Pa.
Mrs. W. H. Lawton.
F. H. Lincoln, Philadelphia R. T. Co., Philadelphia, Pa.
Mrs. F. H. Lincoln.
W. C. Ludwig, United Rys. & Elec. Co., Baltimore, Md.
T. N. McCarter, Public Service Ry., Newark, N. J.
Mrs. T. N. McCarter.
H. G. McConnaughy, Dearborn Drug & Chem. Co., New York.
W. S. McFarland, Westinghouse Elec. & Mfg. Co., Pittsburgh, Pa.
W. S. McGowan, Am. Brake Shoe & Fdy. Co., New York.
W. McLain, Cambria Steel Co., Pittsburgh, Pa.
Mrs. W. McLain.
J. B. MacAfee, Norfolk & Portsmouth Trac. Co., Philadelphia, Pa.
Mrs. J. B. MacAfee.
E. R. Mason, Elec. Serv. Supplies Co., Philadelphia, Pa.
Stephen C. Mason, McConway & Torley Co., Pittsburgh, Pa.
T. J. Mayer, Elec. Service Supplies Co., Philadelphia, Pa.
W. Meeteer, Wallace Supply Co., New York.
P. W. Millar, Kerite Ins. Wire & Cable Co., New York.
C. S. Mitchell, Pitts. Rys. Co., Pittsburgh, Pa.
H. B. Nichols, Philadelphia, R. T. Co., Philadelphia, Pa.
J. W. Perry, H. W. Johns-Manville Co., New York.
J. R. Pratt, United Rys. & Elec. Co., Baltimore, Md.
G. W. Provost, Union Electric Co., Pittsburgh, Pa.
Robert Radford, Standard Steel Works Co., Philadelphia, Pa.
J. W. Rawle, The J. G. Brill Co., Philadelphia, Pa.
C. W. Reinoehl, Penna. Steel Co., Steelton, Pa.
C. L. Richards, Galena Signal Oil Co., New York.
C. E. Roehl, Brooklyn Rapid Transit Co., Brooklyn, N. Y.
Martin Schreiber, Public Service Ry., Newark, N. J.
W. S. Sisson, D & W Fuse Co., New York.
E. H. Sniffin, West. Machine Co., Pittsburgh, Pa.
Mrs. E. H. Sniffin.
P. C. Snow, Globe Ticket Co., New York.
R. P. Stevens, Lehigh Valley Tran. Co., Allentown, Pa.
Mrs. R. P. Stevens.
A. A. Stevenson, Standard Steel Works Co., Philadelphia, Pa.
A. E. Stone, Badger Fire Extinguisher Co., New York.
Mrs. A. E. Stone.
N. E. Stubbs, United Rys. & Elec. Co., Baltimore, Md.
C. J. Symington, The T. H. Symington Co., Baltimore, Md.
J. V. E. Titus, Elec. Service Supplies Co., Philadelphia, Pa.
W. S. Twining, Phila. R. T. Co., Philadelphia, Pa.
Mrs. W. S. Twining.
S. I. Wailes, Natl. Brake & Elec. Co., New York.
William Wampler, American Locomotive Co., New York.
F. J. Whitehead, Wash. Ry. & Elec. Co., Washington, D. C.
Clifford Wiley, New York.

RESERVATIONS ON NEW YORK CENTRAL SPECIAL TRAIN.

G. S. Ackley, National Brake Co., Buffalo, N. Y.
C. Loomis Allen, Utica & Mohawk Valley Ry., Utica, N. Y.
Mrs. C. Loomis Allen.
Alfred Allen, Utica, N. Y.
W. K. Archbold, Archbold-Brady Co., Syracuse, N. Y.
A. H. Armstrong, General Electric Co., Schenectady, N. Y.
C. A. Babtiste, Electric Railway Journal, New York.
Geo. A. Barnes, Galena Signal Oil Co., Cleveland, Ohio.
C. E. Barry, General Electric Co., Schenectady, N. Y.
T. Beran, General Electric Co., New York.
Bertram Berry, Heywood Bros. & Wakefield Co., New York.
C. M. Bliven, General Electric Co., Schenectady, N. Y.
H. S. Bradfield, New York Car Wheel Co., New York.
Mrs. H. S. Bradfield.
M. C. Brush, Buffalo & Lake Erie Trac. Co., Buffalo, N. Y.
F. Buchanan, Crouse-Hinds Co., Syracuse, N. Y.
J. C. Calisch, Buffalo & Lake Erie Trac. Co., Buffalo, N. Y.
W. Gibson Carey, General Electric Co., Schenectady, N. Y.
F. E. Case, General Electric Co., Schenectady, N. Y.
E. F. Chaffee, O. M. Edwards Co., Syracuse, N. Y.
T. C. Cherry, Utica & Mohawk Valley Ry., Utica, N. Y.
William J. Clark, General Electric Co., New York.
J. H. Coleman, Coleman Fare Box Co., Buffalo, N. Y.
J. C. Collins, New York State Rys., Rochester, N. Y.
Mrs. J. C. Collins.
W. H. Collins, Fonda, Johnstown & Gloversville R. R. Gloversville, N. Y.
Mrs. W. H. Collins.
C. F. Conn, J. G. White & Co., New York.
E. J. Cook, New York State Rys., Rochester, N. Y.
Mrs. E. J. Cook.
Miss Cook.
J. P. Devine, J. P. Devine Co., Buffalo, N. Y.
Geo. H. Dreybus, Coleman Fare Box Co., Buffalo, N. Y.
J. E. Duffy, Syracuse, Rap. Tran. Ry. Co., Syracuse, N. Y.
E. I. Edgecomb, Syracuse, N. Y.
Mrs. E. I. Edgecomb.
J. R. Ellicott, West. Trac. Brake Co., New York.
W. Caryl Ely, Buffalo, N. Y.
George H. Ford, Automatic Ventilator Co., New York.
Mrs. George H. Ford.
G. M. Gest, New York.
H. A. Goode, Wonham, Magor & Sanger, New York.
W. R. W. Griffin, Rochester, Ry. Co., Rochester, N. Y.
W. J. Harvie, Utica & Mohawk Valley Ry., Syracuse, N. Y.
T. A. H. Hay, Northampton Trac. Co., Easton, Pa.
W. O. Hay, Montgomery Trac. Co., Easton, Pa.
Frank Hedley, Interborough Rap. Tran. Co., New York .
E. M. Hedley, Galena Signal Oil Co., New York.
O. W. Hershey, Westinghouse Elec. & Mfg. Co., Syracuse, N. Y.
A. F. Hills, Crouse-Hinds Co., Syracuse, N. Y.
Rodney Hitt, Electric Railway Journal, New York.
Walter Jackson, Electric Railway Journal, New York.
E. L. Janes, Am. Brake Shoe & Fdy. Co., Springfield, Mass .
Mrs. E. L. Janes.
John C. Jay, Pennsylvania Steel Co., New York.
Mrs. John C. Jay.
F. D. Kathe, National Carbon Co., Cleveland, Ohio.
E. A. Kendrick, Matthews-Northrup Co., Buffalo, N. Y.
W. H. Kidder, New York.
W. A. Lake, Pantasote Co., New York.
Edward L. Leeds, Niles-Bement-Pond Co., New York.
Ray D. Lillibridge, New York.
Mrs. Ray D. Lillibridge.
A. L. Linn, Jr., New York State Rys., New York.
Mrs. A. L. Linn, Jr.
H. B. Logan, Dossert & Co., New York.
Mrs. H. B. Logan.
Bruce E. Loomis, Fire Underwriters Electrical Bureau, New York.
J. McCullough, Coleman Fare Box Co., Buffalo, N. Y.
James H. McGraw, Electric Railway Journal, New York.
Mrs. James H. McGraw.
F. MacGovern, MacGovern, Archer & Co., New York.
William Marshall, Anglo-American Varnish Co., Newark, N. J.
Mrs. William Marshall.
F. D. Miller, National Brake Co., Buffalo, N. Y.
E. P. Morris, Elmer P. Morris Co., New York.
Mrs. E. P. Morris.
Frederic Nicholas, Electric Railway Journal, New York.
Miss Helen Paddock, New York.
J. H. Pardee, J. G. White & Co., New York.
Mrs. J. H. Pardee.
E. F. Peck, Schenectady Ry. Co., Schenectady, N. Y.
Mrs. E. F. Peck.
Mrs. G. F. Perine, New York.
H. N. Ransom, General Electric Co., Schenectady, N. Y.
Alexander Reed, U. S. Wood Preserving Co., New York.
J. A. Renton, Kerite Ins. Wire & Cable Co., New York.
W. B. Rockwell, Syracuse & Suburban Railroad, Syracuse, N. Y.
Mrs. W. B. Rockwell.
E. A. Rooney, Coleman Fare Box Co., Buffalo, N. Y.
W. G. Ross, Montreal St. Ry. Co., Montreal, Que.
Ralph Sanger, Wonham, Magor & Sanger, New York.
C. N. Ryan, East. Penna. Rys. Co., Pottsville, Pa.
H. W. Sheldon, Standard Steel Works Co., New York.
C. E. Smith, New York.
Mrs. C. E. Smith.
James V. Smith, Galena Signal Oil Co., Cleveland, Ohio.
J. S. Speer, Speer Carbon Co., St. Marys, Pa.
R. M. Standish, Electric Traction Weekly, New York.
H. H. Stannard, G. M. Gest, New York.
J. H. Stedman, Rochester Printing Co., Rochester, N. Y.
E. S. Taylor, W. J. Jeandron, New York.
S. W. Trawick, General Electric Co., New York.
J. M. Wakeman, Electric Railway Journal, New York.
C. T. Walker, Electric Railway Journal, Cleveland, Ohio.
John F. Wallace, Electric Properties Co., New York.
Mrs. John F. Wallace.
Mr. White, Montreal St. R. Co., Montreal, Que.
Ernst Woltman, A. & J. M. Anderson Mfg. Co., New York.
Mrs. Ernst Woltman.

PAY-AS-YOU-ENTER CARS IN WASHINGTON

The Capital Traction Company, of Washington, D. C., as announced previously in these columns, is making an extensive experiment with pay-as-you-enter cars built under the license of the Pay-As-You-Enter Car Corporation. Last fall 39 cars of the pay-as-you-enter type were ordered from the Cincinnati Car Company. Twenty of these cars were received early in the spring of this year and were immediately placed in service. The remaining 19 cars on this order are now building, and will be delivered shortly. In addition, the railway company altered last spring two semi-convertible cars with 6-ft. platforms at each end for pay-as-you-enter operation, and is now converting in its own shops 10 more cars of the same type. The platform and door arrangements of these converted cars are the same as on the new pay-as-you-enter cars put in service this year.

News of Electric Railways

Cleveland Traction Situation

Although the Cleveland Railway made important concessions to the city on Sept. 7, the administration has objected to the settlement proposed on the ground that the rate of fare must not be agreed upon until after a valuation of the property is fixed. The company desires to know what the maximum fare is to be before appraising the property again. The rates set forth in its communication are the best that can be made, the officers believe, if the company is to secure funds for putting the system in condition to take care of the business properly. The following suggestions for settlement were made by the company:

"License provision.—We concede the right of the city to nominate a purchaser for the company's property any time after eight years from the date at which the ordinance becomes operative, provided that the company be permitted to retain its property in the event it is willing to accept as small a return as the proposed purchaser, substantially as provided in the Tayler ordinance.

"Arbitration under ordinance.—We concede your proposition relating to the selection of arbitrators under the operation of the ordinance, and withdraw our request that no arbitrator be an employee of the city or the company.

"Invalidity clause.—The drafting of an invalidity clause to be referred to Judge Tayler, Judge Lawrence, Mr. Tolles and Mr. Baker, by the form set forth in our letter of Aug. 25. The foregoing concessions are on the condition that the Council agree to the following:

"Valuation.—The question of valuation to be submitted to Judge Tayler at once, and that he be unhampered in determining the true, just value of the property.

"Maximum rate of fare.—The maximum rate of fare to be 5 cents cash, including a transfer, or seven tickets for 25 cents, with one cent for a transfer; the initial rate of fare to be 3 cents cash, with one cent for a transfer; the ordinance to be so drawn as to require double transfers on cross-town lines, without additional charge.

"East Cleveland and interurban controversies.—We suggest that these matters be held in abeyance pending our efforts to obtain new contracts."

The reply of the administration, dated Sept. 9, first rehearses the items upon which the company made concessions, and then states that the Council is willing to submit the valuation of the property to Judge Tayler if the company means that he is to consider the physical and franchise value only, excluding everything for good will and going value. The administration claims that an agreement between the city and the company already exists to the effect that the valuation shall be made by items so far as the parties at interest shall desire and that good will and going value shall not be taken into consideration.

As to maximum fare, the administration also argues that the company assented on Aug. 19 to the proposition that the adjustment of this matter should be delayed until after the valuation of the property has been made. The communication states that this is a vital matter to the City Council and that the city's understanding of it should prevail. The following form of submission to Judge Tayler is suggested in the letter:

"The Council of Cleveland and the Cleveland Railway unite in a request that you will, at your earliest convenience, and as sole arbiter, undertake the valuation of the physical property and the unexpired franchises of the Cleveland Railway.

"The agreements reached between the company and the Council are that the valuation is to be by items, to the extent that either side requests, and that the subject of valuation shall be the physical property and the unexpired franchises of the company, excluding good will and going value.

"The company and the Council will meet your wishes in the matter of time and place of hearings, and both, through their representatives, will produce all available data and evidence for your consideration."

The administration agrees to the suggestion of the company relative to the controversies with East Cleveland and the interurban railways. The result is almost sure to be against the ideas of Mayor Johnson in securing a new contract in East Cleveland. John R. McQuigg, Mayor of East Cleveland was renominated on a platform that includes standing for the contract that now exists with the Cleveland Railway. A nomination is equivalent to election in the village, as there was no opposition ticket nominated. The members of the Council who were nominated all uphold Mr. McQuigg.

The question of who will be the opposing candidates for Mayor in the coming municipal election was settled at the primary election in Cleveland on Sept. 7. Mayor Johnson is the choice of the Democrats and Herman C. Baehr the choice of the Republicans. Mr. Johnson is now serving his fourth term as Mayor. He was opposed this time by F. W. Waltz, a Democratic Councilman, but easily defeated Mr. Waltz. Mr. Baehr was opposed by Frank M. Chandler and also by Robert E. McKisson, who was Mayor of the city 10 years ago. He did not win at the election with the ease with which Mr. Johnson did. It is said to be unlikely at this time that an independent candidate will be nominated.

The report of the Municipal Traction Company for August, issued by Receiver Warren Bicknell, follows:

Gross earnings		$575,923.19
Maintenance	$112,228.67	
Transportation	178,770.65	
General expenses	36,823.72	327,823.04
Net earnings		$248,100.15
Deductions:		
Rental Neutral Street Railway	$936.68	
Taxes	24,778.08	
Interest rental	38,589.22	
Dividend rental	73,378.00	137,681.98
Surplus		$110,418.17

The People's Street Railway Company has been incorporated with a capital stock of $10,000 by Thomas J. Dolan, Hugh McConnaughy, Robert Johnson, Francis Cottier and Miles Dodd, all carpenters living in Cleveland. These men are said to be of the opinion that a city system can be operated by a company which will sell its stock at $1 per share, each shareholder to have only one vote, regardless of the number of shares he holds. They also express the opinion that the present system in Cleveland can be duplicated for $10,000,000, but have said nothing about the amount of money that would be required to rehabilitate the present system.

Judge Tayler has granted an order allowing $600,000 of street railway funds to the Cleveland Railway, to be applied on its floating debt and has authorized the receiver to expend $125,000 for new cars and also to pay $75,000 to holders of preferred claims against the Municipal Traction Company.

Annual Meeting of the Massachusetts Street Railway Association

The annual meeting of the Massachusetts Street Railway Association was held on Sept. 8, and the following officers were elected: Robert S. Goff, president; W. W. Sargent, first vice-president; H. H. Crapo, second vice-president; Fred H. Smith, treasurer; Charles S. Clark, secretary; Robert S. Goff, W. W. Sargent, H. H. Crapo, Francis H. Dewey, P. F. Sullivan, William S. Loomis, Edward P. Shaw, L. S. Storrs, executive committee; E. S. Wilde, George A. Butman, Henry E. Reynolds, auditors.

A committee consisting of James F. Shaw, Elton S. Wilde and Charles S. Clark was appointed to assign to each member company one monthly meeting. The company thus selected is to be responsible for the meeting assigned to it, is to bring before the meeting any subject relating to the business that the company considers it advisable for the association to consider, and is to provide speakers and present papers for discussion. This plan was tried last year with considerable success.

The itinerary for the tour of the members of the association who propose to attend the convention of the American Street & Interurban Railway Association at Denver was adopted. It will include a trip to the Alaska-Yukon-Pacific Exposition at Seattle, returning by the way of San Francisco, Los Angeles, and New Orleans.

Letters inviting the association to accept hospitality while on its Western trip were read from G. W. Wattles, president, Omaha & Council Bluffs Street Railway, Omaha, Neb.; R. E. Hunt, assistant general manager, Utah Light & Railway Company, Salt Lake City, Utah; Stone & Webster, general managers, Seattle (Wash.) Electric Company, and the Tacoma Railway & Power Company, Tacoma, Wash.; R. H. Sperling, general manager, British Columbia Electric Railway, Vancouver, B. C.; A. T. Goward, manager, British Columbia Electric Railway, Victoria, B. C.; B. S. Josselyn, president, Portland Railway Light & Power Company, Portland, Ore.; Charles N. Black, vice-president and general manager, United Railroads, San Francisco, Cal.; G. W. Wilder, manager, Santa Barbara (Cal.) Consolidated Rail-

road; W. B. Tuttle, vice-president and general manager, San Antonio (Tex.) Traction Company; Stone & Webster, general managers, El Paso (Tex.) Electric Company, the Houston (Tex.) Electric Company, Galveston (Tex.) Electric Company, and Baton Rouge (La.) Electric Company; E. C. Foster, vice-president, New Orleans Railway & Light Company, New Orleans, La.; Stone & Webster, general managers, Paducah (Ky.) Traction Company; T. Fitzgerald, Jr., assistant general manager, Cincinnati (Ohio) Traction Company.

Transit Affairs in New York

The Third Avenue Bridge Company, which was organized in the interest of the Third Avenue Railroad, New York, to operate cars over the Queensboro Bridge from Fifty-ninth street and Third avenue, New York, to Long Island City, has filed with the Public Service Commission estimates of the probable business that will result from the operation of cars across the structure. The estimates show that 1,000,000 passengers a year could be carried over the line, 1.88 miles long, at a total cost with operating expenses and fixed charges (including 6 per cent on the capitalization of $20,000) of $123 per day. Three cars only would be required to maintain this service on a 5-minute headway, and to carry the necessary 2740 passengers a day. Daily gross receipts, it is estimated, would be $137. Estimates of a carriage of 2,000,000 passengers a year, or 5,480 passengers a day, show that but four cars would be needed to handle the traffic on a 5-minute headway. At a 5-cent fare, including 2.6 cents to the Third Avenue Bridge Company, and the remainder to the Third Avenue Railroad, gross receipts would amount to $52,000 a year, and operating expenses, and including 5 per cent of gross receipts to the city, would leave a balance at the end of the year of $198.

Theodore P. Shonts, president of the Interborough Rapid Transit Company, held the second of a series of conferences on Sept. 10 with the members of the Public Service Commission of the First District of New York on the subject of proposed subway construction. On Sept. 14 the Public Service Commission announced that it has made plans for a new subway route to provide rapid transit for the west side of Manhattan and to extend into Queens by way of the Queensboro Bridge. The proposal will be presented to the Board of Estimate for approval immediately and probably will be advertised for bids at about the same time the Broadway-Lexington Avenue route is advertised. Providing a connection with the new Pennsylvania Railroad station, the route is said to be favored by the Interborough Rapid Transit Company, and is believed to have been decided upon as the result of the conferences between the commission and President Shonts, of the Interborough Rapid Transit Company.

Bridge Commissioner Stevenson, of New York, has written to the Board of Estimate asking for a special appropriation of $17,000 to install service with electric cars across the Queensboro Bridge between Fifty-ninth street and Third Avenue, New York, and Astoria, Long Island, until such time as franchise arrangements have been made with a railroad company to operate cars over the bridge. Commissioner Stevenson proposes at the outset an equipment of 10 cars, maintaining a headway during the rush hours of a 2-minute interval, and during the remainder of the day as the traffic requires. The fares charged would be similar to those on both the Brooklyn and Williamsburg bridges—that is, 5 cents per round trip, or 3 cents per single fare. It is estimated that at least 10,000 passengers will use this line daily and that the receipts will pay for the maintenance and operation of the line. Mr. Stevenson would secure power from the New York Edison Company, and rent cars at a fixed charge per day, including the cost of maintenance, the cars to be returned to the company leasing them when the operation of the road is discontinued by the city.

The Chicago Wage Controversy

The referendum taken on Sept. 7 by the employees of the Chicago City Railway resulted in the defeat of the proposal of Walter L. Fisher, the city's traction expert, noted in the Electric Railway Journal of Sept. 11, 1909, page 411, by a vote of 1588 to 351. Representatives of the employees announced that the proposed scale of wages was defeated because of the length of time the contract would be effective and because the contract provided for grading the men into several classes.

When T. E. Mitten, president of the Chicago City Railway, agreed to adopt the proposed wage scale providing it was acceptable to the employees, he had an understanding with the committee representing the employees that if the scale was rejected the men would agree to present the entire controversy for arbitration. After the result of the vote was made known Mr. Fisher issued the following statement:

"I am afraid we have exhausted the possibilities of negotiations. When one of the companies refuses to join in a proposition because the wages are too high, and the men employed on the other line reject the same proposition because the wages are too low, there seems to be nothing to do but to leave the entire matter to a board of arbitration whose decision will be binding on both parties."

John M. Roach, president of the Chicago Railways, was in conference with the committee representing his employees on Sept. 10 and 11, when the matter of readjusting the wage scale was again considered. During the conference an effort was made to decide upon an equitable plan for arbitration. As soon as President Mitten of the Chicago City Railway returned to Chicago on Sept. 12, after an absence of several days, it was announced that joint conferences would be held between the presidents of the two railways and the representatives of the employees in a further effort to refer the pending controversy to a board of arbitration.

At a recent conference it was pointed out that the Consolidated Traction Company may preclude the possibility of settling the controversy by arbitration. This company, which is a subsidiary of the Chicago Railways, is in the hands of a receiver and is subject to the jurisdiction of Judge Grosscup of the Federal Court. It is stated that the judge will not agree in advance to be bound by any decision regarding wages that might be reached by a board of arbitration. The representatives of the employees of the Chicago Railways have announced that they will not agree to arbitration unless the decision reached by the board of arbitration is made to apply to the employees of all the surface lines of the city.

New Secretary for the National Electric Light Association

At a meeting of the New England section of the National Electric Light Association, held at Newcastle, N. H., on Friday, Sept. 10, the election of Mr. T. Commerford Martin as general secretary of the National Electric Light Association was announced.

Mr. Martin is well known at present as the co-editor of the *Electrical World*, of New York, and has been prominently identified with electrical journalism for the past 25 years as editor of the *Electrical World* and of the *Electrical Engineer*, which latter was incorporated with the *Electrical World*. He has also served as electrical special agent of the United States Census Bureau for the past nine years, and in this capacity had charge with Prof. E. Dana Durand, now Director of the Census, of the street railway section of the 1902 census. He has also attended many street railway meetings, and owing to the close association between the *Electrical World* and the Electric Railway Journal has been a frequent contributor to these columns.

Mr. Martin, who is past president of the American Institute of Electrical Engineers and of the Engineers' Club of New York, was one of the founders of the National Electric Light Association, and has been closely associated with the activities of that body, which some years ago, in recognition of his valuable services, conferred upon him the distinction of an honorary membership. The field of technical journalism will feel the loss of Mr. Martin, as he has been an active member of it, and for many years he has been considered its dean. But all technical journalists will congratulate the National Electric Light Association upon securing Mr. Martin's services. Under his direction and leadership the association should widely extend its sphere of usefulness, and be of much greater value than even at present not only to its membership, but to the field at large.

Annual Meeting of the Kansas Association

The annual meeting of the Kansas Gas, Water, Electric Light & Street Railway Association will be held at Wichita, Kan., on Sept. 23 and 24. A partial list of the papers to be presented at the meeting follows:

"Correct Street and Interurban Railway Equipment," by E. T. Bronnenkamp, of the American Car Company.

"Scientific Illumination," by F. B. Galloway, of the B-R Electric Company.

"Sizes of Single-Phase Motors," by Mr. Briscoe, of the Wagner Electric Company.

"Notes on Transformers," by B. F. Eyer, Manhattan, Kan.

"Duties and Liabilities of Electric Companies," by John C. Nicholson, Newton, Kan.

"Series—Tungsten Lamps for Street Lighting," by W. E. Sweezey, Junction City, Kan.

"Transformers," by J. L. Buchanan, General Electric Company.

"Tungsten Lamps," by Mr. Benson, General Electric Company.

The official program follows:

September 23—10 a. m.: Roll call; address of welcome by Hon. C. L. Davidson, Mayor; reply by association president; president's address; papers. 12:30 p. m.: Adjournment for lunch. 1:30 p. m.: Papers; discussion. 5:30 p. m.: Adjournment. 6 to 8 p. m.: Banquet by United Electric Company. 8:15 p. m.: Electrical display and parade by "Peerless Prophets."

September 24—9 a. m.: Roll call; papers; discussions; new business; election of officers; query box. 11:30 a. m.: Adjournment. Automobile and street railway ride to power plants, water works, telephone plants, parks and other points of interest. Afternoon: Races at the Fair Grounds. Evening: Humbug circus; free street parade, followed by regular performance at the Fair Grounds.

Dinner of Railway Business Association.—The executive committee of the Railway Business Association announces that the association will begin its second year with a subscription dinner on the evening of Oct. 20, 1909, the committee having postponed the annual meeting in New York to that date. The keynote of the occasion will be "The Public Be Pleased," a pronouncement which is expected to have a beneficial effect on the public mind and to assist materially in lessening permanently the agitation against the railroads. Tickets for the dinner, which will be held at the Waldorf-Astoria, will be $10 a cover, and can be subscribed for only by members of the association. Frank W. Noxon, 2 Rector Street, New York, is secretary of the association.

Relief Association of Interborough Rapid Transit Company.—The annual report of the Interborough Rapid Transit Company contains a statement regarding the operations of the voluntary relief association of that corporation, from the time of its organization on Feb. 1, 1907, to June 30, 1909, inclusive. During this period, the receipts were $164,677, of which $109,933 was received in contributions from the Manhattan Railway division, $41,878 from the subway division and $11,174 from the general office. The receipts include also $10 "conscience money." The disbursements during this period aggregated $113,514, divided as follows: Manhattan Railway division, $84,536; subway division, $27,378; general office, $1,600. The balance of $51,163 remaining on June 30, 1909, was divided between $17,732 cash and $35,000 par value Manhattan Railway consolidated mortgage 4 per cent bonds valued at $33,431. The operating expenses paid by the company up to June 30, 1909, were $38,520. There had been admitted to membership on June 30, 1909, a total of 8,226 employees, of which 3087 had withdrawn, due to resignation, dismissal, death or other causes, leaving a balance of 5139, comprising 54½ per cent of the total number of employees of the company.

Hearing on Proposed Elevated Changes in Boston.—The Massachusetts Railroad Commission gave a public hearing on Sept. 8 at its offices in Boston on the petitions of the Boston (Mass.) Elevated Railway for approval of changes in the elevated stations at Dudley Street, Sullivan Square, Dover Street and the South Station. Geo. A. Kimball, chief engineer of the bureau of elevated and subway construction, explained the proposed alterations. At Sullivan Square provision is to be made for bringing the traffic from the Malden extension into the city, with platform enlargements and the erection of a new westerly platform outside the station for loading in-bound trains. A surface car loop is to be constructed in the westerly half of the station, in place of the present stub-track arrangement. At Dudley Street additional platform and waiting-room accommodations are to be provided in the center of the present surface car loop. At Dover Street the principal changes are the adaptation of the station for 8-car train service and the relocation of stairway. A middle siding is to be installed at the South Station to facilitate shuttle service between that point and the North Station. There was no opposition to the proposed changes and the board took the matter under advisement.

Formal Subway Proposal in Chicago.—The engineering and contracting firm of George W. Jackson, Inc., formally presented its proposal to build a subway system in Chicago, estimated to cost $80,000,000, to the city on Sept. 7, when it addressed the following letter to Francis D. Connery, City Clerk, with the request that the matter be presented to the Council: "George W. Jackson, Inc., most respectfully request your kind consideration relative to being allowed to submit to a committee of the City Council as to our financial ability to construct a comprehensive subway for the City of Chicago. We are in a position to proceed at once with the construction of 12 miles of subway in the territory bounded by Chicago Avenue on the north, Twenty-second Street on the south, Halsted Street on the west and Michigan Avenue on the east; also for the construction of 80 miles, as follows: North to Buena Park, northwest to Logan Square, west to Fifty-second Avenue, southwest to Kedzie Avenue and Thirty-fifth Street and two branches south to Seventy-fifth Street. In requesting your consideration of the above, we do so after mature deliberation as to our ability, both financially and otherwise, to construct a system without cost to the city, and at the same time to give the city the right to take over the system when in a position to do so."

Valuing Franchises in Detroit.—Prof. Henry C. Adams, of the University of Michigan, who has been retained by the Committee of Fifty, at Detroit, to appraise the franchises of the Detroit United Railways, said recently that he proposed to submit to the committee shortly for approval a general plan for the work which he is to do and an outline of the principles that govern the local situation in Detroit. Prof. Adams was quoted in the Detroit *Journal* as stating that the estimate of the present value of a franchise is a problem in exact mathematics. He is reported to have said: "If the physical valuation is accurate, and if the figures from the books of the Detroit United Railways on traffic are correct, the estimate of the franchise value can be made with precision. The actual calculation could be done by accountants. The problem is a rental one, so to speak. A franchise is like a rent. It is the right to do a certain thing for another's property at a given time. If a firm puts a certain amount of money into a street car system, pays its operating expenses, and takes in only enough to cover the cost, there is no franchise value. If there is a surplus there is a franchise value. The franchise value is its value to the man who has it."

Exhibit of New York Commission at State Fair.—Invited by the State Commissioner of Agriculture of New York to make an exhibit at the State Fair at Syracuse, which opened on Sept. 13, the Public Service Commission of the First District of New York sent to the fair a set of charts and statistics to show the magnitude of the regulation problem which is before it in the fields of transportation, gas and electricity in New York City, as well as the phenomenal growth of travel and tremendous increase in consumption of gas and electric current. A representative of the commission was present during the week to explain the various details to those interested. Among the exhibits were a profile chart showing hourly ticket sales on subway and elevated lines, the ferries and bridges over the East River; a large map of New York City showing all the street railways within the city limits; two large frames containing several photographs illustrating methods of construction used for the present subway; two large frames containing photographs showing the fender tests held at Schenectady and Pittsburgh last fall, and other maps and charts all bearing on the work of the commission. In addition, the commission distributed a pamphlet of 16 pages explaining the jurisdiction and work of the body and covering some of the principal matters disposed of during the last two years.

Sale of The Iron Age.—Announcement is made of the sale by the David Williams Company of *The Iron Age* and the business of the David Williams Company, including *The Metal Worker* and *Carpentry and Building*, to Charles T. Root, I. A. Mekeel, C. G. Phillips, and William H. Taylor. All of these gentlemen have a high reputation as successful publishers of technical papers. Messrs. Root, Mekeel and Phillips have long been associated together in the Root Newspaper Association, which publishes the *Dry Goods Economist*, the leading paper in the dry goods trade. Mr. Taylor was recently the owner of *The Engineer*, now consolidated with *Power*, and was formerly the publisher of *The Hub*, a carriage paper. For a long time he was Western manager of the STREET RAILWAY JOURNAL. *The Iron Age* is the leading publication of the iron and steel industry. It was founded at Middletown, N. Y., in 1859, by John Williams, as the *Hardware Man's Newspaper*. Subsequently the name of the paper was changed to *The Iron Age*. In 1868 David Williams, a son of the founder, took possession of the property, but in the meantime the headquarters of the journal had been transferred to New York. Charles T. Root, of the Root Newspaper Association, has announced that there will be no change in the staff, policy or method of publication of the paper. Charles Kirchhoff, who has been editor of *The Iron Age* for many years, is to remain with the paper as are also George W. Cope and A. I. Findley, associate editors.

Financial and Corporate

New York Stock and Money Market

September 14, 1909.

The stock market has finally settled down after the excitement and uncertainty attendant upon Mr. Harriman's illness and death, and is now fairly active in trading and undeniably strong in tone. There is ample evidence that the powerful leaders of finance realized that demoralization was possible and took charge of the situation. The market at present seems safely within their grasp, and evidently no bear attacks will be tolerated. To-day there was a renewal of rumors that the hard coal roads were on the verge of distributing extra dividends, and this caused strength in the entire list. Traction stocks have been very dull and prices have been practically unchanged.

The bond demand is less insistent and the money market has shown an increase in loans with a slight advance in rates. Quotations to-day were: Call, 2¼ to 3 per cent; 90 days, 3¾ to 4 per cent.

Other Markets

The feature of the week in the Chicago market was the sudden and unexplained drop in Subway stock. After having been under selling pressure for several days the price declined Sept. 13 to 10, and there was evidence of heavy liquidation by insiders. To-day the market was a trifle stronger, but the close was at 115⅝.

In the Philadelphia market there has been less interest in traction securities than heretofore. There has been but little offering of Rapid Transit and Union Traction stocks. Prices, however, have remained unchanged.

Massachusetts Electric issues have been somewhat active in the Boston market and the tone has been distinctly stronger. Prices have advanced a little, but a good demand exists for the stock.

In Baltimore, practically nothing has been done in traction stocks. Even the United Railways bonds have been dull. Prices have remained about the same.

Quotations of various traction securities as compared with last week follow:

	Sept. 7.	Sept. 14.
American Railways Company	a46	a46¼
Aurora, Elgin & Chicago Railroad (common)	*47½	a50
Aurora, Elgin & Chicago Railroad (preferred)	*92½	a95
Boston Elevated Railway	129¼	127½
Boston & Suburban Electric Companies	*18	*18
Boston & Suburban Electric Companies (preferred)	*72½	*74
Boston & Worcester Electric Companies (common)	a13	a13
Boston & Worcester Electric Companies (preferred)	a54	a54
Brooklyn Rapid Transit Company	78½	76⅞
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	86⅞	86½
Capital Traction Company, Washington	a136½	a136
Chicago City Railway	a180	a190
Chicago & Oak Park Elevated Railroad (common)	*3	*3
Chicago & Oak Park Elevated Railroad (preferred)	*12	*12
Chicago Railways, ptcptg, ctf. 1	a111	a112
Chicago Railways, ptcptg, ctf. 2	a39	a37½
Chicago Railways, ptcptg, ctf. 3	a26	a25
Chicago Railways, ptcptg, ctf. 4s	a10½	a10½
Cleveland Railway	*78	*78
Consolidated Traction Company of New Jersey	a77½	a77½
Consolidated Traction of N. J., 5 per cent bonds	a106½	a106½
Detroit United Railway	a75	a75
General Electric Company	166	166½
Georgia Railway & Electric Company, (common)	*94½	91½
Georgia Railway & Electric Company (preferred)	*87	a88
Interborough-Metropolitan Company (common)	14¾	14½
Interborough-Metropolitan Company (preferred)	46½	46⅞
Interborough-Metropolitan Company (4½s)	82½	83
Kansas City Railway & Light Company (common)	a48	46
Kansas City Railway & Light Company (preferred)	a82	a82
Manhattan Railway	a143½	a144
Massachusetts Electric Companies (common)	16½	17
Massachusetts Electric Companies (preferred)	78	77½
Metropolitan West Side, Chicago (common)	a18	a16
Metropolitan West Side, Chicago (preferred)	a50	a49
Metropolitan Street Railway	a24	a24
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	83¾	83⅞
Northwestern Elevated Railroad (common)	a20	a20
Northwestern Elevated Railroad (preferred)	a71	a70
Philadelphia Company, Pittsburg (common)	48	a48½
Philadelphia Company, Pittsburg (preferred)	a44½	a44¼
Philadelphia Rapid Transit Company	30	a30
Philadelphia Traction Company	91¼	a89
Public Service Corporation, 5 per cent col. notes	a100⅛	a100⅛
Public Service Corporation, ctfs	a94	a94½
Seattle Electric Company (common)	*114½	115
Seattle Electric Company (preferred)	107	103½
South Side Elevated Railroad, Chicago	54½	a55
Toledo Railways & Light Company	a10¼	a11
Third Avenue Railroad, New York	22	22½
Twin City Rapid Transit, Minneapolis (common)	109	108¼
Union Traction Company, Philadelphia	54	a54
United Railways & Electric Company, Baltimore	a13¾	a13½
United Railways Inv. Co., San Francisco (common)	a41	47
United Railways Inv. Co., San Francisco (preferred)	62	76⅝
Washington Railway & Electric Company (preferred)	a92	a93
Washington Railway & Electric Company ,preferred)	a92	a93
West End Street Railway, Boston (common)	97¾	98
West End Street Railway, Boston (preferred)	106½	108¼
Westinghouse Electric & Manufacturing Company	85	85
Westinghouse Elec. & Mfg. Co. (1st pref.)	a146	a133½

aAsked. *Last sale.

Annual Report of the Interborough Rapid Transit Company

A statement of the earnings and expenses of the Interborough Rapid Transit Company of New York for the last two years, contained in the annual report to shareholders for the 12 months ended June 30, 1909, is as follows:

Year ended June 30—	1909	1908	Increase
Earnings from operation	$25,775,392.44	$24,059,299.40	$1,716,093.04
Operating expenses	10,747,443.20	10,722,694.66	24,748.54
Net earnings	$15,027,949.24	$13,336,604.74	$1,691,344.50
Other income	$1,384,643.73	$1,220,170.55	$164,473.18
Gross income	$16,412,592.97	$14,556,775.29	$1,855,817.68
Interest on bonds and 3-year gold notes, rentals and amortization charges	$5,822,962.54	$5,069,649.62	$753,312.92
Taxes	1,799,807.31	1,586,466.31	213,341.00
Total interest, rentals and taxes	$7,622,769.85	$6,656,115.93	$966,653.92
Balance	$8,789,823.12	$7,900,659.36	$889,163.76
Manhattan guarantee (7 per cent. per annum)	4,200,000.00	4,200,000.00	.....
Net income	$4,589,823.12	$3,700,659.36	$889,163.76
Dividend (9 per cent. for one year)	$3,150,000.00	$3,150,000.00	.....
Total	$7,350,000.00	$7,350,000.00	.....
Surplus	$1,439,823.12	$550,659.36	$889,163.76
Per cent. expenses to earnings:			
Excluding taxes	41.69	44.57	*2.88
Including taxes	48.68	51.16	*2.48
Passengers carried	514,680,342	483,285,640	31,394,702
Daily average passengers carried	1,410,083	1,320,452	89,631

*Decrease.

The total number of miles of single track operated at the end of the fiscal year was 199.99. T. P. Shonts, the president, says in his statement to shareholders:

"While gross earnings increased 7.13 per cent, operating expenses increased only 0.23 per cent. This favorable result was due to economies brought about by changes in the organization; the correction in 1908 of defective design in the subway equipment, reducing the cost of maintenance; the manufacture in our own shops of a large number of repair parts heretofore bought in the open market; the inauguration of an improved method of inspection and general overhauling on a car mileage basis; the change during the year 1908 from hand to automatic fire stoking in the Fifty-ninth Street power house and the introduction of a new and less expensive system of handling the coal and ashes, and to a material reduction in the amount paid out for injury and damage claims during the year.

"It is perhaps timely to explain here the new conditions surrounding the issue of securities since the enactment of the Public Service Commission's law in 1907. The Public Service Commission has jurisdiction over the issue of all railroad securities of every description and can prescribe the manner in which the proceeds are to be expended, and for the purpose of arriving at a determination with respect thereto has full authority to examine the books, papers, contracts, etc., of the company and to call any witnesses necessary to a complete understanding of the company's financial condition and responsibility. In making this examination in connection with the above issue of 45-year bonds, by reason of its being the first for which application had been made since the inauguration of the commission, an unusual degree of care was exercised not only with respect to the necessity of the issue and the adequacy of the collateral, but a thorough examination of the physical condition of the property and the earning power of the road was made, by the commission's experts, with a view to ascertaining the sufficiency of the company's assets for securing the payment of its obligations for such refunding purposes and its ability to meet its engagements in connection therewith. These bonds, therefore, have the benefit of the Public Service Commission's approval.

"Fire insurance is carried on all rolling stock, materials and supplies, shops, storehouses and on miscellaneous buildings. Inspections are continuously made as a means of reducing risks to a minimum, and regular and systematic fire drills of employees are held bi-monthly in every yard and storehouse. In a recent bulletin the Fire Underwriters' Bureau reported: 'The properties of the company are in good condition, and equipment is as good as any in this country.' As a consequence your insurance is secured at the lowest rates.

"Your company owns and controls between $4,000,000 and $5,000,000 worth of real estate not required for operating purposes. A considerable part of this real estate is owned by the Manhattan Railway Company, and under the terms of the lease the proceeds can only be expended for the payment of its obligations and in making improve-

ments on its lines. All of this property will be sold from time to time, as favorable opportunity offers, and the proceeds applied for the corporate purposes of the respective companies. Several pieces of property not required for purposes of operation have been rented or sold on advantageous terms during the past year, and other sales and leases are in process of negotiation.

"The structures, equipment and other property of your company have been maintained throughout the year at the highest standard of efficiency.

"For the purpose of securing a more efficient and economical administration of the company's affairs practically a new organization was created, effective in part with the present fiscal year. Some of the departments were consolidated, others eliminated and in still others radical changes were made. A new department was created to include the purchase of materials and supplies, insurance, rentals and real estate, and placed in charge of a vice-president, and the law department was reorganized and placed in charge of a counsel and a general attorney, with a view to reducing outside legal expenses. The wisdom of this course is reflected in the reduced cost of operation during the past fiscal year and in greater efficiency and co-operation between all departments in the transaction of the company's business.

"A short time after the opening of the subway for operation and the inauguration of regular train service it became apparent that the junction at Ninety-sixth Street and Broadway was the controlling factor in our efforts to obtain the full maximum track capacity, the number of trains which could be operated through the entire length of the subway being regulated by the number of trains which could be operated through this junction.

"After considering and experimenting with a number of plans and devices, all more or less expensive and unsatisfactory, the difficulty was finally overcome, at small expense, through the installation of automatic speed control signals invented by the signal engineer of your company, permitting the operation of trains under closer headway in and out of the Ninety-sixth Street station. The capacity of that particular section was thus brought to a parity with the balance of the line and the company enabled to materially increase the train service of the subway. Since the installation of these signals at Ninety-sixth Street arrangements have been made for their installation at all points in the subway where it is possible to provide additional train capacity.

"With a view to increasing the power supply of the Fifty-ninth Street power house there was installed during the past year a low-pressure steam turbine, planned to operate in connection with the present reciprocating engines. The tests made on this combination unit of low-pressure turbine and reciprocating engine were eminently successful, greatly surpassing our expectations of a saving of 15 per cent over the best steam turbines and 20 per cent over the best reciprocating engines. As a result of this economy in power production the installation of low-pressure turbines can be extended to include all of the units in our power houses. When installed the capacity of power houses will have been increased 80 per cent at a cost of $35.50 per kilowatt installed, as against $87 per kilowatt installed with steam turbines only. This increased capacity can be secured without any additions to the present buildings of the company."

Injuries and damages during the year were as follows:

	1909	1908	Decrease	Per cent.
Claims, suits and judgments	$222,088.34	$261,514.30	$39,425.96	15.
Expenses	105,417.19	116,916.56	11,499.37	9.8
Total accident cost	$327,505.53	$378,430.86	$50,925.33	13.4

Mr. Shonts adds: "With an increase of 31,394,702 in the number of passengers carried, there was a decrease of one in the number of persons injured and a decrease of over $50,000 in the amount expended. In the courts with 347 cases tried and settled this year as against 345 last year, there was a decrease in the aggregate verdicts of 35.4 per cent. The policy of quick settlements reduced the number of actions brought in the courts of record 6 per cent, although there was an increase of 12 per cent in all of the courts, due to a larger amount of petty actions brought in the municipal courts. But the volume of active litigation pending was nevertheless reduced 25 per cent during the year by trials and compromises."

"An independent fire-sprinkler system has been installed in the 159th Street and Eighth Avenue elevated yard, at a cost of approximately $90,000. This system provides for a line of sprinklers in the aisles between tracks, operated by electrical motors controlled from a central tower, as well as independently from any point in the yard, the locating of two 50,000-gallon storage tanks on towers and the installation of two 1500-gallon electrically driven centrifugal pumps for drawing water from a crib in the Harlem River. As an additional protection a concrete wall will be constructed to replace the present east wall of the inspection shed in this yard and a concrete floor on the structure covering an area 150 ft. x 400 ft. An independent automatic sprinkler system has been installed in the subway car storage yard under Broadway, between 137th and 145th Streets, at a cost of approximately $15,000. This system provides for a line of aisle sprinklers in the center between all tracks and between the outside tracks and the wall of the subway, containing 1600 sprinkler heads and having four direct connections with the city mains, the pipes to which will at all times be at city main pressure."

The work of the Voluntary Relief Association is described at length and Mr. Shonts adds:

"In addition to this your board of directors recently appropriated the sum of $50,000 for the construction of terminal buildings for the better accommodation of employees. These buildings, which will be located at the principal terminal points, will contain reading and smoking rooms, kitchens, shower baths and toilets, and will be designed to make the surroundings and influences as comfortable and wholesome as possible. August Belmont has donated $10,000 for the purpose of fitting up the reading rooms and providing them with a full equipment for club purposes.

"The subject of taxation as affecting the transportation corporations of this city is one calling for constant consideration. Under the existing State and Federal laws this company is now subject to three distinct forms of taxation:

"1. A State tax of 1 per cent upon the gross earnings of the corporation from every source; and in addition, if the corporation has declared dividends in excess of 4 per cent, a tax of 3 per cent upon the excess dividends so declared.

"2. City taxation, divided into

"(a) Tax upon real estate, which is the ordinary land tax;

"(b) Tax of 5 per cent upon the net income of the Ninth Avenue line of the Manhattan Railway; and

"(c) The special franchise tax upon the intangible right of the company to operate in the public streets of the city, to which is added the tangible value of the property actually located in the streets. No fixed rule has ever been laid down by the State Board of Tax Commissioners from which the value of the special franchise may be determined. A case, however, is now pending in the Court of Appeals which may be expected to throw some light upon this question. In the case of the Interborough company the burden of taxation is considerably lightened by the fact of the city ownership of the property and the statutory exemption from taxation conferred by section 35 of the rapid transit act. In the case of the Manhattan Railway, however, where no exemption is given by law, the assessment of the special franchise has increased out of all proportion to the increased earnings of the property—that is to say, from a valuation of approximately $42,000,000 in 1903 to $78,500,000 in 1908-1909. The franchise taxes against the Manhattan company to date have been paid, under protest, for economical reasons. They are, however, being contested in the courts, and to the extent that they may be held to have been unjustifiably levied must be refunded by the city, with interest at 6 per cent.

"3. In addition, there is now imposed by recent act of Congress a special excise tax of 1 per cent upon the net income of all corporations in excess of $5,000.

"The disproportion between the burden of taxation borne by the public service corporations of this and those of other States and between such corporations here and individual taxpayers is manifest. It is a serious obstacle in the way of the development of the rapid transit facilities in this city. Indeed no prudent plans for the development of these facilities can disregard the excessive taxes now imposed on traction properties in this city or, in connection with the heavily increased cost of new construction, safely assume its burden."

Regarding the subway and elevated extensions which the company desires to make, Mr. Shonts says:

"These plans were prepared for the purpose of developing a unified and comprehensive rapid transit subway system, to be owned by and come into the possession of the city at the termination of present operating leases, and with the further purpose of affording the best possible basis for future extensions into the undeveloped sections of Greater New York. It has seemed to your directors that such a system, with a corresponding elevated system, operated under one experienced management, with one 5-cent fare over all of the new and old subways, transferring passengers at convenient points, and one 5-cent fare over all of the new and old elevated lines, transferring passengers at convenient points, would represent the highest form of rapid transit development."

Investigation of Bridge Operating Company

The investigation of the Bridge Operating Company by the Public Service Commission of the First District of New York was continued on Sept. 9. As stated in the Electric Railway Journal of Sept. 11, 1909, page 413, Edwin W. Winter, president of the Brooklyn Rapid Transit Company; C. D. Meneely, secretary and treasurer of that company, and G. I. Hunt, auditor of the Bridge Operating Company, were sworn by the commission as witnesses on Aug. 31. On Sept. 9, Marvyn Scudder, special accountant for the commission, and Howard Abel, auditor of the Brooklyn Rapid Transit Company, were the principal witnesses. Mr. Scudder gave a list of the Bridge Operating Company's financial transactions since its incorporation in 1904. He said:

"The books of the company show that the total receipts from the day of the beginning of operation, June 12, 1904, to Dec. 31, 1905, were $149,098.45 and that the total receipts from every source, excluding stock subscriptions, from the date of operation to June 30, 1909, were $822,609.33. Deducting the taxes and operating expenses from that amount the remainder, $391,363.53, represents the net receipts, or $78,000 a year approximately. The capital stock of the company is $100,000, so that the profit is about 78 per cent annually, since there is no fund for depreciation."

George D. Yeomans, counsel for the Brooklyn Rapid Transit Company, admitted the truthfulness of the statement made by Mr. Scudder regarding the earnings of the Bridge Operating Company, but both he and William Masten, representing the Metropolitan Street Railway, said that to permit the figures to be presented before the public in the form in which Mr. Scudder had arranged them would convey a wrong impression, and Mr. Yeomans asked to be allowed to offer a statement in explanation. Commissioner Maltbie acceded to the requests, though he made it clear to the attorneys that whatever testimony they introduced would not affect the attitude of the commission in the present investigation of the Bridge Operating Company. Mr. Yeomans replied that he did not believe it just to consider the operating company distinct from the Brooklyn Heights Railroad and the New York City Railway. Through Howard Abel, Mr. Yeomans submitted a statement showing the cost of operating across the bridge and the losses sustained in the past five years. Mr. Yeomans said:

"The Bridge Operating Company is merely the agent of the two controlling corporations, and if each of the companies was running the local cars directly, the profit on this line would not be considered great because it would be offset by the loss which each of the companies sustains in the through service across the bridge. This loss is far greater than the profit on the operating line and we should be given a chance to get that evidence on the record, and also the fact that since the ferries at the foot of Broadway, Brooklyn, shut down the loss to the Brooklyn Rapid Transit Company in the through service is greater than ever."

Albany & Hudson Railroad, Hudson, N. Y.—The property of the Albany & Hudson Railroad was sold under foreclosure on Sept. 8 at Hudson to I. W. Day, secretary of the reorganization committee. The plan of reorganization recently approved by the Public Service Commission of the Second District of New York was declared operative some time ago. This plan was outlined in the Electric Railway Journal of July 31, 1909, page 191. The Albany Southern Railroad was incorporated on Sept. 14 with the Secretary of State at Albany, as a reorganization of the Albany & Hudson Railroad. The new company has a capital of $3,475,000, of which $2,100,000 is preferred stock and $1,375,000 common stock. The company's principal office is in Rensselaer. The directors are: W. R. Gross, H. A. C. Smith, Charles H. Werner, A. M. Young, Irvin W. Day, L. B. Grant, C. M. Congdon, New York; C. L. Rossiter, Brooklyn, and Myron T. Herrick, Cleveland, Ohio.

Boston (Mass.) Elevated Railway.—It is stated that a Boston financier who is a director in a number of street railways in New York and Massachusetts has quietly accumulated by purchase in the open market 10,000 shares of the stock of the Boston Elevated Railway and has become the largest holder of the stock of the company. James J. Bright, Cambridge, Mass., is understood to be the second largest holder with 2400 shares. There are only nine stockholders of the company who own more than 1000 shares of the stock of the company.

Burlington County Railway, Mt. Holly, N. J.—On application of the Bougher Estate of Philadelphia, which owns the controlling interest in the Burlington County Railway, Judge Rellstab in the Federal Court at Trenton, N. J., has appointed John G. Horner, Mt. Holly, receiver of the company.

Centerville Light & Traction Company, Centerville, Ia.—Frank S. Payne, president and general manager of the Centerville Light & Traction Company, and D. C. Bradley have purchased the interest of T. P. Shonts, New York, vice-president of the Centerville Light & Traction Company, and of C. P. Campbell, Chicago, secretary and treasurer of the company, in the company, and new officers have been elected as follows: Frank S. Payne, president; Mrs. C. M. Bradley, vice-president; Mrs. Grace Payne, secretary; D. C. Bradley, treasurer.

Columbus Railway & Light Company, Columbus, Ohio.—The Columbus Railway & Light Company has declared a quarterly dividend of ¾ of 1 per cent, payable on Oct. 1 to holders of common stock of record Sept. 15, thus increasing the dividend rate to 3 per cent per annum. Since Jan. 15, 1906, the Columbus Railway & Light Company has paid regular dividends at the rate of 2 per cent per annum on its common stock.

Columbus, Marion & Bucyrus Railroad, Marion, Ohio.—On the petition of the Cincinnati Trust Company, Judge Babst, on Sept. 8, appointed George Whysall, general manager of the Columbus, Marion & Bucyrus Railroad and the Columbus, Delaware & Marion Railway, and Eli West, Columbus, Ohio, receivers of the Columbus, Marion & Bucyrus Railroad. The petition of the Cincinnati Trust Company states that the Columbus, Marion & Bucyrus Railroad is indebted to it in the amount of $7,500 for money borrowed and that $12,500 is due on the bonds. The bonds and interest are guaranteed by the Columbus, Delaware & Marion Railway, which is also in the hands of Mr. Whysall and Mr. West as receivers, so the systems will be operated as in the past, with some possible betterments between Marion and Bucyrus.

Duluth-Superior Traction Company, Duluth, Minn.—An initial dividend of 1 per cent has been declared on the $3,500,000 common stock of the Duluth-Superior Traction Company, payable on Oct 1, to holders of record Sept 15.

Houghton County Traction Company, Houghton, Mich.—An initial dividend of 2 per cent has been declared on the $750,000 of common stock of the Houghton County Traction Company, payable on Oct. 1, to stockholders of record Sept. 18.

Norwich & Westerly Railway, Norwich, Conn.—On Sept. 1, the Norwich & Westerly Railway defaulted in the payment of the interest on its issue of $750,000 of first mortgage 5 per cent bonds. It is stated that a tentative plan of reorganization, to which more than two-thirds of the bondholders and three-fourths of the general creditors have informally assented, has been framed. This plan, so it is said, calls for a considerable reduction in the volume of fixed charges, and if the plan is accepted foreclosure proceedings will not be instituted.

Second Avenue Railroad, New York, N. Y.—Judge Lacombe, in the United States Circuit Court, in the suit of the Guaranty Trust Company for the foreclosure and sale of the Second Avenue Railroad, has handed down an order extending the time for the complainant to take its chief testimony in the case until 30 days after the service of notice by the solicitors for any of the defendants. The defendants are the Second Avenue Railroad, the Metropolitan Street Railway, the Norton Trust Company, the Pennsylvania Steel Company and the Degnon Construction Company.

Springfield (Mass.) Street Railway.—The proposed consolidation of the Springfield Street Railway and the Western Massachusetts Street Railway was not opposed at the hearing before the Railroad Commission on Sept. 8. Bentley W. Warren, Boston, represented the companies at the hearing before the commission.

Westchester Traction Company, Ossining, N. Y.—Judge Holt, of the United States District Court, signed an order on Sept. 15 authorizing the sale of the Westchester Traction Company at Ossining, N. Y., on a date to be fixed by the special master appointed by the court for that purpose. Judge Holt directs that no bid for the property under $1,200 be accepted. Each bidder will be required to deposit $600 or a note on any trust company in New York. A mortgage on the property to be sold was given by the Westchester Traction Company to the New York Trust Company on April 12, 1902. The property of this company consists principally of 3 miles of track in Ossining, which is not now being operated. H. Benedict, 79 Wall Street, New York, N. Y., is receiver.

West Jersey & Sea Shore Railroad, Camden, N. J.—The West Jersey & Sea Shore Railroad has declared a semi-annual dividend of 2½ per cent, payable Oct. 1, 1909, to holders of record Sept. 15. The previous disbursement was 2 per cent on April 1, 1909.

Traffic and Transportation

Hearing by Massachusetts Commission on New Bedford Fares

The Massachusetts Railroad Commission gave a hearing on Sept. 8 in Boston upon the petition of citizens of New Bedford for a reduction in fares from 10 cents to 5 cents between Lund's Corner and the city line. The Union Street Railway operates cars between the center of New Bedford and Lund's Corner, and the Old Colony Street Railway operates the same cars from Lund's Corner to the city limit. A 5-cent fare is charged by each company. The petitioners' case was introduced by Representative Lewin of New Bedford. The Old Colony Street Railway was represented by Bentley W. Warren of Boston, general counsel, and by H. E. Reynolds, assistant general manager. The Union Street Railway was represented by H. H. Crapo, president, and G. W. Wilde, general superintendent.

For the Old Colony Street Railway Mr. Warren stated that the petitioners desire that the company shall carry passengers for 5 miles for less than 5 cents. The line is a part of the former New Bedford, Brockton and Middleboro system. It has never paid and the best part of the route has always been that nearer Brockton on the northern portion of the Old Colony Street Railway. Between Lund's Corner and the city line, 5 miles, there are only 93 houses, and counts of the traffic show an average patronage per trip of 11 passengers for July, with a winter patronage of 4 or 5. The finances of the Old Colony Street Railway are familiar to the commission. The company paid a 4 per cent dividend last year and less the year before. The demands for improved and increased service keep increasing, but they cannot be met from the earnings. Regarding complaints about the service, Mr. Warren cited the difficulties of handling without delays sudden rushes of travel on single-track lines where the normal traffic is light. He brought out the point that certain complaints of delays had never been called to the attention of the company's officials. The Old Colony Street Railway is single track from the city line to Lund's Corner, while the Union Street Railway operates a double-track line from Lund's Corner to the center of the city. The cars operated on the through route are of the semi-convertible type, seating 40 passengers each. Figures prepared for the week of July 18 to 24 for the 5:45 p. m. car showed very little crowding:

PASSENGERS COUNTED.

	July 18	July 19	July 20	July 21	July 22	July 23	July 24
Regular Car.....	34	39	27	25	30	47	64
Extra Car.....	..	30	46	51	35	..	..

The extra car followed the regular as a double header. This car was selected as the complaints of the service centered on it.

H. H. Crapo, president of the Union Street Railway, New Bedford, said that the city is about 12 miles long by 3 miles wide, and that the Union Street Railway would have to charge a 10-cent fare from the center of the city to the city line if it owned the present line of the Old Colony Street Railway from Lund's Corner to the boundary. The distance from the center of the city to Lund's Corner is 3.5 miles, making the total distance 8.5 miles, with two 5-cent fares. The company is charging a 10-cent fare for a ride of the same distance in every other direction. Nowhere does a 5-cent charge exist on the system for such a long distance. The petitioners have assumed that the city line is naturally the fare limit, which is peculiarly not the case in a long and narrow city like New Bedford.

Chariman Hall, of the commission, endeavored to obtain an explanation from the petitioners of how they would divide the proposed 5-cent fare between the two companies, and brought out the point that there is no obligation on the part of the Old Colony Street Railway to carry patrons at less than 5 cents each. The Union Street Railway holds no franchise between Lund's Corner and the city line, and no statute is known which would compel the Old Colony Street Railway to sell its line. The case was taken under advisement.

Near-Crossing Stops in Buffalo

On Sunday, Aug. 22, the International Traction Company began stopping its cars in Buffalo at the near side of the street. The notice by the company to its employees regarding the change was dated Aug. 19, and follows:

"On and after Sunday, Aug. 22, 1909, trainmen operating cars in the city of Buffalo will stop to receive and discharge passengers at the first crossing, only, of streets, and where signs reading, 'Cars Stop Here' are located, and it must be remembered that where these signs are located cars will stop in both directions. Inspectors will give this order attention, and see that it is properly carried out."

The daily press made mention of the change several days before the new rule went into effect and the public seemed to understand and follow the order very quickly. For several days the company had a number of special employees and inspectors stationed at the points of heavy traffic to direct passengers, and this helped materially to expedite travel.

Employees of Municipal Line Ask Increase in Wages.—The employees of the Calgary Street Railway, owned and operated by the City of Calgary, Alberta, Can., have asked for an increase in wages from 21½ cents an hour to 25 cents an hour, the increase to date from Oct. 1, 1909. The City Council has replied that the conditions of service on the line do not warrant the increase.

Hearing on Application for a Reduction in Fare on New York State Line.—The application of the citizens of Chemung for a reduction in the passenger rate on the Elmira, Corning & Waverly Railroad, Waverly, N. Y., between Holbert's Crossing and Chemung from 10 cents to 5 cents was heard by Martin S. Decker, of the Public Service Commission of the Second District of New York, on Sept. 8. Decision was reserved.

Additional Freight Stations in Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company is erecting four small freight stations along its Willow Grove and Doylestown line to accommodate shippers of garden produce. The company has a small milk traffic on this line which amounts to $800 or $900 a month. As there seems to be a demand for electric railway transportation for farm products, the company is taking steps to accommodate this traffic. The company has not yet made rates for this line.

Frauds in Connection With Accidents in Louisville.—James O'Brien, a former employee of the Louisville (Ky.) Railway, who was indicted in June, 1909, on a charge of perjury in connection with testimony given in a suit growing out of a street railway collision in Louisville, has been apprehended by the company in Boston, and will be arraigned at the fall term of the Circuit Court at Louisville. O'Brien was the motorman of a car of the Preston Street line in Louisville which collided with a car of the Market Street line. A number of suits were filed for damages, and O'Brien is accused of having made an affidavit to the effect that a Mr. Sutton was a passenger on the car which he operated, when in reality Mr. Sutton was a passenger on the Market Street car and was uninjured. James Hubbard and Luke Hubbard have been held in $1,000 bail each for the October grand jury at Louisville for complicity to defraud the Louisville Railway through a "fake" accident. Maggie Tabler, who was associated with the men, turned State's evidence.

Finding of Investigating Committee in Spokane & Inland Empire System Wreck.—Several persons were killed and a number were injured on July 31, 1909, in a head-on collision between two trains of the Spokane & Inland Empire System near La Crosse, Idaho. Following the accident a committee consisting of three members of the Coeur d'Alene Chamber of Commerce, three members of the Spokane Chamber of Commerce, Mayor Boyd Hamilton of Coeur d'Alene, Fred C. Pugh, prosecuting attorney of Spokane County, and E. O. Connor, corporation counsel of Spokane, at the invitation of the Spokane & Inland Empire System, investigated the accident and has filed its report with Graves, Kizer & Graves, attorneys for the Inland Empire System. At the request of the committee it was provided with a train which was a duplicate of the special train in the accident. This train was run past the station at Gibbs at a rate of 25 miles an hour, the brakes were applied as the motor car passed the depot and the train was stopped within 200 ft. and at a point 60 ft. east of the place where the wreck occurred. The trains that collided were No. 5 and No. 20. Train No. 5 was in charge of Conductor Whittlesey and Motorman Campbell. Regular Train No. 20 was in charge of Motorman Delaney. Train No. 20 had been brought practically to a full stop by the motorman when the collision occurred. In placing the responsibility for the accident the committee concludes: "We find that the wreck was due, first, to the fact that Motorman Campbell violated the rules of the company and his orders in running past the 'Y' onto the main track on the time of regular passenger train No. 20; second, to the fact that Conductor Whittlesey commenced to take up tickets without watching to see that the train did not pass the 'Y,' and he violated his orders and the rules of the company; and third, to the fact that Motorman Campbell did not see No. 20 until within 250 ft., whereas the condition of the track permitted him to have seen No. 20 when 800 ft. away."

Personal Mention

Mr. L. S. Storrs has been elected president of the Marlboro & Westboro Street Railway, Westboro, Mass., to succeed Mr. F. H. Dewey.

Mr. F. H. Dewey has been elected vice-president of the Marlboro & Westboro Street Railway, Westboro, Mass., to succeed Mr. L. S. Storrs.

Mr. J. F. Beyer has resigned as vice-president of the Winona Interurban Railway, Winona Lake, Ind., and is succeeded by Mr. C. O. Johnson.

Mr. H. C. Anderson has been elected secretary of the Winona Interurban Railway, Winona Lake, Ind., to succeed Mr. S. C. Dickey, resigned.

Mrs. G. Bedell Moore has been elected president and a director of the Laredo (Tex.) Electric & Railway Company, to take the place of her husband, who died in October of last year.

Mr. Alexander Renick was elected second vice-president of the Philadelphia (Pa.) Rapid Transit Company on Sept. 15, to succeed Mr. C. O. Kruger, who has been elected president of the company.

Mr. C. O. Johnson has been elected vice-president and general manager of the Winona Interurban Railway, Winona Lake, Ind., to succeed Mr. J. F. Beyer as vice-president and Mr. S. C. Dickey as general manager.

Mr. S. C. Dickey has resigned as secretary and general manager of the Winona Interurban Railway, Winona Lake, Ind., and is succeeded as secretary by Mr. H. C. Anderson and as general manager by Mr. C. O. Johnson.

Mr. Hugh J. McGowan, president of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., and president of the Indianapolis & Eastern Railway, has returned to the United States greatly improved in health after spending 14 months in Europe.

Mr. W. R. Leonard has been appointed assistant treasurer of the Everett Railway, Light & Water Company, Everett, Wash., to succeed Mr. R. E. Maxfield, resigned, who has accepted the position of auditor of the Seattle *Post-Intelligencer.* Mr. Leonard was formerly connected with the Northern Texas Traction Company, Ft. Worth, Tex.

Mr. A. A. Lightfoot has been appointed general superintendent of the People's Traction Company, Galesburg, Ill. Mr. Lightfoot was auditor of the Hartford & Springfield Street Railway, Hartford, Conn., for several years. Later he was assistant manager of the Lowell & Fitchburg Street Railway, Ayer, Mass.; general manager of the Mankato (Minn.) Traction Company, and general superintendent of the Elgin & Belvidere Electric Company, Chicago.

Mr. H. C. Page, who retired as general manager of the Springfield (Mass.) Street Railway to become general manager of the Worcester (Mass.) Consolidated Street Railway and affiliated companies, was tendered a banquet by the officers and employees of the Springfield Street Railway at the Highland Hotel, Springfield, recently. During the dinner Mr. William F. Haley, representing the Springfield Street Railway Employees' Association, presented Mr. Page with a diamond pin as a mark of esteem.

Mr. H. E. Farrington has been appointed superintendent of the Lowell division of the Boston & Northern Street Railway, Boston, Mass., to succeed Mr. W. A. Maloney, resigned. Mr. Farrington's experience covers many years of service with the Lynn & Boston Street Railway and the Boston & Northern Street Railway. Mr. Farrington was also connected with the United Railroads of San Francisco as superintendent of car repairs. Since returning from San Francisco to the East about two years ago, he has been superintendent of car equipment of the Boston & Northern Street Railway at Chelsea. In 1903 Mr. Farrington was president of the New England Street Railway Club.

Mr. L. C. Oswold was recently appointed superintendent of the Columbus, Marion & Bucyrus Railroad, Marion, Ohio. On Sept. 8 this company was placed in the hands of Mr. George Whysall, the general manager of the company, and Mr. Eli M. West as receivers. The Columbus, Marion & Bucyrus Railroad was built by Mr. John G. Webb, president of the Columbus, Delaware & Marion Railway, which is also in the hands of Mr. George Whysall and Mr. Eli M. West as receivers, they having been appointed on Aug. 7, 1909. Mr. Oswold has been connected with the Columbus, Delaware & Marion Railway for the last seven years in various capacities. During the construction of the road he was employed in the office of the chief engineer. Later he was agent, clerk in the office of the master mechanic and clerk in the office of the superintendent, and for the last five years has been chief clerk to Mr. Whysall, who has been general manager of the Columbus, Delaware & Marion Railway and Columbus, Marion & Bucyrus Railroad.

Mr. W. A. Maloney has resigned as superintendent of the Lowell division of the Boston & Northern Street Railway, Boston, Mass., and Mr. H. E. Farrington has been appointed to succeed him. Mr. Maloney was born in Rutland, Mass., in 1869. At an early age he moved to Worcester, Mass., and in 1888 entered the employ of the Worcester Consolidated Street Railway. At that time the system consisted of only 28 miles of track, and Mr. Maloney occupied various positions until 1898, when he was given charge of transportation. Early in 1901 the street railway companies at Worcester were consolidated, forming a system with about 125 miles of track. Mr. Maloney remained at Worcester for a short time after the consolidation, resigning from the consolidated company to become superintendent of the Manchester (N. H.) Street Railway. Subsequently he became superintendent of the Lowell division of the Boston & Northern Street Railway.

Mr. Arthur N. Dutton, formerly superintendent of transportation of the Brooklyn (N. Y.) Rapid Transit Company, was tendered a banquet by the Brooklyn Rapid Transit Employees' Benefit Association, of which he was formerly president, at the main building of the association in East New York on the evening of Sept. 2. Officers and employees of the company to the number of 2000 are estimated to have been present. Music was furnished by the band composed of employees of the company, which is under the direction of Mr. Emil Reichardt. During the evening Mr. J. Stoll, one of the trustees of the association, presented Mr. Dutton with a silver loving cup as a present from the men. Mr. Dutton now is vice-president and general manager of the Peerless Motor Car Company, New York.

Mr. John B. Crawford, recently general superintendent of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., has been appointed superintendent of the Winona Interurban Railway, Warsaw, Ind. Mr. Crawford has been connected with railway work for about 15 years. He began his career with the Hartford (Conn.) Street Railway and subsequently has been connected with the Groton & Stonington Street Railway, New London, Conn., as superintendent; with the Fort Wayne & Wabash Valley Traction Company as superintendent of transportation and with the Lexington Railway & Lighting Company as general manager. Resigning from the Lexington Railway & Lighting Company, Mr. Crawford re-entered the employ of the Fort Wayne & Wabash Valley Traction Company as general superintendent.

Mr. Thomas McCaffery, formerly division superintendent of the Los Angeles division of the Southern Pacific Railway, has recently been appointed general superintendent of the Pacific Electric Railway and the Los Angeles Interurban Railway. Mr. McCaffery began service with the Southern Pacific Railway system 30 years ago as a telegraph operator. He successively occupied the positions of operator, dispatcher, chief dispatcher, trainmaster and division superintendent of the Los Angeles division of the company. About two years ago Mr. McCaffery was appointed master of transportation of the Pacific Electric Railway; later he was made superintendent of transportation and within a few months has been made general superintendent of the Pacific Electric Railway and the Los Angeles Interurban Railway. The entire responsibility for the freight and passenger department of 600 miles of interurban railway is Mr. McCaffery's as general superintendent of the Pacific Electric Railway and the Los Angeles Interurban Railway.



T. McCaffery

Mr. John B. Parsons, president of the Philadelphia (Pa.) Rapid Transit Company, tendered his resignation at a meeting of the board of directors of the company on Sept. 9. Mr. Parsons said that he had reached an age when he felt that he should be relieved of the arduous duties of president and expressed a desire not to be considered a candidate for re-election. At a meeting of the directors, on Sept. 15, a new office, chairman of the board of directors of the company, was created, and Mr. Parsons was elected to that position and Mr. C. O. Kruger, second vice-president and general manager of the company, was elected presi-

dent. Mr. Parsons was born on May 17, 1850, at Whitesville, Del. When he was only six years old the family moved to Salisbury, Md., where Mr. Parsons' father engaged in mercantile business, at which he continued for more than 20 years. Mr. Parsons attended Salisbury Academy until he was 16 years old. He intended to go to Princeton, but abandoned this plan and became assistant station agent at Salisbury on the Delaware Railroad. The prospects for advancement with the Delaware Railroad were meager and Mr. Parsons decided to live in Philadelphia. Shortly after going to Philadelphia he became connected with the Chestnut & Walnut Streets Passenger Railway, known as the Philadelphia City Passenger Railway, as a conductor. After serving two years in this capacity, Mr. Parsons was made manager of a branch line of the Chestnut & Walnut Streets Passenger Railway which intersected the main stem at Forty-fourth Street and Darby Road and extended into the suburbs about five miles, ending at the village of Darby. In 1881 the late Robert N. Carson and Mr. William H. Shelmerdine, Mr. William Wharton, Jr., and others, purchased the Lombard & South Streets Railway, extensively used by the market people. Mr. Parsons was placed in charge of the property, and soon reduced the fare on this line to 5 cents and made it a profitable undertaking. In January, 1886, Messrs. Carson and Shelmerdine secured the control of the People's Railway and leased the Germantown Passenger Railway and the Green & Coates line, and Mr. Parsons was called to take charge of the system. He was then at the head of a street railway combination representing 65 miles of road and property valued at $12,000,000. In the latter part of 1887 Messrs. Elkins, Widener and Kemble made Mr. Parsons an offer to take charge of the West Chicago Street Railway in Chicago, and he accepted. Mr. Parsons remained in Chicago 10 years. On Dec. 13, 1896, he was elected vice-president and general manager of the Union Traction Company, Philadelphia, to succeed Mr. J. R. Beetem. At the same time Mr. John Lowber Welsh was elected president of the company. Mr. Parsons assumed his new position with the Union Traction Company on Jan. 1, 1897. In September, 1897, he was elected a director of the company, and on Sept. 26, 1898, he was elected president of the company. Upon the organization of the Philadelphia Rapid Transit Company he was elected president. It is understood that for some years Mr. Parsons has been anxious to be relieved of the arduous work inseparably connected with the duties of president, but has remained in that position at the instance of his associates in the Philadelphia Rapid Transit Company.

Mr. Charles O. Kruger, second vice-president and general manager of the Philadelphia (Pa.) Rapid Transit Company, was elected president of the company at a meeting of the board of directors on Sept. 15 to succeed Mr. John B. Parsons, who was elected chairman of the board of directors of the company. Mr. Kruger was born on Dec. 14, 1864, in Germantown, Pa., and was educated in the public schools of Philadelphia and at the Germantown Grammar School, from which he was graduated in 1882. In February of the same year he entered the employ of the banking firm of S. & W. Welsh, where his aptness led to rapid promotion in positions of responsibility connected with the enterprises in which the firm was interested. In 1892 Mr. Kruger was elected secretary and treasurer of the Penn Traffic Company, and the year following was elected to the same offices with the People's Traction Company. When the Union Traction Company was formed in 1895, Mr. Kruger was elected secretary and treasurer of that company, and held these positions until he was appointed general manager and elected vice-president of the company in 1898. He was elected second vice-president and appointed general manager of the Philadelphia Rapid Transit Company in 1902. In each position his work brought him in close contact with every department of railroading, so that his election as president of the Philadelphia Rapid Transit Company follows 17 years' practical experience covering the financial, mechanical and operating departments. Mr. Kruger will continue to act as general manager of the company.



C. O. Kruger

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS.

***Adel City Railway, Des Moines, Ia.**—Incorporated to construct an interurban railway from Des Moines to Adel. Capital stock, $10,000. Incorporators: Dan A. Blanchard, L. M. Macy, W. B. Kinnick, Robert Pilmer, F. F. Flynn, B. J. Flynn, R. L. Parrish and H. A. Smith.

***Kentucky Rapid Transit Company, Louisville, Ky.**—Incorporated under the laws of Delaware for the purpose of taking over various traction companies and interurban lines in Kentucky. Its principal operations will, at first, be Louisville, Lexington and Frankfort, Ky. The company is also authorized to operate electric light and gas plants. Capital stock, $10,000,000, $2,500,000 of which is preferred stock and $7,500,000 is common stock. Samuel M. Clement, Jr., West End Trust Building, Philadelphia, Pa., is said to be interested.

***People's Street Railway, Cleveland, Ohio.**—Incorporated in Ohio to construct an electric street railway in Cleveland. Capital stock, $10,000. Incorporators: Thomas J. Dolan, Miles Dodd, Hugh McConnaughy, Robert Johnstone and Francis E. Cottier.

Fort Worth, Mineral Wells & Northwestern Interurban Railroad, Fort Worth, Tex.—Application for a charter has been made by this company, which proposes to build an electric railway from Fort Worth to Mineral Wells via Weatherford, a distance of 54 miles, and later on to Roswell, N. M. Capital stock, $100,000. Incorporators: L. C. Cole and Paul S. Hurley, Fort Worth; J. S. Hanford, Beaumont, and James A. Watkins, Little Rock, Ark. [E. R. J., Jan. 9, '09.]

***Newport News & Yorktown Railway, Newport News, Va.**—Incorporated to build a railway from Newport News to Yorktown, a distance of 20 miles. Capital stock, $25,000. Officers: W. T. Chapin, Newport News, president; Alvah H. Martin, Norfolk County, vice-president, and C. P. Jones, secretary and treasurer.

***Tum Tum Mountain Railway, Vancouver, Wash.**—Incorporated to build an electric railway to connect Chelatchie, Prairie, Amboy, View, La Center and Ridgefield, a distance of about 40 miles. Headquarters, Vancouver. Incorporators: A. Aronston, H. J. Hener and others.

FRANCHISES

Watertown, Ill.—The Tri-City & Northeastern Interurban Railway, Port Byron, has applied to the Board of Trustees for a franchise to operate its proposed electric railway in Watertown. The railway will extend from Watertown to Albany. [E. R. J., July 24, '09.]

Fort Wayne, Ind.—The Fort Wayne-Bryan Electric Railway has applied to the County Commissioners for a franchise to build an electric railway from the State line to Reed's Corner. The railway is to extend from Fort Wayne to Bryan, Ohio, a distance of about 41 miles. Edgar A. Tennis, Fort Wayne, promoter. [E. R. J., July 3, '09.]

South Bend, Ind.—The Commissioners of St. Joseph County and Marshall County have granted franchises to the South Bend & Logansport Traction Company, recently incorporated, to build an interurban railway to connect South Bend, Plymouth, Rochester and Logansport, about 70 miles distant, to operate its line through these counties from South Bend to Logansport via Plymouth. If this railway is built there will be a continuous electric interurban line from Chicago to Louisville via Indianapolis. Thos. P. Moredock is said to be interested. [E. R. J., Sept. 4, '09.]

South Amboy, N. J.—The City Council has granted to the Jersey Central Traction Company, Keyport, a franchise to build its proposed extension through South Amboy to Perth Amboy.

***Lawton, Okla.**—Applications have been made to the City Council by J. S. Danneck and D. L. Sleeper for a franchise to operate a street railway in Lawton.

Woodburn, Ore.—The City Council has granted a franchise to the Oregon Electric Railway, Portland, to operate a street railway in Woodburn. The franchise provides that the company must commence work within two months. The railway is a branch of the main route from West Woodburn to Woodburn, 3 miles.

Gettysburg, Pa.—The Town Council has granted the Hanover & McSherrystown Street Railway, Hanover, a franchise to enter Gettysburg at its eastern boundary and run

a single-track railway on Hanover and York Streets and 60 ft. into Center Square. [E. R. J., Sept. 11, '09.]

*Beaver Falls, Pa.—W. C. Cunningham and George W. Reynolds, representing Philadelphia capitalists, it is stated, will soon petition the City Council for a franchise to build an electric railway over certain streets of Beaver Falls to connect with New Castle. The route of the proposed line is along the west bank of the Beaver River, by way of Wampum, Koppel and Homewood.

West Newton, Pa.—The Pittsburgh, McKeesport & Westmoreland Railway has been granted a franchise by the City Council to build an electric railway in West Newton. The company has given a $5,000 bond to complete the line within a year.

Longueuil, Que.—The Montreal & Southern Counties Railway, Montreal, has been granted a 24-year franchise to build a street railway in Longueuil. The railway will connect Montreal, St. Lambert, Longueuil, Chambly, La Prairie and St. Johns, about 15 miles distant. Marcus S. Hill, 112 St. James Street, Montreal, secretary. [E. R. J., May 29, '09.]

*Haskell, Tex.—M. R. Hemphill has applied to the City Council for a franchise to build a street railway in Haskell. The railway will be 3½ miles in length.

Bellingham, Wash.—The Whatcom Railway & Light Company has accepted the franchise for the Happy Valley extension of the Harris Avenue line. The extension will be about 1 mile in length.

Charleston, W. Va.—The Kanawha Valley Traction Company has applied to the City Council for a franchise to extend its street railway system on Russell Street, so as to connect its present lines on the West Side with the bridge of the Kanawha Bridge & Terminal Company at Seventh Street. J. C. Rockwell, Charleston, superintendent.

Milwaukee, Wis.—The City Council has granted a franchise to the Milwaukee Electric Railway & Light Company to operate its electric railway on Sycamore Street, on Second Street and on Cass Street.

TRACK AND ROADWAY

Birmingham & Edgewood Electric Railway, Birmingham, Ala.—It is reported that grading has been started by this company on its electric railway from the end of the South Highlands line to Red Mountain, a distance of 3½ miles. G. T. Brazelton, secretary and treasurer. Headquarters, 103 North Twentieth Street, Birmingham. [E. R. J., Aug. 7, '09.]

Northern Electric Railway, Chico, Cal.—It is stated that this company will, as soon as the necessary capital is obtained, construct a branch line to Colusa. The franchise has already been secured.

Pacific Electric Railway, Los Angeles, Cal.—It is stated that this company will extend its railway 12 miles from La Habra Valley eastward through the valley to a point on Santa Ava River.

*Mill Valley, Cal.—A company has been organized to build an electric railway from Locust Avenue station in Mill Valley through the Muir Woods to Lagoon, with John Dias as president; James V. Chase, secretary, and Judge Conlon and D. C. Braid, directors.

West Chester & Wilmington Electric Railway, Wilmington, Del.—This company, which is to construct an electric railway 17 miles in length between the two named cities, will shortly begin operations. Surveys have been made and all right of way has been secured. The road is through a fertile and rapidly developing farming and dairying district, and will serve a population of 125,000. St. George H. Cooke, Real Estate Trust Building, Philadelphia, engineer, and Sydney Kenney, Land Title Building, Philadelphia, is interested. [E. R. J., March 6, '09.]

Rock Island Southern Railroad, Monmouth, Ill.—Officials of the Rock Island Southern Railroad are reported to have announced that cars will be running over its new extension from Monmouth to Rock Island by Dec. 1, 1909. The work of grading is progressing satisfactorily and the construction of the necessary bridges is well under way. At Monmouth a large gang of men is at work laying track.

Chicago, Kankakee & Urbana Railroad, Paxton, Ill.—The Chicago, Kankakee & Urbana Railroad has been organized to succeed the Chicago, Kankakee & Champaign Electric Railway, which had been dissolved and its board of directors ordered to sell all the property. The new company will buy all rights of the old company. The directors elected are: Ira Palmer, R. F. Cummings, Upton Schaub, C. E. Thrasher, Frank J. Hennessey, William J. Brock, George W. Bennett, W. J. West and W. D. Moore, Jr. The directors organized by electing William J. Brock, Kankakee, president; Ira F. Palmer, Onarga, first vice-president; George N. Bennett, Urbana, second vice-president; Frank J. Hennessey, Chebanse, treasurer; William M. Hickey, Kankakee, secretary; Ira F. Palmer, Onarga; R. F. Cummings, Clifton, and W. J. West, Gilman, executive committee. [E. R. J., July 24, '09.]

Indiana North-Western Traction Company, Monticello, Ind.—W. F. Brucker, Monticello, secretary, confirms the report that this company has been incorporated to build an electric railway from Lafayette to Hammond via Logansport. Officers: Eugene Puntelle, 222 La Salle Street, Chicago, Ill., president, and Geo. A. Haskell, Chicago, treasurer. [E. R. J., Sept. 11, '09.]

Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind.—The Union Trust Company, 116 East Market Street, Indianapolis, receiver for this company, has let the first contract for the completion of this electric railway to W. C. Miller, Indianapolis, having authority to issue $460,000 in receiver's certificates by the order of the Superior Court of Indianapolis.

Iowa Light & Traction Company, Eldora, Ia.—It is announced that this company, through its local representative, J. H. McBride, has made a proposition to the Marshalltown, Ia., Council to build an interurban railway from Marshalltown to Grundy Center and from Marshalltown to Ames, Ia., within three years, and guaranteed by a forfeiture bond of $50,000, providing the company be granted a franchise. The company also proposes to buy the property of the Marshalltown Light, Power & Railway Company, and to extend this company's line to the city park and fair grounds. Andrew Stevenson, 153 La Salle Street, Chicago, Ill., president and general manager. [E. R. J., Sept. 4, '09.]

Red Oak & Northeastern Railway, Red Oak, Ia.—It is announced that this company is preparing plans to begin construction on this electric railway from Red Oak through Greenfield to Des Moines, a distance of 110 miles. W. L. Battin, Greenfield, president, and W. L. Sonntag, general manager. [E. R. J., Aug. 29, '08.]

*West Union, Ia.—It is stated that B. W. Newberry and J. C. Flenniken, Strawberry Point, are interested in a proposition to build next season a 20-mile electric railway from Oelwein to Strawberry Point.

Waldo Street Railway, Rockland, Maine.—Maynard S. Bird, who is interested in this electric railway to connect Camden, Northport and Belfast, a distance of 19 miles, states that only the surveys and right of way have been secured. An organization will be effected this winter and construction will be started next spring. The power house, repair shops and amusement park will be located at Rockland. The company also expects to furnish power for lighting. [E. R. J., Aug. 14, '09.]

Missoula (Mont.) Street Railway.—It is stated that this company has awarded the contract to construct the grade of this electric railway from Pine Street to East Missoula, 2½ miles distant, to Clinton & Rumelhart, Missoula. The company also awarded the contract for the construction of two trestles, one at East Missoula, and the other to span the Rattlesnake River, to Milberry & Weaver, Missoula. It is understood that the company will lay its own rails when the grading is finished. W. A. Clark and others are interested. [E. R. J., Sept. 4, '09.]

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb.—It is reported that this company will resume work on its electric railway, which is to connect Lincoln, Bethany Heights, University Place, Omaha, Papillion, Springfield and Waverley, a distance of 56 miles. It has been completed between Lincoln, University Place and Bethany Heights, 5 miles. E. C. Hurd, secretary.

Hudson & Manhattan Railroad, New York, N. Y.—This company has obtained permission of the Street and Water Board of Jersey City, N. J., to extend its Cortlandt Street tunnel under Railroad Avenue to Summit Avenue.

Sandusky, Norwalk & Mansfield Electric Railway, Norwalk, Ohio.—This company is said to be planning to build an extension from Mansfield to Bucyrus, 30 miles distant. It is expected that the company will issue about $750,000 in bonds for the construction of this new branch. The company also proposes to build a new line from Mansfield to Shelby, 10 miles, to connect with the Mansfield and Bucyrus branch.

Toledo, Columbus, Springfield & Cincinnati Railway, Toledo, Ohio.—At a meeting held in the Spitzer Building, Toledo, Ohio, recently, the following Toledo men were named for members of the board of directors of this company: M. Seyfang, S. C. Heston; A. Beesch, Dr. S. S. Thorn and William P. Heston. The company was incorporated several years ago, and at present 85 per cent of the right-of-

way between Lima and Bellefontaine, as well as 90 per cent of the rights between Lima and Toledo, has been secured. Some grading has also been done. The company plans to build a railway between Toledo and Cincinnati through Lima, Belefontaine, Columbus and Springfield.

Southwestern Interurban Railroad, Mangum, Okla.—It is reported that engineers have completed the field work and will soon be ready with a report for the electric railway which is to connect Mangum, Granite, Altus, Blair, Hollis, Vinson, Reed and Cordell, 22 miles distant. J. W. Solomon, Reed, president; H. M. Ferguson, Mangum, vice-president, and J. C. McCollister, secretary. [E. R. J., Oct. 31, '08.]

Oklahoma Union Traction Company, Tulsa, Okla.—It is stated that this company has begun grading in Tulsa for its first proposed railway which will extend to Orcutt's Lake, a resort 3 miles distant. The railway will be built to Sapulpa, a distance of 20 miles. Albert A. Small and G. C. Stebbins, Tulsa, are said to be interested. [E. R. J., June 26, '09.]

West Tulsa Belt Line Railway, Tulsa, Okla.—It is reported that construction work on this railway has been started. The line will extend through Tulsa, and will be 5 miles in length. W. E. Hawley and Gray Erick are interested. [E. R. J., July 10, '09.]

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—This company is in the market for material for 8 miles of single track for its extension from Welland to Port Colborne. E. F. Seixas, general manager.

***Hartland, Ont.**—John E. Stewart and Hon. A. B. Donworth are said to be interested in a plan to build an electric railway from Hartland to Foreston, N. B.

***Port Arthur, Ont.**—The City Council is said to be endeavoring to organize a company to operate street railways in several adjoining townships in conjunction with the municipal system in Port Arthur. Address J. J. Carrick, Port Arthur, Ont.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa.—It is announced that this company has received bids for the excavation work on the proposed extension from McKeesport to Westmoreland, a distance of 19 miles. It is the intention to have this new line in operation within a year.

McKeesport & Portvue Street Railway, McKeesport, Pa.—It is reported by the Realty Company, McKeesport, that work on the proposed street railway between McKeesport and Portvue Heights will be started this month. Gilbert F. Myer, manager. [E. R. J., July 31, '09.]

Allen Street Railway, Nazareth, Pa.—This company expects to place contracts during the next two weeks for the construction of about 1200 ft. of pile trestle with a 30-ft. span Bethlehem girder bridge. The bridge will have concrete abutments and retaining walls. The average length of piles will be 25 ft.

Philadelphia & Suburban Elevated Railroad, Philadelphia, Pa.—S. S. Neff, president, advises that this company has not yet incorporated, but expects to in October. Construction will be started on the railroad as soon as franchise is granted. The railroad will be wholly in Philadelphia and will be standard gage. It will consist of 20 miles of single track, operated by 650-volt direct current and will be equipped with the third-rail system. Headquarters, 416 Franklin Bank Building, Philadelphia. F. T. Finch, secretary. [E. R. J., Sept. 11, '09.]

***Amarillo, Tex.**—Will O. Miller, Jr., Amarillo, is said to be interested in a projected electric railway between Amarillo and Canyon City.

***Walnut Spring, Tex.**—An interurban railway from Walnut Springs to Glenn Rose is being projected by Judge Sadler and J. H. Farr, Glenn Rose. The right of way and necessary franchises will be secured immediately. The survey has been completed and grading will be started soon.

Richmond & Henrico Railway, Richmond, Va.—This company, which was recently granted an extension of time by the City Council for the construction of its proposed railway and a viaduct, has deposited $10,000 with the city clerk to hold the franchise and as evidence that construction would be begun within 30 days after the deposit had been made. John C. Hagan, secretary and treasurer. [E. R. J., June 19, '09.]

***Charleston, Montgomery & Eastern Railway, Charleston, W. Va.**—It is reported that this company is making a preliminary survey for the electric railway which is to connect Charleston with Gauley Bridge, 38 miles, by the way of Montgomery, Camelton and Kanawha Falls. Charles K. McDermott is engineer in charge at Charleston, W. Va.

Fairmont & Northern Traction Company, Fairmont, W. Va.—This company has completed its organization by electing the following officers: S. L. Watson, president; C. E. Watson, vice-president; Walton Miller, secretary and treasurer, and S. B. Miller, chief engineer. The company will start the construction of an electric railway from Fairmont to Fairview within a short time. [E. R. J., Aug. 28, '09.]

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company has arranged with the authorities of Racine to build a viaduct on East State Street across the tracks of the Chicago, Milwaukee & St. Paul Railroad. The company will pay $12,000 of the cost and the city the remainder.

SHOPS AND BUILDINGS

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—This company expects to place a contract during the next two weeks for the construction of a car house, repair shops, etc.

Mason City & Clear Lake Railway, Mason City, Ia.—It is announced that this company will immediately start construction of the car house which it proposes to build at Emery. The building will be 210 ft. x 55 ft. with 4 tracks and a storage capacity of 16 cars. Cement blocks will be used in the construction.

Rochester (N. Y.) Railway.—This company is erecting a concrete storehouse on Blossom Road, 100 ft. x 40 ft., two stories high in front, and but one story high in the rear. Track connections will be made with the company's own line and the New York Central & Hudson River Railroad, so as to facilitate the handling of shipments. The second floor of the two-story portion of the building will contain offices for the storekeeper, the yardmaster and other employees.

Hudson & Manhattan Railroad, New York, N. Y.—This company has leased for a period of 15 years three plots of ground required for a storage yard, station entrances and exits at Henderson Street and Grove Street, Jersey City, N. J.

Fargo & Moorehead Street Railway, Fargo, N. D.—This company is said to have let the contract to Bower Brothers, Fargo, for the construction of a brick and stone extension to its car house. The addition will be 236 ft. x 118 ft., and will cost $4,000.

Ohio Electric Railway, Cincinnati, Ohio.—It is announced that bids have been received for the construction of the interurban depot to be erected in Lima by this company. The station is to be of concrete and brick, 2 stories in height and will cost about $50,000. The second floor will be occupied by the traffic department. There will be 6 tracks on the main floor of the building. The Western Ohio Railway will also use the depot for its division between Toledo and Dayton.

Port Arthur & Fort William Electric Railway, Port Arthur, Ont.—The Municipal Commission on street railways has decided to erect a car house at Port Arthur for its street railway which it operates in Port Arthur and Fort William.

Texas Traction Company, Dallas, Tex.—This company has in course of erection in Richardson, Tex., a brick and steel depot, which will cost about $2,500 when completed.

POWER HOUSES AND SUBSTATIONS

Washington, Baltimore & Annapolis Railway, Washington, D. C.—This company has awarded a contract to Edward Watters & Company for the erection of a substation at Ardmore, Md., at a cost of $8,000.

Illinois Traction System, Champaign, Ill.—It is stated that this company will presently erect a power station at Venice, Ill., which will have a capacity of 10,000 hp. The plant, which is estimated to cost $500,000, will be used on the southern division of the system.

Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind.—It is stated that arrangements have been made for the installation of the electric machinery and equipment in the power house of this company at New Castle at once. This equipment was partially installed previous to the appointment of the Union Trust Company, as receiver, and was subsequently removed.

Port Arthur & Fort William Railway, Port Arthur, Ont.—This company has recently purchased a 500-hp motor generator set from the Allis-Chalmers-Bullock Company.

Spokane, Walla Walla & Western Railway, Walla Walla, Wash.—It is reported that the survey is completed for the power plant of this company. L. C. Goodwin, engineer, has obtained a proposed power site which will develop about 4500 hp, sufficient to operate the proposed railway. E. M. Symonds and M. S. Parker are interested. [E. R. J., Aug. 28, '09.]

Manufactures & Supplies

ROLLING STOCK

Walkill Transit Company, Middletown, N. Y., is in the market for three double-truck closed cars.

Municipal Tramways, Calgary, Alt., it is reported, will purchase six more cars of the pay-as-you-enter type.

Shore Line Electric Railway, New Haven, Conn., is ready now to purchase six cars, as mentioned in the Electric Railway Journal of Feb. 20, 1909.

Vandalia Railroad, Pittsburgh, Pa., is reported to be planning the purchase of two gasoline motor cars for use on the Butler (Ind.) branch of that railroad.

Spokane & Inland Empire Railroad, Spokane, Wash., it is reported, has ordered 16 cars from The J. G. Brill Company.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has ordered 12 city and six interurban cars from the Niles Car & Manufacturing Company, it is reported.

Northwestern Elevated Railroad, Chicago, Ill., mentioned in the Electric Railway Journal of Aug. 28, 1909, as planning the purchase of 20 cars, denies that it is in the market for any new cars.

Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., has ordered two cars of the pay-as-you-enter type from the American Car Company. This company also expects to remodel a number of its cars for this service.

Chicago (Ill.) City Railway is rebuilding in its shops 45 double-truck cars which will be used on the Calumet & South Chicago Railway. The company will also remodel about 100 of its cars, it is reported, for pay-as-you-enter service.

Fairmont & Mannington Railroad, Fairmont, W. Va., is having an express car 44 ft. long over all built by the G. C. Kuhlman Car Company. Taylor trucks have been purchased for use under this car and a set of trucks of the same manufacture has been purchased for replacement.

Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind., is building an interurban passenger car in its shops at Ft. Wayne. It is reported that this company will rebuild a large number of its old type of cars during the coming winter. The company is also making plans to build an electric locomotive in its shops.

Detroit (Mich.) United Railways, reported in the Electric Railway Journal of Aug. 7, 1909, as having ordered 25 pay-as-you-enter cars from the G. C. Kuhlman Car Company, has drawn the following specifications:

Length of body...31 ft. 3 in.	Hand brakes.....Peacock
Length over bumpers, 42 ft. 3 in.	Headlights ..... Dayton
Width over posts at belt, 8 ft. 3½ in.	Sanders.....Detroit United
Sill to trolley base, 9 ft. 3⅜ in.	Seats, style, H. & K. No. 11-A
Curtain fix...Curtain S. Co.	Trolley retrievers....Wilson
Curtain material, Pantasote	Trucks.....Brill No. 27-F1
	Varnish.....Berry Bros.
	Wheels ..... Griffin

Parsons Railway & Light Company, Parsons, Kan., mentioned in the Electric Railway Journal of July 10, 1909, as having ordered seven 21-ft., single-truck, semi-convertible cars from the St. Louis Car Company, has only ordered five cars of this type, the details of which follow:

Seating capacity.....32	Curtain fixtures, Curtain Supply Company
Length of body.....21 ft.	Curtain material.....Crown
Length over vestibule, 31 ft.	Fenders ..... Eclipse
Width over sills, 8 ft. 1⅛ in.	Heaters ..... Consolidated
Width over posts at belt, 8 ft. 2 in.	Headlights ..... Dayton
Height top rail to sills, 2 ft. 7½ in.	Motors..two Bullock, yoke suspension
Body ..... wood	Seats .....St. Louis
Interior trim.....mahogany	Seating material..Pantasote
Underframe ..... wood	Step treads.....Mason
Bumpers ..... St. Louis	Trolley base.....St. Louis
Couplers ..... Tomlinson	Trucks.....Brill 21-E

TRADE NOTES

Pay-As-You-Enter Car Corporation, New York, N. Y., has licensed the Ft. Dodge, Des Moines & Southern Railway, Boone, Ia., to build several pay-as-you-enter cars.

T. H. Symington Company, Baltimore, Md., has opened a permanent office at 1912 Hudson Terminal Building, 30 Church Street, New York, N. Y., in charge of T. C. de Rosset.

American Brake Shoe & Foundry Company, Mahwah, N. J., has moved its branch office at Room 310 National German-American Bank, St. Paul, Minn., to 425 New York Life Building, Minneapolis, Minn.

Western Electric Company, New York, N. Y., reports a gain in gross sales for August, 1909, over August, 1908, of about 60 per cent. Estimates based on the earnings for the first nine months indicate gross sales for the year in excess of $47,000,000. There has been a specially good demand for cables and generating machinery.

Allis-Chalmers Company, Milwaukee, Wis., denies that any further additions to the West Allis works are contemplated. An extension to the Cincinnati works of the company is being made, however, which will give employment to about 1000 additional men. Construction work and the installation of new equipment were commenced there some weeks ago.

Alexander Milburn Company, Baltimore, Md., has enlarged its factory and increased its staff for the purposes of manufacturing the Milburn acetylene contractor's light. Among the recent purchasers of 5000-cp lights are Grant Smith & Company, and Locher, Gross Isle, Mich.; Smith-McCormick Company, Portland, Pa.; F. J. Romer Construction Company, St. Paul, Minn.; American Pipe & Construction Company, Rochester, N. Y.; Erie Railroad, Johnson-Dauchy & Carey Company, Mandan, N. D.; Meadows Company, Johnson City, Tenn.; United States Reclamation Service, and the United Engineering & Contracting Company, Lockport, N. Y.

A. Y. Evins, Atlanta, Ga., who has been connected with street railways in Atlanta, Mobile and Birmingham for many years, has associated himself with the More-Jones Brass & Metal Company, St. Louis. For the past few years Mr. Evins has been master mechanic of the Birmingham Railway & Light Company, a position which he resigned recently to become assistant manager of the railway department of the More-Jones Brass & Metal Company, which has been in the brass and metal business since 1874, specializing in railway bearings and castings. With the development of electric railways the company entered that field with its bearings, and has since put in a complete line of electric railway materials. Mr. Evins has a wide acquaintance among electric railway operatives, and his many friends will be glad to hear of his connection with the More-Jones Brass & Metal Company.

ADVERTISING LITERATURE

Arthur D. Little, Inc., Boston, Mass., has issued a booklet entitled "The Purchase of Coal."

Coates Clipper Manufacturing Company, Worcester, Mass., has issued Bulletin No. 22. Coates unit link, flexible shaft and drills, including the rail drill, are illustrated and described, together with other products of the company.

Frank Ridlon Company, Boston, Mass., has issued its list of second-hand electrical machinery for September, 1909. Accompanying the list is a four-page folder, in which the American no-slip pulley cement and its uses are described.

H. W. Johns-Manville Company, New York, N. Y., has issued a circular which has for its subject Morris metallic packing, made of a specially treated, soft, gray cast-iron, and intended for use with stationary and marine engines, gas engines, locomotives, steam pumps and air and gas compressors.

Valentine-Clark Company, Chicago, Ill., has reprinted from the New York American, as a placard, its cartoon entitled "Well, Look Who's Back!" the subject of which is the return of prosperity, pictured in the person of a much-be-jewelled man oozing money from every pocket and from a hand bag and with the so-called smile that won't come off. With the placard is a post card addressed to the Valentine-Clark Company on which inquiry may be readily made regarding prices on Michigan or Western cedar poles.

NEW PUBLICATIONS

Electric Power Conductors. By William A. Del Mar, New York, 1909: D. Van Nostrand Company. Cloth, 324 pages and index. Price, $2.

The author, who is assistant engineer of the electrical transmission department of the New York Central & Hudson River Railroad, has expanded his own working formulas, notes and data into a book of considerable size, which takes up in a practical way all of the engineering considerations involved in the design and installation of electrical power conductors for both alternating and direct current. The introductory chapters deal with the properties of conductors and are followed by an analysis of methods for determining the sizes of conductors, outline specifications, descriptions of various methods of testing and a few notes on installation of cables both overhead and underground. Chapters 10 and 11 deal with third-rail working conductors and rail bonding.

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The Hudson-Fulton Celebration

The festivities in New York next week in connection with the Hudson-Fulton celebration will probably be unequaled in extent of any previously conducted in this country and the city is prepared to accommodate a larger influx of strangers than ever before in its existence. As the entertainments will extend over an entire week and will be conducted in the different boroughs of the greater city, the requirements placed upon all of the local transportation lines will be most exacting and each is now preparing to take care of the traffic which will undoubtedly be presented. In one respect the situation is favorable because, owing to the scattered locations of the points of interest the entire brunt of the work will not fall continuously on the same line or lines during every day of the week. On the other hand, this condition has the disadvantage that it compels the use of different schedules by the various lines, depending upon the program followed each day. The fact that many of the leading features will occur on the Hudson River will shift the center of interest for several of the days to the border line between the States of New York and New Jersey, so that for these days the electric lines in the latter State, the Public Service Railway Company and the New Jersey & Hudson River Railway & Ferry Company, will be almost, if not quite, as much affected by the special demands for transportation as the New York City lines. Then as the festivities move north, following the course of discovery, the lines in Poughkeepsie, Kingston, Catskill, Hudson, Albany and Troy will successively have to cope with the wave of travel. It is safe to say that all records for travel in the towns along the Hudson will be broken during the two weeks from Sept. 25 to Oct. 9.

Electric Locomotive Design

The experimental geared type freight locomotive for the New York, New Haven & Hartford Railroad, which is described elsewhere in this issue, illustrates again the present tendency in the design of powerful electric locomotives to raise the motors above the axles and increase their size beyond the limited space between the wheels. Locomotives intended to run on standard-gage track are restricted as to width between the side frames, and the requirement of short wheelbase limits the longitudinal space between axles. There remains, therefore, but the one dimension of height above the rail in which expansion of the size of the motors can take place. To take advantage of this unrestricted space the motors of powerful locomotives must be mounted above the axles and some form of connecting drive employed. The use of side rods and crank arms is one method of doing this, and the spring-supported axle gears of the New Haven locomotive is another. Raising the motors above the axles also raises the height of the center of gravity of the locomotive and relieves the axles of dead load. Both are advantageous for producing easy riding and lessening the shocks on the track when running at high speeds. As the power of the locomotives has increased, the use of articulated trucks has become almost imperative in order to relieve the cab framing from the enormous buffing and tractive stresses produced. For single-phase

motors some means must be provided for smoothing out the pulsating torque produced. In the Schenectady side-rod locomotive a leaf spring flexible coupling was used between the armature shaft and the driving-rod crank-arm. The spring mounting of the axle gears of the experimental New Haven locomotive accomplishes the same purpose, and also compensates for any variation in distance between the centers of the armature shafts and the axles due to compression of the truck springs. The quill mounting of the armatures on the original New Haven locomotives has given no trouble in service, and none should be anticipated from the application of the somewhat different plan followed in the support of the gears, as its efficacy has previously been demonstrated in service.

Surprise and Efficiency Tests

In a paper read last week before the New York Railroad Club Frederick C. Syze, trainmaster of the Staten Island Rapid Transit Company, defined the terms "surprise" and "efficiency tests" as "the systematizing of the inspections and supervision of trainmen always carried on by able railway officers." The purpose of surprise tests is to keep those charged with the safety of train operation at all times up to a rigid observance of the rules laid down for their guidance. The experience of the railroads which have conducted these tests regularly in recent years proves that the practice is necessary and valuable. Mr. Syze said: "It is a sad commentary on our American methods that we install expensive signals and issue rigid instructions as to their operation and must then stand behind a tree to see whether or not the engineers pay any attention to them." This expresses in few words the fault and the remedy and it applies no less to electric railways than to steam roads. Even the best trainmen cannot be trusted altogether. They must be watched and know that they are being watched to keep them in the straight and narrow path of obedience to the rules.

Surprise testing is akin to "spotting," but of a different form and for a different purpose. The superintendent cannot ride the cars unknown to the trainmen and observe the every-day infractions of the rules which take place when supposedly no one is looking. Block signals, whistle posts and stop signs tell no tales of disobedience. Neither can the superintendent wait for a car house to catch fire to learn if all members of the car-house force know what their duties are in case of fire. The only method of providing for contingencies which may happen is to maintain the vigilance of all by surprise tests. Train and shopmen have no just cause for complaint against such a practice. It inflicts no hardship on those who do their duty, but is a form of legitimate inspection which can be conducted in no other way.

As already stated, the value of the surprise test applies with particular emphasis to the matter of fire drills. Great improvements have been made during the last few years in the science of protecting car houses and their contents from fire. While formerly the chief reliance was placed on pails of water or sand, there is now available a long list of apparatus for quickly extinguishing an incipient fire, as well as methods for summoning the fire department and for insuring regular inspection of the premises. The practical value of this apparatus, however, depends largely upon the vigilance of the men in charge. The automatic apparatus should be frequently inspected, to see that it is in good order, and the value of the non-automatic apparatus depends upon its prompt use by the men. The most important time for fighting a fire is that elapsing between its discovery and the arrival of the fire department. After the latter appears on the scene there is usually nothing more that the company can do, but before that time the men about the house are the only ones who can do anything, and as the fire is then small, it can often be successfully combated. Several severe losses have occurred recently because the men or man on the ground who discovered the fire did not know exactly what to do. The surprise drill, the only way of maintaining the efficiency of the fire fighting squad, is as important in railway work as the military drill in the army or target practice in the navy. Fire extinguishing apparatus alone may be of actual detriment if it inculcates a false idea of protection. It is a good thing to have a car house well supplied with such equipment, but it is far more important to have those who are to use it always ready to put their knowledge into effect.

Rowdyism in Cars

So far as we know, psychologists have never made a definite analysis of the moral instinct in boys, nor have accounted satisfactorily for the presence in them of a tendency to rowdyism under favoring conditions. If we accept the theory of Wordsworth, as expressed in his "Intimations of Immortality from the Recollections of an Early Childhood," we must explain this condition by considering it an occasional triumph of earthly instincts over celestial recollections. On the other hand, if we are disciples of the Darwinian theory we should undoubtedly conclude that the motives of those who have not reached maturity are influenced by an atavistic inheritance from far removed ancestors among the lower animals. In either case it is impossible to deny that there has been from time immemorial an almost irresistible tendency for the younger generation at times to perform acts more in harmony with the instincts of a wild Indian or Peck's bad boy than those taught in Dr. Blimber's school for polite young gentlemen, described by Dickens in "Dombey and Son."

Street railway companies are frequently the sufferers from this overabundance of spirits and it is often a problem to what extent the culprits should be punished. This question arose in Chattanooga recently. For some time it had been the practice of the boys of that town to celebrate Halloween night in a manner which we believe is sometimes practiced elsewhere and is not at all in consonance with the name of the festival, and among other playful pastimes were wont to indulge in that of greasing the rails and placing obstructions upon the tracks. Last year the company was prepared with a force of policemen for lawlessness of this kind and several high-spirited youths were promptly arrested when they attempted to repeat the jokes of a year before. They spent the night in jail, but later were released and then through their parents brought suit against the company for false imprisonment. The case

was not tried until last week, when it was promptly thrown out of court, and the judge took occasion to say that the punishment inflicted was by no means sufficiently severe for the offense committed.

One may make all the allowances he pleases for the excesses of youth so far as the destruction of his own property is concerned, but railway companies are responsible for the safe transportation of their passengers and for the maintenance of order in their cars, and a good-sized extinguisher should be dropped promptly over any attempt of rowdyism. It flourishes on nothing so much as toleration, and a quick trip to the courts will do more to teach general good behavior on cars than any other lesson. There was a similar outbreak recently on the New York subway, where, on one Sunday afternoon, returning parties of ball players commenced the practice of marching through the trains and knocking off the hats of passengers in spite of the efforts of the guards to stop them. An attempt to repeat this horse-play was made on the following Sunday, but it was soon stopped by a large number of officers in citizen's clothes. The conclusion of the performance was held at the courts with the principal actors as prisoners behind the bar, and it did not seem as wildly hilarious as at first it promised to be. It is safe to say that both in Chattanooga and in the New York subway passengers will be able to ride for some time without being subjected to similar exhibitions of hoodlumism.

The Publicity Department

Many small railways through their more intimate connection with their patrons have long appreciated that they were quasi-public institutions and that as such the newspapers, representatives of the people, were entitled to information about their doings. This feeling has gradually spread to the larger companies, of which quite a number now have a regular publicity department. Such an organization will fail in its object, however, if the newspapers are asked to accept so many cut and dried stories at stated intervals. On the contrary, the publicity manager seldom should prepare more than the skeleton of a story and then should allow the reporter every means to get enough additional data to give the write-up a distinctly individual garb. Exclusive stories are the joy of every newspaper man, and if the "leads" are fairly distributed the company will find no difficulty in getting space for less attractive matters of other kinds.

One of the most serious questions in connection with publicity is the policy to govern the extent of the information to be given out as to accidents, and as this is a question of publicity, it can properly be considered in this connection. No one can deny that full advantage will be taken by the attorneys for claimants of any admissions made in the public press by the officials of a railway company after an accident. Published accounts of this kind will also sometimes invite fictitious and other claims, and a desire to prevent the publication of sensational stories about troubles of this kind often leads to an unwillingness to give out even the facts. The result is that many railway companies are reticent, even to the point of rudeness, when it comes to giving out news of this kind. The proper policy to pursue must be determined by each individual road and often is largely affected by local conditions. It is interesting to note, however, a marked tendency recently on the part of a number of companies to supply freely all legitimate requests for news of accidents. The main purpose of this policy, in several instances, was the belief that the position of the company with the public would be strengthened. If the accident had been caused by the blunder of an employee, but the public realized that the officials had done as much to avoid the accident as could reasonably have been expected of them—that is, if the equipment was in good condition and every effort had been made to employ only competent men—then the public would be apt not to hold the company morally responsible for the accident even if legally liable. Another equally important advantage of this plan is that where absolute frankness is followed in the case of the more important accidents there is less tendency on the part of the newspapers to exaggerate minor casualities.

The reasons given briefly above were those which converted to the policy of publicity a company in a large city in the East where public accounts of accidents had been notoriously unfair. Orders were issued that the accredited representatives of the local newspapers were to have free access to the scene of any accident inside or outside of the company's properties and that they were to be given permission to take photographs at will, except that no flashlights must be used. The step may be considered by some a radical one, but hereafter at least there will be fewer published misstatements to create a dangerous first impression in the minds of future jurymen. Each company can easily decide whether newspaper accounts of this kind, in their own instances in the past, have been overdrawn or understated.

Advertising Route Connections in Urban Service

In the majority of suburban street railway systems where cars are run upon short intervals on the greater proportion of the lines it is usually needless to advertise the service by printed timetables, either in the daily press or on special cards or folders. The convenience of being able to take a car to almost any desired point with not more than 5 or 10 minutes' wait is one of the strongest assets of the electric railway in competition with other means of transportation, especially where this condition obtains throughout the entire day. The point is somewhat overlooked, however, that where one or more changes of cars between lines of different frequency of service are involved, it may be desirable to advertise the scheduled times of passing the transfer points on the less frequent lines in order that the public may plan through trips with a reasonable chance of carrying them out in a certain minimum time. This is a much more important matter in cases where rival methods of transportation are in competition because the actual running time between two distant points on a system will sometimes vary 50 per cent, according as connections are made en route, where, for instance, the headway on one of the two lines is 5 minutes and on the other 15. The cost of acquainting the public with connections of this kind is trifling if the cars are utilized as distributing centers, either through the use of dasher signs, inside placards or small printed timetables the size of an ordinary visiting card. The main point is that unless the public is informed of the way in which to make the best use of existing facilities much patronage is liable to be lost.

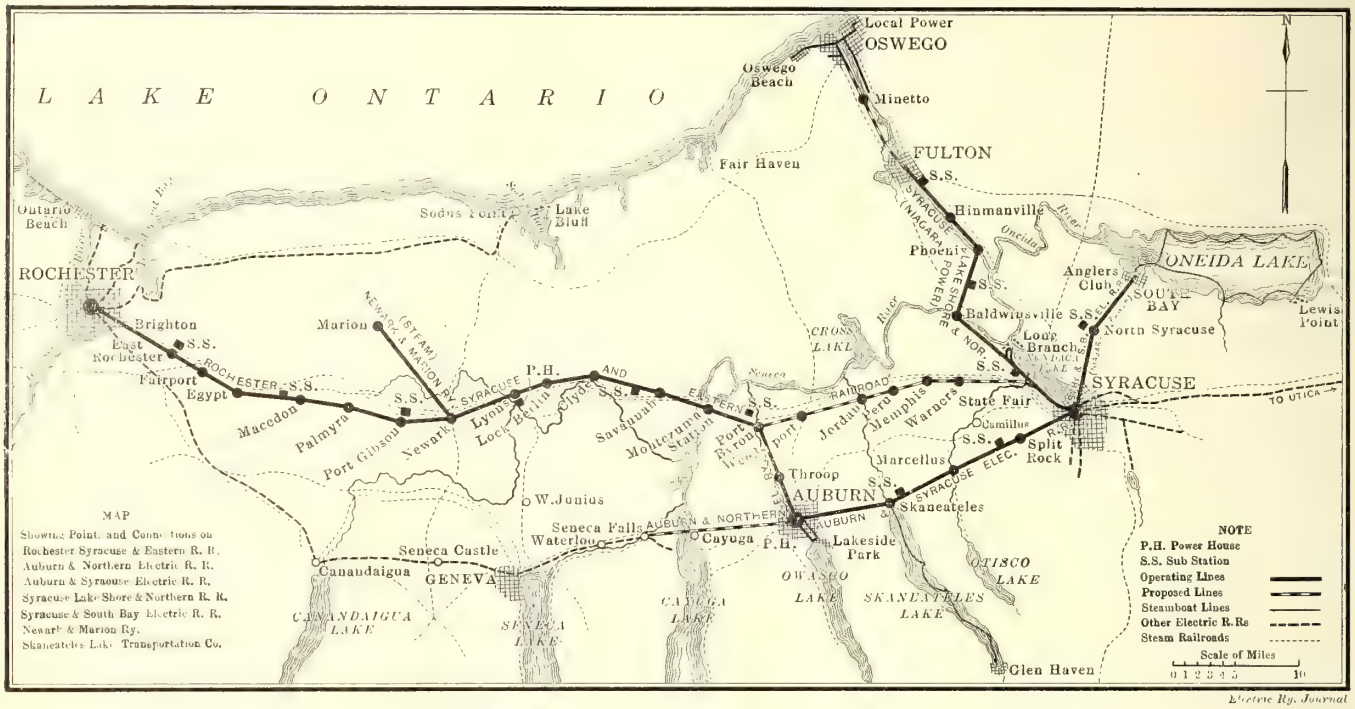
THE BEEBE SYNDICATE INTERURBAN SYSTEM IN CENTRAL NEW YORK—CONSTRUCTION FEATURES

The Beebe Syndicate is the popular title of the financial interests which, under the names of the Syracuse Railroad Construction Company, the Ontario Construction Company, and other corporate titles, are developing from an original system of 5 miles of city track in Auburn, N. Y., an extensive electric interurban railway system connecting Syracuse, Rochester, Auburn, Oswego and other points in Central New York. The territory traversed by these lines is the most prosperous in the State, and because of the many lakes and other natural beauties, affords an excellent field for pleasure travel. Although the Beebe lines are managed as separate companies, they have the same chief operating officials and are controlled by the same financial interests. The general offices of the companies are located in Syracuse, with operating headquarters at Auburn, Newark and other cities on the various lines.

The different roads, as they exist to-day and as they will appear when the extensions now under construction are completed, are shown on the accompanying map. These lines comprise a total of 56.88 miles of single-track street or highway construction, and 261.43 miles of single track on private right-of-way. The details of mileage of first and second track and sidings of each line are given in the accompanying table.

DESCRIPTION OF THE LINES

The Rochester, Syracuse & Eastern Railroad is a 58-mile double-track railway, which was started from Rochester three or four years ago and reached Port Byron in July, 1908. When the link between Port Byron and Syracuse, a distance of 23 miles, which is now under construction, is completed, the all-electric traveler will have a direct route between Rochester and Syracuse. It is now planned to place the last section in operation by the first of the year.



Beebe Syndicate Lines—Map of Interurban Roads Operated in Central New York

The Auburn & Northern Electric Railroad operates 6½ miles of single track between Port Byron and Auburn, and about 2½ miles in the city of Auburn. This section was completed in the summer of 1908. It is proposed to extend this line at some later time from Auburn to Seneca Falls over Cayuga Lake.

The Auburn & Syracuse Electric Railroad is a consolidation of the old Auburn City Railway and the Auburn Interurban Electric Railway, which was built about six years ago. It comprises 54.2 miles in all, including 27 miles of track between Auburn and Syracuse, of which the 7-mile section between Skaneateles and Auburn is single track.

The Syracuse, Lake Shore & Northern Railroad now runs from Syracuse to Fulton, 28 miles, but is to be extended this year 12 miles farther, to Oswego, where it will connect with the local traction line, which is a part of the Beebe system. The earlier portion of the interurban line was started 12 years ago and carried to Baldwinsville by a com-

New York State Trackage Owned and Operated by The Beebe Syndicate, January 1, 1909

Name of Railroad	Main Track			Second Track			Total Main Tracks			Side Tracks		Total		Total	Remarks
	Streets	P. R. of W.	Total	Streets	R. of W.	Total	Streets	R. of W.	Total	Streets	R. of W.	Streets	R. of W.	All Track	
	Miles	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	
Auburn & Northern Elec. R. R.	2.81	6.23	9.04	.....	.....	.....	2.81	6.23	9.04	.19	.18	3.00	6.41	9.41	Includes Dill, Clark and W. Genesee Sts.
Auburn & Syracuse Elec. R. R.	19.08	16.52	35.60	2.24	15.20	17.44	21.32	31.72	53.04	.95	.14	22.27	31.86	54.13	
Newark & Marion Ry.	1.60	7.37	8.97	.....	.....	.....	1.60	7.37	8.97	.....	.81	1.60	8.18	9.78	Includes .72 miles in street(not oper't'd)
Oswego Traction Co.	10.11	.35	10.46	.....	.....	.....	10.11	.35	10.46	.73	.....	10.84	.35	11.19	
Roch'r, Syracuse & East'n R. R.	5.71	51.61	57.32	5.71	51.52	57.23	11.42	103.13	114.55	.....	.....	11.42	103.13	114.55	
Syracuse, Lakeshore & N'n R. R.	4.60	23.35	27.95	3.10	9.77	12.87	7.70	33.12	40.82	.05	Loops 1.08	7.75	34.20	41.95	Inc. Fulton CityLine
Syracuse & So. Bay Elec. R. R.	.....	10.49	10.49	.....	9.79	9.79	.....	20.28	20.28	.....	.14	.....	20.42	20.42	Inc. .61 miles freight tracks.
Total	43.91	115.92	159.83	11.05	86.28	97.33	54.96	202.20	257.16	1.92	2.35	56.88	204.55	261.43	

pany called the Syracuse, Lakeside & Baldwinsville Railway Company. This trackage was acquired by the present company through purchase at mortgage foreclosure sale. The section between Baldwinsville and Fulton was built late in 1908 and was the first to be equipped with steel bridges

The Skaneateles Lake Transportation Company operates a boat service on Skaneateles Lake.

With the exception of the Syracuse, Lake Shore & Northern Railroad, which enters the city over its own tracks, the lines which enter Syracuse come in over the tracks of the

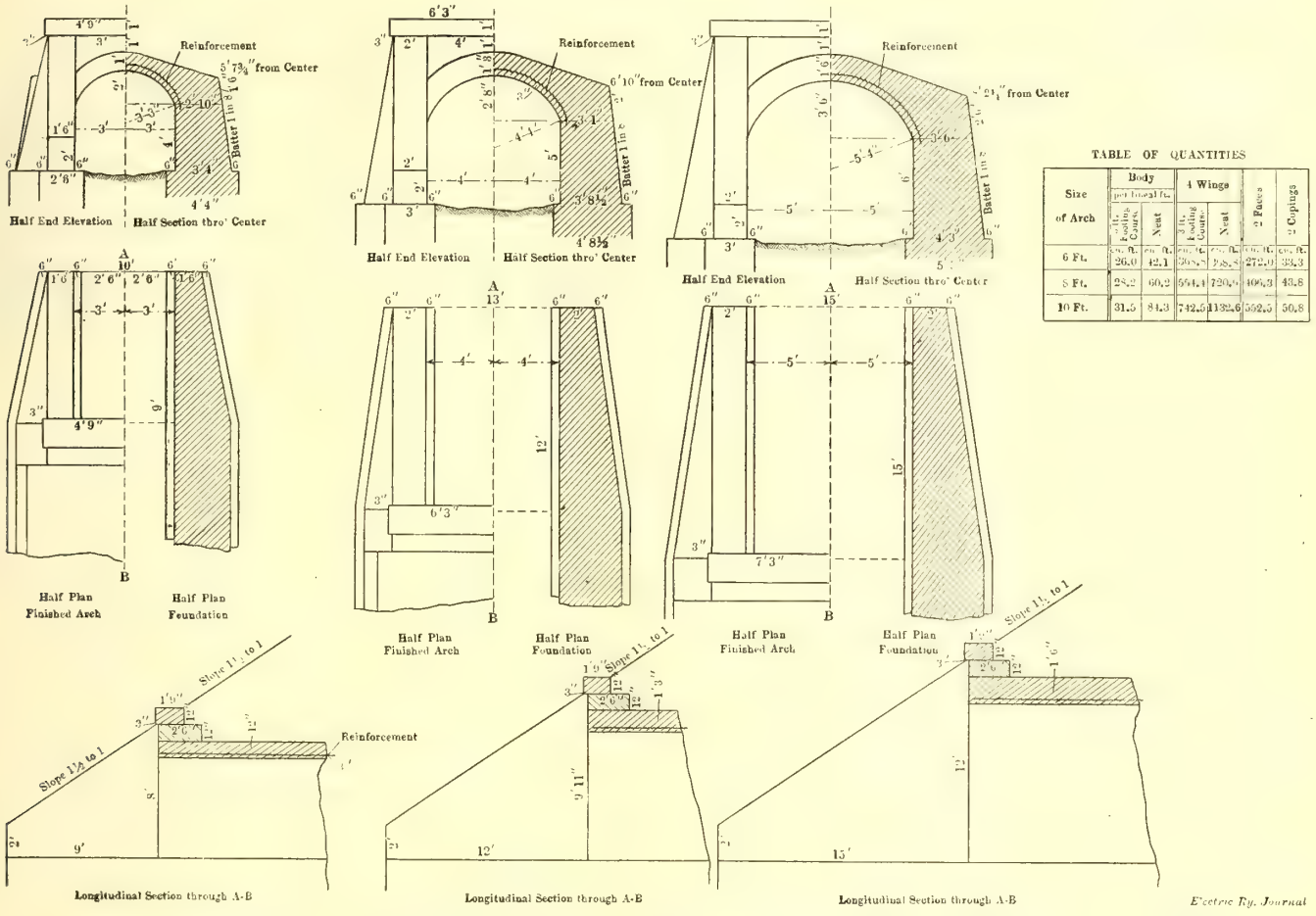


TABLE OF QUANTITIES

Size of Arch	Body per linear ft.		4 Wings		2 Faces	2 Copings
	Footing Course	Neat	Footing Course	Neat		
	cu. ft.	cu. ft.	cu. ft.	cu. ft.	cu. ft.	cu. ft.
6 Ft.	26.0	42.1	296.8	288.8	272.0	33.3
8 Ft.	28.2	60.2	564.4	720.0	409.3	43.8
10 Ft.	31.5	84.3	742.5	1132.6	552.5	50.8

Beebe Syndicate Lines—Standard Reinforced Concrete Arch Culvert for 6-ft., 8-ft. and 10-ft. Spans

for catenary suspension. The first 9 miles out of Syracuse and all sections in towns and cities are double track.

The Syracuse & South Bay Electric Railroad is a double-track line running from Syracuse to Oneida Lake. It was opened for traffic Sept. 1, 1908. The interurban line is 10½ miles long, but the total run to the center of Syracuse over the tracks of the Syracuse Rapid Transit Railway Company is 12 miles.

The Newark & Marion Railway is a single-track line 9 miles long. It is being temporarily operated by steam, and is used mostly for handling freight.

Syracuse Rapid Transit Railway Company, but have no common terminal. This is due to the fact that, as the Erie Canal passes through the city, the frequent raising of bridges through periods of heavy barge traffic would make it impossible to maintain any fixed schedule for intercon-



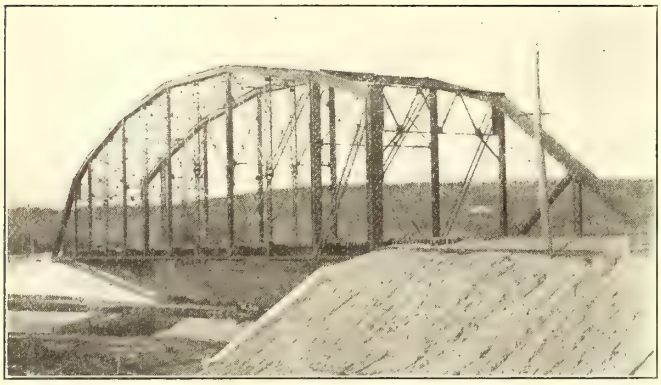
Beebe Syndicate Lines—Bridge over Oswego River at Phœnix, N. Y.

necting lines. Nevertheless, the Lake Shore and South Bay lines have lately arranged for a common waiting room with the electrified division of the West Shore Railroad, which enters the city from Utica on the east.

RIGHTS-OF-WAY AND GRADES

As indicated in the preceding paragraphs, a large part of

the Beebe lines are double tracked. Eventually, all the lines will be double-tracked throughout as the rights-of-way in all cases are wide enough for two tracks. The heaviest grades prevail on sections where the cars travel over the



Beebe Syndicate Lines—Bridge over Erie Canal at Fairport, N. Y.

highway. For example, on the Auburn-Skaneateles section of the Auburn & Syracuse Railroad there are three short grades of 8 per cent and one each of 7 per cent and 9 per cent. This is the steepest division in this territory, but plans have already been made to transfer the tracks to a private right-of-way. This improvement will shorten the distance from 27 miles to 26 miles, and will reduce the maximum grade to 3¾ per cent. The present maximum grades on the private right-of-way sections of this line are 3 per cent to 4 per cent.

The Rochester, Syracuse & Eastern Railroad has an



Beebe Syndicate Lines—Double Concrete Culvert over Allen Creek

average grade of 1 per cent, with a 3 per cent maximum for a distance of 1800 ft.

BRIDGES AND CULVERTS

The bridge practice of the Beebe lines is to use plate girders for spans of 60 ft. to 80 ft., and trussed bridges for spans over 80 ft. The heaviest bridges are on the Rochester, Syracuse & Eastern Railroad. All of these are being designed to carry three 60-ton cars on each track

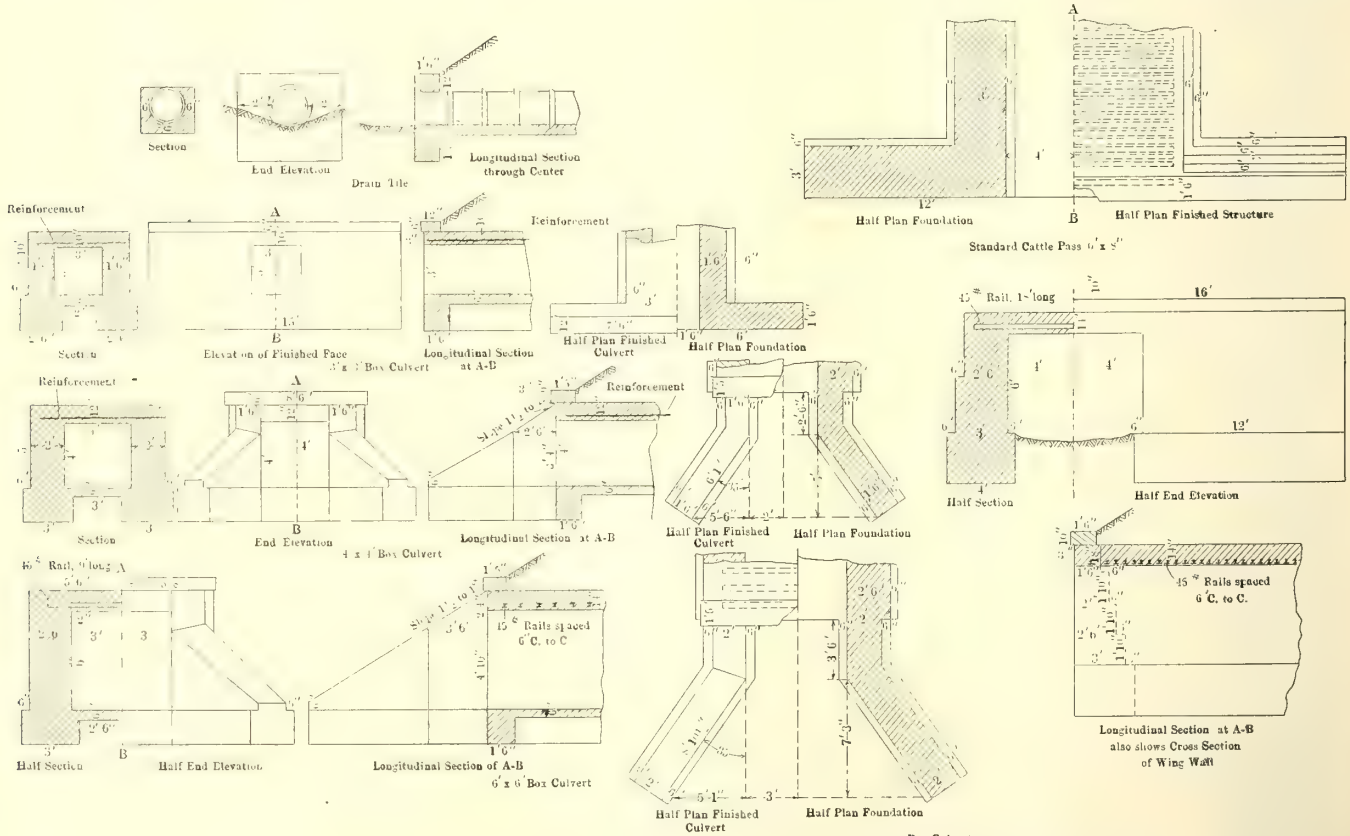


TABLE OF QUANTITIES
Settings for 12, 15, 18 and 24 in. Tile

Size of Tile	Body per Lineal Foot	2 End Walls	
12 in.	2.6 Cu. Ft.	65.3 Cu. Ft.	
15 in.	3.1 " "	72.0 " "	
18 in.	3.8 " "	79.0 " "	
24 in.	5.2 " "	93.2 " "	

Box Culverts

Size	Body per Lineal Foot		4 Wings		2 Faces	2 Copings
	2 Foot Footing Course	Neat	2 Foot Footing Course	Neat		
	cu. ft.	cu. ft.	cu. ft.	cu. ft.	cu. ft.	cu. ft.
2' x 2'	10.5	9.4	60.0	95.1		10.0
3' x 3'	11.0	14.0	90.0	145.3		15.0
4' x 4'	13.5	24.0	161.6	133.3	126.0	18.1
6' x 6'	16.5	42.8	282.0	360.0	200.3	24.5

6' x 3' Cattle Pass

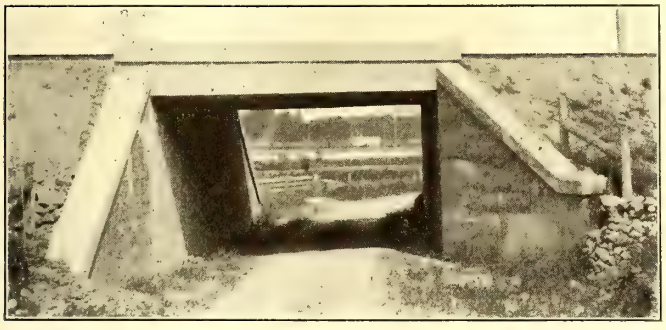
	2 Ft. Footing	Neat	2 Ft. Footing	Neat	2 Copings	
	24.0 c. f.	48.7 c. f.	501. c. f.	890. c. f.	79.7 c. f.	

Electric Ry. Journal

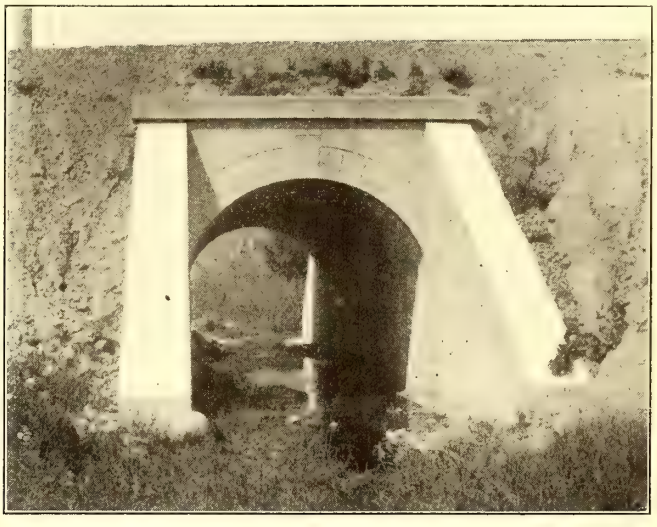
Beebe Syndicate Lines—Details of Standard Concrete Box Culverts, Cattle Pass and Drain Tile

at the same time, with an impact, calculated according to steam railroad formulas, of 90 per cent on the floor system at 60 m.h.p. One of the accompanying illustrations shows a bridge over the Erie Canal at Fairport, and another view shows the bridge over the Oswego River at Phoenix. The bridge abutments are of concrete, composed of 1 part cement, 2½ parts sand and 5 parts of broken stone.

Several accompanying drawings show the standards adopted for the construction of box and arch culverts, cattle passes, drain tiles, etc. Arches are made of 1:2:4 concrete and reinforced by Ransome steel rods. Box culverts are reinforced with old 45-lb. rail laid to 6-in. centers. The Allen Creek bridge, shown in one of the halftones and drawings, was designed originally as a flat-top culvert, and was reinforced as such. The arch effect was produced simply for the sake of symmetry.



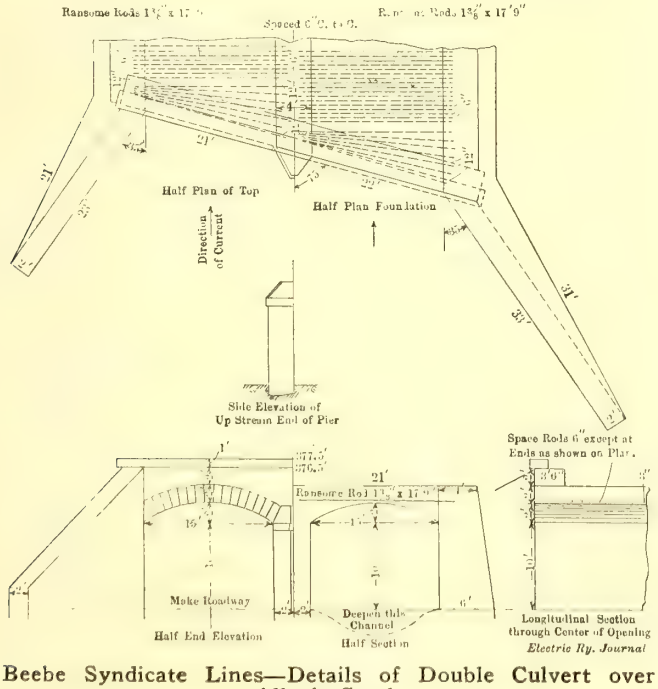
Beebe Syndicate Lines—Typical Flat Top Concrete Highway Crossing



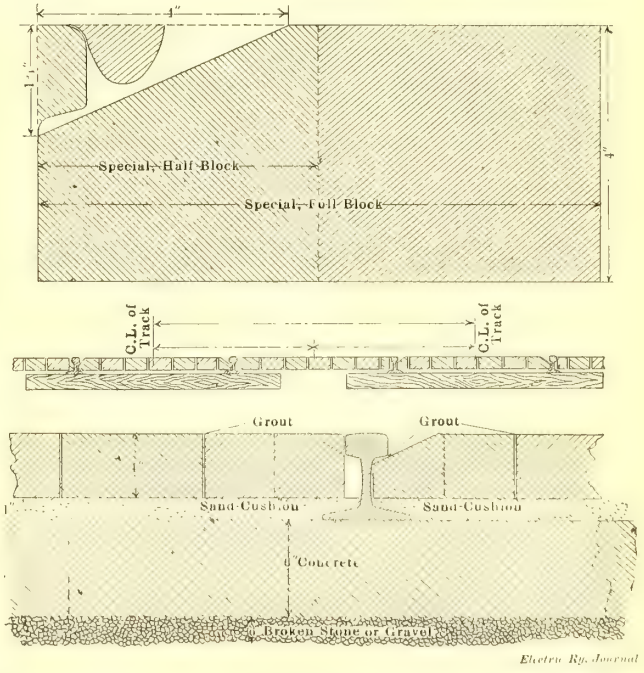
Beebe Syndicate Lines—Typical Reinforced Concrete Arch Culvert

TRACK STANDARDS

The standard weight of rail on the Beebe lines is 70 lb. on private right-of-way and 90 lb. in villages and towns. The only exception is the Syracuse & South Bay Railroad, a purchased property, which was laid with 85-lb. rails. The accompany cross-sections of the track on the Rochester, Syracuse & Eastern Railroad are typical of the latest practice. Continuous and Bonzano joints are the principal types of rail joints used. The customary tie spacing is 24 in., but at joints the ties are only 10 in. apart. The standard ties are strictly long-leaf Southern Pine, 8 ft. x 6 in. x 8 in. These are purchased in lots up to 100,000, and must not be shipped from port until every tie has been approved and stamped by the syndicate's lumber expert, who is specially engaged for this purpose. When the roadbed is finally ballasted and shouldered the ends of the ties are left exposed to aid their drying out. Some of this long-leaf pine has been in service for nine years on these lines, and is still in good condition. It is believed that at least 12 years' life will be obtained from this wood, in which case preservative treatment would not pay. Much of the tie trouble met with by railways is due to purchasing short-leaf and loblolly pine, which rots much faster.



Beebe Syndicate Lines—Details of Double Culvert over Allen's Creek

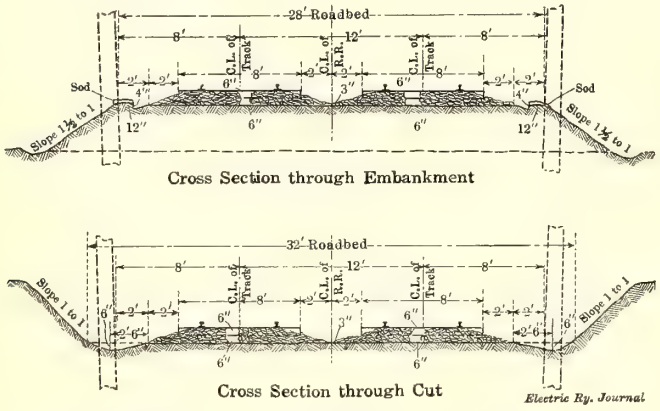


Beebe Syndicate Lines—Standard Brick Paving Construction in Streets

On the Rochester, Syracuse & Eastern Railroad the ballast, either of local gravel or stone, is laid 6 in. below and up to the top of the ties, giving 12 in. of ballast. The ballast on the Auburn & Syracuse is 90 per cent stone. The Syracuse, Lake Shore & Northern has excellent local

gravel ballast between Baldwinsville and Fulton, and crushed stone between Baldwinsville and Syracuse. The Syracuse & South Bay line has crushed stone ballast only, as no gravel was available. Cinder ballast is used to give the first lift on new construction, where it can be procured, the second lift and finishing being of crushed stone or gravel.

In bonding, this system has obtained very satisfactory results with 300,000 circ. mil Chase-Shawmut bonds, which are soldered to the side of the head of the rail. On the

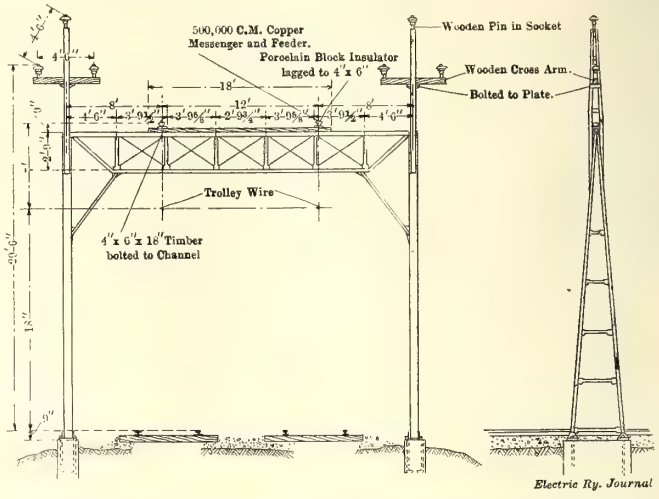


Beebe Syndicate Lines—Cross-Sections of Standard Roadbed

5-mile stretch from Long Branch to Baldwinsville not a single bond has come off since the original installation in January, 1908. These bonds are installed as follows: 20 miles of single track on the Syracuse, Lake Shore & Northern; 14 miles of double track on the Rochester, Syracuse & Eastern; 10 miles of double track on the Syracuse & South Bay.

The track construction adopted for paved streets, as shown in one of the accompanying illustrations, consists of a 90-lb. T-rail laid with Mack special half-blocks and full blocks with staggered joints. The paving blocks are 4 in. thick and are set on a 1-in. sand cushion which rests on a substructure of 6 in. of concrete of 1:3:6 mixture and 6 in. of broken stone or gravel. Some of this paving

visor for the Auburn & Syracuse and Auburn & Northern; a second supervisor from Port Byron to Rochester, on the Rochester, Syracuse & Eastern, and a third supervisor for the Syracuse, Lake Shore & Northern and the Syracuse & South Bay. The Newark & Marion road is looked after directly by the general roadmaster. The divisions outlined are subdivided into sections varying from 5½ miles to 7 miles



Beebe Syndicate Lines—Double Track Steel Catenary Bridge

in length, according to the difficulty of maintenance. In summer the section gangs consist of a foreman with six or eight men. The larger gangs are on the newer sections, where it is necessary to have a few extra men during the first year to take care of ditching, cleaning cuts, etc. In winter each section foreman has four men to look after snow fences and remove snow from village streets.

OVERHEAD CONSTRUCTION

The greater part of the overhead construction is of the span wire type, and was put up with 35-ft. cedar or chestnut poles, which are 8 in. at the top and not less than 14 in. at the butt. Where span construction is used, as on the Rochester, Syracuse & Eastern Railroad, the 33,000-



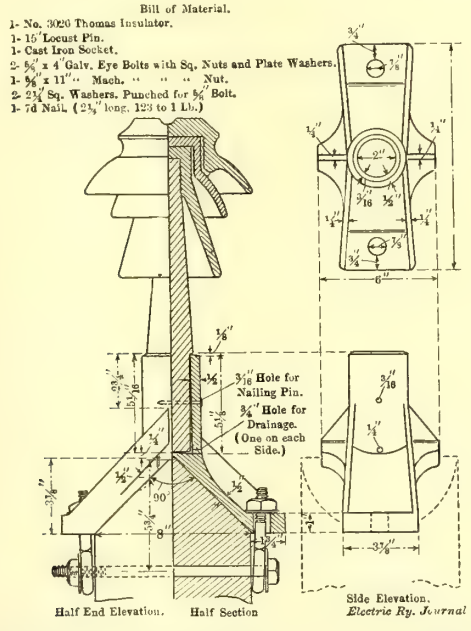
Beebe Syndicate Lines—Typical Passenger and Freight Station in Village

block construction has been successfully used in Auburn for the past eight years.

The track maintenance organization is headed by one general roadmaster, who reports to the chief engineer of the associated railways. The roadmaster has one super-

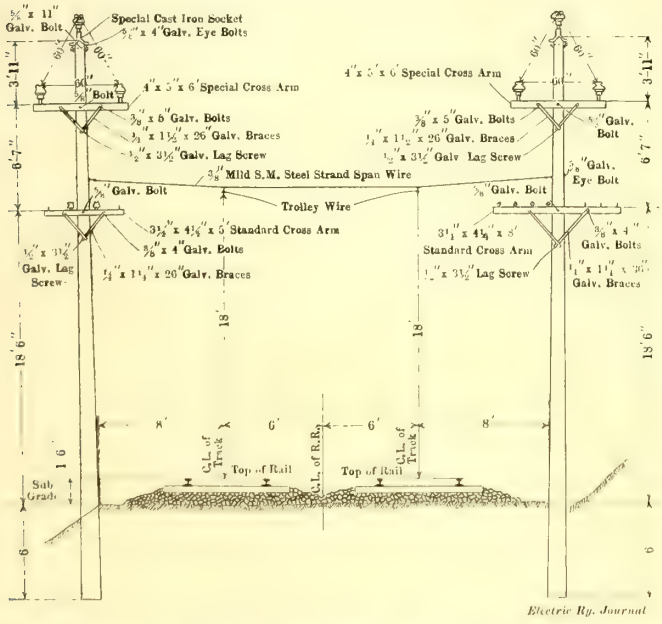
volt transmission line is carried in duplicate. Two wires of each group are placed on an upper cross-arm and the third is mounted at the top of the pole in the special socket casting illustrated, which is so heavy and strong that it remains stable in the heaviest winds. In the double trans-

mission line construction mentioned the telephone and feeder cross-arms are carried on opposite poles, 6 ft. 7 in. below the high-tension cross-arm. The telephone wires are equipped with Western Electric repeating coils, and have not suffered from the proximity of the 33,000-volt transmission wires, although the latter are not always transposed.



Beebe Syndicate Lines—Standard Socket for High-Tension Pole Top

The feeders on all lines are calculated for a permissible drop of 20 per cent below 600 volts. The feeder sizes are as follows: two 500,000 circ. mil on the Rochester, Syracuse & Eastern; two 500,000 circ. mil on the Syracuse, Lake Shore & Northern; one 500,000 circ. mil on the Syracuse & South Bay. On the Auburn & Syracuse road the feeders vary in size from 116,033 circ. mil to 500,000 circ.



Beebe Syndicate Lines—Standard Span Wire Construction for Double Track

mil and 1,633,000 circ. mil, depending upon the grades and traffic. The company has recently put up 10 miles of 500,000 circ. mil feeders to take care of the 3 per cent grade at the entrance to Syracuse. Trolley taps are commonly connected every 1000 ft. The usual trolley clearance is 18 ft. above the head of the rails. In general the trolley wire on the interurban roads is a grooved No. 0000, while No. 00 and No. 0000 wire is used on the street-car lines in the City of Auburn.

Several articles have already been published in this paper on the Archbold-Brady catenary bridges first installed on the Syracuse, Lake Shore & Northern line. This type of construction is to be applied on the extension of the Rochester, Syracuse & Eastern Railroad now building between Port Byron and Syracuse, a distance of 22 miles. As in the earlier installations, the bridge spacing will be 300 ft. Between Port Byron and Syracuse the line does not run over the streets in any of the towns, but continues on private right-of-way and merely crosses a few streets. For this reason the bridges will also carry high-tension lines on extensions of the bents, as shown in the accompanying drawing. The telephone wires will be placed on a separate line of 35-ft. poles entirely independent of the catenary. Copper feeder cables, instead of steel, will be used for the catenary messenger wires, thereby eliminating an outside feeder. This copper messenger wire will be supported at the bridges on porcelain block insulators bolted to a 4-in. x 6-in. x 18-ft. timber attached to the top channel of the bridge. A copper messenger will also be used when the Syracuse, Lake Shore & Northern is double-tracked between Baldwinsville and Fulton.

There is no general line superintendent for maintaining the overhead wires of the associated lines, but this work is done by foremen on the various lines, who report to the operating manager of the syndicate. The Auburn & Syracuse and Auburn & Northern are maintained as one road by one foreman, three linemen and one helper; the Rochester, Syracuse & Eastern has one foreman, four linemen and one helper; the Syracuse, Lake Shore & Northern and Syracuse & South Bay combined have one foreman and three linemen. Line cars with ladders are furnished to each crew except in Auburn, where a tower wagon is employed.

NEW POWER DEVELOPMENT IN CANADA

The Canadian Light & Power Company, of Montreal, Canada, has arranged with J. G. White & Company, New York, for the engineering, design and supervision involved in the construction of a hydro-electric plant on the St. Lawrence River near St. Timothee, Quebec, Canada. The present initial development provides for 21,600 shaft-hp, with such further developments as may be required in the future. The main features of the present initial construction will include the construction of a canal intake and headgates about 3200 ft. below the present intake; the enlargement of the Beauharnois Canal from the intake to the station site—32,000 ft.—to the capacity of the present initial installation; the construction of a forebay with concrete headwall and the power station itself, the tailrace excavation; the construction of the 27-mile transmission line to Montreal, and the substation and distribution system in that city.

The power station will contain four main units and two exciter units, the equipment of which will be as follows: Three 7200-hp turbine units, two 440-hp exciter turbine units, three 4000-kw generators, two 250-kw generators, three 4000-kw transformers, switchboard, etc.

It is estimated that the present initial development will cost about $4,000,000. The Canadian Light & Power Company proposes to do this work by contract on the basis of unit prices.

GEARED FREIGHT LOCOMOTIVE FOR THE NEW YORK, NEW HAVEN & HARTFORD RAILROAD

The Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., is building for the New York, New Haven & Hartford Railroad an electric freight locomotive of large capacity for use on the electric division of that road, between Stamford and New York City. The construction of this machine is well under way, and the manufacturers expect to have it ready for service next month.

The locomotive has been designed primarily for handling fast freight trains, but will also be used for hauling heavy passenger trains. The machine will be placed in regular service by the New Haven road as soon as completed, and given a thorough test in freight service with a view of eventually handling all freight trains electrically.

The mechanical parts of this locomotive have been designed by the engineers of the Baldwin Locomotive Works, of Philadelphia, and the mechanical department of the New York, New Haven & Hartford Railroad, and are being built at Philadelphia.

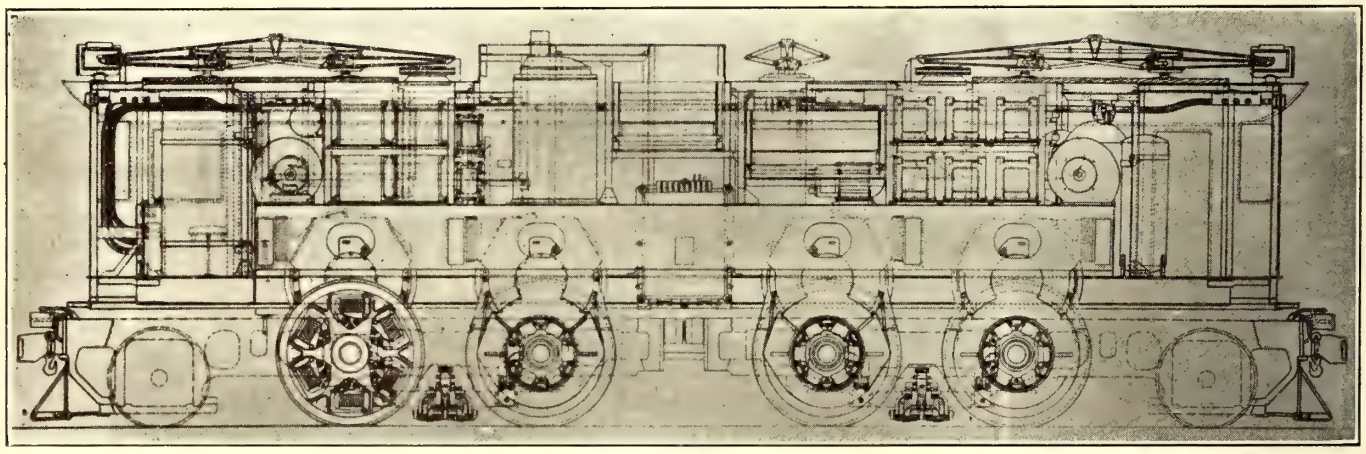
The design includes a number of features of special interest. The general plan of the trucks and running gear has been worked out in accordance with a patent granted to S. M. Vauclain, July 6, 1909. This patent describes an articulated locomotive in which the truck frames are connected by an intermediate drawbar. One truck has only a rotative motion about its center pin, while the other has a fore-and-aft as well as a rotative motion, in order to compensate for the angular positions of the trucks and drawbar when the locomotive is traversing curves. The tractive force is transmitted through the truck frames and drawbar, instead of through the main frame.

The 2-4-4-2 wheel arrangement has been adopted for this new locomotive. Each truck has two pairs of driving wheels and a single pair of leading wheels. The driving wheels are held in alignment by cast-steel bar frames, similar to those usually used in steam locomotive practice. The frames are placed outside the wheels, and are braced transversely under the center of the locomotive by heavy steel castings provided with draw pockets in which the intermediate drawbar is seated. This bar transmits from one truck frame to the other the full tractive force developed by the motors of the leading truck. Train connections are effected by means of two radial drawbars, one of which is placed at each end of the locomotive. The drawbars are pinned to cast-steel cross-ties, which brace the truck frames between the driving and leading wheels. The latter are mounted in radial-swing trucks of the well-known Rushton type. The radius bars for these trucks are pivoted to the same cross-ties as the main drawbars.

The wheel loads are equalized as in steam locomotive practice, the springs of the leading wheels being connected to the driving springs by equalizing beams. One of the trucks is cross-equalized under the center of the locomotive. The frame is spring-supported by the cross-equalizer on each side of the center line. This arrangement will promote steady riding, and tends to prevent side rolling at high speed.

The cab is built of steel plate, and is 43 ft. 6 in. long, covering the entire locomotive. The frame which supports the cab is composed of two 12-in. channels, united at the ends by plates and angles. This frame is braced transversely by five cast-steel cross-ties, one over each truck center pin, one at mid-length, and one near each end of the locomotive. The truck center pins carry no weight and, as before explained, one of them is allowed a fore-and-aft as well as a rotative motion.

The cab is supported on the intermediate and end cross-ties, the weight being transferred through coiled springs, which are placed in suitable pockets. The cab frame is held in alignment by the truck center pins, while the lower spring pockets are free to slide over the truck-frame cross-ties. The springs over the end cross-ties are placed 30 in. apart, transversely. The middle cross-tie carries four springs; these are placed at the corners of a rectangle and are 84 in. apart transversely and 53 in. longitudinally. As both the trucks are free to rotate about their center pins, the displacement of the spring pockets, even on a 20-deg. curve, is comparatively slight.



Sectional Elevation of Geared Freight Locomotive for the New York, New Haven & Hartford Railroad

To assist in reducing shocks and keeping the two truck frames in alignment, chafing castings and spring buffers are interposed between the frames under the center of the locomotive.

The principal dimensions of this locomotive follow:

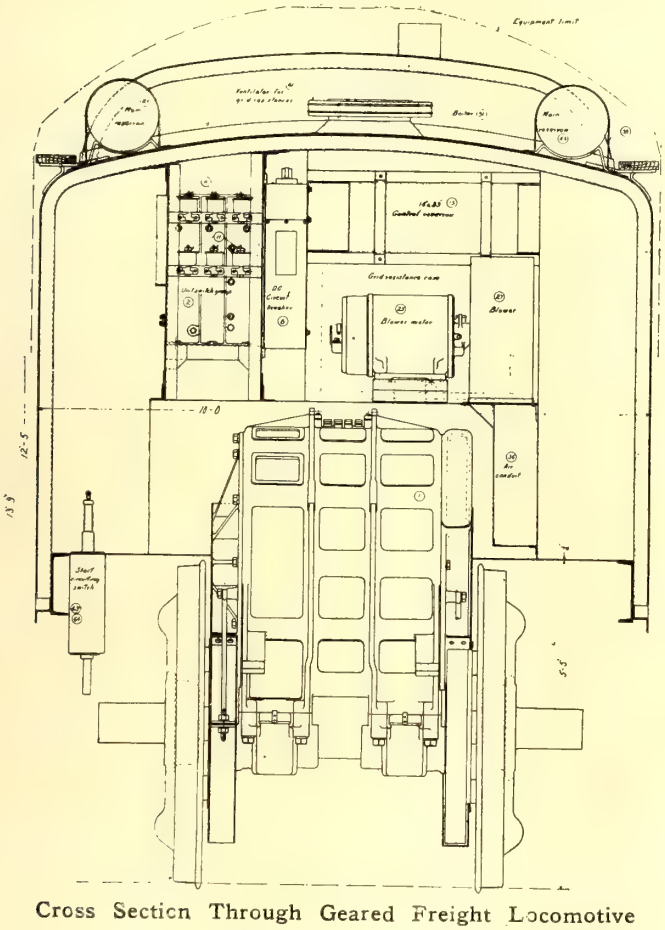
Gage	4 ft. 8½ in.
Driving wheels, outside diameter	63 in.
Driving wheels, center diameter	56 in.
Driving-axle journals	8 in. x 13 in.
Truck wheels, diameter	42 in.
Wheelbase, rigid	7 ft. 0 in.
Wheelbase, total	38 ft. 6 in.
Length between coupler faces	48 ft. 0 in.
Height, over-all	13 ft. 9 in.
Width	10 ft. 0 in.
Approximate weight, total	260,000 lb.
Approximate weight on driving wheels	188,000 lb.

It is believed, from experience gained with previous locomotives, that the method of supporting the running gear

and cab adopted for this engine will tend to avoid nosing, promote easy riding and minimize shocks on the track and roadbed.

A characteristic feature of the running gear is the use made of cast steel. This is particularly true of the truck frame cross-ties, which are interesting examples of mechanical design. The tendency to follow approved steam locomotive practice is also evident in many of the mechanical details of this locomotive.

The electrical equipment, which is being built and installed by the Westinghouse Electric & Manufacturing Company, comprises four 350-hp single-phase geared motors, together with the necessary auxiliary apparatus for



Cross Section Through Geared Freight Locomotive

their operation on either the 11,000-volt alternating-current or 600-volt direct-current circuits of the electric divisions over which the locomotive will run.

The motors are placed directly over the axles and are mounted solidly on the truck frames. Each end of the armature shaft is provided with a pinion meshing with gears mounted on a quill surrounding the axle and carried in bearings on the motor frame, similar to the usual axle bearings. The quills are provided with six driving arms on each end, which project into spaces provided between the spokes in the driving wheels. Each of these arms is connected to an end of a helical spring, the other ends of the springs being connected to the driving wheels.

This arrangement of drive smooths out the torque pulsations, and at the same time allows for vertical movement of the axles. In addition to the spring connection between the quills and drivers, flexibility is provided between the pinions and motor shaft, to equalize the torque on the gears. The quills are of large diameter, permitting unrestricted motion of the wheels and axles. The center of gravity of the motors, as well as that of the entire locomotive, is high, avoiding the transmission of strains and shocks from the track and roadbed to the motors.

The motors, of the standard Westinghouse type, have 12 poles built into a solid frame, and are designed for forced ventilation. When operating on 25-cycle alternating current with forced ventilation, each of the four motors will carry continuously a load of 300 hp. An air-blast transformer is provided for lowering the trolley line voltage to that required by the motors. The control apparatus is of the well-known Westinghouse electro-pneumatic type.

When operating on alternating current all four motors are connected in multiple, and the control is obtained entirely by changing the connections to various voltage taps on the main transformer. On direct current the motors are first grouped all in series, and then two in series and two in parallel, in combination with various resistance steps. Provision is made for cutting out any one of the four motors singly on either alternating current or direct current.

A master controller and brake valve are located in each end of the cab, so that the locomotive can be operated from either end, and the system of control is such that two or more locomotives of this type can be coupled together and operated from one master controller.

Two pneumatically operated pantograph trolleys are provided for collecting current from the 11,00-volt overhead alternating-current line. Pneumatically operated third-rail shoes are used to collect current on the direct-current third-rail section.

A steam-heat outfit is provided on the locomotive for heating the cars when used in passenger service.

The locomotive will be capable of hauling a freight train having a maximum weight of 1500 tons at a speed of 35 miles per hour. When used in passenger service 800-ton trains will be hauled at a maximum speed of 45 miles per hour.

The drawings of this locomotive, reproduced, show the arrangement of control apparatus, which, as will be seen, is located in the center of the cab, with a passage on each side. A number of windows, 20 in all, are provided, affording ample lighting of the cab interior.

HINTS FROM A CONDUCTOR

BELLS IN PAY-AS-YOU-ENTER CARS

The pay-as-you-enter cars are substantiating a point which I have always advocated, namely, that when a conductor pulls the bell for the motorman to stop the car it should be heard by the passengers, the conductor and the motorman. The pay-as-you-enter cars are equipped with electric bells, and when a passenger pushes a bell button he or she hears it, so does the conductor, and there is no dispute. On cars of the ordinary type the bell should be placed in a hole cut in the panel so that when it was pulled it can be heard by the conductor and passengers. With the pay-as-you-enters, in addition to the electric bells, there should also be a bell cord and bell distinct from the conductor's bell. Then no one would be inconvenienced if the batteries gave out.

LARGER POCKETS IN OVERCOATS

A matter seemingly trivial, yet of great importance, is the size of the pockets in the overcoats of both conductors and motormen. Pockets such as are in ordinary overcoats are altogether too small and should be just twice as large. This would allow larger sized gloves, reverse handles, target keys, etc., to be carried more conveniently by the crews, hence better service.

LIABILITIES ON WHICH PROPER RETURNS SHOULD BE ALLOWED

The Electric Railway Journal of Dec. 19, 1908, page 1607, contained a report of the hearing before the Board of Railroad Commissioners of Massachusetts in relation to the increase in fares of the Middlesex & Boston Street Railway and other roads. In connection with this case a memorandum was filed with the commission by A. A. Ballantine and Gaston, Snow & Saltonstall, Boston, counsel for the company. This memorandum analyzes the liabilities of the company on which it sought to earn proper returns, and discusses the bases on which the value of the property should be computed. As stated in previous issues, the board concluded that it ought not to recommend a reduction in the 6-cent unit of fare which was established after 5 cents proved to be inadequate.

An abstract of the memorandum relating to the case follows:

INTEREST ON NOTES TO BE CONSIDERED

The liabilities of the Middlesex & Boston Street Railway Company upon which it seeks to earn proper returns are as follows: Capital stock, $300,000; bonds (assumed from South Middlesex), $100,000; notes (for part of cost of road to the company), $125,000; total, $525,000. Question has been raised as to the right of the company to have the earning of interest on the notes for $125,000 taken into account by the board in passing upon the increase in the rate of fare from 5 to 6 cents.

It seems clear to the company that the earning of this interest does not need to be considered to justify the increase. Examinations of the returns from the road show that even if the company did not have to pay this interest it would, according to the figures for two exceptionally good years prior to the present year, be earning as dividends about 6½ per cent. This year the earnings would be considerably less. It is submitted these returns with no allowance for depreciation are by no means excessive, and that the company cannot be said to have acted unreasonably in raising the fare in the attempt to maintain and increase them.

The company feels, however, that, if material, the earning of interest on its notes for $125,000 ought clearly to be taken into account. The issuing of these notes came about as follows:

The obligations of the South Middlesex Street Railway Company at the time of the receivers' sale in July, 1907, were:

Capital stock	$100,000.00
Bonds	100,000.00
Notes for debts incurred in construction prior to receivership (purchased by present owners)	182,672.20
Interest on these notes accruing during receivership	49,702.46
Notes issued during receivership for reconstruction	200,000.00
Total	$630,374.66

Against these liabilities the South Middlesex carried its property at a book value (representing expenditure less interest item) of $570,000, with a deficit of $50,684.

A decree of the court on June 11, 1907, authorized the receiver to sell by auction at not less than $400,000, the purchaser to take the property subject to the bonds of $100,000.

The creditors of the company—the Boston Suburban—decided to bid in the property at a figure substantially equal to the debts, called $525,000 (instead of $530,374.66). The bid made on behalf of this interest by Messrs. Claflin & Viles on this understanding, being the only one, the road was sold to them at $425,000, subject to bonds of $100,000, a total of $525,000. They paid the receiver in obligations of the company, as provided in the decree authorizing the sale.

The new company, the Middlesex & Boston, was then organized, as required by law, to own and operate the road. The capital stock asked for was $300,000, it being felt that while on the replacement value basis prescribed for such a company the company might be entitled to more stock, that question would be taken up again in detail in connection with the proposed early consolidation of this road with the Natick & Cochituate and Westboro & Hopkinton.

The amount of capital stock was approved on certificates that the replacement value was at least $400,000.

The Middlesex & Boston took over the road at the price paid by Messrs. Claflin & Viles, $525,000. It paid $300,000 in cash—the amount yielded by its capital stock—assumed the bonds of $100,000 and gave its note (of less than a year) for the balance—$125,000.

In substance the whole transaction meant that the old capital stock of $100,000—representing, of course, cash put into the property—was written off; and the creditors of the company who had put $525,000 (in principal and unpaid interest) into the property had their old debts replaced by obligations of the new company to that amount. About $50,000 was written off from the book value of the property.

REPLACEMENT VALUE

The replacement value of the property turned over to the Middlesex & Boston was certified by Mr. Harrington to be at least $400,000; he did not attempt to state its maximum or full value.

Mr. Tompson's appraisal puts the figure at $468,133.71. In reaching this figure he allows $69,427 for the cost of old track and overhead taken out, *i.e.*, worn out. (Note that this was expenditure on track or lines now operated—not for the abandoned Natick & Needham, which was a separate company.) Mr. Tompson allows nothing for interest during construction, legal expenses and very little for engineering and office expenses. With proper allowance for these (say 10 per cent), this figure would not be far from $525,000.

THE LAW

But, assuming that the replacement value of the road at the time of its purchase by the Middlesex & Boston was but $400,000, it seems that

(1) The notes issued by the Middlesex & Boston for $125,000 are proper legal obligations.

(2) The earning of interest on these obligations should be considered in the adjustment of fares.

I.—The notes issued by the Middlesex & Boston for $125,000—the balance of the purchase price of the road—are proper legal obligations.

It is suggested that the law providing for the sale by a receiver and the organization of a new company means in effect that the new company cannot have any liabilities in excess of the replacement value.

But the statute does not, at least in terms, provide that the new company shall not have liabilities, other than for stock or bonds, in excess of the replacement value.

It says only, "less the amount of any outstanding mortgages."

With regard to liabilities other than stock and bonds (the amount of which in every case requires the approval of the board) it would seem that companies organized under this statute are in the same position as ordinary companies, which are entirely free to contract such floating debts as seem necessary without the approval of the board. This freedom means possibility of abuse in cases of such sort, and the board must always consider whether there has been abuse.

Furthermore, that the new company may assume, in some form, the burden of the purchase price seems a necessary implication of the statute.

The obligation to form a company is positive; the purchase of the property from the receiver by individuals seems to be a mere bit of machinery for getting the road into the company. Presumably individuals are allowed to buy, instead of the company itself, simply to avoid the necessity of organizing several companies to operate the same road, only one of which could secure the property.

It seems hardly reasonable to suppose that the purchase by individuals plays an important part; that they take their chance as to whether the company which they and their associates must organize can assume the price.

If the new company cannot pay the price from the subscription for the amount of stock allowed, it must give its notes for the balance, and such notes represent a necessary and legitimate expense.

II.—The earning of interest on such notes should be considered in passing on the adjustment of fares.

While the notes in question are legal obligations, nevertheless the board is, of course, free to determine, on proper grounds, whether or not such obligations are to be considered in the adjustment of fares. If the charge was not thought to have been properly incurred, they would not have to take it into account, even though the company is legally bound to pay the interest.

(a) The adjustment of fares on the lines of a company which takes its road from a receiver should be made or considered upon the same basis as the adjustment on an ordinary company.

Any company is ordinarily entitled to adjust its fares in such a way as to make it possible to pay operating expenses, interest on its bonds, interest on other obligations properly incurred, and a fair dividend on its stock.

In a case such as that under consideration the old company would have been clearly entitled to earn on all its debts, as they represented expenditure upon the road. The fact that the new company's floating debt does not represent expenditure, and cannot, perhaps, be capitalized, should make no difference. The debt represents a portion of the purchase price of the road by the new company, and that price represents (and was less than) the cost of the property, being about what the present owners have put into it.

Why should the step of passing through the receiver's hands alter the rights of the owners of the property to earn upon what they have put into it? True, if they had been willing to write off part of their just claims and bid the property in at less (if they had secured it), the public would have gained at their expense; the new company would have had to pay less, and hence earn less. But the public had no right to expect a gain of this sort because of the receivership. The public did gain by the extinction of the old capital stock (706 shares of which were held by the owners of the new company).

(b) The board should not hold unreasonable an adjustment of fares by a street railway company which is necessary to enable the company to earn fair returns upon the actual proper investment in its property (so long as the amount invested is represented by outstanding obligations), even though the present or replacement value is less than such amount.

The question before the board is whether the rate established by the company is reasonable. The question of whether a rate established by a carrier is unreasonable is different from the question, often presented to the courts, of whether a rate established by or under a statute is constitutional.

The basis for deciding that question has been pretty clearly worked out by the courts, which generally hold that a rate is not in violation of constitutional rights if it allows the carrier a reasonable return on the present value of its property.

The question before the board is similar to questions brought before the Interstate Commerce Commission by complaints as to rates. The commission has refused to adopt absolutely any one basis of return to the company, taking the ground that in each case it "can only upon the whole exercise its best judgment."

BASES OF RETURN

There are but two bases of returns, broadly speaking, which the board would consider in making its recommendations as to the adjustment of fares.

(1) The present value of the property of a company, in determining which the cost of replacement is a chief factor.

(2) The actual amount fairly invested in its property, this question being somewhat similar to that of the question as to capitalization considered by the board in the report of 1896 in the Interstate Consolidated Street Railway case. It is submitted that the later basis, with certain qualifications, is more just.

(1) Present value basis. For practical purposes this is largely a question of replacement value, as the value of franchises, locations, established business, etc., would not in this connection be given weight.

This is an arbitrary basis. Replacement costs may vary greatly from time to time as the cost of labor and materials fluctuate. On this basis the road might be required to change its fare every few months; it might be held not entitled to increase its fare to-day, and yet entitled to increase it six months from now.

The basis is arbitrary for another reason. A fall in replacement cost does not mean a drop in the cost of service rendered. A commodity like shoes, say, being constantly reproduced, sells for substantially its reproduction cost. If manufacturer A will not sell his shoes at their reproduction cost, the customer, after a short delay, can obtain similar goods from manufacturer B, who actually makes them at the less cost. But while the service of a particular street railway company is in a sense being constantly reproduced, and a material fall in the cost of labor, power and other immediate expenses of operating it ought to mean a decrease in fare, the fact that its plant, on which it must earn a return, could to-day be reproduced for less than the original cost cannot be taken advantage of. Another company cannot, for obvious reasons, start up with a new plant at the less cost and render the same service at a lower figure. The fact that the plant could be reproduced for less has therefore little commercial significance. It does not enable the company to reduce expenses. If a town owned its own street railway it could not take advantage of the decrease, but would have to charge on the basis of its original investment.

REPRODUCTION VALUE AN UNJUST BASIS

Reproduction value is an unjust basis. In the paragraph above was considered the significance of reproduction cost lower than original cost owing to a fall in the cost of commodities and labor in or on the plant. Suppose it to be due to wear and tear, the company not having set aside from earnings annual sums to make this good. Assume also that the dividends paid by the company have not been even equal to a normal return upon the money invested. Is it fair to require the company to bear the entire burden of the shrinkage in the value of its plant? It is true that probably the company should have charged rates enough higher to enable it to make proper allowances for wear and tear. But if the company did not do this, and the public served by it got the benefit of rates which were too low, should they not now be willing to pay something to make up for it?

Again, suppose the depreciation be due to the advance in the science of railroading, rendering useless old contruction or equipment. If that construction or equipment was necessary at that time, and the cost has not been repaid to the investors, should they not now be entitled to a return of or upon that amount?

Such considerations as the above largely influenced the Interstate Commerce Commission in deciding that the cost of reproduction basis cannot be taken as the exclusive guide.

This is a one-sided basis. The greatest objection to the cost of reproduction basis is that its logical application leads to results which would not be allowed by the board. Suppose it was found, as might easily be the case and certainly is true of many steam roads, that the cost of reproduction is materially greater than the amount invested.

The company, on this basis, would be entitled to returns upon more than what had been invested in the property; rates might be properly changed to yield returns upon double that amount. This would hardly be approved by the board. If the rule will not work as applied to this situation, is it not clear that cost of reproduction is really not the just basis of return?

(2) The fair investment basis. This basis is not arbitrary; it does not fluctuate; it represents an actual fact; it can be applied, with certain limitations, to all cases.

Of course, nothing should be allowed for amounts extravagantly or vastly expended upon the property. It must be assumed that expenditures upon which returns are sought were made by the company in good faith, with reasonable judgment at the time, for property or work necessary or reasonably believed to be so. And if the property of the road was greatly injured by some calamity or disaster, the investors would have to bear the loss in large part. These are the qualifications suggested by the Interstate Commerce Commission.

EFFECT OF CHARGES ON ACCOUNT OF DEPRECIATION

This difficulty has been suggested in the application of this rule; if the amounts necessary to make good depreciation from wear and tear are continually charged up as basis for future earnings, rates for the same service may become progressively higher. But shall not this difficulty be met by insisting that, as the board has already suggested, the companies in the future make proper depreciation allowances, while not refusing to allow them now to make reasonable recoupment for carrying the public too cheaply in the past. That modification in the application of the just basis of free adjustment would be better than the application of an arbitrary and one-sided rule.

With these qualifications, considerations of justice are all in favor of the rule suggested. In the fixing of prices, in private business, advantage can actually be taken of a lessened cost of reproduction of the article in question. The manufacturer, obliged to take losses in his investment, as against this enjoys the change of great gains. But in the case of street railway companies returns are practically restricted to normal investment rates. While theoretically there is no limit upon dividends—so long as those (if any) over 8 per cent are divided with the State—practically any increase in charges designed to yield higher returns would be disapproved by the board. If, then, a company cannot make large profits, from which it can recoup its losses, is it not fair that it should be allowed moderate returns upon actual investment, even though the present value of the property is less? Is not this rule, giving some security to street railway investments, really in the public interest?

Even if the $125,000 notes are not to be taken into account, it would seem that the road is entitled to maintain the 6-cent fare.

During the nine months ending July 1, 1908, the road carried 118,939 less passengers than in the corresponding period in 1906-7, which year, like the one before it, was exceptionally prosperous. The returns of the company for these nine months were $3,298.01 behind those of the corresponding months in 1906-7, even with the 6-cent fare. Assuming that the 118,939 additional passengers in the period for 1906-7 each paid a 5-cent fare, making a total additional payment of $5,946.90, the passenger returns for 1908 being but $1,336.09 behind those for last year, it would seem, allowing nothing for decrease in traffic due to the 6-cent fare, that the company is $4,610.81 better off by reason of the 6-cent fare.

RETURNS MUST BE ATTRACTIVE TO INVESTORS

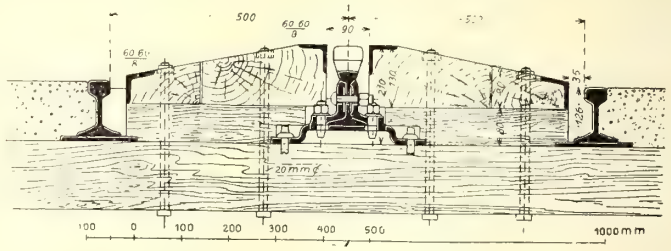
The board, recognizing that the public is better served by a prosperous road, and that the returns from street railway properties must in the interests of the public be made attractive to investors, has declared repeatedly that it would not recommend any reduction in rates unless such rates are palpably unjust and exacting. Rates yielding 6 per cent, or even 8 per cent, the return clearly contemplated by the statutes, are not palpably unjust and exacting. Particularly if the board should not take the view that the owners of the Middlesex & Boston Street Railway are not entitled to earn interest on $125,000 of the amounts which they have in good faith expended upon or for the property, should it approve such rates as allow substantial returns upon the approved basis of capital charges. For years these owners have been carrying this property without return; are they not justified in now expecting such returns?

In order to pay a dividend of 8 per cent the company must earn $24,000—more than $4,000 more than it has earned in exceptionally prosperous years. In addition to that, the company should earn a substantial sum to set aside for depreciation—say $5,000 or $6,000. Only by doing so can the company avoid a repetition of its past history and present difficulty. This would make a total of $30,000 net to be earned by the company; more than $10,000 in excess of what it has earned in its best years. If such a year should recur, the company, even with the 6-cent fare, allowing for some decrease in traffic, would hardly earn such a return, although it is impossible to estimate at present just how much is gained through the increase in fare. This being the case, it seems clear that the 6-cent fare is not unreasonable or exacting, and should be approved.

THE MONTHEY-CHAMPERY RAILWAY

Within the last year there has been placed in operation in the Illiez Valley of the Savoy Alps, between Monthey and Champéry, a combined adhesion and rack electric railway of such novel construction that it merits rather an extended description. The line is 11.4 km (7.07 miles) long and of meter (39.37 in.) gage. The maximum grades on the adhesion section is 5 per cent and on the rack and pinion route 13 per cent to 13.6 per cent.

The course of the line is from the steam railroad station in Monthey through the village streets, thence over the tracks of a local steam line until it reaches a height of 408 m (1258 ft.) above sea level. At this point it enters on the first rack section, which is 2.2 km (1.4 miles) long. After a run of 2.6 km (1.6 miles), including the 33-ft. stone viaduct illustrated, Chemed is reached, at an elevation of 687.5 m (2120 ft.). Then follows a section of ordinary construction 2.25 km (1.4 miles) long, which ends at a height of 770 m (2375 ft.), after passing through a tunnel nearly 300 ft. long. The next 2.6 km (1.6 miles) is of ordinary construction, but is followed by a rack section 0.6 km (0.37 mile) of 13 per cent grade, which ends at Val d'Alliez, 946 m (2917 ft.) elevation. The line then descends some 65 ft. to 70 ft. in the 1.3 km (0.8 mile) to La



Monthey-Champery Railway—Rack-Rail Construction at Highway Crossing

Cour, to avoid extraordinary rock cuts. The third and last rack section begins 9.6 km (0.7 mile) from Monthey and extends 0.73 km (0.45 mile). The terminal, Champéry, is 1048 km (3232 ft.) above the sea.

TRACK AND LINE

The rails are laid in 35-ft. lengths and weigh approximately 48 lb. per yard. The ties are of impregnated beech. The Strub type rack rails weigh about 69 lb. per yard, and at a highway crossing are installed as shown in the accompanying section. The overhead construction is carried from curved iron brackets and wooden poles. There are two trolley wires, each of 9 mm diameter (197,670 circ. mils) except at stations, where only one trolley is used. The brackets also carry an 8-mm diameter (99,350 circ. mil) feeder, which has taps to the trolley wire about every 1550 ft. The rails are bonded for the return current. The line is divided into independent divisions by circuit breakers, and is protected by a horn lightning arrester every kilometer (0.62 mile). Power is purchased from a hydroelectric company and converted at Troistorrents, about midway between the terminals. The transmitted current is first stepped down from 6000 volts to 500 volts by transformers, after which it is used to drive two 150-hp, 50-cycle, three-phase motors direct-connected to 750-1000 volt, 100-kw d.c. generators. The generators are mounted on insulators and the motors are grounded. The station also contains a 390-cell accumulator having an hour discharge capacity of 270 amp and a five-minute discharge capacity of 400 amp. Practically all the Swiss electric

lines have storage battery outfits to steady the load, to increase the reliability of service and to permit the company to purchase power at constant load prices.

MOTORS AND ROLLING STOCK

The standard train on this line weighs 40 metric tons and accommodates 70 passengers. In choosing the motor equipment it was figured that for trains of this weight a tractive pull of 6000 kg (13,200 lb.) would be required on the maximum rack grade of 13 per cent and 2300 kg (5060 lb.) on the maximum grade of 5 per cent where the rack was not used. In other words, the maximum power needed on the rack grade would be nearly three times as great as on the other sections. This condition led to the choice of motor cars with four similar motors, two of which would be operated in parallel on rack and pinion sections only, while the other two motors are connected to the running axles of the car and are operated in series with each other on the rack sections and in parallel on the other sections. The two motors which are used on the rack sections only are always operated in parallel. As all motors are of the same size and have about half the output, at the same speed, when running in series to that possessed when running in parallel, the total output on the rack sections is about three times that on the adhesion sections, a condition which corresponds to the grade conditions. The following table shows the tractive efforts of the motors under different conditions of speed:



Monthey-Champery Railway—First Rack Section



Monthey-Champery Railway—Motor Passenger Car and Freight Trailer Going Down a Rack Section

	8.55 km an hr. (5.3 m.p.h.)	10.8 km an hr. (6.7 m.p.h.)
Total tractive effort	6,000 kg (13,200 lb.)	3,000 kg (6,600 lb.)
Tractive effort of rack motors	4,140 kg (9,108 lb.)	2,000 kg (4,400 lb.)
Tractive effort of adhesion motors,	1,860 kg (4,092 lb.)	1,000 kg (2,200 lb.)
Current per rack motor	164:2 = 82. amp	95:2 = 47.5 amp
Current per adhesion motor	77. amp	49. amp
Total current	241. amp	144. amp

Each motor car has two trucks, placed 7.5 m (24.5 ft.) centers and carrying one motor for each class of service.

The wheels of each truck are connected with driving rods and the trucks are so arranged that the axles driven by the adhesion motors are always in front when going up hill. All the motors use nose-suspension and are outside hung. The adhesion motors have single reduction gearing, and the rack motors double reduction. The motors on three cars have an hourly rating of 75 hp each at 750 volts and 500 r.p.m. These cars haul one trailer. A fourth car with four 100 hp motors hauls two trailers. The electrical equipment on each platform comprises a controller, two circuit breakers (one for adhesion and the other for rack motors), two ammeters and one voltmeter. The fuses for each set of motors and the lightning arresters are mounted on the roof controllers.



Monthey-Champery Railway—Four-Compartment Central-Entrance Motor Car with Driving Rods

The platform controllers are of a special three-cylinder design. One cylinder is used for reversing, another for operation on the adhesion sections, and the third on the rack sections. The so-called adhesion cylinder has five positions for series running, four for parallel running and five for braking. The cylinder for rack operation has eight running positions and seven braking points.



Monthey-Champery Railway—Viaduct

Just before a car enters a rack section on an ascending grade, the adhesion controller is thrown to zero and the speed of the car is greatly reduced. The rack motors are then started slowly. As soon as the rack pinions have entered the rack, the adhesion control cylinder is moved from the first to the fifth position and the rack control cylinder from the first to the eighth position. In doing this the motorman is guided by the ammeters, which must show that the adhesion motors are taking about one-half as much current as the rack motors when the fifth and eighth points of each cylinder have been reached. In reversing this operation, namely, when running into a rack section, the speed is also reduced, and both control handles are successively brought to the braking points. The three cylinders are so interlocked that errors are impossible. For instance, the handle of the rack controller cylinder can be turned only when the reverse cylinder is in the second "forward" position; on the other hand, the adhesion controller can be moved whether the reverser is the first or second point of forward or backward running, but only up to the last series position as long as the reverser is at the second point. The latter interlock prevents the adhesion motors from being connected in parallel when the rack motors are in circuit.

The braking equipment consists of the electric short-circuiting brakes for continuous downward running as metioned, hand brakes, the Westinghouse air-brakes acting on the brake shoes, a special rack brake which locks into a grooved braking disk on the rack shaft and an emergency brake which actuates the braking disks wherever the speed exceeds approximately 10 km an hour (6.2 m.p.h..

CARS

The motor cars weigh empty 27 metric tons and are about 46 ft. long and over 7 ft. wide. They are divided into second and third-class passenger compartments with a central entrance platform. The second-class compartment has six seats and the third-class compartment has 24 seats of which eight are for smokers. There is also a baggage section in which eight more smokers can be seated. The trailers are similar to the motor cars except that there is no man's cab or baggage compartment. All of the electrical equipment and part of the other apparatus was furnished by the Alioth Company, of Basel, Switzerland.

GASOLINE CARS BUILDING FOR NEW YORK

The J. G. Brill Company, Philadelphia, Pa., is building for the Gas Car Manufacturing Company, The Bourse, Philadelphia, a semi-convertible car which the Gas Car Manufacturing Company proposes to equip with two four-cylinder gasoline engines of 24 hp each, of its own manufacture, for use on the Metropolitan Street Railway, New York. The drive will be direct with several speeds. The engines will be water cooled and piping from the water jackets will be run to the inside of the car and the cooling water will be circulated through this piping so as to heat the car.

HEARING ON VALUATION OF CONEY ISLAND & BROOKLYN RAILROAD

The hearing in the case involving valuation of the property of the Coney Island & Brooklyn Railroad was resumed by the New York Public Service Commission, First District, on Sept. 15. Commissioner Bassett presided.

TESTIMONY OF BION J. ARNOLD

Bion J. Arnold, consulting engineer to the commission, was called as a witness and testified that evidence had already been presented placing the cost to reproduce the physical property of the company at $5,676,895.96. He said that there was one item of about $67,000 for cribbing and intake at the power house which it might be advisable to add to that figure.

Commissioner Bassett asked Mr. Arnold if he would call the Coney Island Avenue right-of-way and real estate a part of the tangible property. Mr. Arnold said that there were a number of items in a list he had which might, or might not, be construed as tangible values. He expected to submit this list in his testimony, giving the maximum and minimum values for certain items and allowing the items to be discussed as tangible or intangible values. Answering another question, the witness said that the figure that was given as the reproduction value of the tangible property did not attempt to state the present value.

A question was asked by Commissioner Bassett and W. N. Dykman, of counsel for the Coney Island & Brooklyn Railroad, asked to be allowed to interpose an objection that testimony on the subject of depreciation would be immaterial and irrelevant. Depreciation should not be counted against the company in a case of this character. Whether a horse car was drawn by an animal in its prime or by one in its old age was of no account to the man riding in the car. If the horse was to be sold more would be received for the younger horse and it would have a longer life to haul the car. The commission should not be led away from the real issue by a study of depreciation. It would destroy the ability to make good the difference between what might be called the present value and the reproduction value. There would be a constantly decreasing fare until the vanishing point of fare was reached without any ability to recover.

Commissioner Bassett, overruling the objection, said that the position of the commission was referred to somewhat in a former proceeding regarding the fares to Coney Island, but that a full understanding of the subject required a knowledge of present values. Mr. Dykman entered an exception to the action of the commissioner.

Mr. Arnold then discussed, at the request of Commissioner Bassett, the relation between reproduction value of the physical property and what might be called the present value. He said that in valuing any property a careful examination was first made and all the items found were valued to get a total value that was called the cost to reproduce. Mr. Arnold's discussion in full of the relation between the different values was as follows:

RELATION BETWEEN DIFFERENT VALUES

This property was examined to determine:

1. First cost.
2. Cost to reproduce, physical property (not including real estate).
3. Present value, including the depreciated value of the physical property plus the value of real estate and right of way and the current assets, i. e., cash on hand, stores, special reserve funds, etc.
4. Development expenses, including legal, technical, financial and permanent way development expenses and working capital.
5. Needed improvements.

1. *First Cost.*—Upon examination of the records it was found that accurate and authentic information as to the original cost of all parts of the property could not be secured. The present property is made up of a consolidation of several smaller street railroads and the present set of books does not show the details of the original charges. Much valuable information, however, was gained by examining the records and vouchers of expenditures during the past few years and in many cases the costs shown were checked and used in obtaining the cost to reproduce.

2. *Cost to Reproduce; Physical Equipment.*—To arrive at this value the following process was followed:

- *a.* A careful, itemized inventory was made of the entire tangible property (exclusive of real estate).
- *b.* A unit cost was determined for each item to cover the cost of labor and material "as of to-day," i. e., the date of appraisal.
- *c.* Each unit price included in the estimate was made on the basis of a subcontract.
- *d.* Percentages were added to these estimates as follows:
  - *a.* Contractors' profit, 10 per cent on all items of a construction nature, as follows: Track, track special work, bonding, overhead trolley construction, overhead feeders, underground conduit and cables, power plants, substations and buildings. This allowance includes the general contractor's overhead charges.
  - *b.* Incidentals, organization and engineering, 15 per cent as an additional percentage on all the above construction items and also upon the rolling stock. The above 15 per cent may be considered to be divided into three parts, as follows:

    Incidentals, including contingencies, incomplete inventories and loss and wastage of material during construction.

    Company's administration expense, including rent, officers' salaries, State and city permits and fees, property owners and local consents, legal expenses in connection with construction, superintendence and inspection, accounting department, printing, storeroom expenses, etc.

    Engineering, including cost of design and testing of all construction and equipment items.

3. *Present Value.*—This value was divided as follows:

- *a.* Depreciated value of physical equipment.
- *b.* Value of real estate and rights of way.
- *c.* Current assets, such as furniture, supplies, tools, scrap, cash on hand, reserve accounts, etc.

A. Depreciated value of physical equipment: This value was obtained under the following instructions: Deduct from the cost to reproduce the depreciation which may have been caused by obsolescence, inadequacy, wear, deferred maintenance and casualties.

The equipment can deteriorate only down to its scrap value. In obtaining the present value of this part of the property, therefore, consideration should be given the following items:

A. Cost to reproduce, including: Contractor's profit, incidentals, administration during construction and engineering.

B. Scrap value.

C. Original service value.

D. Depreciation due to obsolescence, inadequacy and age.

E. Depreciation due to normal wear.

F. Depreciation due to deferred maintenance and casualties.

G. Remaining service value.

H. Present value as follows: $C = A - B$; $G = C - (D + E + F)$; $H = G + B$.

B. Scrap value. Is determined by allowing a fair market price for the material as scrap, less the cost of turning it over to the dealer.

C. Original service value. Is the difference between the cost to reproduce (A) and the scrap value (B). Depreciation was considered as taking place only on the original service value. Scrap value does not depreciate.

D. Obsolescence, inadequacy and age. There is a class of deterioration which cannot be prevented by maintenance or offset by repair. Obsolescence which results from a "change in the art," inadequacy due to the growth of the business and the natural result of age are examples of depreciation which can only be taken care of by complete replacement, and should therefore be provided for by means of a renewal, reserve or amortization fund.

This fund should equal the original service value of the part by the time it becomes of no operating value. If the amount that should be in this reserve fund at any time is determined then this amount is a proper measure of the depreciation due to the above causes which has occurred up to that time.

There are a number of possible methods which may be followed in determining the amount which should be annually allowed for a reserve or amortization fund for each part of the property which is subject to obsolescence, inadequacy and age, but for the purpose of this appraisal the simplest and most direct method has been adopted. This method consists in deciding upon a probable time when each part of the property shall be of no operating value; that is, reduced to scrap. Dividing 100 by this length of life in years gives at once the annual percentage or rate per year of depreciation from these causes. The product of this rate, the elapsed life of the part and the original service value equal the deduction to be made for obsolescence, inadequacy and age. If a reserve fund has not been provided to offset this depreciation then a deduction of the amount should be made from the cost to reproduce when determining present value.

E. Normal wear. The normal wear of any part is the deterioration of that part due to service or the action of the elements and should periodically be offset by proper and regular maintenance and repair. This wear may be considered as "normal" down to the point where economy of operation or adequate service dictates repair if allowed for any reason to wear; beyond this point continued wear means neglect or deferred maintenance. A depreciated condition of the system as a whole, however, must ordinarily exist from normal wear, due to the fact that wear on the system as a whole, which occurs gradually, can, as a rule, be offset only periodically and there will be an appreciable period of time between the actual wear and the removal of its effect from the system.

The measure of this normal wear is best determined by a careful, detailed examination of the property, but as it is often impracticable to make such an examination over an entire system in such a short time that the wear neither increases nor is removed during the examination, it is ordinarily more practicable and equally as accurate to determine this normal wear as follows:

For all parts which have been in use long enough to have passed through an entire period or cycle of complete repair, determine the entire cost of one complete maintenance, i. e., the cost of a complete renewal of those parts subject to wear. The amount to be deducted for normal wear is 50 per cent of this total maintenance cost, as the average condition of all the parts is midway between the point of complete repair and of normal disrepair. Whether or not this normal wear, which is inherent, should be offset by a reserve account, is an undecided question; but in examining a property the amount of this normal wear should be determined.

F. Deferred maintenance and casualties. If proper and regular renewals have been neglected from any cause the amount of such deferred maintenance should be determined and this amount deducted when arriving at present value. If the buildings or equipment have been subjected to a fire, severe collision or other casualty, entailing a loss which is not chargeable to regular maintenance, then the amount of such loss should be determined and a proper reduction should be made. If a reserve account is available to offset all or any losses, then the amount of such funds will appear as a separate item to be added to present value.

G. The remaining service value. Is found by subtracting from the original service value the sum of all the depreciation due to obsolescence, inadequacy, age, neglect and casualties.

H. The "present value" of the physical equipment is equal to remaining service value, plus scrap value.

DEVELOPMENT EXPENSES AND WORKING CAPITAL

Mr. Arnold added that the foregoing was the basis upon which the values had been determined, both the cost to reproduce and the present value of the property.

Commissioner Bassett asked whether there were additional values that might be denominated roughly as intangible values. The witness said that there were and proceeded to enumerate them. In giving these values Mr. Arnold stated that he did not wish to be considered as an expert in the sense of attempting to reduce the values below a fair amount. He had always preferred and wished to retain the position of endeavoring to place fair values upon any property with the appraisal of which he had anything to do. In order to be fair toward the property and to reach a conclusion which might be reviewed he had given minimum and maximum values rather than to affix one column of figures only, and his opinion was that the final figures might be determined after discussion before the commission and the experts of the railroad company. All he wanted to do was to present the figures as they had been prepared and to say that they had been gone into very carefully, and he believed that the method of preparing them was correct and the results were fair. They represented his judgment as to the limits of what the figures should be and probably there was a middle point at which the commissioners might arrive.

These values were expressed by Mr. Arnold as development expenses and working capital.

ADDITIONAL TESTIMONY OF GEORGE A. DAMON

George A. Damon was then recalled as a witness and testified regarding the development expenses and working capital values discussed by Mr. Arnold. Mr. Damon testified that he had gone over the items comprising the reproduction value with the object of determining the present value, and that he had followed the methods outlined by Mr. Arnold in his testimony. Commissioner Bassett then asked Mr. Damon to make a statement regarding the items of present value in relation to their reproduction value, and Mr. Dykman entered an exception, as he had in the case of Mr. Arnold, and it was overruled again. Mr. Dykman took exception to this ruling. Mr. Damon then stated that in order to determine what was called present value from the cost to reproduce a careful detailed study was made of each part of the equipment and of the physical property. The witness then explained in detail the method that was followed in arriving at the values.

The hearing was continued on Sept. 16, and adjournment was taken then to Sept. 27.

The tramway and electric lighting system of Seoul, Corea, is said to have been sold to the Japanese Gas Company.

The New South Wales Railway Commissioners, it is reported, have decided to electrify the remaining 43½ miles of suburban steam lines running out of Sydney. A total of 146 miles of single track have been electrified during the last nine years, and the return on the capital invested is now nearly 6 per cent.

CONVENTION EXHIBITS AT DENVER

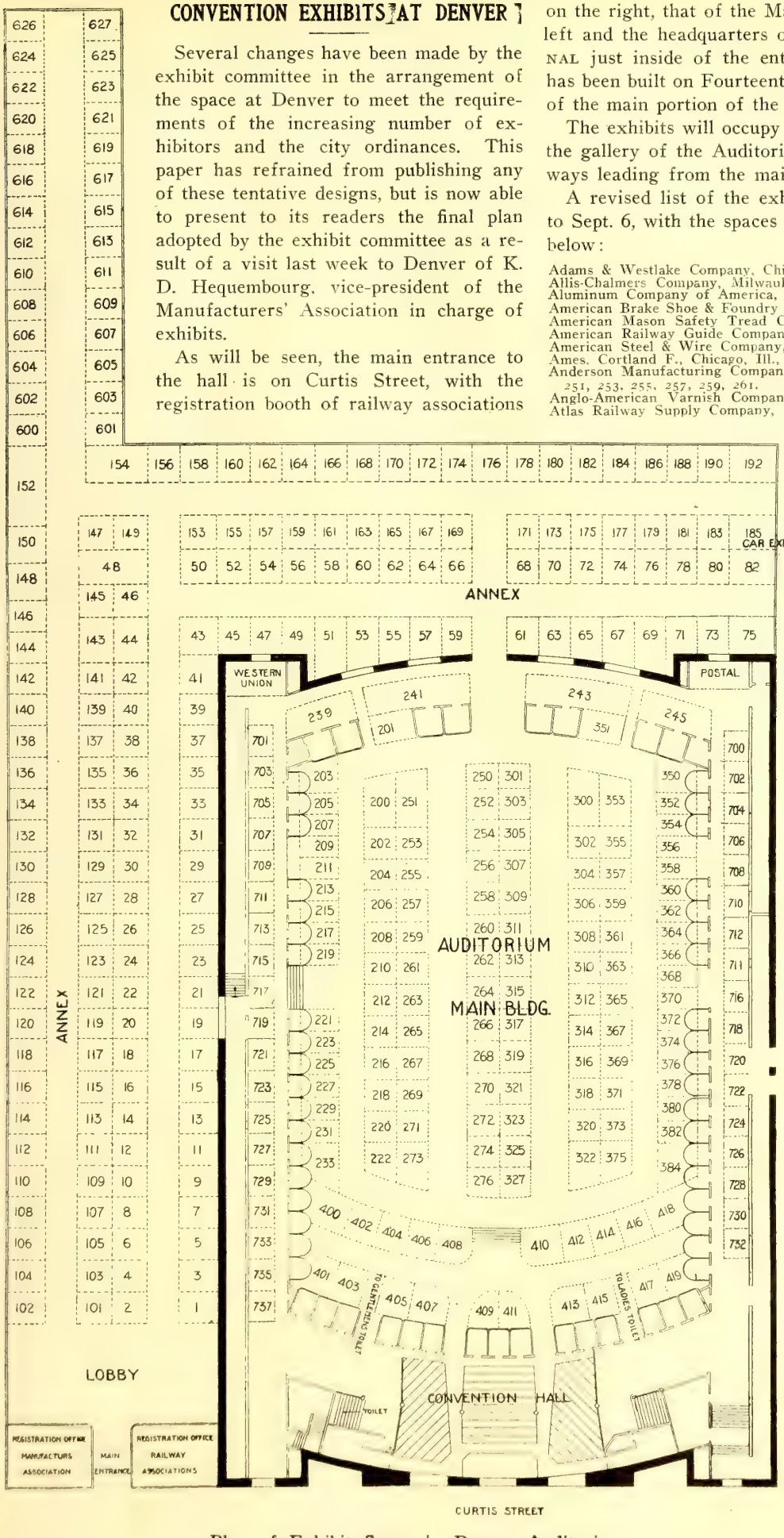
Several changes have been made by the exhibit committee in the arrangement of the space at Denver to meet the requirements of the increasing number of exhibitors and the city ordinances. This paper has refrained from publishing any of these tentative designs, but is now able to present to its readers the final plan adopted by the exhibit committee as a result of a visit last week to Denver of K. D. Hequembourg, vice-president of the Manufacturers' Association in charge of exhibits.

As will be seen, the main entrance to the hall is on Curtis Street, with the registration booth of railway associations on the right, that of the Manufacturers' Association on the left and the headquarters of the ELECTRIC RAILWAY JOURNAL just inside of the entrance at the right. An annex has been built on Fourteenth Street and directly in the rear of the main portion of the Auditorium.

The exhibits will occupy the annex, the ground floor and the gallery of the Auditorium, the latter reached by stairways leading from the main floor of the Auditorium.

A revised list of the exhibitors at Denver, corrected up to Sept. 6, with the spaces to be occupied by them, is given below:

Adams & Westlake Company, Chicago, Ill., 366, 368.
Allis-Chalmers Company, Milwaukee, Wis., 200, 202, 204, 206, 208, 210,
Aluminum Company of America, Pittsburgh, Pa., 403.
American Brake Shoe & Foundry Company, Mahwah, N. J., 33, 35, 37, 39.
American Mason Safety Tread Company, Boston, Mass., 715.
American Railway Guide Company, Chicago, Ill., 106.
American Steel & Wire Company, Chicago, Ill., 28, 30, 32, 127, 129, 131.
Ames, Cortland F., Chicago, Ill., 713.
Anderson Manufacturing Company, A. & J. M., Boston, Mass., 221, 223, 251, 253, 255, 257, 259, 261.
Anglo-American Varnish Company, Newark, N. J., 378.
Atlas Railway Supply Company, Chicago, Ill., 168.
Automatic Car Coupler Company, Pasadena, Cal., 605.
Automatic Ventilator Company, New York City, 203, 205.
Avery Scale Company, N. Milwaukee, Wis., 616.
Badger Fire Extinguisher Company, Boston, Mass, 201.
Barber Car Company, York, Pa., 615, 617, 619.
Bayonet Trolley Harp Company, Springfield, Ohio, 411.
Berry Brothers, Ltd., Detroit, Mich., 166.
Black Diamond Boring Machine Company, Monongahela, Pa., 376.
Brown, Harold P., New York City, 128, 130, 132.
Brill Company, J. G., Philadelphia, Pa., 218, 220, 222, 269, 271, 273.
Buckeye Electric Company, Cleveland, Ohio, 380.
Buda Foundry & Manufacturing Company, Chicago, Ill., 50, 52, 153, 155.
Burroughs Adding Machine Company, Detroit, Mich, 215, 217, 219.
C. A. Wood Preserver Company, Austin, Tex., 620.
Carnegie Steel Company, Pittsburgh, Pa., 16, 18, 20, 22, 24, 26, 115, 117, 119, 121, 123, 125.
Chicago Car Heating Company, Chicago, Ill., 170, 172.
Chicago Varnish Company, Chicago, Ill., 370.
Chisholm-Moore Manufacturing Company, Cleveland, Ohio, 76, 179.
Cincinnati Car Company, Cincinnati, Ohio, 186, 188, 190, 192.
Climax Railway Supply Company, Chicago, Ill., 409.
Coin Counting Machine Company, New York City, 160.
Coleman Fare Box Company, Buffalo, N. Y., 419.
Colorado Cement Products Company, Denver, Colo., 80, 183.
Columbia Machine Works & Malleable Iron Company, Brooklyn, N. Y., 607.
Consolidated Car Fender Company, Providence, R. I., 229, 231.
Consolidated Car Heating Company, Albany, N. Y., 316, 369.
Cooper Heater Company, Dayton, Ohio, 717.
Coulter & Co., C. J., Hammond, Ind., 611.
Crane & Co., Chicago, Ill., 613.
Crouse-Hinds Company, Syracuse, N. Y., 360, 362.
Curtain Supply Company, Chicago, Ill., 406, 408.
D & W Fuse Company, Providence, R. I., 116.
Dearborn Drug & Chemical Company, Chicago, Ill., 308, 310, 361, 363.
Duff Manufacturing Company, Pittsburgh, Pa., 150.
Duntley Manufacturing Company, Chicago, Ill., 176, 178.
Eclipse Railway Supply Company, Cleveland, Ohio, 601.
Edwards Company, O. M., Syracuse, N. Y., 384.
Electric Manufacturers' Sales Company, Denver, Colo., 603.
ELECTRIC RAILWAY JOURNAL, New York City, 1, 3, 5, 7, 9, 11, 13.
Electric Railway Improvement Company, Cleveland, Ohio, 214, 216, 265, 267.
Electric Railway Equipment Company, Cincinnati, Ohio, 624, 626.



Plan of Exhibit Space in Denver Auditorium

Electric Renovator Company, Pittsburgh, Pa., 413.
Electric Service Supplies Company, Philadelphia, Pa., 270, 272, 274, 276, 321, 323, 325, 327.
Electric Traction Supply Company, St. Louis, Mo., 207, 209, 211, 213.
Emery Pneumatic Lubricator Company, St. Louis, Mo., 410.
Eureka Tempered Copper Works, North East, Pa., 402.
Fertig, Charles J., Colorado Springs, Colo., 627.
Forsyth Brothers Company, Chicago, Ill., 212, 263.
Forsyth Steel Tie Company, Pittsburgh, Pa., 78, 181.
Galena Signal Oil Company, Franklin, Pa., 68, 70, 72, 74, 171, 173, 175, 177.
General Electric Company, Schenectady, N. Y., 2, 4, 6, 8, 10, 12, 14, 101, 103, 105, 107, 109, 111 113.
Gest, Guy M., New York City, 29.
Globe Ticket Company, Philadelphia, Pa., 233.
Goldschmidt Thermit Company, New York City, 71, 73, 75.
Griffin Wheel Company, Chicago, Ill., 41, 43, 45.
Gulick-Henderson Company Pittsburgh, Pa., 609.
Hale & Kilburn Manufacturing Company, Philadelphia, Pa., 312, 314, 365.
Handlan-Buck Manufacturing Company, St. Louis, Mo., 140.
Hess-Bright Manufacturing Company, Philadelphia, Pa., 126.
Heywood Brothers & Wakefield Company, Wakefield, Mass., 38, 137.
International Register Company, Chicago, Ill., 134, 136, 138.
Jewett Car Company, Newark, Ohio.
Jeandron, W. J., New York City, 351.
Johns-Manville, H. W., Company, New York City, 152.
Jones & Laughlin Steel Company, Pittsburgh, Pa., 243.
Kenfield-Fairchild Publishing Company, Chicago, Ill., 102, 104.
Kerite Insulated Wire and Cable Company, New York City, 414, 416.
Lang Retrieving Trolley Company, Oakland, Cal., 245.
Lorain Steel Company, Philadelphia, Pa., 42, 44, 46, 48, 141-143, 145, 147, 149.
Massachusetts Chemical Company, Boston, Mass., 114.
Meyer Safety Guard Company, Omaha, Neb., 600, 602.
Midvale Steel Company, New York City, 239.
McConway & Torley Company, Pittsburgh, Pa., 318, 320, 322, 371, 373, 375.
McCord & Co., Chicago, Ill. 148.
Nachod Signal Company, Philadelphia, Pa., 409.
National Brake Company, Buffalo, N. Y., 112.
National Brake & Electric Company, Milwaukee, Wis., 350, 352, 354, 356, 358.
National Carbon Company, Cleveland, Ohio, 372.
National Lead Company, New York City, 108.
National Lock Washer Company, Newark, N. J., 142, 144.
Nichols, A. O., Omaha, Neb., 417.
Niles-Bement-Pond Company, New York City, 61, 63, 65, 67, 69.
Ohio Brass Company, Mansfield, Ohio, 47, 49, 51, 53, 55, 57, 59.
Ohmer Fare Register Company, Dayton, Ohio, 15, 17, 19, 21, 23, 25.
Onderdonk Engineering Company, Denver, Colo., 174.
Pantasote Company, New York City, 405, 407.
Pay-As-You-Enter Car Corporation, New York City, 180, 182, 184.
Pennsylvania Steel Company, Steelton, Pa., 54, 56, 58, 60, 62, 64, 157, 159, 161, 163, 165, 167, 169.
Peter Smith Heater Company, Detroit, Mich., 27.
Planet Company Chicago, Ill., 374.
Rail Joint Company, New York City, 156, 158.
Roebling's Sons Company, John A., Trenton, N. J., 31.
Rubberset Brush Company, Newark, N. J., 374.
Sherwin-Williams Company, Cleveland, Ohio, 314.
Speer Carbon Company, St. Mary's, Pa., 110.
St. Louis Malleable Castings Company, St. Louis, Mo., 621, 623.
Standard Paint Company, New York City, 404.
Standard Steel Works Company, Philadelphia, Pa., 135, 36.
Standard Motor Truck Company, Pittsburgh, Pa., 608, 610, 612, 614.
Standard Varnish Works, Chicago, Ill., 382.
Standard Brake Shoe Company, Chicago, Ill., 400.
Star Brass Works, Kalamazoo, Mich., 364.
Sterling Varnish Company, Pittsburgh, Pa., 418.
Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., 133, 134.
T. H. Symington Company, Baltimore, Md., 139, 40.
Taylor Electric Truck Company, Troy, N. Y., 604, 606.
Tool Steel Motor Gear & Pinion Company, Cincinnati, Ohio, 227.
Traction Lubricating Company, Chicago, Ill., 622.
Transfer Issuing Machine Company, Boston, Mass., 625.
Transportation Equipment Company, New York, 711.
Trolley Supply Company, Canton, Ohio, 162, 164.
U. S. Wood Preserving Company, New York City, 82, 185.
Under-Feed Stoker Company, Chicago, Ill., 412.
Van Dorn Co., W. T., Chicago, Ill., 146.
Wallace Supply Company New York City, 612, 614.
Wagner Electric Manufacturing Company, St. Louis, Mo., 154.
Western Electric Company, New York City, 118, 120, 122, 124.
Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319.
Wharton, Jr. & Co., William, Philadelphia, Pa., 300, 302, 304, 306, 353, 355, 357, 359.
Wheel Truing Brake Shoe Co., Detroit, Mich., 225.
Whitmore Manufacturing Company, Cleveland, Ohio, 415.
Wilson, George. Pasadena, Cal., 401.
Wonham, Magor & Sanger Company, New York City, 241.

RESERVATIONS ON SPECIAL TRAIN FROM CHICAGO

The following is a list of those expecting to attend the Denver convention from the Middle West, who have reserved accommodations on the special train to be run from Chicago over the Chicago, Burlington & Quincy Railroad, leaving Chicago Saturday, Oct. 2, at 2 p. m., and arriving in Denver Sunday afternoon at 4:30:

E. O. Ackerman, Columbus Ry. & Lt. Co., Columbus, Ohio.
W. S. Arnold, Westinghouse Elec. & Mfg. Co., Chicago, Ill.
G. H. Atkin, Chicago, Ill.
F. M. Bayliss, Chicago, Ill.
W. W. Bean, Benton Harbor, Mich.
J. R. Blackhall, Chicago & Joliet Elec. Ry., Joliet, Ill.
Arthur W. Brady, Indiana Union Trac. Co., Anderson, Ind.
J. J. Brennan, Ft. Wayne & Wabash Valley, Ft. Wayne, Ind.
J. A. Brett, Westinghouse Elec. & Mfg. Co., Cincinnati, Ohio.
P. V. Burington, Columbus Ry. & Lt. Co., Columbus, Ohio.
Robert F. Carr, Dearborn Drug & Chemical Wks., Chicago, Ill.
W. A. Carson, Evansville Ry. Co., Evansville, Ind.
C. C. Chappell, West. Elec. & Mfg. Co., Chicago, Ill.
W. B. Conover, John A. Roebling's Sons Co., Chicago, Ill.
J. H. Cook, Buckeye Electric Co., Chicago, Ill.
G. W. Cooper, Ohio Brass Co., Mansfield, Ohio.
J. B. Crawford, Winona & Warsaw Inter. Ry., Warsaw, Ind.
D. B. Dean, Chicago, Ill.
C. F. Dodson, Baldwin Locomotive Wks., Chicago, Ill.
H. A. Dorner, Dorner Railway Equipment Co., Chicago, Ill.
L. J. Drake, Galena Signal Oil Co., Indianapolis, Ind.
A. E. Duclos, Mass. Chemical Co., Chicago, Ill.
Allen F. Edwards, Detroit United Ry., Detroit, Mich.
Electric Service Supplies Co., Chicago office, 6 representatives.
Electric Traction Weekly, Chicago, Ill., 4 representatives.
C. D. Emmons, Ft. Wayne & Wabash Valley, Ft. Wayne, Ind.
E. C. Faber, Aurora, Elgin & Chicago, Wheaton, Ill.
L. D. Fisher, Joliet & Southern Trac. Co., Joliet, Ill.
W. H. Forsyth, Curtain Supply Co., Chicago, Ill.
H. M. Frantz, Chicago, Ill., 4 representatives.
C. B. Friday, Carnegie Steel Co., Chicago, Ill.
Irwin Fullerton, Detroit United Ry., Detroit, Mich.
C. V. Funk, Ohmer Fare Register Co., Dayton, Ohio.
Galena Signal Oil Co., 5 representatives.
E. H. Hammond, American Elec. Co., Chicago, Ill.
A. M. Hanbrich, Chicago, Ill.
F. Hardy, Ft. Wayne & Wabash Valley, Ft. Wayne, Ind.
W. W. Hincher, A. & J. M. Anderson Mfg. Co,. Chicago, Ill.
Charles E. Hott, Columbus Ry. & Lt. Co., Columbus, Ohio.
G. M. Huber, Atlas Railway Supply Co., Chicago, Ill.
Indiana Union Traction Co., Anderson, Ind., 6 representatives.
Mr. Jackson, National Conduit Co., Chicago, Ill.
L. W. Jacques, Ft. Wayne & Wabash Valley, Ft. Wayne, Ind.
Frank E. Johnson, Ohio Brass Co., Chicago, Ill.
M. J. Kehoe, Ft. Wayne & Wabash Valley, Ft. Wayne, Ind.
W. J. Kelsh, Wisconsin Elec. Ry., Oshkosh, Wis.
George W. Knox, Knox Engineering Co., Chicago, Ill.
E. N. Lake, Board of Supervising Engineers, Chicago, Ill.
Joseph Leidenger, Dayton Mfg. Co., Dayton, Ohio.
W. H. McAlister, Cincinnati Traction Co., Cincinnati, Ohio.
Mr. McCaskey, Rail Joint Co., Chicago, Ill.
McGuire-Cummings Mfg. Co., Chicago, Ill., 5 representatives.
J. E. McLain, Trolley Supply Co., Canton, Ohio.
J. G. McMichael, Atlas Ry. Supply Co., Chicago, Ill.
Mr. Marsh, Chicago, Ill.
Massachusetts Chemical Co., 4 representatives.
G. A. Mead, Ohio Brass Co., Mansfield, Ohio.
T. H. Minary, Louisville Ry. Co., Louisville, Ky.
H. A. Nicholl, Indiana Union Traction Co., Anderson, Ind.
C. J. Olmstead, West. Traction Brake Co., Chicago, Ill.
Mr. Olson, Ohio Brass Co., Mansfield, Ohio.
E. S. Pattee, Twin City Rap. Trans. Co., Minneapolis, Minn.
Mr. Peterson, Baldwin Locomotive Wks., Chicago, Ill.
Mr. Porter, Cincinnati, Ohio.
Railway Materials Company, Chicago, Ill., 2 representatives.
C. W. Register, West. Elec. & Mfg. Co., Chicago, Ill.
John M. Roach, Chicago Railways Co., Chicago, Ill.
F. C. Robbins, Cleveland, Ohio.
S. C. Rogers, Mahoning & Shenango Ry. & Lt. Co., Youngstown, Ohio.
L. C. Shipherd, Evansville & Southern Ind. Ry., Evansville, Ind.
Mr. Slinghuff, John A. Roebling's Sons Co., Chicago, Ill.
Thomas Sloan, Chicago, Ill.
Mr. Stewart, Chicago, Ill.
H. R. Swift, Toledo Ry. & Lt. Co., Toledo, Ohio.
Mr. Tate, National Conduit Co., Chicago, Ill.
C. E. Towle, Chicago, Ill.
H. E. Vordemark, Ft. Wayne & Wabash Valley, Ft. Wayne, Ind.
O. F. Weaver, National Carbon Co., Cleveland, Ohio.
George R. Whisner. Columbus Ry. & Light Co., Columbus, Ohio.
L. G. White, Columbus Ry. & Lt. Co., Columbus, Ohio.
E. F. Wickwire, Ohio Brass Co., Mansfield, Ohio.
J. R. Wiley, Chicago, Ill.
A. L. Wilkinson, Ohio Brass Co., Mansfield, Ohio.
E. A. Wurster, Falk Co., Milwaukee, Wis.

THE BOSTON-DENVER-PACIFIC TRAIN

Charles S. Clark, secretary of the Massachusetts Street Railway Association, contributes the list printed opposite of those who have already registered as members of the party from Boston to Denver and the Pacific Coast, and in this connection has asked this paper to correct any false impression which may exist that passengers on this train are limited in any way to Boston people, or that it is a private party. Passage is available not only to Denver, but for the entire trip to any one connected with the street railway industry who is planning to go to the Denver convention, whether he is a member of the Massachusetts Street Railway Association or not. The list already includes a number of people outside of New England, and it is possible yet to provide accommodations for four or five others, or possibly more, for the round trip. Even if one has already arranged to go to Denver by another route, he may be able to take the place of some of the present members of the party who are obliged to return directly from Denver. In other words, it is possible to join the party at any point along the line between Boston and Denver, and even at Seattle, provided, of course, there are accommodations on the train. Any one who wishes, therefore, to join the party at other points than Boston should communicate promptly with Mr. Clark.

It might be added that about 20 of the party are now planning to include a trip to the Grand Canyon of Colorado in the tour, as this can be done at a comparatively small expense of time and money, and it is quite likely that the whole party will take this trip.

John A. Arnold, Taunton & Pawtucket St. Ry., Pawtucket, R. I.
Mrs. John A. Arnold.
W. H. Bacon, Bacon & Co., Boston, Mass..
Albert W. Bliss, Brookline. Mass.
Mrs. Albert W. Bliss.
John Burns, Duxbury, Mass.
Mrs. John Burns.
Charles S. Clark, Sec. Mass. St. Ry. Assoc., Boston, Mass.
Mrs. Charles S. Clark.
Joseph F. Clark.
Miss Arabella B. Clark.
Frank R. Coates, Stone & Webster Eng. Corp., Boston, Mass.
Clifton L. Colburn, Nahant & Lynn St. Ry., Lynn, Mass.
Edward Dana, Boston Elev. Ry., Boston, Mass.
Mrs. Edward Dana.
Bradford D. Davol, Fall River, Mass.
Mrs. Bradford D. Davol.
J. E. Dozier, Nahant & Lynn St. Ry., Lynn, Mass.
Mrs. J. E. Dozier.
Howard F. Eaton, Brockton & Plymouth St. Ry., Plymouth, Mass.
Mrs. Howard F. Eaton.
Charles R. Edwards, Badger Fire Extinguisher Co.. Boston, Mass.
Mrs. Charles R. Edwards.
J. F. Fletcher, Boston, Mass.
Mrs. J. F. Fletcher.
Joseph J. Flynn, Boston, Mass.
E. C. Foster, New Orleans Ry. & Ltg. Co., New Orleans, La.
Mrs. E. C. Foster.
Royal C. Gillespie, New River Coal Co., Boston, Mass.
E. W. Holst, Boston & Northern St. Ry., Boston, Mass.
Francis H. Johnson, Nahant, Mass.
Mrs. Francis H. Johnson.
E. B. Kidson, Manchester Trac., Lt. & Pwr. Co., Boston, Mass.
Clarence E. Larned, Boston El. R. R., Boston, Mass.
Harry L. Libbey, Boston Elev. R. R., Boston, Mass.
A. L. McDonald, Brockton, Mass.
Mrs. A. L. McDonald.
George C. Morse, Taunton, Mass.
John F. McCabe, Springfield St. Ry., Springfield, Mass.
Thomas N. McCarter, Public Service Ry. Co., Newark, N. J.
Mrs. Thomas N. McCarter.
J. C. Meixell, Northern Electric St. Ry., Scranton, Pa.
W. F. Narey, Berkshire St. Ry., North Adams, Mass.
George A. Nash, Brown Bros. & Co., Boston, Mass.
Mrs. George A. Nash.
Henry C. Page, Worcester Con. St. Ry., Worcester, Mass.
Mrs. Henry C. Page.
Charles C. Pierce, General Electric Co., Boston, Mass.
Mrs. Charles C. Pierce.
H. E. Reynolds, Boston & Northern St. Ry., Boston, Mass.
Mrs. H. E. Reynolds.
James W. Rollins, Jr., Holbrook, Cabot & Rollins, Boston, Mass.
Mrs. James W. Rollins, Jr.
Master Rollins.
Charles S. Sergeant, Boston Elev. R. R., Boston, Mass.
James F. Shaw, Boston, Mass.
J. Brodie Smith, Manchester Trac., Lt. & Pwr. Co., Manchester, N. H.
Mrs. J. Brodie Smith.
Mrs. Alice J. Smith.
Morris Spillane, Boston Elev. R. R., Boston, Mass.
B. V. Swenson, New York City.
Charles E. Taylor, Edmonton Radial Ry., Edmonton, Alta.
Charles I. Thayer, Boston, Mass.
Mrs. Charles I. Thayer.
A. J. Thornley, Narragansett Mach. Co., Providence, R. I.
Mrs. A. J. Thornley.
James R. Wells, Springfield, Mass.
Mrs. James R. Wells.
Edward Wellington, Rindge, N. H.
Mrs. Edward Wellington.
Elton S. Wilde, Union St. Ry. Co., New Bedford, Mass.
Paul Winsor, Boston Elev. R. R., Boston, Mass.
H. L. Wilson, Boston Elev. R. R., Boston, Mass.
Mrs. H. L. Wilson.

ATTENDANCE AT THE CONVENTION

The ELECTRIC RAILWAY JOURNAL publishes herewith replies received by telegram or letter from a number of companies in answer to an inquiry as to the number of officials who will attend the Denver convention of the American Street & Interurban Railway Association. No attempt was made to gage the total probable attendance at the convention. The design was to show that numerous representative companies, both large and small, will have officials present in as large number as in other years. The companies to which an inquiry on this subject was sent were selected at random, and the results are as follows:

Austin (Tex.) Electric Railway Company:
  W. J. Jones, president and general manager.
Bay City (Mich.) Traction & Electric Company:
  J. F. Collins, general manager.
  H. G. Kessler, secretary and auditor.
  J. W. Glendening, general passenger and freight agent.
Boston (Mass.) Elevated Railway Company:
  C. S. Sergeant, vice-president.
  H. L. Wilson, treasurer.
  M. P. Spillane, claim agent.
  C. E. Learned, superintendent of inspection.
  Paul Winsor, chief engineer of motive power and rolling stock.
  John W. Corning, electrical engineer.
  H. L. Libby, superintendent of car shops.
  Edward Dana, inspector of service conditions.
Brooklyn (N. Y.) Rapid Transit Company:
  C. E. Roehl, electrical engineer.
  W. G. Gove, superintendent of equipment.
  C. L. Crabbs, engineer of way and structures.
Boston & Northern Street Railway Company, Boston, Mass.:
  H. E. Reynolds, assistant general manager.
  E. W. Holst, superintendent of equipment.
Butte (Mont.) Electric Railway Company:
  J. R. Wharton, manager, or
  J. S. Wathey. superintendent.
Choctaw Railway & Lighting Company, McAlester, Okla.:
  One representative.
Cincinnati (Ohio) Traction Company:
  Dana Stevens, vice-president and general manager.
  Thomas Elliott, chief engineer.
  W. H. McAlister, comptroller.
Cleveland, Painesville & Eastern Rialroad Company, Cleveland, Ohio.:
  J. Jordan, general manager.
Colorado Springs & Interurban Railway Co., Colorado Springs, Colo.:
  Ten officials and delegation of minor employees.
Columbus (Ohio) Railway & Light Company:
  P. V. Burington, secretary and auditor.
  L. G. White, general superintendent.
  E. O. Ackerman, engineer maintenance of way.
  George Whisner, superintendent of transportation.
  B. B. Davis, claim adjuster.
  Charles E. Hott. master mechanic.
Dallas (Tex.) Consolidated Electric Street Railway Company:
  E. T. Moore, manager.
  E. J. Emerson, superintendent.
Detroit (Mich.) United Railway:
  F. W. Brooks, general manager.
  Irwin Fullerton, auditor.
  George W. Parker, general freight and express agent.
  Harry Bullen, general superintendent.
  Allen F. Edwards, purchasing agent.
Eastern Pennsylvania Railways Company, Pottsville, Pa.:
  C. N. Ryan, assistant treasurer.
El Paso (Tex.) Electric Railway Company:
  H. S. Potter, general superintendent.
Evansville & Southern Indiana Traction Company, Evansville, Ind.:
  One representative.
Fort Smith, (Ark.) Light & Traction Company:
  J. Walter Gillette, general manager.
Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.:
  C. D. Emmons, general manager, and several heads of departments.
Galveston (Tex.) Electric Company:
  H. S. Cooper, manager.
Little Rock (Ark.) Railway & Electric Company:
  D. A. Hegarty, general manager.
  W. J. Thorp, auditor.
  A. R. Koonce, master mechanic.
  A. B. Chichester, claim agent.
Nashville (Tenn.) Railway & Light Company:
  Percy Warner, president.
  H. A. Davis, superintendent railway department.
  G. D. Mills, superintendent transportation department.
  H. C. Walters, secretary and treasurer.
  George Swint, master mechanic.
  H. C. Benagh, roadmaster.
Northern Texas Traction Company, Ft. Worth, Tex.:
  H. T. Edgar, manager.
  G. H. Clifford, general superintendent.
  J. H. Du Fresne, assistant treasurer.
Ohio Electric Railway Company, Cincinnati, Ohio:
  Dana Stevens, vice-president.
  Thomas Elliott, consulting engineer.
  W. H. McAlister, assistant treasurer.
Philadelphia (Pa.) Rapid Transit Company:
  F. H. Lincoln, assistant general manager.
  W. S. Twining, chief engineer.
  H. B. Nichols, engineer of way.
  H. R. Goshorn, general claim agent.
  Charles Hewitt, superintendent of motive power.
  James Heywood, superintendent of lines and cables.
Public Service Railway, Newark, N. J.:
  Thomas N. McCarter, president.
  N. W. Bolen, superintendent of transportation.
  H. V. Drown, general claim agent.
  Martin Schreiber, engineer maintenance of way.
  L. S. Hoffman, general solicitor.
  E. J. Dunne, superintendent of distribution.
Rhode Island Company, Providence, R. I.:
  H. M. Bronsdon, chief engineer.
Schenectady (N. Y.) Railway Company:
  Edward F. Peck, general manager.
  George L. Radcliffe, general superintendent.
Sheboygan (Wis.) Light, Power & Railway Company:
  Ernest Gonzenbach.
Springfield (Mass.) Street Railway Company.
  H. C. Page, vice-president.
  James R. Wells, auditing department.
Terre Haute, Indianapolis & Eastern Traction Company:
  Three representatives.
Toledo Railways & Light Company, Toledo, Ohio.
  A. E. Lang, president.
  L. F. Beilstein, vice-president and general manager.
  H. S. Swift, secretary and auditor.
Tri-City Railway Company, Davenport, Iowa:
  H. E. Weeks, secretary and treasurer.
  William Heindle, superintendent of construction.
  J. G. Huntoon, general superintendent.
Twin City Rapid Transit Company, Minneapolis, Minn.:
  E. S. Pattee, secretary and comptroller.
  L. S. Cairns, general superintendent.
  W. Whiteford, general storekeeper.
Union Electric Company, Dubuque, Iowa.
  L. D. Mathes, general manager.
United Railways & Electric Company, Baltimore, Md.:
  N. E. Stubbs, auditor.
  James R. Pratt, assistant general manager.
  W. C. Ludwig, superintendent of transportation.
  A. T. Clark, superintendent of shops.
Washington (D. C.) Railway & Electric Company:
  George H. Harris, second vice-president.
  W. F. Ham, comptroller.
  C. S. Kimball, engineer maintenance of way.
Worcester (Mass.) Consolidated Street Railway Company:
  H. C. Page, general manager.

CONVENTION NOTES

Secretary Swenson mailed this week to all member companies Convention Bulletin No. 5, containing additional information regarding the progress of arrangements being made for the Denver convention.

HOTEL ACCOMMODATIONS

The bulletin again calls attention to the necessity of immediately making hotel reservations. A complete list of hotels and rates was published in Bulletin No. 3. The American and Manufacturers' Associations will have headquarters at the Brown-Palace Hotel, the Accountants' Association will be at the Savoy Hotel, the Engineering Association will be at the Adams Hotel, the Claim Agents' Association will be at the Metropole and the Transportation & Traffic Association will be at the Albany Hotel.

REGISTRATION

A number of registration cards have been sent out by the secretary to the general managers of each of the member companies. Delegates from the member companies should have one of these cards carefully filled out in typewritten form and signed by the president or general manager of the company before leaving for the convention. It is most important that these cards be properly filled out and signed before they are brought to the convention and presented at the registration booth. By so doing, delegates will be registered and can obtain badges without delay, and this will greatly facilitate the work of registration. The registration cards are printed on paper of four colors. Pink cards should be used by associate members who attend the convention, but who do not come as delegates of their respective companies. Associate members and others who attend the convention as official delegates of their respective companies should fill out the yellow registration card if they are to represent their companies at the meetings of any of the affiliated associations. Delegates who will represent member companies in the American Association should fill out a blue card. Guests of railway companies who may attend the convention should be supplied with a salmon-color registration card.

REGISTRATION AND INFORMATION BUREAUS

All delegates and guests of the railway associations will register and receive their badges at the association booth, located at the entrance to the auditorium. This booth will be open from 9:30 a. m. to 5:30 p. m. during all the days of the convention. Any information concerning association matters can be obtained at this booth.

The Manufacturers' Association will have a registration booth on the opposite side of the entrance, which will take care of all matters relating to exhibitors and members of the Manufacturers' Association.

ENTERTAINMENT

The Manufacturers' Association has completed its plans for entertainment during the convention week. On Monday evening the annual reception to officials of the association will be held at the Brown-Palace Hotel. On Tuesday evening an amateur vaudeville performance will be given. The Denver City Tramway Company has provided the entertainment for Wednesday evening, which will be spent at the White City, near Denver. This is one of the largest and most attractive summer parks in the country. The exclusive use of the grounds and all the attractions, including boating, dancing, roller skating, etc., will be complimentary, and this evening, no doubt, will be the most interesting during the entire convention. Through the personal efforts of J. A. Beeler, vice-president and general manager of the Denver City Tramway Company, the delegates will be regaled by an immense barbecue of wild game, consisting of deer, bear, grouse and other delicacies of the magnificent forests and mountains of the region through which the Moffat Road is being constructed. In the northwestern part of Colorado are the largest natural game preserves now existing on the American continent. The game barbecue prepared for the delegates and guests of the convention will be one of the most remarkable ever held in the West. A dozen deer and several bear have been promised by the hunters of northwestern Colorado, besides a quantity of grouse and sage hens sufficient for the needs of the hungry visitors, whose appetites will be whetted by the keen mountain air to such a point of sharpness that they will be able to do full justice to this unique spread. The committee in charge of the game barbecue has arranged to exhibit the heads and skins of the game animals slaughtered for this feast. The banquet will be held in the open air, and in addition to the game features of the menu the usual viands and condiments of the civilized larder will be supplied. Thursday evening a theater party has been arranged. Special trips over the famous Moffat Road will be run on Friday and Saturday. In addition to these evening entertainments, several entertainments will be given for the ladies during the afternoons of the convention week.

MEETING PLACES

Two meeting rooms, located in the Auditorium Building and each capable of seating approximately 200 people, will be provided for the meetings of the different associations. In addition, several meeting rooms are available in the Savoy Hotel and in the Metropole Hotel.

CONVENTION PROGRAM

The programs of the five associations, as finally arranged, are printed below:

AMERICAN ASSOCIATION

All Sessions at Auditorium Hall.

Tuesday, Oct. 5—9:30 a. m. to 12:30 p. m.
- Registration and Badges. (Association booth, entrance to Auditorium.)

Tuesday, Oct. 5—2 p. m. to 5 p. m. (Open Session.)
- Convention Called to Order.
- Annual Address of the President.
- Annual Report of the Executive Committee.
- Reports of Committees.
  - (a) Subjects.
  - (b) Active Membership.
  - (c) Associate Membership.
  - (d) Revision of Associate Membership.
  - (e) Welfare of Employees.
  - (f) Associate Membership Pins.
- Annual Report of the Secretary-Treasurer.
- Announcements.
- New Business.
  - (g) President Goodrich's Suggestions.
- Paper "Organization, from the Standpoint of the Smaller Companies," by Ernest Gonzenbach, President and General Manager, Sheboygan Light, Power & Railway Company, Sheboygan, Wis.
- Report of Committee on Education.

Wednesday, Oct. 6—2 p. m. to 5 p. m. (Executive Session.)
- Appointment of Nominating Committee.
- Reports of Committees.
  - (a) Interstate Commerce Commission Affairs.
  - (b) Compensation for Carrying United States Mail.

Thursday, Oct. 7—2 p. m. to 5 p. m. (Executive Session.)
- Reports of Committees.
  - (a) Insurance.
  - (b) Public Relations.
  - (c) Subjects for Confidential Bulletins in 1910.
  - (d) Electric Railway Dictionary.

(e) Brill Prize.
Report of Committee on Nominations.
Election of Officers.
Installation of Officers.
Resolutions.
Unfinished Business.
Adjournment.

ACCOUNTANTS' ASSOCIATION

Wednesday Session at the Savoy Hotel, Thursday and Friday Sessions at Rose Parlor, Auditorium Building.

TUESDAY, OCT. 5—2 p. m. to 5 p. m.
Registration and Badges.

WEDNESDAY, OCT. 6—9:30 a. m. to 12:30 p. m.
Convention called to order.
Annual Address of President.
Annual Report of Executive Committee.
Annual Report of Secretary-Treasurer.
Paper—"Interurban Statistics," by S. C. Rogers, Treasurer and Secretary, Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.
Report of the Committee on Interline Accounting.
Appointment of Convention Committees.
Appointment of Nominating Committee.
New Business.

WEDNESDAY, OCT. 6—1 p. m.
"Get-together Luncheon." (Place to be announced at Wednesday morning session.)

THURSDAY, OCT. 7—9:30 a. m. to 12:30 p. m.
Address—"The Census and Electric Railway Statistics," by W. M. Steuart, Chief Statistician for Manufactures, Bureau of Census, Washington, D. C.
Paper—"The Electric Railway Auditor, His Duties and Relation to the Organization," by W. B. Brockway, Chief Accountant, Ford, Bacon & Davis, New York, N. Y.
Paper—"Payrolls and Timekeeping," by N. E. Stubbs, Auditor, United Railways & Electric Company of Baltimore, Baltimore, Md.
Report of the Committee on Standard Classification of Accounts and Form of Report.

FRIDAY, OCT. 8—9:30 a. m. to 12:30 p. m.
Paper—"Stores Accounting and Inventory," by E. S. Pattee, Secretary and Comptroller, Twin City Rapid Transit Company, Minneapolis, Minn.
Report of Joint Committee on Shop Accounting.
Reports of Convention Committees.
Report of Nominating Committee.
Election of Officers.
Installation of Officers.
Adjournment.

ENGINEERING ASSOCIATION

Tuesday and Wednesday Sessions in Rose Parlor, Auditorium Building. Friday Sessions in Auditorium Hall.

TUESDAY, OCT. 5—9:30 a. m. to 12:30 p. m.
Registration and Badges.

TUESDAY, OCT. 5—2 p. m. to 5 p. m.
Convention called to order.
Annual Address of President.
Annual Report of Executive Committee.
Annual Report of Secretary-Treasurer.
Appointment of Convention Committees.
Report of Committee on Way Matters.

WEDNESDAY, OCT. 6—9:30 a. m. to 12:30 p. m.
Report of Committee on Equipment.

WEDNESDAY, OCT. 6—2 p. m. to 5 p. m.
Report of Committee on Power Generation.
Appointment of Nominating Committee.

THURSDAY, OCT. 7—9:30 a. m. to 12:30 p. m.
Inspection of Exhibits.

THURSDAY, OCT. 7—2 p. m. to 5 p. m.
Inspection of Exhibits.

FRIDAY, OCT. 8—9:30 a. m. to 12:30 p. m.
Report of Committee on Standards.
Report of Committee on Power Distribution.

FRIDAY, OCT. 8—2 p. m. to 5 p. m.
Report of Joint Committe on Shop Accounting.
Question Box.
General Business.
Report of Nominating Committee.
Election of Officers.
Installation of Officers.
Adjournment.

CLAIM AGENTS' ASSOCIATION

All Sessions at the Metropole Hotel.

MONDAY, OCT. 4—9:30 a. m. to 12:30 p. m.
Registration and badges.

MONDAY, OCT. 4—2 p. m. to 5 p. m.
Convention called to order.
Annual Address of the President.
Annual Report of the Executive Committee.
Annual Report of the Secretary-Treasurer.
Appointment of Convention Committees.
Discussions:
1. What is the best means of preventing collisions of cars and of cars with vehicles and pedestrians?
2. How can boarding and alighting accidents be diminished or prevented?

TUESDAY, OCT. 5—9:30 a. m. to 12:30 p. m.
Discussions:
3. What is the best plan of having trainmen procure and report an increased number of witnesses to accidents?
4. Is it good practice, when statement of injured party is obtained of accident, to furnish him with copy of his statement?
5. Is a school of instruction for trainmen essential?

TUESDAY, OCT. 5—2 p. m. to 5 p. m.
Discussions:
6. Should information be furnished newspapers regarding the work of the Claim Department?
7. What should be the relationship of the Medical and Claim Departments? How can the Medical best serve the Claim Department in the handling of accidents?
8. The Claim Department and its relation to the Operating Department.
Appointment of Nominating Committee.

WEDNESDAY, OCT. 6—9:30 a. m. to 12:30 p. m.
Discussion:
9. The unreported accident; its evils and remedy.
General Business.
Reports of Convention Committees.
Report of Nominating Committee.
Election of Officers.
Installation of Officers.
Adjournment.

TRANSPORTATION AND TRAFFIC ASSOCIATION

All Sessions at Auditorium Hall.

MONDAY, OCT. 4—9:30 a. m. to 12:30 p. m.
Registration and Badges.

MONDAY, OCT. 4—2 p. m. to 5 p. m.
Convention called to order.
Annual Address of the President.
Annual Report of the Executive Committee.
Annual Report of the Secretary-Treasurer.
Appointment of Convention Committees.
Reports of Special Committees.
Report of Committee on Passenger Traffic.

TUESDAY, OCT. 5—9:30 a. m. to 12:30 p. m.
Report of Committee on Interurban Rules.
Report of Committee on Express and Freight Traffic.

WEDNESDAY, OCT. 6—9:30 a. m. to 12:30 p. m.
Appointment of Committee on Nominations.
Report of Committee on City Rules.
Report of Committee on Transfers and Transfer Information.
Paper—"Chicago's Transfer Crusade," by Joseph V. Sullivan, General Supervisor, Chicago Railways Company, Chicago, Ill.
Paper—"Transfer Laws and Suggested Changes," by Arthur A. Ballantine, Boston, Mass.

THURSDAY, OCT. 7—9:30 a. m. to 12:30 p. m.
Report of Committee on Training of Transportation Employees.
General Business.
Report of Nominating Committee.
Election of Officers.
Installation of Officers.
Adjournment.

RULES ON DEPRECIATION IN GREAT BRITAIN

The income tax law of Great Britain has forced the railway companies and authorities there to establish a system of arbitrary rulings as to what allowances should be made for depreciation in electric railway and lighting undertakings for the purpose of assessing the income taxes. This subject has been recently again taken up by the Board of Internal Revenue and Tramway & Light Railway Association, with the result that the following rules have been agreed upon by both the board and the tramway association.

PERMANENT WAY

LIFE

The life of the permanent way is to be taken as 12, 14 or 16 years, according to the traffic thereon. The classification is to be based on the average car-mileage per mile of track per annum of the financial year preceding the year of assessment, viz.:

(1) Not exceeding 50,000 car-miles per mile of track—16 years.

(2) Over 50,000 and not exceeding 75,000 car-miles per mile of track—14 years.

(3) Over 75,000 and not exceeding 125,000 car-miles per mile of track—12 years.

(4) Over 125,000 car-miles per mile of track—special consideration.

Where there are special circumstances, such as exceptional gradients and the compulsory use of wood paving, etc., tending to show that the car-mileage does not fairly represent the wear and tear of the track, each such case is entitled to special consideration.

COST OF RENEWALS

The cost of renewals, including setts or other paving, but excluding concrete foundations, should be taken at £4,400 per mile of single track until the general renewal of the track takes place.

BASIS OF COMPUTATION OF DEPRECIATION ALLOWANCE

No allowance should be made in computing the assessable profits in respect of any expenditure on repairs or maintenance of the permanent way, but the allowance for depreciation should be computed at such a sum per annum as will in the aggregate over the determined life of the permanent way be equal to the cost of renewal as above fixed plus the estimated repairs for that period:

Cost of renewal per mile as above	£4,400
Add, for example:	
Estimated cost of repairs, at £100 per mile per annum, for an undertaking with a life of 16 years	1,600
	£6,000
Amount to be allowed per annum in lieu of depreciation, 1/16th	£375

The amount to be added in respect of ordinary repairs should be determined by taking the actual average expenditure as shown in the accounts of the undertaking for the last three years, or such period less than three years as the undertaking has been in existence.

Repairs under this head should be understood to include renewals of special track work at junctions and crossovers, which occur at frequent intervals.

PERIODICAL ADJUSTMENT

Inasmuch as the expenditure on repairs is expected to increase as the track begins to wear, in which case the figure to be adopted under this head, which is to be based on past experience, will be unsatisfactory, the amount of such estimate should come up for revision at the end of every five years, and an adjustment should be made by increasing or diminishing the allowance as the circumstances require, having regard to the basis of calculation outlined above.

A strict account should be kept by the corporation and the surveyor of the annual allowances, and of the actual expenditure on repairs and renewals; and at the end of 10 or 15 years (i.e., the second or third revision), or at such time as the general renewal of the track shall have taken place, the amount to be annually allowed should be reconsidered and increased or diminished for succeeding years as the ascertained facts shall show to be necessary, provided that under no circumstances shall the allowances for previous years be reopened.

All expenditure on extensions and improvements should be excluded from the working expenses for income tax purposes, and the necessary additional allowance for depreciation on the lines suggested above (i.e., mileage) should at once be allowed on such expenditure, and added to the sum already allowable.

The allowance of £4,400 for renewal of permanent way mentioned above is intended to apply to the overhead trolley system. Special arrangements should be made, on the lines of the foregoing, in the case of the conduit, surface contact, or other system. The number of such cases is very small. As the circumstances vary very considerably in each case, the amount to be allowed for renewals should in the first instance be arrived at by arrangement with the chief of inspector of taxes.

CABLES

In addition to repairs, depreciation should be allowed at the rate of 3 per cent per annum on the written-down value.

OVERHEAD EQUIPMENT, I.E., TROLLEY WIRES AND CONNECTIONS

No depreciation should be allowed; all expenditures on maintenance and renewals should be charged as working expenses, as and when incurred.

CARS AND OTHER ROLLING STOCK

Subject to the ensuing clause, expenditure on maintenance and renewals should be treated as working expenses, and allowed in lieu of depreciation.

Depreciation, however, should be allowed in lieu of renewals where the circumstances justify such an allowance, provided that a strict account is kept of all renewals, and that if such renewals are charged to revenue account they shall be shown separately in such account and added back in computing the assessable profits.

The allowance in such case should be 7 per cent per annum on the written-down value.

In any case the annual expenditure on repairs is to be allowed as a deduction in computing the assessable profits.

GENERAL PLANT AND MACHINERY

All other plant and machinery, including standards, brackets and workshop tools, but excluding loose implements, office furniture and small articles which require frequent renewals, should be bulked together and depreciation allowed thereon at the rate of 5 per cent per annum on the written-down value, in addition to the cost of repairs.

GENERAL

In all cases where depreciation allowances are granted a strict account should be kept of the annual expenditure on renewals (and repairs in the case of tramway tracks), including replacements due to obsolescence, and of the amounts allowed for depreciation and obsolescence, whether under this arrangement or under any arrangement made prior hereto, and a readjustment should be made for the future, if necessary, at the end of every five years, as detailed under tramways (permanent way), subject, however, to the special provisions applicable to tramways (permanent way).

Where depreciation allowances other than those for the permanent way of tramways are granted, renewals should be carefully distinguished, and, if charged against revenue, they should be notified to the surveyor, in order that they may be added back in arriving at the income-tax liability.

"Written-down value" means original prime cost, plus subsequent additions, less all allowances actually granted by the revenue in respect of wear and tear.

These proposals are to take effect for the year 1908-09, and for years preceding in cases where claims of depreciation are at the present time awaiting settlement.

The computations necessary for any future adjustment should be duly made, agreed and recorded each year, whether the accounts for the particular year under review show any assessable income tax liable or not.

Where, in any cases, allowances for depreciation have been made which are now to be discontinued, and they have not been exhausted by renewals already effected, the amount of such unexhausted allowances should be deter-

mined by agreement between the surveyor and the corporation, and deducted from the expenditure on future renewals as and when they are effected.

All cases of dispute should be referred to the board through the chief inspector of taxes.

POWER PLANT ECONOMIES AT SHREVEPORT, LA.

The Shreveport Traction Company, Shreveport, La., recently has made improvements in its power plant water supply which are resulting in a considerable saving, not only in the cost of water, but also in boiler house repairs, through the occasional use of rain water.

Boiler feed water ordinarily is taken from the city water mains, which are supplied by a municipal filtration plant. This water is used throughout the city for drinking purposes. Before being received at the power plant it is filtered three times, yet it contains many scale-forming ingredients. When this water is used the boiler tubes are protected from scale so far as possible by a Sorge chemical system operated in connection with the Cochrane heater. Notwithstanding this protection, it was found that scale continued to form in the tubes and caused trouble at the boiler plant. The recent improvements, which comprise the collection and intermittent use of rain water in the boilers, have practically eliminated the trouble from scale, and also have cut down the yearly cost of water from 12 to 15 per cent.

To provide storage for rain water collected from the roofs of the power plant and the nearby repair shops, a storage tank, 12 x 20 ft. in ground dimensions by 10 ft. deep, was made of tongue and groove native cypress planks at a cost of about $80. This tank is half-buried underground, and is roofed over to prevent evaporation. Additional storage is provided in an elevated tank supported on the top of a brick oil house.

When rain falls and the water draining from the roofs of the buildings begins to collect in the storage reservoir this water immediately is used in the boilers. The storage reservoir in the ground and the elevated tank will hold sufficient water for a run of 72 hours, and it has been found that by thus making use of every rainfall not only is an economy of 15 per cent effected in the cost of city water, but an even greater economy is effected because the rain water loosens the scale which forms in the boiler tubes during the time when the city water must be used. The latter economy, of course, is shown in a reduction of fuel cost and a saving in boiler cleaning expense. The piping in the power plant is so arranged that the engines exhaust to the Cochrane heater as in ordinary practice, while the boiler feed pumps exhaust into the wooden rain water tank, and thus warm this water before it is fed to the boilers.

Formerly crude oil at 56.6 cents per barrel was burned under the boilers of the Shreveport plant, but the contract with the oil-producing company guaranteed that 3 bbl. of oil should equal in heat units one ton of Indian Territory or Arkansas coal at $2.50 per ton. Actual operation of the plant showed that the oil did not meet this contract requirement, and so the traction company has installed gas burners and purchases natural gas for 7.7 cents per 1000 cu. ft. This fuel is found to be more economical as regards cost and far more satisfactory than oil or coal on account of the ease with which the fires may be handled. Only one fireman per shift is needed for tending five boilers. The fuel gas is automatically regulated by the steam pressure. The boilers are set to pop at 120 lb. and the automatic gas regulator is set to cut down the fuel supply when the steam pressure reaches 116 lb.

COMMUNICATION

RAIL CORRUGATION

WILLIAM WHARTON, JR., & COMPANY, INCORPORATED
PHILADELPHIA, Sept. 18, 1909.

To the Editors:

In connection with the recently revived discussion on the cause of rail corrugations by your publication of a resumé of Mr. Peterson's study and theory of the subject, permit me to say that I agree with Mr. Fowler, that while the lack of homogeneity of the rail surface, due to the rolling process, may contribute to the formation of rail corrugations, it can hardly be accepted as the cause of the corrugations.

I further see that Mr. Nichols, in your recent issue, reiterates his opinion that corrugations are caused by vibration. I share this opinion unqualifiedly. In fact, I advanced this theory as long ago as the year 1897, which was about the time that rail corrugations first made themselves felt on electric railway track, and at that time I made a number of investigations. Nothing has come under my observation, nor have any of the various theories and experiments that have been published from time to time changed my opinion or brought out anything that could not be explained by the vibration theory.

In this way all the various characteristics described by Mr. Peterson can be explained, as follows:

(1) "The corrugations always commence on the side of the tread next to the groove." This is natural, as the first wear on rails always comes on that part of the head, due to the coning of the wheels.

(2) "The crests disappear after a certain period of time." The stretch of rail which vibrates is lengthened, and with it the wave length, so that the valleys of the waves will come in some cases where the crests were before, thereby wearing away the original crests.

(3) "The reappearance of some corrugations after their removal by grinding." The grinding removed the corrugations, but not the vibrations, so that new corrugations are formed.

(4) "The reappearance of corrugations of other lengths at points where corrugations had previously been observed." Same cause as in No. 2, that is, the length of the vibrating part was changed, and thereby the wave length was changed.

(5) "The disappearance of corrugations after welding a strip of soft iron on the head of the rail." The uniformity of the section is destroyed by welding on this piece, and therefore the regularity of the wave length is destroyed.

(6) "The appearance of corrugations only at certain points on the same rail." Only portions of a rail vibrate, while the balance is held solid.

(7) "T or Vignole rails are less subject to corrugations than girder rails." Rails will only vibrate under a load when they have sufficient vertical strength to sustain the load between points of support without deflecting. Ordinary T-rails, except the very heaviest sections, have not the vertical strength of the usual girder rails, and bend or deflect perceptibly under the load. When T-rails are laid on elevated structures, where corrugations are plentiful, the vibration of the entire structure produces the corrugations, which also accounts for the much greater wave length usual there.

The vibration in the rail or structure may be supplemented by the vibration of the car trucks, and in some cases the vibration of the latter may produce corrugations. The

vibration in either may be set up by the wheels striking any small irregularity in the track surface, and in that way the irregularities observed in the new rails by Mr. Peterson may contribute to the formation of corrugations.

V. Angerer,
Vice-President and General Manager.

DUPLEX CHECK GATE FOR COUNTING PASSENGERS

The accompanying line engravings show the application of the Jones duplex check gate to the platform of a pre-payment type car. The purpose of this device is to give a positive mechanical count of every passenger entering the car and either paying a cash fare or tendering a transfer or ticket in the same way as would an ordinary turnstile. It occupies much less space, however, than a turnstile; cannot be made to register two passengers by a rapid movement through it, and offers no obstruction to persons carrying suit cases or bundles.

The gate consists of two short horizontal pivoted arms of slightly different lengths, pivoted on top of iron posts set in the platform and a mechanically connected curved arm forming a secondary barrier. The two short arms are about waist high, while the curved arm is formed in the shape of a bent loop with the top bar at about the same height as the short pivoted arms. In the normal position of the gate the two short arms are opened inwardly and the curved arm is swung across the passageway, completely closing the entrance to the car. When the lock is released by the conductor a slight forward push of the entering passenger's body swings the curved arm clear of the passageway and at the same time causes the two straight arms to swing out behind the entering passenger and close the passageway. The next passenger entering pushes open the two straight arms, which in opening cause the curved arm to swing out again and close the passageway in the normal locked position. There is room for only one person between the straight arms and the curved arm, and it is said to be impossible for more than one person to pass through with one movement of the gate. The two short arms are high enough above the floor to permit small children to pass underneath without operating the gate. The connecting links between the two short arms and the curved arm which cause them to move simultaneously are below the platform floor. There is nothing to get out of order and all parts are made amply strong to withstand hard usage. The arms turn in specially designed bearings and only a small pressure is required to move them.

The gate can be locked with a connection to the ordinary fare register in such a way that forward movement of the curved arm registers the fare on the proper dial. The foot pedals shown in the plans enable the conductor in unlocking the gate to throw the recording arm into engagement with either the cash or transfer register mechanism. The foot pedals do not operate the register directly.

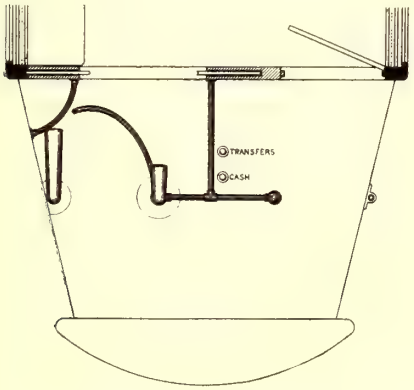


Duplex Check Gates and Ticket-Selling Booth

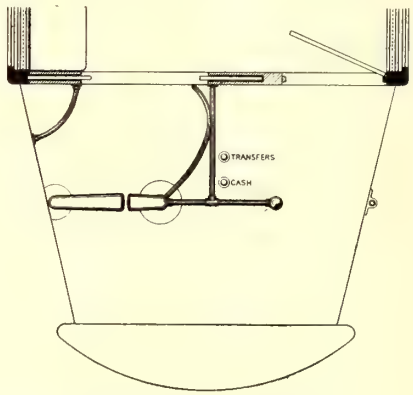
When it is desired to convert the entrance into an exit the curved arm can be removed and the two short arms locked back out of the way, as shown in one of the engravings. Only one curved arm is carried on each car.

This device is also suitable for use in place of a turnstile at the entrance to stations, parks and amusement resorts. Owing to the small space occupied it permits the use of an aisle on each side of the selling booth and doubles the capacity of the entrance. A pair of these gates and a double aisle booth are shown in the engraving from a photograph.

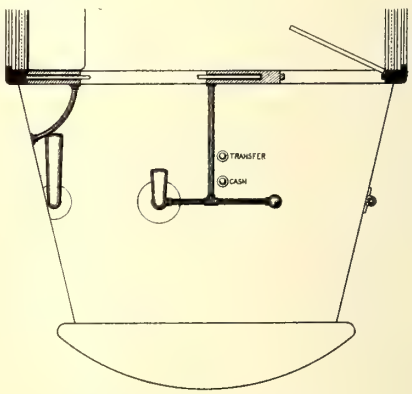
The device is patented and is made by the Jones Change Register Company, New York.



First Position of Gate



Second Position of Gate



Arm Removed for Exit

The municipal tramway system of Aberdeen, Scotland, has decided to adopt a universal fare of 1 penny from the center of the city to the termini of all lines.

The Little Rock Railway & Electric Company has a benevolent organization, one peculiar feature of which is that every six months all of the money in the treasury is divided among those members who have not received any benefits from the organization. The dues are $1 a month. The company also contributes to the fund.

News of Electric Railways

Transit Affairs in New York

The City of New York, through the Department of Bridges, has begun the operation of a shuttle car service over the Queensboro Bridge, between Fifty-ninth Street, New York, and Long Island City. The cars used in the service are leased and power is purchased from the New York Edison Company. The fare is 3 cents for a single trip, or two rides for 5 cents. The fares are all collected at the New York end of the bridge. The application of the New York & Queens County Railway for a franchise to cross the bridge has been referred to a special committee of the Board of Estimate.

The Public Service Commission has forwarded to Attorney-General O'Malley memoranda and maps showing the location of more than 20 miles of unused street railway tracks in Manhattan Borough, with a view to their removal. W. R. Willcox, chairman of the commission, in his communication to the Attorney-General, says: "The commission has no authority to begin proceedings relative to the presence of such tracks or their maintenance under franchises heretofore granted by the city authorities, and has deemed it advisable to refer each case to you as the memoranda and maps are prepared for the commencement of proceedings to forfeit franchises, or such other action as you may deem advisable and appropriate."

On the ground that it is a dummy corporation; that its route is not a good one, and that no adequate assurance has been given that it would furnish a through route with a 5-cent fare, the Public Service Commission has rejected the application of the Third Avenue Bridge Company for a certificate of convenience and necessity to cross the Queensboro Bridge. Frederick W. Whitridge, receiver of the Third Avenue Railroad, organized a corporation, consisting of employees of the Third Avenue Railroad, to make it formal to the Public Service Commission. The company made two proposals, or routes, the final one covering a line partly through Fifty-ninth Street and partly through Fifty-seventh Street from the present line of the Third Avenue Railroad to the bridge. The tracks of the Second Avenue Railroad were to be utilized to make the connection.

The Public Service Commission has adopted an order denying the application of G. L. Lawrence and others, owners of property in the vicinity of 175th Street and St. Nicholas Avenue, requesting the establishment of a new station in the subway at St. Nicholas Avenue and 175th Street. In the memorandum filed by Commissioner Eustis, to whom the application was referred, he states that he does not believe the facts submitted are sufficient at the present time to warrant the commission in ordering the construction of a new station at this point, especially as the capacity of the station at 181st Street is being very largely increased.

Requisition has been sent to the Board of Estimate and Apportionment of New York by the Public Service Commission, asking for $150,000 additional to pay its expenses during the year 1909. A considerable part of the additional amount required is due to the fact that the commission has deemed it advisable to rush all preparation of plans and forms of contract for the Broadway-Lexington Avenue subway route, the Canal Street line and the Broadway Elevated-Subway route. This has required additions to the engineering forces of the commission. The passing of the plan and forms of contracts, which is required by law, and the advertisement for bidders will alone, it is estimated, cost more than $50,000.

Cleveland Traction Situation

Mayor Tom L. Johnson has been absent from Cleveland on an automobile trip and the Cleveland Railway has delayed its reply to the last communication of the administration until his return.

The payment of $600,000 to the Cleveland Railway out of the funds of the Municipal Traction Company will leave the debts of the Municipal Traction Company about $200,000, secured by a deposit of bonds, and less than $100,000 unsecured. About $75,000 of the preferred claims still remain unsatisfied. Receiver Warren Bicknell has in the treasury about $300,000, some of which will perhaps be needed to care for expenditures during the winter.

Although 25 new cars will be put into service, the operation of the open cars and trailers will soon have to be discontinued and the need will then be felt of sufficient rolling stock to care for the business of the company properly. The patrons of the lines on which a 5-cent fare is charged feel that they have done the most to assist the company and that they should have the benefit of any new cars that may be placed in service.

Claims other than preferred, which have been contested by the Cleveland Railway, will be up for hearing on Sept. 27. Special Master Irving Belford's report on these claims has been in the hands of the court for some time, but only matters of the greatest importance have received attention.

The Cleveland Railway will be required to apply all the money received from the receiver to the discharge of the floating debt of the company, under the order of the court. The Cleveland Railway has received nothing since the Municipal Traction Company refused to turn over the rental funds unless the company would agree to pay it all out in dividends in order to comply with agreements made with those who purchased stock under the holding company plan.

Wage Scale in Chicago Adopted

After conferences between the parties to the Chicago wage controversy almost daily for several weeks the president of the Chicago Railways and the president of the Chicago City Railway signed an agreement on Sept. 19 looking to a settlement of differences between the street railway companies and their employees, which had been previously ratified by the employees. The agreement provides that the accepted wage scale shall be operative for a period of three years from Aug. 1, 1909, as follows:

For trainmen in the employ of the companies who have completed two or more years of service:

First year	28 cents an hour
Second year	29 cents an hour
Third year	30 cents an hour

For trainmen who hereafter complete two years of service:

Next succeeding year	28 cents an hour
At expiration of third year	29 cents an hour
Thereafter	30 cents an hour

For "new men" employed subsequent to Aug. 1, 1909:

First six months	23 cents an hour
Second six months	25 cents an hour
Second year	26 cents an hour
Third year	27 cents an hour
Fourth year	28 cents an hour
Fifth year	29 cents an hour
Sixth year	30 cents an hour

The contract also contains provisions for increased wages for barn and shop men in the employ of the Chicago City Railway and the Chicago Railways.

The scale of wages finally adopted was proposed by the committee representing the employees, and was founded on a plan submitted several weeks ago by J. M. Roach, president of the Chicago Railways, and later amended by T. E. Mitten, president of the Chicago City Railway, as outlined in the ELECTRIC RAILWAY JOURNAL Aug. 21, 1909, page 300.

Philadelphia Transit Talks

Transit Talk No. 14, of the Philadelphia (Pa) Rapid Transit Company, was dated Aug. 13, 1909. The subject was "Nearly Half a Million Seats to Spare." The talk follows:

Our traffic records for July show that we furnished seating capacity in our cars for the total number of riders carried daily, and had 466,991 seats to spare each day.

You may be surprised at this assertion, but you can readily test its accuracy.

We had an average of 1450 cars in service every day (including Sundays) during the month. They made an average of 209,072 miles a day. The average seating capacity was 41 per car.

A simple multiplication—41 times the mileage—gives the total seating capacity for 8,571,052 persons every day, provided each person rode only one mile.

We will assume that the average ride was five miles. This is probably a high average, but we would rather overshoot the mark than underestimate.

Dividing the total daily seating capacity by five, we find that there were seats for 1,714,390 passengers, each to ride five miles.

But the average number of riders per day was only 1,247,399. Subtracting this number from the 1,714,390 seats furnished shows that we had each day *466,991 seats more than were required.*

True, this was not furnishing seats for all riders during rush hours. Much of the seating accommodation went to waste in hours when travel was light.

Every one can realize that there would be hopeless blockades if we tried to run a sufficient number of cars to give seats to all riders in the rush hours.

The point we make is that we furnished seating accommodations during July for about 30 per cent more riders than the total number carried, provided the travel could have been evenly distributed. And we do this day in and day out the year round.

Do you know of any business in which so large a percentage of the product necessarily goes to waste?

Transit Talk No. 15 was dated Sept. 2, 1909. The subject was "Philadelphia's Largest Employer." The talk follows:

If you were asked to name, offhand, the institution that to-day is the largest employer of labor in this city, would your answer be the Philadelphia Rapid Transit Company?

Probably not; yet that would be correct.

Perhaps it will surprise you to know that the number of wage earners on our payroll on June 30 was close to 11,000. We have had as many as 13,000.

Barring the Pennsylvania Railroad, which is a national institution, there is not another corporation in the city that is giving work to nearly as many men as we employ.

Locomotive works have had a greater number of workers, but not for a year past.

And our average weekly wage, $10.05, compares favorably with the average pay of workers in industries that make Philadelphia's fame as a manufacturing center.

It exceeds the average weekly earnings of $9.53 in carpet and rug factories, and the $5.91 average in hosiery and knit goods establishments; likewise, the average of $8.64 earned by cotton goods workers.

Of course, in some industries, where highly skilled labor predominates, the average is higher. It ranges from $11.19 to $13.44.

These figures are quoted from the United States Census reports of Pennsylvania manufactures for 1905—a prosperous year.

Our average is exclusive of the executive and office force payrolls. Including them it would be considerably higher.

And our wage-roll has a steadiness that is not found in mill and factory salary lists. Last year, when the big shops were working only part time, or not at all, our weekly payrolls totaled $6,291,165.53 for the year.

Recently the city was gladdened by the news that two "Dreadnoughts" are to be built on the Delaware. They are to cost more than $9,000,000. It is estimated that about half of this sum, say, $5,000,000, should go to pay the wages of some 7,000 workmen in the next 32 months.

We have distributed $64,854,810.85 for wages in the past 12 years—more than $5,000,000 a year. And our employees live here and spend their money here.

We spent for materials last year about $8,000,000 with Philadelphia concerns, or those with stock largely owned here.

We know it has not been the custom to think of the Rapid Transit Company when the magnitude of Philadelphia enterprises is in question. Well, custom is sometimes at fault.

Transit Talk No. 16 was dated Sept 8, 1909. The subject was "Trolley Fares and Steam Car Fares." The talk follows:

Your money has from two to ten times the purchasing power on our street cars that it has on the steam cars.

It is possible to ride nearly twenty miles on our lines for 5 cents. For a ride of this length on a steam road the fare one way would be 50 cents.

Our average length of route over which a single fare will carry a passenger is 11.58 miles. This is about the distance to Chestnut Hill by the steam roads. They charge 22 cents one way.

We carry passengers to Fox Chase and Frankford for a 5-cent fare. The trip by steam train to Fox Chase costs 24 cents, to Frankford 18 cents. Our charge to Willow Grove is 10 cents; the fare on the steam cars is 30 cents.

Passengers ride to Bala on our cars for 5 cents and make the greater part of the trip on the fast subway and "L" trains. Fifteen cents is the fare by railroad.

Of course, there are cheaper steam road rates by the month to and from some of these points. But the lowest steam rates are usually more than double our charge.

In the continental cities of Europe, where the zone system prevails, the average rate charged per mile on the street railways is 1 cent. In Great Britain the average is 1.1 cents. In Berlin the average of all classes for the combined elevated and tunnel service is 1.25 cents per mile.

How far do you ride each day? And how much would it cost you at these rates?

We carry millions of passengers at the rate of one-half cent a mile or less.

In 1870 the standard street car fare was 7 cents; in 1880, 6 cents; in 1890, 5 cents. In 1900 the fare per passenger had dropped to 4.4 cents. For the year ending June 30, 1909, we got 3.9 cents average fare.

In street railroading everything but the price of service has gone up. It costs you less to ride more than 19 miles in a well-lighted, comfortable electric car, running over an expensive roadbed, than it cost to ride five miles in an old-time horse car.

Transit Talks No. 17 was dated Sept. 14, 1909. The subject was "Our 'Cost of Living.'" The talk follows:

Corporations, as well as individuals, feel the pinch of increased cost of living. Our necessaries of life—rails, wire, coal, ties and equipment—are costing us much more than they did a few years ago, yet we are giving better service and within the same fare limit.

Let us illustrate: One of our most important items is the expenditure for rails. In 1894 there was used a girder rail, weighing 90 lb. to the yard, that cost $25 per ton.

To-day the type of grooved rail we use weighs 141 lb. to the yard and costs $38.20 a ton. This is an increase of almost 53 per cent. And we use 10,000 tons of rails a year, which is considerably more than were required 15 years ago. This heavier type of rail was, of course, adopted for the betterment of the service.

Coal is another big item in our expenses. Buckwheat coal sold 12 years ago at approximately $1.72½ a ton; now we pay 33 per cent more for our supply. The present price is about $2.30 a ton on a basis of 28,000 tons a month.

Then consider the cost of equipment. At the time of the consolidation of the lines in 1895 the single-truck car in use represented an outlay for each car of $2,500. Our big double-truck cars in service to-day cost us about $5,000 each, and we operate many more cars than were in service in 1895. Here is an advance in cost of 100 per cent.

These big cars are operated with four 40-hp motors. Two 25 to 30-hp motors were adequate in the days of smaller cars. And electrical equipment, it is generally known, is very costly.

Copper wire, special track work, ties and wheels are all much more expensive.

These increases are a few illustrations of advanced costs in railway operation.

And the five-cent piece is still the maximum price for our product—transportation—just as it was when we could operate with 15 to 50 per cent less expense for equipment and maintenance.

Transit Talk No. 18 was dated Sept. 16, 1909. The subject was "About That $40,000,000 Valuation Increase." The talk follows:

One of the surest signs of a city's development is the increase in tl value of taxable realty.

Just now, Philadelphians are taking pride in the report of the boarc of revision of taxes, which shows an increased property valuation o: $41,600,000 for 1910.

This big jump in the total assessment means progress. It indicates how rapidly populous districts are supplanting the farm and suburban sections.

And in tracing the source of this greatly increased assessment, which will bring the city $700,000 additional revenue next year, it is only fair to consider how largely transportation affected the result.

The increase is assessed because of the extension of city improvements—paved streets, city water mains, city sewers, school facilities and police and fire protection. When an outlying district obtains full service in this respect it ceases to be rated in the farm or suburban class.

But the first step in this transformation is street car service. As a rule, the street car extensions precede, instead of follow, city improvements.

We are constantly extending our routes into territory that is sparsely populated. Home building follows the trolley line, and when settlements spring up the city installs its improvements. Then the community benefits by the larger tax payments.

Many instances could be cited to show how this program of development has been followed in Philadelphia. In most of these instances the initial steps were taken by the street railway company. We assumed the risk in the opening of new territory, and others were first to reap the benefit.

In time all our extensions are likely to bring us profit. But when they do the city will be profiting to a still greater extent by increased property valuation.

New Road Opened in Georgia.—The City & Suburban Railway, which has been under construction for some time at Brunswick, Ga., has been completed and placed in permanent operation.

Outing of Savannah Employees.—The employees of the Savannah (Ga.) Electric Company were the guests of the Savannah Electric Benefit Association at an outing at Isle of Hope Park on Sept. 13. Assignments were so arranged that all the men were afforded an opportunity to attend the outing either in the afternoon or the evening. A series of athletic events, including a baseball game, tended to enliven the outing in the afternoon.

Meeting of Car Lighting Engineers.—The annual meeting of the Association of Car Lighting Engineers is to be held at the new LaSalle Hotel, Chicago, Ill., from Oct. 4 to 7. The question of changing the scope of the association will be brought up at the meeting. It is thought advisable to change the name to "Association of Railway Electrical Engineers," as most of the electrical engineers and chief electricians of the railroads have to do with general railway electrical work and do not confine their efforts to car-lighting work.

Construction of Cambridge Subway to Start.—Active construction will shortly be started at the Boston end of the Cambridge Subway. The Supreme Judicial Court of Massachusetts decided on Sept. 17 in favor of the Boston Transit Commission's authority to build the subway under the Common from Park Street westward beneath Beacon Hill and the West End toward the Charles River. An injunction was granted in the spring of 1909 to Edmund Codman and others restraining the commission from building under the Common. It is not thought that the plaintiffs will take an appeal to the United States Supreme Court, and the contract has been awarded to Patrick McGovern, Boston, who bid $478,000 if the work is done by compressed air, and $469,000 if by free air. The latter method will probably be chosen by the commission.

Proposed Unification of Railroad Terminal Facilities in Chicago.—F. A. Delano, president of the Wabash Railroad, was the speaker at the meeting of the Electric Club in Chicago on Sept. 15. His subject was "A Plan for a New Union Passenger Railway Terminal for Chicago." Of the 26 railroads coming into Chicago all except two enter the city at or south of Sixteenth Street, but the intramural transportation facilities between them are very unsatisfactory. It would therefore seem feasible to construct a series of terminal units at some point south of the "down-town" business center, and Mr. Delano suggests Twelfth Street as such a location, and recommends a series of terminal station units, the passenger traffic to be handled on one level and freight cars on a lower level, or possibly on two lower levels. There are six main terminal stations in Chicago now, including the Northwestern terminal in course of erection at an expense of $20,000,000. The Illinois Central terminal is on Michigan Avenue at Twelfth Street and need not be disturbed. Perhaps the other four terminals could be built on Twelfth Street side by side, and possibly the railroad interested would be willing to spend $20,000,000 on each. The matter of electrification of the railroad terminals was discussed, and Mr. Delano said that the details of the plan he suggests could be carried out more readily with electric operation than with steam. This would be particularly true in the case of the two-deck or three-deck track construction. If terminal electrification is found to pay in New York, it may be expected to do so in a city like Chicago, according to Mr. Delano.

Financial and Corporate

New York Stock and Money Market

September 21, 1909.

After a week of strength and advancing prices, the Wall Street market suffered a slight reaction to-day. About the middle of the day Reading was attacked and the price declined 4 points from the high figure. Transactions in the stock were very heavy, but before the close there was a rally which carried the price up to within a fraction of the opening. Taken as a whole, the week has been one of active trading and general strength. There has been no disturbing element, and the improvement in business has added to the general optimism. Traction shares have been only fairly active and price changes have been insignificant.

Bonds have been in less demand than formerly, due no doubt to the increasing confidence in stocks as an investment proposition. There has been a more active demand for money and rates are a trifle stiffer. To-day's quotations were: Call, 2¾ to 3 per cent; 90 days, 4 per cent.

Other Markets

More than 10,000 shares of Chicago Subway were sold on the Chicago Exchange during the past week. Some stock was sold to-day as low as 8⅞. Other tractions were out of the market.

In the Philadelphia market there has been some pressure to sell Rapid Transit and prices have receded about two points. Other tractions have held about stationary.

In the Boston market both issues of Massachusetts Electric have been fairly active and the preferred has advanced several points during the week. Other price changes are unimportant.

In the Baltimore market there have been no tractions handled except the bonds of the United Railways Company. These have been moderately active, but the changes in price have been unimportant.

Quotations of various traction securities as compared with last week follow:

	Sept. 14.	Sept. 21.
American Railways Company	a46¼	a46
Aurora, Elgin & Chicago Railroad (common)	a50	*50
Aurora, Elgin & Chicago Railroad (preferred)	a95	*95
Boston Elevated Railway	127½	129
Boston & Suburban Electric Companies	*18	*18
Boston & Suburban Electric Companies (preferred)	*74	73
Boston & Worcester Electric Companies (common)	a13	a13
Boston & Worcester Electric Companies (preferred)	a54	a54
Brooklyn Rapid Transit Company	76⅞	80⅛
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	86½	87¾
Capital Traction Company, Washington	a136	a137
Chicago City Railway	a190	a180
Chicago & Oak Park Elevated Railroad (common)	*3	2
Chicago & Oak Park Elevated Railroad (preferred)	*12	7
Chicago Railways, ptcptg, ctf. 1	a112	a110
Chicago Railways, ptcptg, ctf. 2	a37½	a37
Chicago Railways, ptcptg, ctf. 3	a25	a25
Chicago Railways, ptcptg, ctf. 4s	a10½	a10
Cleveland Railways	*78	*78
Consolidated Traction Company of New Jersey	a77½	77½
Consolidated Traction of N. J., 5 per cent bonds	a106½	a106½
Detroit United Railway	a75	a75
General Electric Company	166½	167
Georgia Railway & Electric Company (common)	91½	94
Georgia Railway & Electric Company (preferred)	a88	a90.
Interborough-Metropolitan Company (common)	14½	14⅞
Interborough-Metropolitan Company (preferred)	46⅛	47¾
Interborough-Metropolitan Company (4½s)	83	82¾
Kansas City Railway & Light Company (common)	46	45⅞
Kansas City Railway & Light Company (preferred)	a82	82
Manhattan Railway	a144	143
Massachusetts Electric Companies (common)	17	a17
Massachusetts Electric Companies (preferred)	77½	79½
Metropolitan West Side, Chicago (common)	a16	17¾
Metropolitan West Side, Chicago (preferred)	a49	a50
Metropolitan Street Railway	a24	a24
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	83⅞	83
Northwestern Elevated Railroad (common)	a20	a20
Northwestern Elevated Railroad (preferred)	a70	a71
Philadelphia Company, Pittsburg (common)	a48½	48¼
Philadelphia Company, Pittsburg (preferred)	a44¼	44
Philadelphia Rapid Transit Company	a30	28
Philadelphia Traction Company	a89	a89
Public Service Corporation, 5 per cent col. notes	a100⅛	a100⅞
Public Service Corporation, ctfs.	a94½	a95½
Seattle Electric Company (common)	115	*114
Seattle Electric Company (preferred)	103½	105
South Side Elevated Railroad, (Chicago)	a55	a54
Toledo Railways & Light Company	a11	a10
Third Avenue Railroad, New York	22½	22½
Twin City Rapid Transit, Minneapolis (common)	108¼	110
Union Traction Company, Philadelphia	a54	53½
United Railways & Electric Company, Baltimore	a13½	14
United Railways Inv. Co., San Francisco (common)	47	45½
United Railways Inv. Co., San Francisco (preferred)	76⅝	74¼
Washington Railway & Electric Company (common)	47⅜	a48
Washington Railway & Electric Company (preferred)	a93	a94
West End Street Railway, Boston (preferred)	98	*98
West End Street Railway, Boston (preferred)	108¼	*109
Westinghouse Electric & Manufacturing Company	85	86
Westinghouse Elec. & Mfg. Co. (1st pref.)	a133½	130

aAsked.
*Last sale.

Annual Report of the American Railways Company

During the year ended June 30, 1909, the gross earnings of the subsidiary properties of the American Railways Company of Philadelphia were $2,865,229, a decrease of $62,208 or 2.12 per cent from the previous year. The report of Walter W. Perkins, the treasurer of the American Railways Company, compares as follows with the operations of the two preceding years:

Year ended June 30—	1909	1908	1907
Gross income	$527,114	$498,758	$527,063
Expenses, taxes, interest, etc.	216,385	171,645	142,504
Net income	$310,729	$327,113	$384,559
Dividends	305,706	305,706	304,392
Surplus	$5,023	$21,407	$80,167

J. J. Sullivan, the president, says in his statement to shareholders:

"The total number of passengers carried was 67,556,901, showing a decrease of 1,195,685, or 1.74 per cent.

"During the first five months of the fiscal year, owing to the general depression in business throughout the country, the gross receipts fell off $104,000. Since December, 1908, there has been a gradual improvement in the business of the company, and up to June 30 the loss was cut down to $62,208. During the prosperous times in 1906 and 1907, the cities of Altoona, Springfield, Dayton, Joliet and Scranton made provision to do considerable street paving to improve their highways. A very large amount of this work was done during the fiscal year just closed, costing us $92,374, also the further sum of $37,345 due to municipal requirements, making $129,719, mostly for new street paving, of which sum $54,420 was charged to maintenance account. To this sum must be added $20,631 due to scrapping obsolete equipment and machinery, and renewal of storage batteries, making the sum of $75,052 charged to maintenance and depreciation.

"The fire insurance fund has increased during the year $12,426, making the net assets now on hand $181,306.

"The accident insurance fund has increased during the year $3,430, making a credit in that fund of $37,166. The average cost of accident claims during the year amounted to 2.22 per cent of the gross receipts.

"Collateral trust gold 5s of 1917, amounting to $1,468,000, have been sold to bankers during the year, and out of a part of the proceeds $865,000 was paid on account of the floating indebtedness, leaving the floating obligations of the company $250,000. The sum of $525,782.48 was charged to construction and equipment.

"During the year your company, having in view the possibility of securing the Interstate Railway Company's properties, issued a statement addressed to the holders of the collateral trust 4 per cent bonds agreeing to give in exchange a bond of the American Railways Company bearing 4½ per cent interest at 50 per cent of the face value of Interstate 4s. A large number of the holders availed themselves of this privilege, and we issued a 4½ per cent bond bearing interest from Jan. 1, 1910. The outcome of the Interstate transaction is still undetermined.

"During the year we increased the stock of the People's Railway Company of Dayton, Ohio, by issuing at par to the American Railways Company 7750 shares at a par value of $100 per share, amounting to $775,000, reducing the indebtedness of that company to the American Railways Company a like amount, which debt was incurred by the erection of a new fire-proof power house and machinery, extension of new tracks and railway equipment. It is gratifying to note that the saving in the cost of coal, due to improved machinery in Dayton, amounted to $16,000."

Mr. Sullivan discusses in detail the important events of the year affecting the subsidiary properties.

During the year the business conditions in the district served by the Altoona & Logan Valley Electric Railway were poor owing to the curtailment of employment in the Pennsylvania Railroad shops. However, at the close of the year business conditions are much better as the Pennsylvania Railroad is increasing the number of men employed in its shops.

During the year, the construction of the Corn Products Refining Company's plant, located at Argo, about four miles from Chicago limits, has considerably increased the travel from that point to Argo, on the line of the Chicago & Joliet Electric Railway. The Refining Company has bought several hundred acres and has erected 32 buildings, and at present is employing about 1,200 men, the majority of whom travel to and from Chicago over the road twice a day.

During the latter part of the present fiscal year, the general business conditions in Dayton, Ohio, served by the People's Railway, have shown improvement over the previous year. The large factories in Dayton are now working

full time, and the receipts are beginning to show the effect of improved conditions. The new power house and machinery erected during the year have been entirely completed and more than fulfilled expectations, both as to power furnished and economy produced. It is hoped to complete the new car barn of fire-proof construction, in Dayton, during the present year, on ground which the company purchased about a year ago.

The construction of work on the new power plant of the Scranton Railway, which was mentioned in the last annual report, has been progressing in a satisfactory manner. At the present time the engine and boiler house are practically completed. The engine and generator are now delivered and are being erected. The work of the erection of boilers is well along and should be completed within 30 days. This station should be in service some time in October.

It is the intention to put up a fire-proof car barn for the Springfield Railway to accommodate at least 30 cars and the necessary shops for making repairs to the equipment during the coming year. The company owns a suitable lot for all these improvements, which was purchased more than three years ago.

Mr. Sullivan states that all of the properties of the company are in a satisfactory condition.

Albany & Southern Railroad, Hudson, N. Y.—The Public Service Commission of the Second District of New York has authorized the Albany & Southern Railroad to issue common stock to the amount of $1,375,000 and 5 per cent non-cumulative preferred stock to the amount of $2,029,000. The stock is to be issued for the following purposes only: The acquisition of all properties, rights and franchises of the Albany & Hudson Railroad, sold at foreclosure sale pursuant to the judgment of the Supreme Court of the State of New York on Sept. 7, 1909, to the reorganization committee of the stockholders and bondholders of the company. The Albany & Southern Railroad is further authorized to issue its first mortgage sinking fund gold bonds to the amount of $250,000, said bonds to be sold at not less than 85, and the proceeds to be used: $765,000, par value, for acquiring the total outstanding stock of the Albany & Greenbush Bridge Company for the sum of $650,000; the proceeds of the amount to the amount of $485,000, par value, in the acquisition of property and improvement of its facilities, namely, in acquiring additional power plant, constructing a second track from Rensselaer to Kinderhook Lake and straightening and improving its line between said points. The commission has also consented to the issuance to the Manhattan Trust Company of a mortgage upon all the property of the Albany & Southern Railroad to secure the payment of bonds to the amount of $1,500,000.

Bangor Railway & Electric Company, Bangor, Me.—The directors of the Bangor Railway & Electric Company have declared a quarterly dividend of 1½ per cent upon the capital stock of the company, payable on Oct. 1, to stockholders on record Sept. 27. This is an increase of ¼ of 1 per cent and places the stock upon a 6 per cent basis.

British Columbia Electric Railway, Vancouver, B. C.—The British Columbia Electric Railway is making an issue of $2,500,000 of new capital stock in London, Eng., to provide for extensive improvements and the construction of a new terminal station in Vancouver.

Boston Suburban Electric Companies, Newton, Mass.—The trustees of the Boston Suburban Electric Companies recommended a reduction of 9 per cent in the number of preferred shares of the company and 2 per cent in the number of common shares to meet the changed conditions resulting from the recent sale of the Waltham Gas & Electric Company to the Edison and the Massachusetts gas interests. It is proposed to retire 4694 shares of preferred stock and 1173 shares of common stock issued for the purchase of the 3247 shares of the Waltham Gas & Electric Company, reducing the number of shares outstanding to 50,146 common and 45,775 preferred. From the sale of the Waltham property the company received $750,000, while the market value of the preferred and common shares to be retired is $357,909. As more than $350,000 will be required in the purchase of outstanding shares and $200,000 will be applied to reducing the floating debt, there will be left about $200,000 of the amount received for the Waltham property for the payment of back dividends, which now amount to more than $480,000.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—Guy M. Walker, New York, a member of the stockholders' protective committee of the Columbus, Delaware & Marion Railway and the companies allied with it, states that the assignment of John G. Webb's interests was made at the request of the committee in order that the bondholders and all others interested in the properties might be protected. According to Mr. Walker it is the purpose of the committee to protect the consolidated bondholders and the junior creditors from default on the interest on the underlying bonds of the Columbus Northern Railway, Power & Equipment Company and the Marion Railway, Light & Power Company and to protect the holders of the first mortgage bonds of the Columbus, Delaware & Marion Electric Railroad, and to that end the court has authorized the interest on the first-named bonds, due on Sept. 1, 1909, to be paid. Mr. Walker says that the committee has agreed to furnish the funds necessary for improvements as soon as the receivers have completed an estimate of the amount that will be needed.

Gettysburg (Pa.) Transit Company.—The property of the Gettysburg Transit Company was purchased at foreclosure sale on Sept. 16 for $60,000 by C. F. Kraft, Philadelphia, representing, it is said, the Central Trust Company, Philadelphia.

Interstate Railways Company, Philadelphia, Pa.—It was stated on Sept. 11 that $5,838,600 of the bonds of the Interstate Railways Company had been deposited under the Earle readjustment plan. Members of the reorganization committee state that they expect ultimately that at least $7,500,000 of the bonds will be deposited. On Sept. 13 the company filed an answer in the Court of Chancery at Trenton, N. J., to the suit of E. J. Moore, Philadelphia, who seeks to enjoin the company from carrying out the plan of reorganization proposed by the Earle readjustment committee. The company admits financial embarrassment, but denies insolvency. The plan proposed by the Earle committee will avoid foreclosure, according to the company's answer, and to protect the holders of securities issued by the company.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—Judge Vincent Carter of the Marion County Superior Court has decided that ex-Governor W. T. Durbin, John J. Appel, T. F. Rose, G. A. Ball and Claud Cambern, trustees, who are planning the reorganization of the Indianapolis & Cincinnati Traction Company shall have until April 1, 1910, to submit a plan to the court for approval. Judge Carter has authorized an issue of receiver's certificates amounting to nearly $900,000.

Lake Shore Electric Railway, Cleveland, Ohio.—On Sept. 14, the Lake Shore Electric Railway announced that it had sold $1,200,000 of its general mortgage 5 per cent bonds to an Eastern syndicate. The proceeds will be used to pay off the entire floating debt of $940.000, incurred in double-tracking, in increasing the power capacity and in purchasing new equipment. The proceeds of the new bonds will also care for a note issue of $50,000, which becomes due Dec. 1, 1909, and for the 6 per cent notes which are now outstanding.

Norwich & Westerly Railway, Norwich, Conn.—On page 446 of the Electric Railway Journal of Sept. 18, 1909, mention was made of the default by the Norwich & Westerly Railway on Sept. 1 in the payment of the interest on its issue of $750,000 of first mortgage 5 per cent bonds. On Sept. 15 Judge Noyes in the United States Circuit Court appointed U. S. Senator Frank B. Brandegee of Connecticut, receiver of the company. It is said that the Norwich & Westerly Railway has a floating and unsecured indebtedness of about $250,000.

Northwestern Elevated Railroad, Chicago, Ill.—The annual meeting of the Northwestern Elevated Railroad, which was to have been held on Sept. 20, has been postponed until Oct. 25. The report of the company for the year ended June 30, 1909, will be made public at the meeting.

Philadelphia (Pa.) Rapid Transit Company.—On page 448 of the Electric Railway Journal of Sept. 18, 1909, mention was made of the election of John B. Parsons as chairman of the board of directors of the Philadelphia Rapid Transit Company; of C. O. Kruger, as president of the company, and of Alexander Rennick as second vice-president at the meeting of the directors on Sept. 15. The other officers were all re-elected. The terms of P. A. B. Widener and Clarence Wolf as directors had expired, and they were re-elected. The following resolution was adopted by the board: "Resolved, That in view of Mr. Parsons' insistence upon retiring from the presidency, the board desires to express its high appreciation of his long and devoted services to the company and his unfailing courtesy to and cooperation with the board as president of the company; and further to express its satisfaction that he will remain as chairman of the board." Drexel & Company were by resolution designated as the fiscal agents of the company. While they have heretofore acted in this capacity, this is the first

time the status of the relations between Drexel & Company and the Philadelphia Rapid Transit Company has been formally declared. The report of the company for the year ended June 30, 1909, which was presented at the meeting, shows gross receipts for 1909 of $18,317,529, as compared with $18,300,080 for 1908; operating expenses for 1909 of $9,364,737, as compared with $9,794,507 for 1908; net earnings for 1909 of $8,952,792, as compared with $8,505,572 for 1908; deficit for 1909 of $224,270, as compared with $92,048 for 1908. For the year ended June 30, 1909, 464,264,656 passengers were carried, as compared with 512,869,023 for the previous year. The receipts per passenger for 1909 were 3.9432, as compared with 3.5659 for 1908.

Public Service Corporation of New Jersey, Newark, N. J.—The directors of the Public Service Corporation of New Jersey have declared a quarterly dividend of 1¼ per cent, putting the stock on a 5 per cent basis. This is an increase of 1 per cent in the yearly rate. The directors have also voted to issue $5,000,000 of capital stock remaining in the treasury of an authorized issue of $25,000,000 to stockholders of record Sept. 30. They will be allowed to buy the new stock at par in proportion of one share of new stock for each four shares of the old issue they hold. The dividend is payable Oct. 1. Thomas N. McCarter, president of the company, says that the proceeds of the $8,000,000 bonds will be used largely to retire the collateral gold notes of the company maturing Nov. 1, and the proceeds of the sale of stock will be used for further substantial improvements which the company has in contemplation. A statement by Mr. McCarter says: "The action of the directors in placing the stock on a 5 per cent annual dividend basis was taken upon the recommendation of the executive committee after a careful consideration by that committee of the favorable showing which the company is making both in the increase in its gross business and the economical operation of its properties. The cancellation of the outstanding bonds of the company under the issue of May 1, 1908, and the mortgage securing the same, was authorized, as was the execution of the new general mortgage of the company, securing an issue of $50,000,000 bonds."

Second Avenue Railroad, New York, N. Y.—Justice O'Gorman, in Special Term of the Supreme Court, on Sept. 20 authorized George W. Linch, as receiver of the Second Avenue Railroad, to borrow $500,000 and issue therefor certificates at par with 6 per cent interest, to mature in one year. The money is to be used to improve the condition of the road and its properties. The receiver set forth in his petition that he had entered into contracts for the reconstruction of the car barn at Ninety-sixth Street and Second Avenue, which was virtually destroyed by fire some months ago. He said that part of the loss was covered by insurance but that he needed $139,000 in addition to the insurance money.

Tarrytown, White Plains & Mamaroneck Railway, White Plains, N. Y.—The sale of the property of the Tarrytown, White Plains & Mamaroneck Railway, under foreclosure, which was to have taken place on Sept. 17, was postponed by H. R. Barrett, the referee, until Sept. 24. The appointment of Mr. Barrett as referee was announced on page 192 of the ELECTRIC RAILWAY JOURNAL of July 31, 1909.

United Traction Company, Albany, N. Y.—The Public Service Commission of the Second District of New York has approved the lease of the Capitol Railway to the United Traction Company. The Capitol Railway is a double-track, overhead line on Delaware Avenue, Albany, between Madison and Second Avenues. It was constructed and paid for by the United Traction Company and has since been operated by that company. There has been an understanding between the two companies that a lease of the railroad should be made by the Capitol Railway to the United Traction Company, but no lease has been executed up to the present time. The lease is for the term of the life of the franchises, 50 years from 1901. The outstanding capital stock of the Capitol Company is $10,000, which, it is understood, is owned by the United Traction Company.

Winona Interurban Railway, Winona Lake, Ind.—On page 448 of the ELECTRIC RAILWAY JOURNAL of Sept. 18, 1909, mention was made of several changes in the personnel of the Winona Interurban Railway, made at the recent annual meeting of the company. The complete list of officers and directors elected at the annual meeting follows: H. J. Heinz, president; C. O. Johnson, vice-president and general manager; H. C. Anderson, secretary and treasurer; J. B. Crawford, superintendent; R. M. Murray, chief engineer; J. C. Schade, assistant secretary and treasurer; William D. Frazer, general counsel; C. O. Sullivan, general freight and passenger agent; H. J. Heinz, C. O. Johnson, H. C. Anderson, F. S. Fish, R. L. Leeson, E. F. Yarnelle, J. H. Matchett, E. O. Excell, J. F. Beyer, J. E. Beyer and W. D. Frazer, directors.

Traffic and Transportation

Transit Facilities in New York During the Hudson-Fulton Celebration

Preparations are fast being completed in New York for the great civic and military celebration of the three hundredth anniversary of the discovery of the Hudson River by Hendrick Hudson, and the centenary of the first voyage on the Hudson River of Robert Fulton's steamboat the *Clermont*. The celebration will continue from Sept. 25 until Oct. 9, and the program provides for a fortnight of ceremonies, with an extra day. For eight days New York City proper will be the center of interest, then the Hudson River towns will continue the observances. Finally, New York City will again become the center of interest with ceremonies in Brooklyn closing the celebration. It will be the largest historical celebration New York has ever known, and as early as Sept. 15 hotel reservations were being made that presaged a larger influx of visitors than has ever before been attracted to New York.

Realizing that the parades and other ceremonies will interfere with the schedules of the surface lines, and at the same time greatly increase the volume of traffic over all the railways in the city, the street railway companies operating in New York have announced that they are preparing to cope with the situation by increasing their facilities. The Interborough Rapid Transit Company will operate the greatest possible number of cars on both the elevated and subway divisions, continuing them in service as far into the night as conditions demand. The company has also arranged for the erection of extra ticket booths along the Ninth Avenue elevated line at Barclay, Cortlandt, Franklin and Desbrosses Streets, and at Fourteenth, Twenty-third, Thirty-fourth, Forty-second and Fiftieth Streets; on the Sixth Avenue elevated at Eighty-first, Seventy-second and Fifty-ninth Streets, and on the Second and Third Avenue elevated lines at Forty-second, Fifty-ninth and Fifty-seventh Streets. Extra ticket booths and chopping boxes will also be placed in the subway at stations where it is thought the crowds will be largest. Turnstiles will be discarded during the heavy traffic days of the celebration. Extra special officers will also be stationed by the company at congested points to facilitate the easy ingress and egress of passengers, and as there will be several thousand foreign visitors who are unfamiliar with the English language, it has been arranged to have officers on many of the stations who are ready linguists. To prevent delay in case of breakdown, inspectors from the mechanical department will be detailed to every third station along the lines of both the elevated and subway divisions who will see that trains are kept moving as rapidly as possible.

The Hudson & Manhattan Railroad, operating under the Hudson River between New York and New Jersey, has recently reduced the headway of its trains during the rush hours from 2½ minutes to 1½ minutes. If it is found that this schedule is inadequate during the celebration, the rush-hour headway will be continued throughout the day and extra cars will be added, so it is said.

The Metropolitan Street Railway, operating all the surface lines in New York with the exception of those of the Third Avenue Railroad, will have every car suitable for service available for use. In the operation of its lines it will be governed, however, largely by the exigencies of the occasion, as the parades and other ceremonies will at times seriously interfere with the systematic operation of cars. The employees of this company are under instructions to be particularly courteous at all times to passengers seeking directions, as many of the patrons of the company are visitors in New York who are unacquainted with the city, and the company anticipates being able to handle traffic during the celebration with a minimum of discomfort to those who use its lines.

While the chief events of the celebration will be held in Manhattan and the burden of the transient traffic will fall upon the railroads of that borough, a program of local events for Brooklyn has been arranged that will greatly increase street railway travel in Brooklyn on several days. It is also expected that a considerable number of strangers will visit Coney Island. The Brooklyn Rapid Transit Company, however, anticipates its greatest rush on Sept. 25, when the naval parade will make its appearance off Bay Ridge. A schedule has been prepared that will send elevated trains over the Fifth Avenue line to the Bay Ridge terminal at Sixty-fifth Street every three minutes throughout the day. These trains will come alternately from the Manhattan and the Brooklyn ends of the Brooklyn Bridge. At Sixty-fifth Street four cars bound for Fort Hamilton will meet each train. That will represent the capacity of the terminal. Beginning at 9 a. m. on Sept. 25, cars of the

Third Avenue line will be operated through from the Borough Hall, Brooklyn, to Fort Hamilton. This will make the most direct and comfortable route from down-town Brooklyn, avoiding the delays and the annoyances of the change from the elevated trains. In addition to the Third Avenue cars, all cars of the Hamilton Avenue line, starting at Hamilton Ferry, will be sent through to Fort Hamilton. A similar order has been issued for the Fifth Avenue line, sending cars out from both South Ferry and the subway terminal at Flatbush and Atlantic Avenues. The various lines passing through Third Avenue in the Bay Ridge district are within two blocks of the Shore Road, from which it will be possible to obtain an excellent view of the fleet in lower New York Bay. On Oct. 1 and Oct. 9 special short-line service will be operated on each surface line running to Eastern Parkway, the thoroughfare on which the parade will be held. The company has published a list of places where it will be necessary to cut the trolley wires to permit the floats of the parade to pass, and has issued instructions to its patrons who find it necessary to travel during the parades how to avoid the delays incident to the passing of the parades. In most cases where cars are interfered with temporary cross-overs will be laid and cars operated from either side of the line of march.

As a mark of esteem and courtesy the Interborough Rapid Transit Company, the Brooklyn Rapid Transit Company and the Coney Island & Brooklyn Railroad will extend the privilege of free transportation to the officers and enlisted men of the foreign fleets and to the specially delegated representatives of the foreign governments who are to be the guests of the nation, State and city. Those will number about 10,000 persons. A special pass has been designed which will be honored from Sept. 25 to Oct. 9, inclusive. The passes for the delegated representatives will be delivered to them personally at their hotels. The fleet passes furnished will be distributed by the Commander-in-Chief of the Atlantic Fleet from the U. S. S. *Connecticut.*

Rowdyism on Street Cars Rebuked

On Oct. 31, 1908, Hallowe'en night, the Chattanooga (Tenn.) Railways sent 42 extra policemen to guard the tracks and property of the company, as in former years on Hallowe'en it had been the practice of young men and boys in the city to grease the tracks on grades, place obstructions on the track, cut wires, etc. On the evening mentioned two cars were derailed, the tracks greased on a 9 per cent grade, waiting stations were overturned and the block system interrupted. In a fracas with 12 or 13 of the miscreants, two of the deputies employed by the company were badly stoned, but they managed to arrest four of the party, one of whom was shot in the hip, and laid up for more than three months. These boys were brought to the city and placed in jail over night, but the justice of the peace before whom they were tried next morning released them. They sued the company for damages. The case of the boy who was injured, a lad 16 years old, was tried on Sept. 15 before Judge Allison, who instructed the jury to return a verdict for the defendant and strongly rebuked those who had played the pranks. In addressing the jury the judge said:

"It is apparent from the whole testimony in this case, the testimony that is undisputed, that a very great wrong had been done this plaintiff. Hallowe'en is an occasion when every American citizen ought to be permitted to enjoy himself, and if this street car company sent out officers to interfere with the plaintiff and 12 or 13 other boys, to interfere with their little innocent pranks such as greasing trolley poles and tracks and throwing rocks at cars when they pass and things like that, of course it is outrageous. I say a very great wrong had been done this boy and the 12 or 13 others that were with him, but the wrong that was done him was not in that the defendants abandoned this prosecution when it should have been pushed so vigorously that the plaintiff and the other boys with him, if they were guilty of the depredations which the proof seems to indicate, should have been put on the rock pile and had to work there for about six months. If a crowd of boys, such as this boy is, are allowed on Hallowe'en night or any other time to band together and terrorize a community by playing any such pranks as this, greasing trolley poles and tracks and throwing at cars as they pass, there is no telling where it will stop. If that is a little innocent prank, if it is a little innocent prank to throw rocks at a street car where passengers are riding and to grease trolley poles and wires and tracks and put rocks in switches and do things which are otherwise calculated to destroy the property, if that is considered a little innocent prank, what is the reason the burning of a man's house would not be considered an innocent prank?

"The plaintiff in this case cannot recover for two reasons: In the first place, from the evidence that is undisputed, it is shown that the plaintiff was with these other 12 or 13 boys when they were playing these pranks, what they call these innocent pranks, and that was a sufficient ground upon which to have him arrested. He cannot recover for malicious prosecution under that state of facts and he ought not to be permitted on the ground of public policy. When a boy joins a crowd of 12 or 13 others to play pranks at the expense of the public, if he happens to get caught, he ought not to be permitted to recover in a case of this kind because it would be against public policy.

"Now, I think you will gather from the charge that I have given you that the court is of the opinion that the plaintiff is not entitled to recover in this case."

Ticket Controversy in Trenton

On Sept. 11, following a week of trouble with alleged dishonest conductors, orders were issued by the Trenton (N. J.) Street Railway to its inspectors to supply conductors with only a limited amount of six-for-a-quarter tickets. Many passengers, however, demanded the low-fare tickets in quantities, and announcement was made that the sale of tickets would be withdrawn within the city limits. For three days the tickets were sold from the office of the company, and they were purchased in quantities by merchants and manufacturers who intended re-selling them to their patrons and employees. At the same time announcement was made that tickets would be placed on sale in the townships adjoining Trenton only where the local franchise called for such tickets.

Both the Mayor and the Council of Trenton protested to John A. Rigg, president of the Interstate Railways, which controls the Trenton Street Railway, and to P. E. Hurley, general manager of the company. On Sept. 17 a special meeting of the Council was held, at which it was announced that a committee from that body had obtained from the Trenton Street Railway an agreement to place six-for-a-quarter tickets on sale at most of the drug stores instead of through the conductors, as in the past. President Howell of the Council, however, refused to receive the message of the committee upon the subject, saying that the idea of those presenting the report was to make political capital of the incident. At this juncture Ferdinand W. Roebling, a director of the Trenton Street Railway and the Interstate Railways, contributed a statement to the *Sunday Advertiser,* in which he called attention to the benefits which the local railway had conferred upon the city, questioned the attitude of the merchants' association, and suggested that the newspapers which had distorted the facts and invited passengers to rebel did not deserve the patronage of that part of Trenton's populace which respects law and order.

Transfers are issued in Trenton giving the passenger an average ride of about 5 miles for each 4 1-6 cents fare. One can ride from White Horse to Lawrenceville, 11 miles, on a single ticket and transfer. On the other hand, on the Pennington line one can ride only 1 mile for a single fare in the city; but transfers are accepted. The Camden & Trenton Railway parallels the Trenton Street Railway for 4 miles from State Street to White Horse. It sells 11 tickets for 50 cents, but issues no transfers. The New Jersey & Pennsylvania Traction Company, which parallels the Trenton Street Railway to Princeton, 12 miles, charges 3 cents in the city limits, with free transfers to and from the Pennsylvania division; but the maximum ride is only 2 miles.

Hearing on South Boston Service

The Massachusetts Railroad Commission gave a public hearing at its offices in Boston on Sept. 13 on the petition of Joseph A. O'Bryan and William T. Conway relative to transfers at the Dover Street station and service on the Bay View lines of the Boston Elevated Railway. Mr. O'Bryan appeared for the petitioners and C. S. Sergeant, vice-president of the Boston Elevated Railway, represented the company. The petitioners asked that the present transfer booth be located at a point farther away from the elevated trains, and also requested additional service on the Bay View lines, South Boston.

Mr. Sergeant stated that the transfer conditions at Dover Street station will be considerably improved when the company's plans adapting the station to the operation of eight-car trains are carried into effect. The platform will be lengthened and widened, and there will be considerably more space near the transfer window than at present. Regarding the suggestion of the petitioners that the transfer window be moved downstairs, Mr. Sergeant said that in

his opinion such a course would not be feasible, as it would involve extra expense, requiring at least one additional employee all the time and opening the way toward abuse of transfers. In reference to the frequency of the service on the South Boston lines passing through Dover Street, Mr. Sergeant submitted several tables, showing the daily car movements over this part of the Boston system. These figures showed that there are 133 round trips per day between Bay View and Harvard Square via East Cambridge and 20 round trips per day between Bay View and Franklin Street over a part of the preceding route. At Dover Street, the disputed point, there are 416 cars per day from the South Boston peninsula westward into the city proper, the Roxbury district or the Back Bay, in one direction, while the total northbound surface car traffic through Dover Street on Washington Street requires 827 cars per day. The figures thus showed a large proportion of South Boston cars passing through Dover Street, compared with the surface car facilities afforded the public at that point. In the maximum hour of the afternoon 42 South Boston cars pass through Dover Street in one direction, against 84 through Washington Street at the same point northbound. Between 4 a. m. and 5:42 a. m. 11 early morning cars leave City Point, South Boston, for the city via Broadway. A count of the passengers on the Bay View lines inwardbound in the morning maximum hours of Sept. 8, 9 and 10 showed practically no crowding. The case was to be taken under advisement.

Hearing on Application for Lower Fare on Lynn & Nahant Street Railway

A hearing was held before the Massachusetts Railroad Commission recently on the application for a reduction in fare by the Lynn & Nahant Street Railway between Lynn and Nahant from 8 cents to 5 cents. No one appeared to represent the petitioners. Just as the commission was about to close the hearing, however, Richard B. Carahar said that he had expected that others would be in attendance, and expressed the opinion that the fare of 8 cents charged by the company between Nahant and Little Nahant ought to be reduced to 5 cents. He and his brother are engaged in developing Little Nahant as a place of residence. He said that the haul between Nahant and Little Nahant was short and that the low fare would tend to develop the new property and incidentally benefit the company.

J. E. Dozier, superintendent of the company, said that the number of fares between the two places now would not exceed seven a week. Mr. Dozier drew a map of the company's lines on the blackboard. With the map as a basis for questions, the chairman inquired what it would cost to travel from the Lynn line to the life saving station, and was informed that the fare is 8 cents. Mr. Dozier brought out the fact that a fare of 5 cents prevails between the Lynn line and the State bathhouse at Nahant Beach, and that 8 cents is charged to any point in Nahant beyond the State bathhouse. It was stated in behalf of the railroad that 85 per cent of the travel over the line is to Bass Point; also that the company issues a workingman's ticket, which is sold at 5 cents a trip, and that a 5-cent fare prevails between 12 m. and 1 p. m. on Saturdays. At this point Samuel Powers, attorney for the company, announced that the company would grant Mr. Carahar's request for a 5-cent fare between Nahant and Little Nahant. The chairman of the commission remarked that as the company had conceded all that had been asked there was nothing more for the commission to consider.

Public Service Commission of New York on Celebration Transit Facilities

W. R. Willcox, chairman of the Public Service Commission of the First District of New York, sent the following letter to the street railway companies in New York relative to the service on their lines during the Hudson-Fulton celebration:

"As you are doubtless aware, there will take place the latter part of this month the celebration of the discovery of the Hudson River by Henry Hudson and of the first use of steam in navigation on the Hudson River, at which time it is expected that a very great many persons will visit New York City. Accordingly, it is of great importance that the service on all of the transportation lines of the city should be at its maximum. I desire, therefore, to urge you to make a special effort to have all available equipment in condition for use during that period of time. The commission has, at various times, issued orders prescribing the character of service that shall be rendered on various transportation lines. The large public parades that have been arranged for by the Hudson-Fulton Celebration Commission will necessarily require the use of various streets in the city. If you are operating lines over any such streets the commission will be ready to receive an application from you for a suspension of its orders on the days of the several parades."

Pay-as-You-Enter Cars for Los Angeles.—The Los Angeles (Cal.) Railway is arranging to equip one of its lines with pay-as-you-enter cars remodeled from cars of the type now in use in Los Angeles as an experiment. The opinion is expressed that the cars will meet with popular approval and that eventually all the lines of the company reaching the central part of the city will be equipped with pay-as-you-enter cars.

New Freight Station in Columbus.—The Ohio Electric Railway, Cincinnati, Ohio, on Sept. 22 abandoned its depot at 36 West Gay Street, Columbus, Ohio, and established a station at 39 East Rich Street, from which all freight and passenger business will be handled in the future. The time of departure of all eastbound cars will hereafter be five minutes after the hour and all westbound cars five minutes before the hour.

Articles That May Be Carried on Street Cars in Cleveland.—Warren Bicknell, receiver of the Municipal Traction Company, has issued orders to conductors not to permit passengers to carry large articles on the cars. Washerwomen's baskets, carpenters' small tool boxes, surveyors' instruments, small tools, suit cases, valises and not more than two market baskets will be accepted for transportation. Special permits will be required for harps, bass drums and bass viols, which will be transported at the risk of the owner.

Increase in Wages in Spartansburg.—The employees of the railway department of the Spartansburg Railway, Gas & Electric Company, Spartansburg, S. C., have been granted an increase in wages. According to the old scale, first year men received 12 cents an hour, second year men 13 cents an hour and third year men 14 cents an hour. The new scale provides a rate of 14 cents an hour for the first year of service, 15 cents an hour for the second and 16 cents an hour for the third year, 17 cents for the fourth year and 18 cents for the fifth year and thereafter.

Hudson-Fulton Souvenir Time-Table.—The New Jersey & Hudson River Railway & Ferry Company, Edgewater, N. J., has recently issued a very attractive souvenir edition of its standard time-table, giving in addition to views of its railroad and running times of its cars a map of the Hudson River from New York City to Saratoga. This map shows the route of the Hudson-Fulton naval parade which starts from New York on Oct. 1 and reaches Troy on Oct. 9, and gives the dates of the ceremonies which will be held in connection with the Hudson-Fulton celebration at the towns along the Hudson River and explanatory notes of the historical points on the river.

Suburban Freight Service at Pittsburgh.—The Pittsburgh (Pa.) Railways, at the solicitation of merchants and farmers on its Washington and Charleroi routes, is planning to establish a high-speed freight service between Pittsburgh and suburban points. The first of the new cars to be used in this service has been received in Pittsburgh and will be placed in operation very soon. The car is 45 ft. long and is equipped with four 75-hp motors. The height of the car from the top of the rail to the top of the car is 11 ft. 6 in., and the width of the car 8 ft. 2 in. Its capacity is 22½ tons. Two sliding doors are provided on each side of the car, and in addition there is a door at each end for loading and unloading such material as timber.

Limited Service Increased by Boston & Worcester Street Railway.—On June 20, 1909, the Boston & Worcester Street Railway, Boston, Mass., established a limited service between Boston and Worcester. This arrangement proved so popular and successful that the company has increased the service so that now limited cars leave Worcester for Boston at 8:05 a. m., 9:05 a. m., 1:10 p. m. and 4:10 p. m. and leave Boston for Worcester at 8:30 a. m., 4 p. m. and 5 p. m. The running time from City Hall, Worcester, to Park Square, Boston, is 1 hr. 45 min., which is 35 min. less time than is required by the local cars to make the trip. The limited cars stop only at Framingham Center and White's Corner. At the latter place connections are made with cars to and from Hudson and Marlboro.

Report on Fair Traffic in Indiana.—It is understood that a very favorable report has been made by its inspectors to the Railroad Commission of Indiana regarding the manner in which the electric railways transported their patrons during the recent circuit of fairs in Indiana. The interurban roads operating out of Indianapolis are estimated to have carried 40,000 passengers a day for three days to the State Fair and about 20,000 on two other days without an accident. William J. Wood, chairman of the commission, has

expressed his gratification over the reports of the inspectors, and has acknowledged the courtesy of the managers of the different railroads in co-operating with the commission. The report will commend the precaution of the companies in keeping repair cars fully equipped and manned in operation prepared for emergencies.

New Orleans—What to See—How to See It.—This is the title of a 68-page publication devoted to the interests of New Orleans, compiled by the Progressive Union of New Orleans, a civic organization of some 2000 business and professional men, which the New Orleans Railway & Light Company is distributing as a souvenir. The publication is in reality a handbook of the city, and contains a description of the city which brings out prominently the things for which New Orleans is noted. The commercial side is adequately represented by scenes from the markets and along the water front and the social side by scenes on Lake Pontchartrain and at the different field and country clubs and of the famous Mardi Gras celebration. The work is concluded with a very complete directory of hotels, railroads, steamship lines, educational institutions, etc.

Accident Faker Arrested in Baltimore.—William G. Fossbenner, age 54, was arrested on Sept. 8, 1909, in Baltimore charged with attempting to defraud the United Railways & Electric Company, Baltimore, out of $60 by means of false pretense and false representation, and Justice Grannan on Sept. 8 committed Fossbenner for the action of the Grand Jury in default of $1,000 bail. Fossbenner claimed to have had his collarbone fractured by the premature starting of a car of the United Railways & Electric Company on Aug. 15, 1909. His injuries were dressed at the Maryland University Hospital. He made statements to the effect that the accident happened at two different places. After a thorough investigation by the company and the police it was learned that Fossbenner had been thrown downstairs by his brother in a personal encounter, and his collarbone broken. Immediately upon making a demand upon the company he was taken before A. J. Pumphrey, chief of detectives, to whom he confessed that he and his brother had quarreled, and that he had received the injury complained of in this encounter.

Strike in Omaha.—The union employees of the Omaha & Council Bluffs Street Railway in Omaha, Neb., and Council Bluffs, Ia., went on a strike on Sept. 18. The tieup of the lines in both cities was by no means complete, but the employees who refused to man their cars succeeded in seriously interfering with the schedules of the company, and on many lines it was impossible for the company to run cars until the middle of the afternoon. Under conditions existing at the time, the company felt that it would be inadvisable to attempt to continue services after 7 p. m., and all cars were withdrawn at that hour. The company and the men had been considering terms of a new working agreement for some time, and it is thought that the representative of the men took advantage of the intended visit of President Taft to tie up the lines and place the company in public disfavor. D. W. Wattles, president of the company, announced on Sept. 18 that hereafter the company would maintain an open shop, and that arrangements had been made to secure sufficient men to operate the full schedules on Sept. 20. President Taft reached Omaha on Sept. 20. While Mr. Wattles felt certain that he could operate all of the cars necessary to care for the crowds, a truce was declared, and no attempt was made to run the cars during the President's visit to the city.

Clear Right of Way in Indiana.—The Railroad Commission of Indiana, under date of Sept. 15, 1909, addressed the following circular to all steam and electric railways in the State, regarding the removal of obstructions from the right of way of their lines: "Numerous highway crossing accidents have recently been reported to the commission, caused, in part, by the obstruction of view along the railway by trees, bushes and weeds. Such conditions now exist at many road crossings throughout the State. They materially enhance the peril at these danger points. In some instances the obstructions grow upon the company's right of way; in others they stand upon the highway or on adjoining private premises. The commission hereby recommends that the railroads, both steam and interurban, give specific instructions to their roadmasters, section foremen and other employees charged with this class of work, to cut and keep cut all such obstructions where the same are located upon the right of way, and to call personally upon neighboring land owners and secure their active co-operation in trimming or removing trees and cutting underbrush and weeds growing on such owners' land, or along the highway adjacent thereto, and that a supply of these circulars be furnished to roadmasters and section foremen by their respective companies, as their warrant for insisting upon the work being done by said property owners."

Personal Mention

Mr. H. M. Flanders has been appointed roadmaster of the Springfield (Mass.) Street Railway, to succeed Mr. F. A. Sawin.

Mr. Robert Valentine Matthews has been elected president of the Buffalo Southern Railway, Gardenville, N. Y., to succeed Mr. Wm. H. Cummins.

Mr. Clare F. Beames has severed his connection with J. G. White & Company to accept the position of general manager of the Cobalt Power Company, Cobalt, Ont.

Mr. James Otis Watson has been appointed general manager of the Fairmont & Clarksburg Traction Company, Fairmont, W. Va., to succeed Mr. George T. Watson.

Mr. L. L. Smith has resigned as master mechanic of the Chicago & Milwaukee Electric Railroad, Chicago, Ill., to accept a position with the Westinghouse Machine Company.

Mr. J. J. Bangert has resigned as general manager of the Buffalo Southern Railway, Gardenville, N. Y., and is succeeded by Mr. George F. Wells, purchasing agent of the company.

Mr. J. H. Meyer, who has for several years acted as vice-president of the California Street Railroad, San Francisco, Cal., has been elected president of the company, to fill the vacancy caused by the death of J. B. Stetson.

Mr. J. C. Coleman has been elected vice-president of the California Street Railroad to succeed Mr. J. H. Meyer, who has been elected president of the company, and Mr. J. W. Harris has been elected a director of the company.

Mr. Raymond G. Carroll, for two years assistant treasurer of the Pensacola (Fla.) Electric Company, has returned to Boston to accept a position with the home office of Stone & Webster, operating managers of the Pensacola Electric Company.

Mr. Thomas N. Fordyce has succeeded Mr. Charles C. Richardson and Mr. W. C. Shepherd, receivers of the Miami & Erie Canal Transportation Company, Cincinnati, Ohio. Mr. Fordyce was formerly general manager of the company for the receivers.

Mr. H. J. McPherson has been appointed master mechanic of the Marlboro & Westboro Street Railway to succeed Mr. J. H. McMillen, superintendent of the car shops, with offices at Worcester, Mass. Mr. McPherson is also connected with the Worcester Consolidated Street Railway and his title with that company has recently been changed from superintendent of equipment to master mechanic.

Mr. Wm. A. Satterlee has resigned as assistant general manager of the Kansas City Railway & Light Company, Kansas City, Mo. Mr. Satterlee was in the employ of the Metropolitan Street Railway, Kansas City, and the Kansas City Railway & Light Company for 20 years. During his connection with these companies he served as purchasing agent, auditor, cashier, assistant superintendent, superintendent and assistant general manager.

Mr. Robert H. Boyl has been appointed traveling auditor of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind. Mr. Boyl entered the employ of the Indianapolis & Cincinnati Traction Company in January, 1907, when the road was extended from Shelbyville to Greensburg, as assistant station agent at Greensburg. In July, 1907, he was appointed station agent of the company at Greensburg, in which capacity he has served since that time.

Mr. Matthew C. Brush, who recently resigned as vice-president and general manager of the properties controlled by the Boston (Mass.) Suburban Electric Companies to become general manager of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., was tendered a dinner at Norumbega Park on Sept. 14 by the employees of the company. Mr. George M. Cox, as toastmaster, presented Mr. Brush a watch from the employees as a token of esteem and a large picture of the heads of all the departments of the company.

Mr. Charles F. Berry has been appointed general manager of the Portland (Maine) Railroad to fill the vacancy caused by the death of Edward A. Newman. Mr. Berry has been connected with the company for 27 years. He was born in Gorham, Maine, in 1865, and was educated in the public schools of that town. He was about 16 years old when he went to work for the Portland Railroad as a conductor. At that time the road was operating 7½ miles of track and running 12 horse cars on its several lines. At present the Portland Railroad comprises 95 miles of track and 194 cars.

Mr. George F. Wells has been appointed general manager of the Buffalo Southern Railway, Buffalo, N. Y., to succeed Mr. J. J. Bangert, resigned. Mr. Wells has been connected with the company since its reorganization in 1904, serving as general passenger agent and treasurer. For six years previous to 1904 Mr. Wells was private secretary to Mr. W. W. Crittenden, superintendent of the New York & Pennsylvania Railway. He has been a director of the Buffalo Southern Railway since 1905. The Buffalo Southern Railway operates 25 miles of line between Buffalo, Hamburg, Orchard Park, Gardenville, Ebenezer and East Seneca, and has a 7-mile extension under construction to East Aurora.

Mr. Robert I. Todd, vice-president of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., was elected general manager of the company on Sept. 17, to succeed the late Charles C. Reynolds. Mr. Todd has been acting in the capacity of general manager of the Terre Haute, Indianapolis & Eastern Traction Company since the death of Mr. Reynolds, and during the absence of Mr. Hugh J. McGowan, president of the company, in Europe, also acted as president of the company. Mr. Todd will continue as the vice-president of the company and as vice-president of Indianapolis Traction & Terminal Company. Mr. Todd was born at Lakewood, N. J., on Nov. 29, 1869, and was graduated from Johns Hopkins University in 1893. Soon thereafter began his connection with the street railway industry, his first position being as assistant superintendent of the Eckington & Soldiers' Home Railway and the Belt Railway, Washington, D. C. These companies were subsequently consolidated as the City & Suburban Railway, and Mr. Todd was made general superintendent and electrical engineer. In the spring of 1899 Mr. Todd resigned from this position, to take charge of the experimental work of the Compressed Air Company in New York. In 1900 he was appointed mechanical engineer of the Consolidated Traction Company, Pittsburgh, Pa., and a year later he became general manager of the Cincinnati (Ohio) Traction Company. Subsequently he was made second vice-president of the company. In 1902 Mr. Todd became connected with the home office of the United Gas Improvement Company, in Philadelphia, and later was appointed manager of this company's properties at Providence, combined as the Rhode Island Company.

OBITUARY

S. Proctor Thayer, who organized the Hoosac Valley Street Railway, North Adams, Mass., and who for many years was interested in railway and commercial enterprises in North Adams and in Massachusetts, is dead. Mr. Thayer was born in North Adams on July 1, 1853, and was graduated from Williams College in 1873. Subsequently he was admitted to the bar and practised in North Adams.

Edward H. Harriman, who died on Sept. 9, was connected indirectly with a number of electric railways. He was a director of the Brooklyn Rapid Transit Company and through his connection with the Southern Pacific Company was interested financially in several electric railways in Southern California. Mr. Harriman is also understood to have been interested financially in the Utah Light & Railway Company, Salt Lake City, Utah, but he was not a director or officer of the company.

Henry W. Brinckerhoff died at his home in Brooklyn, N. Y., recently. Mr. Brinckerhoff was connected with the construction of the Sixth Avenue elevated line of the Interborough Rapid Transit Company, New York, was office engineer of the organization in charge of installing the cable road of the Metropolitan Street Railway on Broadway, New York, and for awhile was technical editor of the *Engineering Record* of New York. He was lately connected with the staff of Mr. William Barclay Parsons.

The Hudson-Fulton celebration in New York is essentially a recognition of the explorer and the engineer. To show the relation of the latter to the celebration, models of the *Clermont* and other early steamboats, through the courtesy of the Smithsonian Institution, are now on exhibition at the rooms of The American Society of Mechanical Engineers in the Engineering Societies Building, New York. The exhibit includes the *Clermont*, the *Phoenix*, built by John Stevens, and one of John Fitch's early types. Original drawings by Robert Fulton, an oil portrait of Fulton painted by himself, Fulton's dining table, oil portraits and bronze bust of John Ericsson, models of the *Monitor*, all owned by the society, and Ericsson's personal exhibit at the Centennial Exposition, are also exhibited. Through the courtesy of the Hamburg-American line, a beautiful model of the *Deutschland* shows the highest type of the development of steam navigation.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Pensacola (Fla.) Suburban Railway.—Application for a charter has been made by this company to take over the East Pensacola City Company's electric railway, which extends from Sixteenth Street across Bayou Texar to Magnolia Bluff Park at East Pensacola, a distance of about 2 miles. Capital stock, $50,000. Incorporators: John E. Stillman, Knowles Hyer, Henry M. Yonge and W. A. Blount, Jr. [E. R. J., April 24, '09.]

***Port Jervis Traction Company, Port Jervis, N. Y.**—Incorporated to construct an electric street railway 4.3 miles long in Port Jervis. Capital stock, $43,000. Incorporators: John E. Dilly and James Torney, New York; Thomas H. Milson, Paterson, N. J.

***Pocahontas Connecting Railway, Cirtsville, W. Va.**—Incorporated to build a railway between Cirtsville and Jarrold's Valley, a distance of 20 miles. Capital stock, $200,000. Incorporators: John G. Reading and Robert F. Allen, Williamsport, Pa.; O. P. Fitzgerald, V. L. Black and G. S. Couch, Jr., Charleston, W. Va.

***Dunkard Valley Railroad, Wheeling, W. Va.**—This company has been incorporated in West Virginia and Pennsylvania to build electric railways from Waynesburg to Washington, Pa., where a railway now in operation connects with Pittsburgh and West Alexander, Pa., and from Mannington to Blacksville, W. Va., thence to Waynesburg, Pa. These railways will place Wheeling in communication with Pittsburgh and Washington, Pa., and Morgantown, Clarkesburg and Mannington, W. Va. John L. Johnson, Wheeling, is said to be in charge of a corps of engineers surveying for the proposed railway.

***Castle Valley Railroad, Evanston, Wyo.**—Incorporated to construct an electric railway from Price, Utah, to Cedar Creek Canyon. Capital stock, $100,000. Windsor V. Rice, Salt Lake City, Utah, president.

FRANCHISES

Montgomery, Ala.—The City Council has granted a franchise to the Montgomery Traction Company to extend its electric railway along Jeff Davis Avenue from Holt Street to Oak Street and granting that company the right to tear up its tracks along St. Charles Street from Holt to Dorsey Street and to relay them along Holt Street from Stone Street and along Day Street west to Hill Street. The company paid the city $2,000 for the rights granted under the franchise.

Colusa, Cal.—The City Trustees have granted to the Northern Electric Railway, Chico, an extension of a year to its franchise to operate its system through Colusa.

Fresno, Cal.—The City Trustees have granted to the Fresno, Hanford & Summit Lake Railroad a 25-year franchise to build an electric railway in Fresno. The franchise provides that construction shall be started within four months after the passage of the ordinance. [E. R. J., July 31, '09.]

San Diego, Cal.—The City Council has determined to grant the franchise for the right to enter San Diego, petitioned for by the San Diego, El Cajon & Escondido Railroad. Work is to be started within six months after the franchise has been granted and the railway must be completed to El Cajon within one year, and to Escondido within two years. Bids will be opened Sept. 27 and the franchise sold to the highest bidder. No bid will be considered less than $3,000. As security to the city the successful bidder will be required to put up a bond of $15,000. [E. R. J., Sept. 11, '09.]

San Diego, Cal.—The City Council has granted a 25-year franchise to the San Diego Electric Railway to extend its railway over certain streets of San Diego.

Pensacola, Fla.—The East Pensacola City Company has applied to the City Council for a franchise to extend its electric railway to the business section of Pensacola.

Galesburg, Ill.—The City Council has granted an extension of the franchise of the Peoria & Galesburg Railway from 25 years to 30 years. The company asked for a 40-year extension. S. F. Atwood, Mayer Office Building, Peoria, Ill., secretary and treasurer. [E. R. J., July 31, '09.]

Paris, Ill.—The City Council has granted a 50-year franchise to the Paris & Northern Traction Company, Danville, to extend its proposed electric railway over West Washington Street east to connect with the Terre Haute & Western Railway at Paris. The railway is to run from

Ridgefarm to Paris, a distance of 26 miles. W. M. Bridgett, president. [E. R. J., Aug. 14, '09.]

Fort Wayne, Ind.—The County Commissioners have granted a franchise to the Fort Wayne & Toledo Electric Railway to build an interurban railway along certain highways between Fort Wayne and Reed's Corner. The company will file a bond of $5,000 to have the railway completed by Dec. 1, 1910. The railway will extend from Fort Wayne to Bryan, Ohio, a distance of 42 miles, making a direct connection to Toledo, Ohio. R. T. Bastress, Harlan, general manager. [E. R. J., Sept. 18, '09.]

Plymouth, Ind.—The City Council has granted a 40-year franchise to the South Bend & Logansport Traction Company to build its electric railway through Plymouth. The franchise provides that work shall begin within three months and shall be completed by June 1, 1910. P. J. Haulihan is said to be interested. [E. R. J., Sept. 18, '09.]

Glasgow, Ky.—Charles Van-Den-Burgh has applied to the Fiscal Court for a franchise to enter Glasgow. The proposed electric railway is to connect Glasgow and Horse Cave, a distance of 18 miles. [E. R. J., Sept. 11, '09.]

New Iberia, La.—H. A. Mentz, Hennen Building, New Orleans, has been granted a franchise by the City Council for the building of an interurban railway to Jeanerette. [E. R. J., Aug. 14, '09.]

Boonton, N. J.—The Common Council has granted to the Morris County Traction Company, Morristown, a franchise to extend its electric railway through Boonton.

Jersey City, N. J.—Mayor H. O. Wittpenn has vetoed the franchise granted to the Hudson & Manhattan Railroad, New York, N. Y., by the Board of Street and Water Commissioners to extend its Cortlandt Street (New York) tunnel under Railroad Avenue to Summit Avenue, Jersey City.

Oklahoma City, Okla.—The County Commissioners have granted a franchise to Homer S. Hurst, Holdenville; Alfred Hare, Shawnee; W. F. Harn and J. F. Winans to construct an electric railway over certain highways of Oklahoma County. [E. R. J., April 3, '09.]

***Welland, Ont.**—Fred D. Corey, Buffalo, N. Y., as trustee for a company, has applied to the Town Council for a 99-year franchise to operate an electric railway over certain streets of Welland, the franchise specifying that construction must be started by April 1, 1911, and the railway completed in 1912. The proposed railway is to extend from Port Colborne through Welland and Port Robinson, Ont., to Niagara Falls, N. Y.

***Canonsburg, Pa.**—J. B. Holland, Cecil, who is said to be interested in the construction of an electric railway from Canonsburg to McDonald, has applied to the Mount Pleasant Township for the right of way along the public highway from McDonald to Primrose.

Chattanooga, Tenn.—S. W. Divine, promoter of the proposed Tennessee-Georgia Interurban Electric Railway, has been granted an extension of time on the franchise granted by the Government to build an electric railway through Chickamauga Park. The original franchise expired Sept. 1. According to the extension the company is given nine months in which to begin work, and 18 months addition, in which to complete the railway. [E. R. J., May 29, '09.]

San Antonio, Tex.—The San Antonio Traction Company has applied to the City Council for a franchise to extend its West Commerce Street line from Prospect Hill to the Lake View Addition, a distance of 3½ miles.

TRACK AND ROADWAY

Helena Street & Interurban Railroad, Helena, Ark.—It is announced that the contract for building this electric railway between Helena and West Helena, about 4 miles distant, has been awarded to R. L. Leonard, Helena. The cost of the railway is estimated at $40,000, besides the cost of erecting a power plant, which will be located at West Helena. [E. R. J., Aug. 7, '09.]

Humboldt & Eastern Railroad, Eureka, Cal.—It is stated that the preliminary survey for this electric railway to connect Eureka with Redding or Red Bluff has been started near Redwood Creek. William S. Clark, Eureka, is a promoter. [E. R. J., Sept. 4, '09.]

Los Angeles-Pacific Company, Los Angeles, Cal.—This company has inaugurated service through the 1500-ft. tunnel under Hill Street, Los Angeles, to be used by the Hollywood and Colegrove division of its electric railway.

Pasadena Rapid Transit Company, Pasadena, Cal.—It is announced that this company has plans and engineering profiles ready for the entire right of way, including the prospective route into Los Angeles, of its rapid transit railway from Pasadena to Los Angeles. Horace M. Dobbins, Pasadena, president. [E. R. J., June 19, '09.]

***Macon, Ga.**—Frederick Kauffman and associates are said to be interested in the construction of a 4-mile electric railway connecting with the Macon Railway & Light Company's tracks at East Macon, to extend to Recreation Club, which will be made a summer resort and public park. The company is obtaining right of way and will petition for the necessary franchise.

Carmi-Fairfield Traction Company, Burnt Prairie, Ill.—It is announced that this company has started surveys for the construction of its proposed electric railway to connect Carmi, Sumpter, Liberty and Fairfield, a distance of about 25 miles. E. S. Lawrence, St. Louis, Mo., chief engineer. [E. R. J., July 31, '09.]

Illinois Light & Traction Company, Streator, Ill.—This company has completed a 1-mile extension of its electric railway reaching the factory district of Streator.

Covington & Southeastern Railway, Kingman, Ind.—This company has filed a trust deed for $825,000 in favor of the Union Trust Company of Indiana, preparatory to the issuance of bonds to build its proposed electric railway. The railway is to penetrate Parke County coal fields and probably will be extended to Crawfordsville from Covington. [E. R. J., Aug. 21, '09.]

Winona Interurban Railway, Winona Lake, Ind.—This company is planning to construct an extension in Goshen from the substation along Ninth Street to Monroe Street and west to the hydraulic plant. The company has secured a franchise for this route.

Des Moines & Sioux City Railway, Des Moines, Ia.—It is announced that this company has secured more than 100 miles of right of way, and that the terminals have been arranged for in Sioux City and Des Moines. The new officers are: J. W. Reed, president; M. H. Miller, vice-president and general manager; J. W. Russell, treasurer; M. F. Coons, secretary; M. H. Miller, assistant secretary; C. E. Russell, auditor. [E. R. J., Feb. 20, '09.]

Kentucky Rapid Transit Company, Louisville, Ky.—On page 449 of the issue of the Electric Railway Journal of Sept. 18, 1909, was mentioned the incorporation of this company, which proposed to take over various traction and interurban companies in Kentucky. George S. Graham, 42 Broadway, New York, N. Y., one of the incorporators and chief attorney for the company, states that the organization of the company is of a confidential nature, and that no statement as to the properties absorbed can be given out.

Portland, Gray & Lewiston Railroad, Lewiston, Maine.—At the annual meeting of the stockholders of this company Harry M. Dingley, Lewiston, and John A. Morrill, Esq., Auburn, were added to the board of directors, in place of C. C. Benson and John D. Clifford, Lewiston, who have sold their stock. The other directors are W. Scott Libbey, Lewiston; E. W. Gross, Auburn, and Louis A. Goudy, Portland. [E. R. J., Aug. 14, '09.]

Aroostook Valley Railroad, Presque Isle, Maine.—The Railroad Commissioners have approved the petition of this company to change the location of its proposed electric railway about 4 miles outside the highway. The company has planned to construct a railway from Presque Isle through Mapleton to Washburn, 12 miles, joining the Canadian Pacific Railroad at Presque Isle, and the Bangor & Aroostook Railroad at Washburn. A. R. Gould, Presque Isle, president and general manager. [E. R. J., Aug. 14, '09.]

Kansas City, Harlem & St. Joseph Railroad, Kansas City, Mo.—Edward J. Ward, president and chief engineer of this company, announces that construction to connect Kansas City, Harlem, Camden Point, Tiffany Springs, Summit, Dearborn, Faucett Station and St. Joseph, a distance of 53 miles, will not be started until next year. It is the intention to carry both freight and passengers. The company plans to build an amusement park at Tiffany Springs. The terminal in Kansas City is to be located at Third Street and Walnut Street, but a future plan is to run cars through the city to some railroad terminal. The main power house is to be located at Summit. Substations will be built at 15-mile intervals. The preliminary expenditures are estimated at $100,000, and it is expected that $2,500,000 will be spent before the line is completed. Headquarters, 629 Ridge Building, Kansas City. Daniel O. Ketchum and Ralph B. Throop are also interested. [E. R. J., Sept. 4, '09.]

Buffalo (N. Y.) Southern Railway.—This company announces that it is about to begin work on an extension to East Aurora, about 5 miles of which is in operation, and 8 miles needed to complete the route. This extension will probably be completed by Jan. 1, 1910. George F. Wells, general manager.

Elmira, Corning & Waverly Railroad, Elmira, N. Y.—This company, which is building an electric railway between Waverly and Corning via Elmira, expects to commence

operation between Waverly and Elmira about Oct. 1. It will use the tracks of the Elmira Water, Light & Railroad Company in Elmira, and will also purchase power from the latter company.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—This company is building an extension to its Maple Avenue line, about ½ mile in length, with 96-lb., 9 in. girder rails, in order to connect with the Elmira, Corning & Waverly Railroad, which company is constructing a line from Waverly to Corning, N. Y., and will use the Elmira Water, Light & Railroad Company's tracks in Elmira. The Elmira Water, Light & Railroad Company has renewed with 96-lb. 9-in. girder rails about 2 miles of its city tracks during the past two months, besides making extensive general repairs to track and roadway.

Hornellsville Electric Railway, Hornell, N. Y.—This company expects to relay within the next month tracks on two streets of its electric railway. Rails and ties have been purchased. The company will do the work with its own force.

Richmond Light & Railroad Company, New Brighton, N. Y.—The Public Service Commission of the First District has issued an order approving the application of this company for authority to lay tracks on Wadsworth Avenue, Borough of Richmond, from New York Avenue to Tompkins Avenue.

New York, Westchester & Boston Railway, New York, N. Y.—It is stated on good authority that this company has purchased all the right-of-way needed for the branch line it proposes to build to White Plains. The entire route, it is said, will cost over $1,000,000. It is proposed to build a station at Quaker Ride Road and North Avenue, New Rochelle.

Syracuse (N. Y.) Rapid Transit Railway.—It is stated that this company has commenced the work of double-tracking its line between Syracuse and East Syracuse, by way of the Burnet Avenue route. The work will be completed in about six weeks.

City Railway, Dayton, Ohio.—This company expects to place during the next 30 days the contract for relaying 1 mile of new track and paving. The rails have been purchased for this work.

Dayton (Ohio) Street Railway.—This company has increased its capital stock to $300,000, and from the proceeds of the sale of the new issue will take care of the expense incurred in building the proposed extension between Athletic Park and Carrmont. W. L. Smith, general manager.

Muskogee (Okla.) Electric Traction Company.—It is reported that this company will make extensions to its electric railway in Muskogee. The extensions proposed will be on East Okmulgee Avenue to P Street and to the Reeves Addition, which will include a large territory. R. D. Long, general manager.

Oklahoma City & Shawnee Railway, Oklahoma City, Okla.—This company has commenced grading on the Winans and Harn quarter-sections, northwest of Oklahoma City and adjacent to the city limits. The work is being done by a construction company organized by the same men interested in the railway company; among them are Homer S. Hurst, Holdenville, and Alfred Hare, Shawnee. [E. R. J., April 3, '09.]

Oakland & Tidewater Railway, Portland, Ore.—It is stated that W. W. Purdy, chief engineer for this company, has completed a survey from Oakland across the mountains to Coos River and down to Marshfield. The railway will extend from Oakland to Empire. C. A. Pengra and H. D. May, Portland, are also said to be interested. (E. R. J., June 26, '09.]

Easton (Pa.) Transit Company.—This company has awarded to Miles-Tighe Contracting Company, Easton, the contract for constructing 1500 sq. yd. of brick paving with 6-in. concrete base.

Cleveland & Erie Railway, Girard, Pa.—This company has purchased and placed approximately 15,000 ties this season; also is placing 17,165 cu. yd. of gravel ballast. The work has been handled by the company alone.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa.—A meeting of the stockholders of this company has been called for Nov. 22 to vote on the proposition to spend $2,000,000 on extensions and improvements next spring. Provision is understood to have been made for obtaining the money, and it will be available as soon as the stockholders approve the proposed plan.

***Rock Hill, S. C.**—J. M. Cherry, Charleston, is said to be interested in an electric railway to extend from Rock Hill north to the Catawba River. A franchise will be applied for at the next meeting of the City Council.

Utah Light & Railway Company, Salt Lake City, Utah.—It is stated that this company has completed laying its track on Eighth West Street to Tenth South Street. The State Street line has been double-tracked to Twelfth South Street. Beyond that point it is to be single track with four long sidings, one being 2000 ft. long. The extension to Sandy will be made next spring.

Lynchburg Traction & Light Company, Lynchburg, Va.—This company expects to place contracts during the next two weeks for the relaying of three-quarters of a mile of track and for the construction of three-quarters of a mile extension at Diamond Hill.

SHOPS AND BUILDINGS

Cairo & St. Louis Railway, Cairo, Ill.—This company plans to erect a terminal station on the easterly side of Commercial Avenue above Eighth Street, Cairo. It is said that the company will pay $15,000 for the land. The proposed building will be two stories high, 50 ft. x 120 ft., covering the full length of the lots to Railroad Street. On the second floor there will be offices, the passenger and express departments being on the ground floor. [E. R. J., June 19, '09.]

Des Moines & Sioux City Railway, Des Moines, Ia.—This company has signed a contract with F. M. Hubbell for a 50-year lease of property at Eighth Street and Market Street, to be used for a terminal. M. H. Miller, vice-president and general manager. [E. R. J., Feb. 20, '09.]

Ohio Electric Railway, Cincinnati, Ohio.—This company has awarded a contract to Valentine Heil, Cincinnati, for the erection of an interurban depot at Market Street and Union Street, Lima. The station is to be of concrete and brick, two stories in height and will cost about $35,000. The traffic department will occupy the second floor. There will be six tracks on the main floor of the building. The Western Ohio Railway, Lima, will also use the depot.

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—This company has let the contract for the building of a 3-story office and station building in Willoughby. Work is to commence at once.

Portland Railway, Light & Power Company, Portland, Ore.—The company is said to be erecting a car house, 400 ft. x 150 ft. at Sellwood. It is situated at the end of East Thirteenth Street and at the junction of the Sellwood, Cazadero and Oregon City lines. Pits, tracks and the foundation for the building have already been completed, and the work on the superstructure will start at once. The cost of construction will be about $55,000. Club houses for the employees are also to be built.

West Side Electric Street Railway, Charleroi, Pa.—This company expects to place a contract for the construction of a brick car house, 30 ft. x 200 ft. during the next month. It is its intention to furnish material for this car house and to build, contracting for the labor only.

POWER HOUSES AND SUBSTATIONS

Illinois Light & Traction Company, Streator, Ill.—This company is installing in its power station two 312-hp Heine boilers, stokers, grates and a coaling trestle.

Citizens' Railway & Light Company, Muscatine, Ia.—This company has purchased a 750-kw Westinghouse turbine and 300-kw rotary, to be installed within the next few weeks.

Louisville (Ky.) Railway.—This company is erecting an addition to its power plant at Campbell and Logan Streets, Louisville, which will involve an expenditure of about $70,000. The new building will be 110 ft. x 60 ft., one story in height and will cost $20,000. The machinery alone is estimated to cost about $50,000.

Winona Railway & Light Company, Winona, Minn.—This company expects to purchase boilers and coal handling outfit for its plant. C. A. Bernier, electrical engineer.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—This company has purchased a 2000-kw Curtis horizontal turbine from the General Electric Company, Schenectady. The turbine will be delivered and installed about Nov. 1.

United Electric Company, Dennison, Ohio.—This company expects to purchase in a few weeks a 150-kw, direct-current railway generator. It has already closed contract with the C. & G. Cooper Company for a 400-hp Corliss engine, heavy duty type, 20 in. x 36 in.

Niagara, St. Catherines & Toronto Railway, St. Catharines, Ont.—This company expects to build a rotary transformer station with 500-kw capacity.

Wilkes-Barre & Hazleton Railway, Hazleton, Pa.—This company has contracted for the following apparatus: Three 150-kw, single-phase 16,000-183 step-down transformers; a 400-kw rotary converter; two 350-hp boilers, and three 375-kw, single-phase, 300-16,000 step-up transformers.

Manufactures & Supplies

ROLLING STOCK

Cleveland (Ohio) Electric Railway has been authorized to purchase 25 new cars by the court.

Cleveland & Erie Railway, Girard, Pa., purchased six sets of Baldwin 72-22 trucks which were placed under old cars.

Sunbury & Northumberland Electric Railway, Sunbury, Pa., is in the market for two 38-ft., semi-convertible, double-truck cars.

St. Lawrence International Electric Railroad & Land Company, Alexandria Bay, N. Y., is in the market for one complete snow plow.

Aurora, Elgin & Chicago, Chicago, Ill., is reported to be directing the purchase of some new cars for the Aurora, De Kalb and Rockford Railway.

Chicago & Milwaukee Electric Railroad, Chicago, Ill., expects to purchase one double-truck steel-frame snow sweeper; also one double-truck café parlor car and three double-truck passenger interurban cars for limited service; five standard, semi-Empire, interurban double-truck cars; four motor and eight semi-convertible trail cars.

Mahoning & Shenango Railway & Light Company, Youngstown Ohio, in addition to the 12 city and six interurban cars mentioned in the Electric Railway Journal of September 18, 1909, as having been ordered from the Niles Car and Manufacturing Company, has ordered two freight cars from the same car builders. Standard Motor Truck Company's trucks and both Westinghouse and General Electric motors were purchased for all rolling stock.

Louisville (Ky.) Railway, reported in the Electric Railway Journal of Aug. 14, 1909, as having ordered 33 city cars from St. Louis Car Company, has specified the following in addition to the pay-on-platform feature:

Length of body...31 ft. 3 in.	Couplers ..... Tomlinson
Length over vestibule.45 ft.	Curtain fixtures,
Width over sills...8 ft. 2 in.	Curtain Supply Company
Width over posts at belt, 8 ft. 3 in.	Curtain material...Pantasote
Sill to trolley base..9 ft. 4 in.	Gongs ..... St. Louis
Body .....steel	Roofs ..... Monitor
Interior trim.....mahogany	Sanders ..... St. Louis
Underframe ..... composite	Sash fixtures.....Edwards
Axles.....Jones & Laughlin	Seats, style..... St. Louis
Bolsters, body.....St. Louis	Seating material.....rattan
Car trimmings.....St. Louis	Trucks .....St. Louis
	Wheels .....34 in.

TRADE NOTES

A. R. Hunt, general superintendent of the Homestead works of the Carnegie Steel Company, Pittsburgh, Pa., has been elected a director of the company to succeed William H. Singer, deceased.

Chicago Car Heating Company, Chicago, Ill., announces that Roswell P. Cooley, formerly mechanical inspector for the Pullman Company, Chicago, has become connected with the Chicago Car Heating Company.

Blue Island Car & Equipment Company, Chicago, Ill., announces the appointment of B. L. Verner as sales manager of the company. Mr. Verner was formerly assistant purchasing agent of the Republic Iron & Steel Company, Pittsburgh, Pa.

W. H. Schott, Chicago, Ill., consulting engineer, the Schott Engineering Company and the Schott Specialty Company have removed from the American Trust Building, 125 Monroe Street, Chicago, Ill., to suite 926, 315 Dearborn Street, Chicago.

Raymond Concrete Pile Company, New York, N. Y., has been awarded the contract for placing concrete piles in the foundations of the power house for the Illinois Traction System at Venice, Ill., for which the Central Illinois Construction Company is the contractor.

George H. Erich & Company, Minneapolis, Minn., who represent the C. A. Wood Preserver Company, Austin, Tex., with a factory in Mannheim, Germany, have changed their postoffice address from Box 91, Minneapolis, to 211-212 Lumber Exchange, Minneapolis, Minn.

Pressed Steel Car Company, Pittsburgh, Pa., announces that B. L. Lockwood has been made assistant chief engineer of the company. Mr. Lockwood was formerly mechanical engineer of the Cleveland, Cincinnati, Chicago & St. Louis Railroad at Indianapolis, Ind.

Seneca Chain Company, Kent, Ohio, announces that W. A. Hengstenberg, for many years connected with the Newhall Chain, Forge & Iron Company, New York, N. Y., and until recently vice-president of that company, has been elected secretary and general manager of the Seneca Chain Company. Mr. Hengstenberg will have full charge of the Seneca Chain Company's business, including the management of its plants at Kent and Mansfield, Ohio.

Cooper Heater Company, Dayton, Ohio, reports the receipt of orders during the last 30 days for equipping city and interurban cars with its hot water heaters on the following lines: Bay City Traction & Electric Company, Fargo & Moorhead Street Railway, Iowa & Illinois Railway, Cedar Rapids & Iowa City Railway & Light Company, Chicago & Southern Traction Company, the East Liverpool Traction & Light Company, Sioux Falls Traction System, Cedar Rapids & Marion City Railway, Fonda, Johnstown & Gloversville Railroad, Lehigh Traction Company, Hanover & McSherrystown Street Railway, Wilkes-Barre & Hazleton Railroad, Oskaloosa Traction & Light Company, Interurban Railway & Terminal Company, Hannibal Railway & Electric Company, Dayton, Springfield & Xenia Southern Railway, Williamsport Passenger Railway, Shamokin & Edgewood Street Railway, West Side Electric Street Railway, Shamokin & Mt. Carmel Transit Company, Lehigh Valley Transit Company, Morgantown & Dunkard Valley Railway, Cincinnati, Milford & Loveland Traction Company and Citizens' Traction Company.

ADVERTISING LITERATURE

Hunter Illuminated Car Sign Company, New York, N. Y., has issued a 40-page publication in which its signs and fenders are described and illustrated.

Washburn & Granger, New York, N. Y., have issued catalog B, in which are illustrated and described Dean dumping, shaking and stationary grates.

Buckeye Engine Company, Salem, Ohio, is distributing a folder illustrating the Buckeye electric blue printing machine and pointing out the saving in time and money made possible by its use.

Wyoming Yarn Company, Wyoming, R. I., manufacturer of "Wypah" woollen yarn journal packing, has published a small pamphlet containing suggestions and instructions for the proper packing, oiling and inspection of car journals.

Ohmer Fare Register Company, Dayton, Ohio, is distributing two pamphlets comparing the methods of recording fare collections with the ordinary register and with the indicating, recording and printing type of Ohmer register.

Covington Machine Company, Covington, Va., has issued a catalog of its punching and shearing machines, universal boiler makers' tools, rolls, etc. The company announces in the publication that it has arranged with C. C. Wais, Cincinnati, Ohio, to take over his lines of tools, and that it is now prepared to offer them to the trade.

General Railway Supply Company, Chicago, Ill., has issued a 20-page pamphlet descriptive of its metallic sheathing for use on the exterior of cars, its National steel trap door and lifting device, its Schroyer friction curtain ruler, its Garland ventilator, its Flexolith composition flooring, its Perfection sash balance, and other devices made by it. All of this apparatus has been used in steam railroad work and much of it in electric railway service.

American Locomotive Company, New York, N. Y., has issued bulletin No. 1, illustrating and describing its new type "S" short wheelbase electric motor truck with steel-plate side frames for city service. In this bulletin are also illustrated and described two new adjustable swing link devices, which are applicable to any of the builder's types of trucks with swinging bolsters. This bulletin will be distributed at the Denver convention of the American Street & Interurban Railway Association.

NEW PUBLICATIONS

Hendricks' Commercial Register of the United States. Edition of 1909: New York, S. E. Hendricks Company. Price, $10.

This is the eighteenth annual edition of this comprehensive classified list of manufacturers and users of machine tools, railroad supplies, architectural, engineering, manufacturing and similar miscellaneous equipment of all kinds. More than 350,000 names and addresses are included under 35,774 different classifications.

Protection of Railroads from Overhead Transmission Line Crossings. By Frank F. Fowle. New York, 1909: D. Van Nostrand Company. Cloth, 69 pages and two plates. Price, $1.50.

Railroad companies, with reason, are often exacting in their requirements when granting permission to cross their right-of-way with high-tension electric transmission lines. The author describes a number of good and bad methods of protecting the railroads from the effects of broken wires. The book is written primarily for the information of railway officers to give them an outline of the best engineering practice in this respect on which they can base reasonable demands for their own protection. Numerous drawings and half-tone engravings are used to illustrate the text.



DENVER, the 1909 convention city, is the metropolis of that great agricultural and mining district extending from the Missouri River on the east to the ranges of the western mountains not far distant from the Pacific coast. It is the social, political and mercantile center of Colorado, a State which is unequaled in its variety of natural resources.

Quite properly it is said that the chief assets of Colorado are its scenery and its climate. In the valleys between the hundreds of magnificent mountain peaks, occupying the entire western half of the state, are found some of the richest mines in the world, and the mining industry has recently been extended to the production of coal. In 1908 the mines of Colorado produced $42,199,804 in metals and $19,550,000 in coal. Notwithstanding these enormous figures, illustrating the extent of Colorado's mining industry, the substantial growth of Denver and other Colorado cities is accounted for even more largely by the agricultural and manufacturing output.

To the traveler from the East there exists an idea that Colorado is an entirely mountainous State. Such a conception, however, is far from true. The entire eastern portion of the State from a line drawn north and south through Denver is a comparatively level plain, the inhabitants of which are wideawake, aggressive people, interested chiefly in manufacturing and agriculture. The manufactured products of the State for 1908 were valued at $200,000,000 and the agricultural products, including beet sugar and its by-products and live-stock, totaled $136,943,000. The western slope of Colorado is one of the most fertile fruit sections of the country and in one county alone 2,000,000 acres of land, well suited to general farming, await settlement and development.

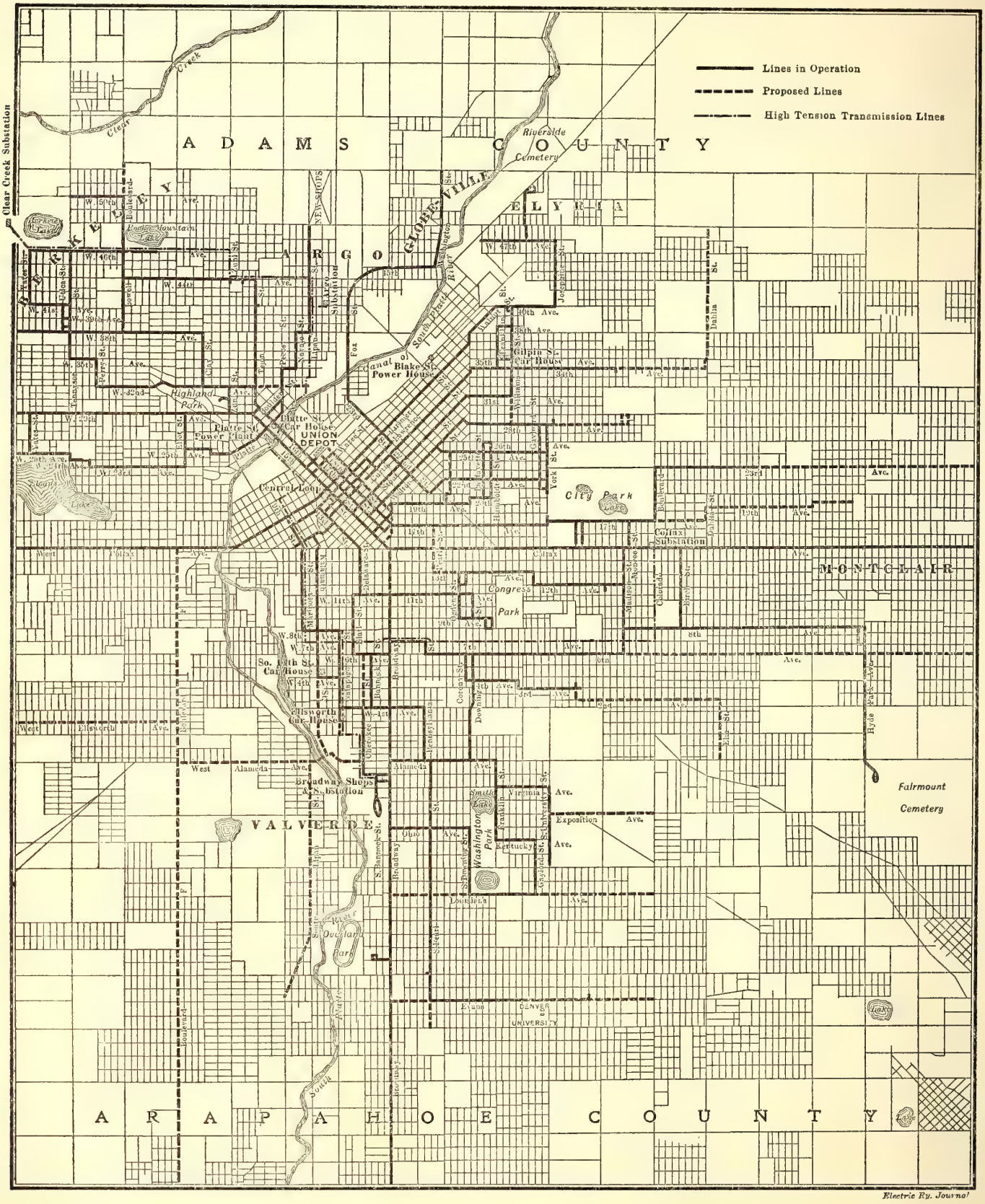
The location of Denver is ideal for a business, residence and convention city. It is situated on a level plain 20 miles east of the foothills of the Rocky Mountains. The general elevation of the city above sea level is about 5200 ft. To the east, and sloping gradually toward the Platte and Arkansas valleys, are vast plains, farming and grazing lands; to the west, and, seemingly almost within reach, is the magnificent Rocky Mountain range extending in an unbroken line north and south for 150 miles.

The valuable mining and agricultural resources of Colorado, combined with the delightful climate, have made Denver truly a city of homes. The street railway system, which so well serves this city, has scattered the residences over a large area instead of permitting congestion close to the business center. Denver has broad, level streets; good water, attractive homes and ample shade. Strict fire ordinances forbidding the erection of any but stone or brick structures have caused Denver to be as substantially built as any city. The following table presents interesting data concerning Denver:

DENVER STATISTICS

Area, square miles	54
Population	235,000
Miles of streets	1,220
Altitude above sea level, feet	5,200
Assessed valuation	$125,000,000
State Capitol, cost	3,600,000
United States Mint, cost	2,000,000
New Federal Building, cost	2,000,000
Auditorium, seating capacity, 13,000; cost	750,000
Public Library Building (100,000 volumes), cost	375,000
Young Men's Christian Association Building, cost	300,000
Young Women's Christian Association Building, cost	100,000
Public bath house, cost	75,000
Colorado Museum of Natural History, cost	100,000
Sanitary sewers, miles	300
Storm sewers, miles	85
Curbed streets, miles	250
Asphalt pavement, miles	56
Stone and cement sidewalks, miles	1,000
Electric street car lines, miles	200
Interurban electric railways, miles	125
Macadam pavement, miles	10
Stone pavement, miles	5
Surfaced streets, miles	200
Public parks (including 1200 acres)	24
Bank clearings (1908)	$411,493,943
Building permits (1908), value	10,024,000
Church edifices	180
Hospitals, homes and sanitariums	34
Banks, with deposits of $66,000,000	18
Building and loan associations	7
Newspapers and publications (five dailies)	87
Theaters and places of amusement	24
Hotels	86
Wholesale houses	100
Seventeen railroads, six being transcontinental lines; 126 passenger trains arrive and depart daily.	
One of the largest and best equipped water plants in the country, furnishing daily 250 gal. of water to each inhabitant.	
Excellent street and residence lighting service.	

Denver has five well established electric railway systems, each serving the needs of its own particular field. The Denver City Tramway Company, including the Denver & Northwestern Railway extending to Leyden and Golden, operates 222 miles of track in the city and its suburbs. The Denver & Interurban Railway, an electrified division of the Colorado & Southern Railway system, connects Denver with Boulder and El Dorado Springs, electrically operating 58 miles of track. The Denver & Inter-Mountain Railway, a steam road recently electrified, extends from Denver to Golden, 22 miles, at the very foot of the Rocky Mountains. The Denver & South Platte Railway now has a 5-mile suburban line to Littleton in operation and is planning the construction of a 15-mile extension to reach attractive natural resorts in the foothills of the Rocky Mountains.



Denver City Tramway—Map Showing the Lines Operated and the Extensions to Be Built Within the City of Denver

THE DENVER CITY TRAMWAY SYSTEM

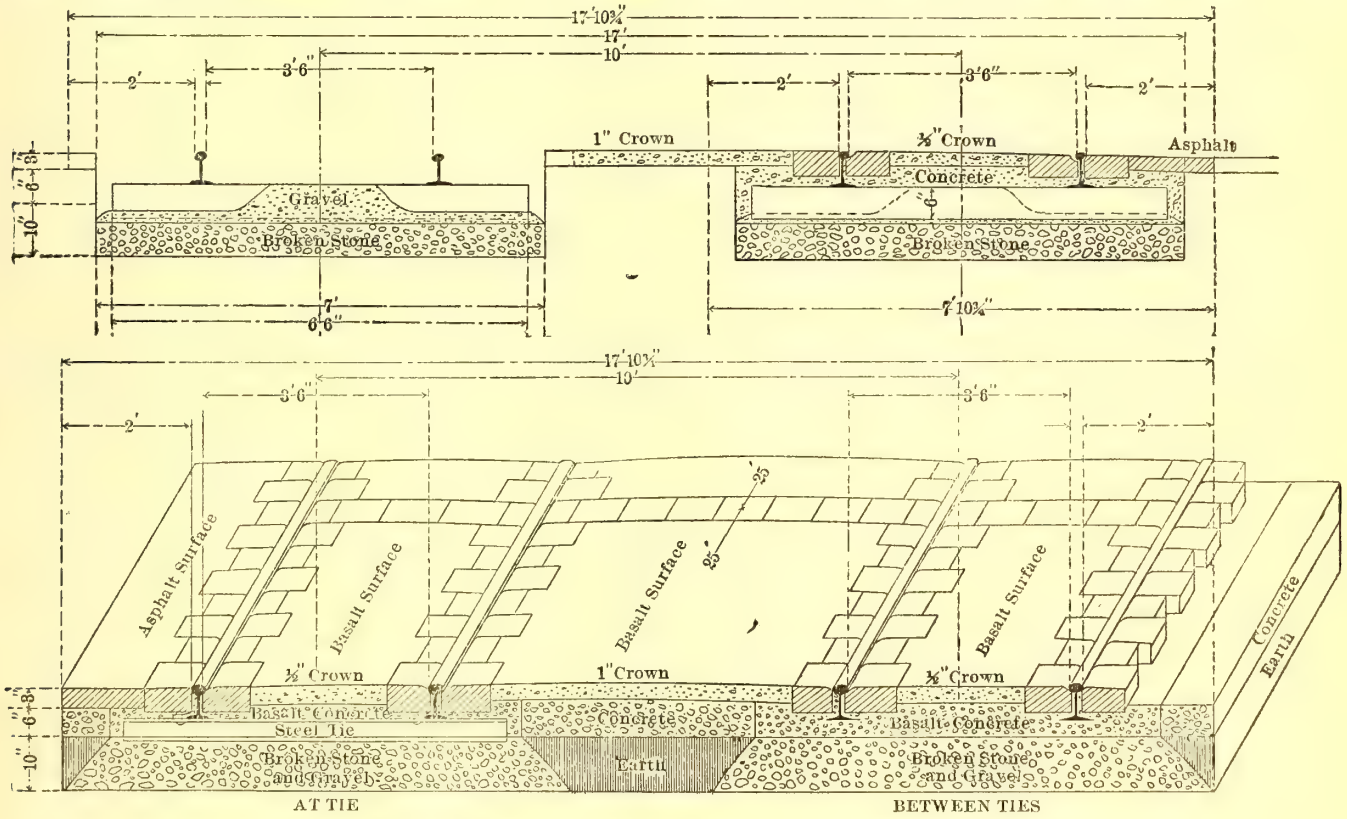
DENVER has a street railway system of which its citizens may justly be proud, and to the visitor interested in railway work the Denver City Tramway system presents a subject worthy of careful study, particularly on account of its well maintained physical property and its harmonious, well advanced operating organization. Among the many excellent features of the Denver City Tramway which are unique are the system of car dispatching by telephone, the use of trail cars for handling the rush-hour load, the light and substantial design of this company's cars, the well maintained narrow-gage T-rail track paved with solid concrete and the efficient power generation and distribution system.

Denver is a comparatively level city and the railway company's tracks have few grades. The location of the trackage within the city is shown on the accompanying map. The Denver City Tramway has 196.04 miles of track and the Denver & Northwestern, 26.19 miles—a total of 222.23 miles operated as one system. Practically all of the lines of the Denver City Tramway are double-tracked. There are 97 miles of streets occupied. With the exception of 7.06 miles all of the track is built to a gage of 3 ft. 6 in. This exception is the standard-gage double track line between the center of the business district of Denver and the suburb of Globeville, which route serves as an entrance for the passenger cars of the electrified division of the Colorado & Southern Railroad, known as the Denver & Interurban.

In May, 1906, the Denver City Tramway Company was granted franchises for the present and future expansion of its tracks. The track extensions yet to be built are indicated on the map of the city of Denver. According to the ordinance the company shall build 10 miles of extensions per year for seven years. This regular plan of extension permits the company to have a well organized track force which also is engaged in reconstructing about 5 miles per year of old cable track. The organization of the civil engineering department is headed by a chief engineer with the necessary staff of clerks and draftsmen and with an assistant engineer in charge of both maintenance and new construction of track. Under the assistant engineer are three construction foremen and two maintenance foremen. The number of gangs and laborers is varied from time to time to suit the work in hand.

TRACK AND ROADWAY

The general dimensions of the typical track structure of the Tramway company are shown on this page. It will be noted that for paved streets both steel and wooden ties are used. The steel-tie track construction has been used for 1.25 miles in the business district and, it is expected, will be found desirable for future use. Wooden ties, however, are still considered as standard for the larger part of the work.



Denver City Tramway—Track Construction with Steel and Wood Ties

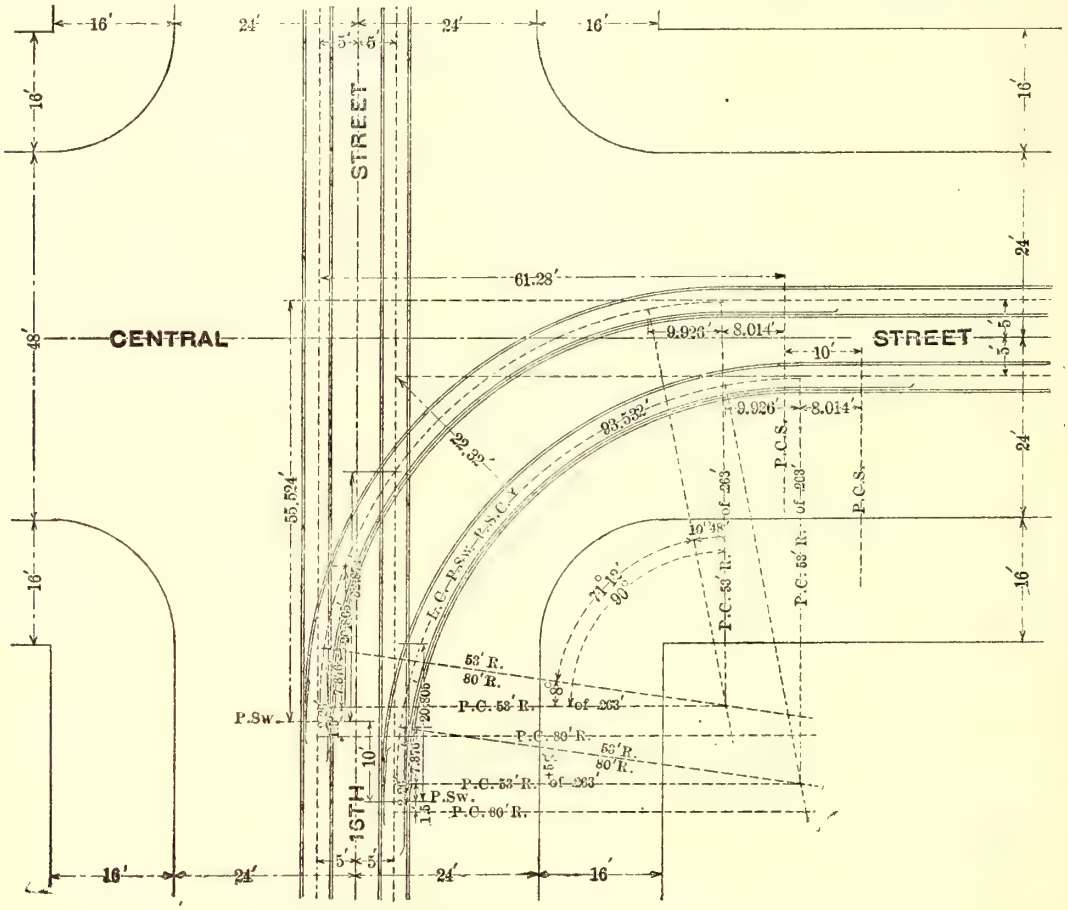
The thoroughness with which the tracks of the Denver City Tramway are built can best be shown by describing the steps followed in the execution of the work. A large part of the city track recently built has taken the place of cable track. In this reconstruction work the first step is to remove the old rails and break up the large mass of concrete forming the cable conduit and supporting the slot-rail yokes. Only one track at a time can be torn up for reconstruction. When the substructure of the cable track has been removed and the concrete broken into small parts the trench is leveled 2 ft. deep below the rail top. Into this trench is placed a bed of either broken concrete or gravel, depending upon whether or not an

old cable track is being rebuilt. For steel-tie construction the broken stone and gravel bed within the trench is made 10 in. deep. The ties and rails are next placed. Before surfacing the rails all the voids in the track foundation are filled with clean bank sand which is dumped into the trench on top of the broken stone and flushed until thoroughly packed. Wooden ties are surfaced with clean gravel, a center filling of which is brought up to the top of the ties for a width of 18 in. between the rails. The ties are then covered with a pavement foundation of concrete which is a 1:4:8 mixture of Portland cement, sand and basalt rock. Where steel ties are used they are laid directly on the broken stone or gravel subbase and are entirely enclosed in concrete, which it is thought will prevent corrosion of the metal.

In some of the asphalt paved streets, of which there are 64 miles in the city of Denver, excellent results have been obtained with a surface paving of basalt concrete placed between rails and in the devil strip. A row of beveled basalt toothing blocks 4 in. x 4 in. x 8 in. in size is placed on either side of each rail. The blocks are so cut that they fit between the head and base of the rail close to the web. These blocks are grouted with a mixture of equal parts of sand and Portland cement. The top surface of the street is then filled in with concrete made of Portland cement, sand and basalt rock in the proportions of 1:2:4. The concrete in this form of track construction is kept wet for seven or eight days while it is setting. The Denver City Tramway Company has used this concrete mixture for a paving surface between rails and tracks for seven years and the first of this work put in is still in excellent condition. It is found that the basalt surface outwears not only the toothing blocks along the rails, but the adjacent pavement put down by the city.

In part of the earlier pavement of this type cracks developed on account of lack of room for longitudinal expansion and therefore the present design of paving surface as illustrated includes a row of stone paving blocks from rail to rail on 25-ft. centers. Although these blocks are grouted and the concrete street pavement is laid against them on both sides, nevertheless their presence in the pavement seems to prevent cracking from expansion and contraction. In the railway company's quarry at Golden an unlimited supply of basalt is available for track construction. This rock is crushed at the quarry and forms a substantial ballast as well as an excellent aggregate for the concrete used in track work.

The rail used in paved streets is a 6-in. 72-lb. tee section and in unpaved streets a 65-lb. 4 1/2-in. A. S. C. E. section is used. The rail ends are connected with the Jones beveled rail joint, which has been found to offer some advantages and which differs from an ordinary four-bolt joint only in the method of cutting the rail ends. The rail ends are cut so that the inclined faces overlap and closely abut to form a tight joint. Ordinary splice bars are used. The object of this beveled joint is to provide an inexpensive means whereby weight brought to bear on one rail end will act simultaneously upon the adjacent section and prevent movement of one rail by the other, thus obviating wear on the receiving end of the joint. On double-track lines the traffic is operated against the incline ends and therefore the receiving rail in a closely butted joint transfers a part of its load to the delivering rail. About 7000 such joints had been installed in Denver up to July, 1908.

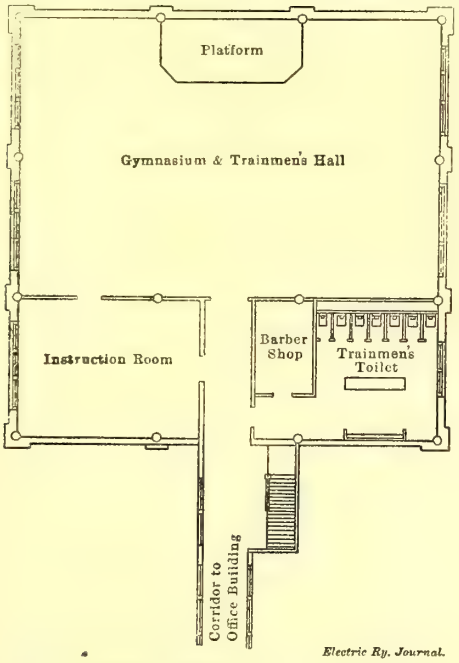


Denver City Tramway—Typical Branch-Off Curve and Switch Layout

The steel ties used in the Denver track construction weigh 14.5 lb. per foot. The design is illustrated on page 495. These ties are spaced 40 in. between centers. Wooden ties are of Texas pine 6 in. x 8 in. in cross section and are dipped in creosote. An untreated tie has a life in Denver of not more than seven years, but some treated ties which have been in use for seven years as yet show no deterioration.

An illustration presented on Plate II shows a typical special track work layout as designed and built in the company's special-work shop. Other views on Plate II show the interior of the track shop and several of its tools and also the laying-out yards close to the shop.

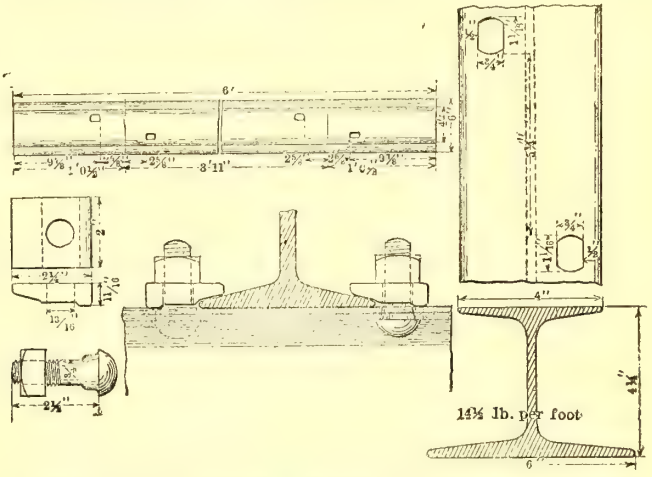
On the 72-lb. rail the joints are single bonded with 300,000-circ. mil capacity Brown standard plastic bonds. Near power stations the rails are double bonded and all special track work is jumped with two 500,000-circ. mil copper cables. Wherever a lighter rail is used the joints are bonded with American Steel & Wire pin-driven bonds extending around the joint plates, and twin-terminal No. 0000 bonds of the same manufacture. Tests made in July of the present year on the Colfax Avenue line, which was bonded in 1896 and 1897 with Brown plastic bonds, showed that out of 505 joints only 76 were defective after 13 years of severe service. In practically every case in which a bond was found to be defective the joint is said not to have failed mechanically.



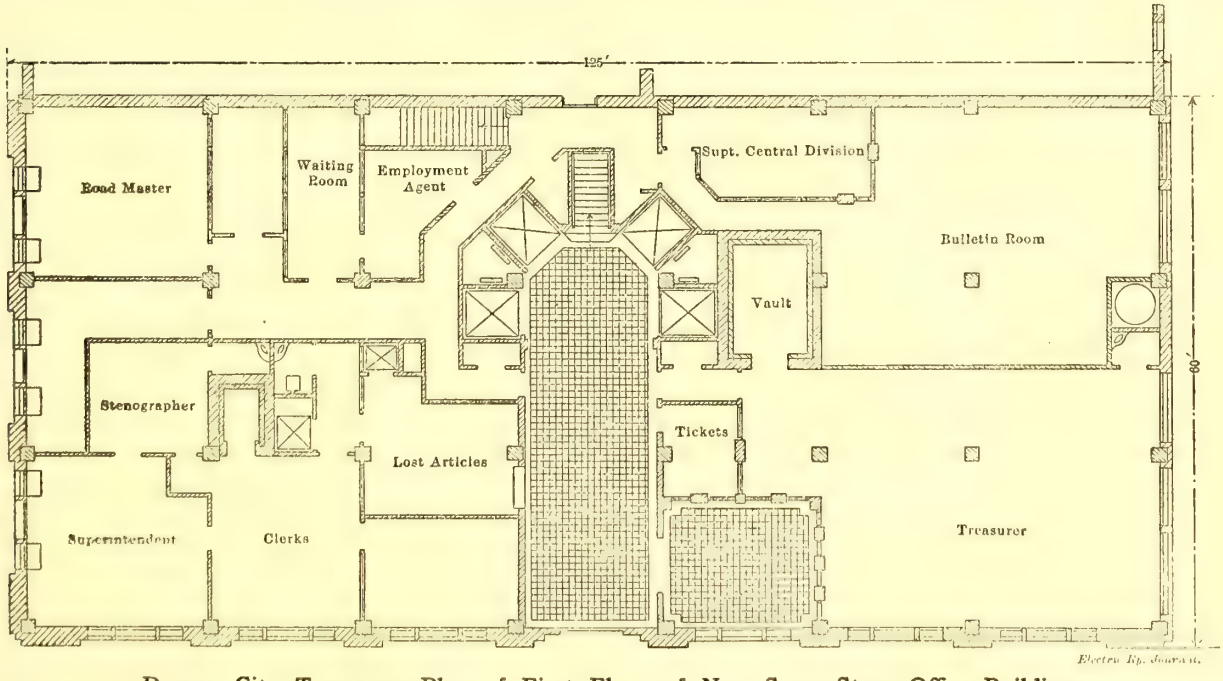
Denver City Tramway—Plan of Trainmen's Room Above Car House

Plans have recently been completed for the construction of a general office building to be used as executive and operating headquarters by the Denver City Tramway and Denver & Northwestern Railway. A new car house with storage space on two floors will be built on adjacent property and separated from the office building by fireproof partions. A difference in the street elevation at two ends of the building will permit the use of double-deck storage tracks without requiring a car elevator. The storage capacity will be for 140 cars.

The car-house section of the building will be 325 ft. long by 125 ft. wide, subdivided into two bays. One bay will have four tracks and the other five tracks. On the second floor of the car house will be three tracks in one bay and four in the other, leaving wide aisles on one side of each bay for repair and inspection work. Above the roof of the car house a gymnasium, instruction room and trainmen's quarters 75 ft. square will be erected. This superstructure will connect by a corridor with the second story of the office building.



Denver City Tramway—Details of Carnegie Steel Tie and Rail Fastening



Denver City Tramway—Plan of First Floor of New Seven-Story Office Building

The office building, seven stories in height, with a floor area 60 ft. x 125 ft., faces streets on three of its sides. On the fourth side it joins the car house. The basement of the office building has the floor on a level with the lower floor of

the adjoining car house. It will contain the boiler plant, coal storage and a general storage room with track facilities for handling heavy materials. The first floor will be subdivided into quarters for the transportation department, the treasurer and the roadmaster. The second floor will be occupied by the legal, claim, medical and tax departments and the Tramway Mutual Aid Association. The fifth floor will be subdivided for use by the auditing department, the sixth floor for the engineering department and the seventh floor for the executive department.

OVERHEAD LINES DEPARTMENT

The organization of the Denver City Tramway Company includes a department of overhead lines in charge of a superintendent. This department has charge of the construction and maintenance of all trolley lines, and outside feeders, transmission and lighting wires. It also maintains the lighting service for the entire railway, including car lighting. The superintendent of the department has a general foreman with sub-foremen in charge of trolley and overhead construction, repairs and emergency work, and a foreman in charge of lighting. The department headquarters are at the central loop where the superintendent is kept in close touch with the transportation department and also is near his emergency crews.

Whenever overhead repairs are needed the line department is notified on a blank which gives the name of the trainman or other individual reporting the defect, the line and location with pole number, and a statement of the nature of the trouble. At the lower part of the blank are lines ruled for a memorandum of the disposition of the report and for remarks. Such reports when received by the superintendent of lines are handed to the line foreman who sees that the needed repairs are made.

Each member of the line department turns in daily a blank on which he distributes the number of hours' time spent on different pieces of work. The clerk in the line superintendent's office distributes the time for all general repairs on construction work by reference to a tabulation showing the items and account numbers, as used in the company's classification. These classifications of detail accounts are reproduced herewith to show how thorough a record the Denver City Tramway Company keeps of the costs of its construction and maintenance work:

GENERAL REPAIRS.

Overhead Lines.
51—HANGERS—spans, ears, insulators, feed taps.
52—SPECIAL WORK—Curves, switches, breakers, x-overs.
53—SIGNS—on poles or span wire.
55—GROUND—Return wires and connections.
57—BROKEN TROLLEY WIRE.
58—RENEWING TROLLEY WIRE.
59—READJUSTING Alignment, plumbing.
60—POLES—Renewing, dig hole, set, release.
62—MOVING Poles, stubs, anchors.
65—INSPECTION—General.
66—ON WATCH.
67—HAULING.
68—RENUMBERING POLES, Feed or trolley.
70—REMOVING Abandoned poles, wire, etc.
72—ELECTRIC TRACK SWITCHES.
73—REPAINTING POLES.
74—CLEARANCE account storms, trees, foreign wires, etc.
76—LIGHTNING ARRESTERS.
79—FEEDERS—General—except feed taps.

Lights, Signals, Heaters, Fans, Etc.
100—HOUSE—Car Barns, Waiting Rooms, Power House, Sub-Station, etc.
101—CAR—General.

THE DENVER CITY TRAMWAY CO.

*Record of Electric Line Construction Maintenance, etc., for*_____

○	ACCOUNT	LOCATION	WORK DONE	SUSPENSIONS: EARS	SUSPENSIONS: INSULATORS	SUSPENSIONS: HANGERS	SPAN WIRE	TROLLEY WIRE	O-H SWITCHES	O-H XINGS	O-H BREAKERS	SPLICERS	POLES	COST: MATERIAL	COST: LABOR	COST: TOTAL
				0-14 B-62 B-179 B-198 16925		15788 15789 15790	1-4 8-16<
1-2	1-0 5-8 1-0 NEW	17345 17346	16392 16393	2601	1-0 404	30 35			

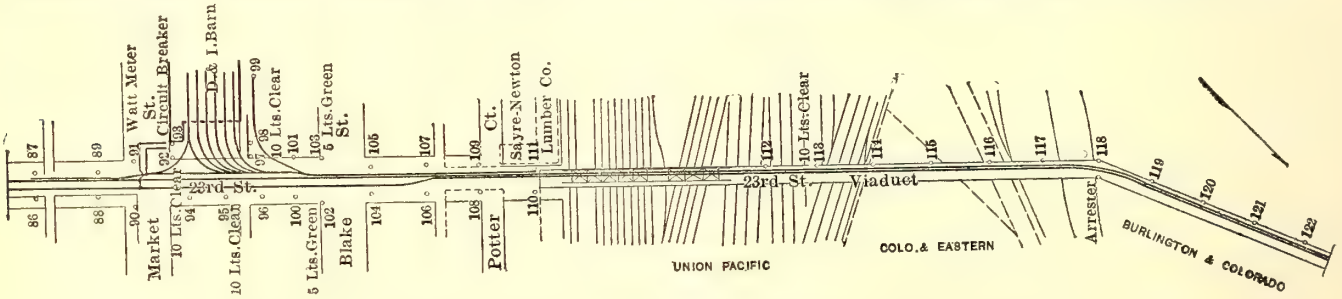
Denver City Tramway—Detail Record and Distribution Sheet for Line Work (Original 19 1/2 in. x 8 in.)

102—POLE LIGHTS—Clusters and arc lamps, clear or colored.
104—SIGNALS—Bells and buzzers, all kinds.
105—TROLLEY PARTY CARS—Illumination.
106—ELECTRIC FANS.
107—CAR HEATERS.
110—STATIONARY MOTORS—All kinds.

CONSTRUCTION.

Trolley Lines.
85—GUYING—Stubs, anchors, etc.
84—HAULING—General.
80—ERECTING POLES—Dig hole, raise, set, bank.
81—SPAN WIRES—Bore hole, put eye bolt, span up.
82—TROLLEY WIRES—String, pull, finish, put on ins. han. ears.
75—LIGHTNING ARRESTERS—Placing all parts.
88—SIGNS—On poles or span wire.
89—NUMBERING POLES, stenciling.
86—PAINTING POLES.
87—ELECTRIC TRACK SWITCHES—Placing all parts.

Feeder Lines.
95—HAULING.
91—ERECTING POLES—Dig hole, raise, set, bank.
93—GUYING—Stubs, anchors, etc.
92—FRAMING—Cross-arming or placing other supports.



Denver City Tramway—Section of Pole Plat Kept by Overhead Department

78—STRING WIRE—Pull, tie in, finish.
98—PAINTING—Poles or crossarms.
97—NUMBERING—Poles, stenciling.
96—DROP-OUTS—Foreign wire protectors, placing.
83—FEED TAPS or bonds between trolley wires.
99—CLEARANCE—All kinds.

Lights, Signals, Heaters, Fans, Etc.
200—HOUSE—Car Barns, Waiting Rooms, Power House, Sub-Station, etc.
201—CAR.
202—POLE LIGHTS—Clusters or arc lights, clear or colored.
204—SIGNALS—Bells, buzzers, all kinds.
206—ELECTRIC FANS.
208—STATIONARY MOTORS—All kinds.

In the event of any delay caused by overhead line trouble being reported to the dispatching office, a delay report, as illustrated, is made out conveying to the line superintendent the time and location of the trouble and the number of minutes delayed. If such delay is excessive the general manager also is advised.

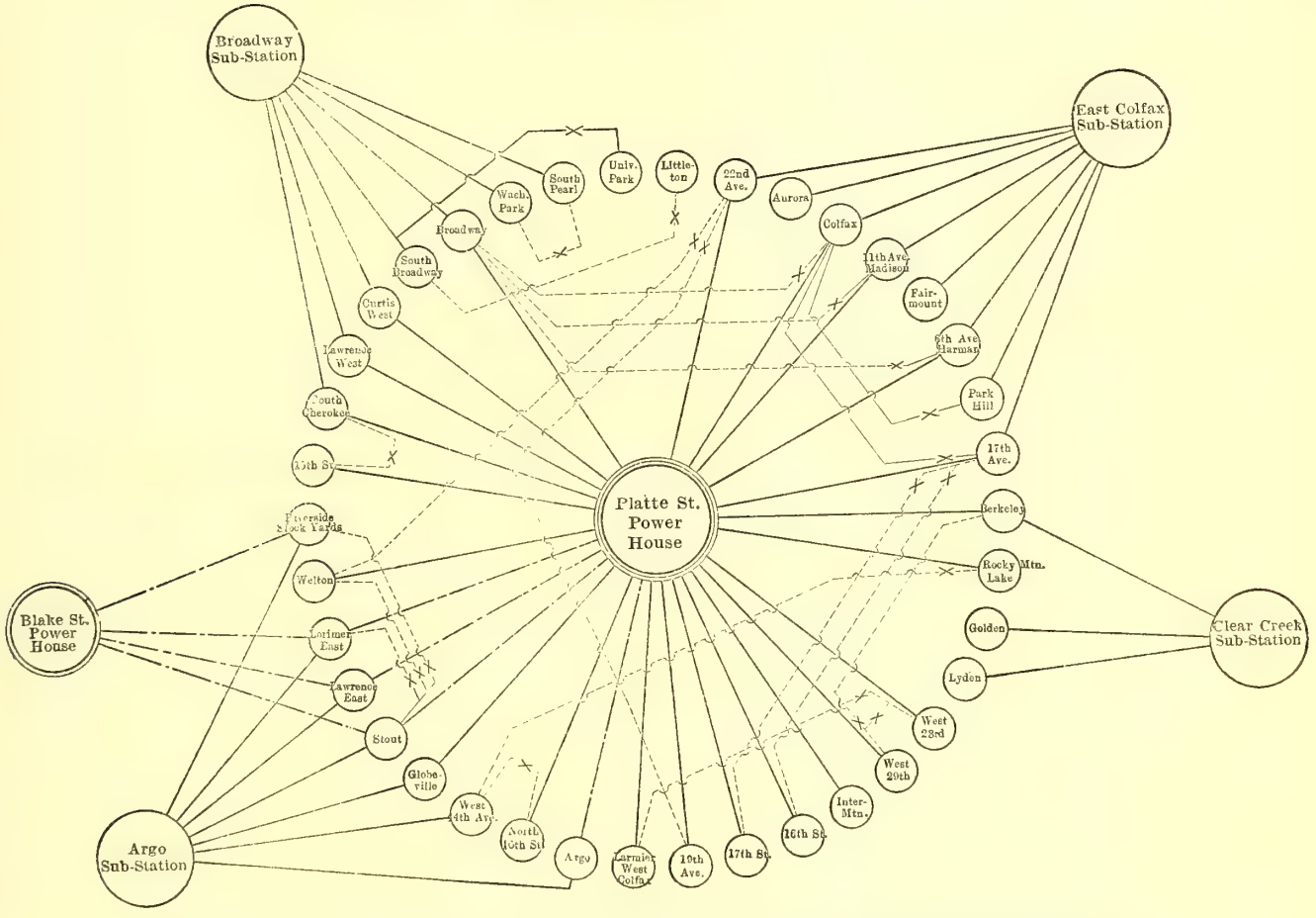
During the daytime no emergency crew is kept at the station regularly, but some member of the department is

always on duty at the central lop and one trolley repair crew, with a Trenton trolley wagon and repair materials, works within the business district, where it may be reached by the dispatcher by means of the very complete telephone system described later. The overhead maintenance force includes a night crew of two men who are on duty from the time the two day crews leave at night until they return at 7 a. m. The entire city is served from the emergency station at the central loop and emergency repairs are made either with a trolley wagon or with the very complete line car herewith illustrated on Plate VI. This emergency and construction equipment is a double-truck car provided with an elevating tower and a complete supply of trolley repair materials, including a reel of wire.

LIGHTNING PROTECTION

On account of the severe electrical storms in and around Denver the protection of the lines and cars from lightning troubles has been a problem requiring close application on the part of the line department. For that reason this department has established and maintains complete records of each burnout caused by lightning. Whenever a car is struck by lightning the crew immediately reports to the dispatcher, who fills out a blank form addressed to the superintendent, advising him of the car number, line, time and pole number at which the burnout occurred. The employees of the line department then inspect the lightning arresters on either side of the location where the car was struck and make certain that all pole arresters are in operative condition. Before May 1 of each year this department tests all lightning arresters so that the efficiency of the apparatus may be assured before the spring storms begin. A card index is kept showing the location and a complete record of the performance of each arrester.

An interesting feature of this lightning protection work is the use of a large map for exhibiting the relative location of lightning disturbances. An engraving on Plate VI shows this map as mounted on the wall of the line superintendent's office. In connection with this map stick pins of three colors are used to indicate the location of arresters, cars struck and arresters replaced. As the reports of lightning troubles are received and as the damaged arresters are repaired, new pins to indicate the changes made are placed on the map in their proper location. At a glance, therefore, it is possible to note whether trouble is more prevalent at one location than at another, and particular attention can be given to that point. Several types of arresters are used on the poles. They are spaced from 500 to 1,000 ft. apart, according to local conditions as determined by experience. Cars are protected from lightning with G. E. type M D arresters and also with water-box leakage arresters which can be cut in by the motormen during storms.



Denver City Tramway—Feeder Line Connections and Possible Cross Connections

GENERAL LINE DEPARTMENT FEATURES

The line department has a stock room at the central loop where materials are kept for all general repair work of the department. The timekeeper acts as stock clerk and keeps an accurate stock account with each repair and maintenance wagon and also with the company's general storekeeper. The records of this department include pole plats made to a scale of 100 ft. to the inch, showing the curb line, pole locations, track arrangement, pole numbers and distances. These plats are found especially useful in planning the replacement of feeders or the rearrangement of any of the overhead structure. A card index showing a complete inventory of all parts of the overhead and transmission system also is kept in the office of the department. This index, which is held in a vertical file, shows the number and size of the wire, the

location and the weight for all sections, the number and sizes of the poles, the number of incandescent lamps along the route, the location and description of lightning arresters, the location of span wire signs, stop and slow signs, telephones and the size and weight of trolley wire. Pole charts, showing the location of the different circuits on the various poles also are indexed.

In connection with the carefully kept inventory of the overhead structures the line department keeps an accurate record of the work it has done, by entering the details on the pages of a large loose-leaf record book. One page is set apart for each line and is ruled to show the account number, the location and character of the work done. It also exhibits the total quantities of the various kinds of material used. Space is provided at the right of the page as shown, for extending the items and for ascertaining the costs of the various sections of the work and the totals.

The overhead construction of the Denver City Tramway Company is No. 0 or No. 0000 trolley supported with 1/4-in. or 5/16-in. 7-strand span cable from Idaho cedar poles, brush-treated with carbolineum. The company has treated its poles by this method since 1903 and has obtained excellent results. The general details of the transmission system are described and illustrated elsewhere. At those locations where the transmission system crosses the trolley or telephone wires "drop-out" terminals are used to take the place of protection cradles. Matthews' guy anchors are used for guying.

A simple trolley feeding-in tap is being made by connecting two trolley ears with a blind stud of bronze and sol-

The Denver City Tramway Co.

Lamps Used To-day on Car Repairs

*Date*_____ *190*____

*By*_____

CAR NO.	LINE	TIME REP'R'D	CONDITION												REMARKS
			CAR				WATCH				GAUGE				
			Bur'd Out	Broken	Loose	Gone	Bur'd Out	Broken	Loose	Gone	Bur'd Out	Broken	Loose	Gone	

The Denver City Tramway Co.

Lamps Used To-day on Houses, Pole Clusters and Signals

*Date*_____ *190*____

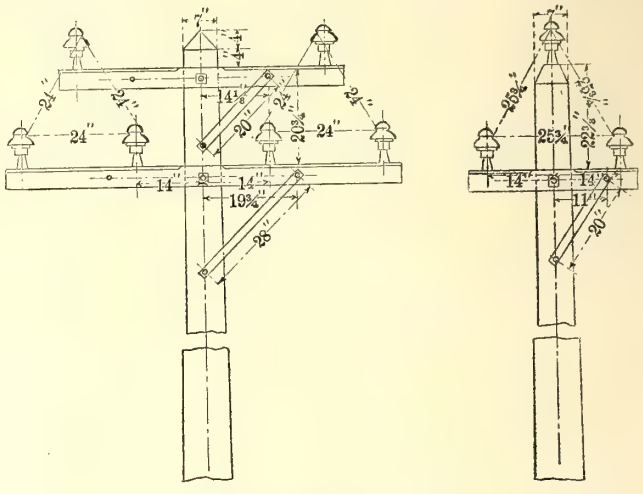
LOCATION	POLE NO.	CONDITION														REMARKS
		ED. 110				ED. 120				T.H. 110				T.H. 120		
		Bur'd Out	Broken	Loose	Gone	Bur'd Out	Broken	Loose	Gone	Bur'd Out	Broken	Loose	Gone	Bur'd Out	Broken	Loose	Gone	
	TOTALS																	

Electric Ry. Journal

Denver City Tramway—Record Forms Used in Checking Distribution of Lamps (Original 5 1/2 in. x 8 1/2 in.)

dering the joint. In this way ample electrical conductivity as well as the required mechanical strength is afforded. At turning "Y's" 18-in. steel spring-point trolley frogs have been installed so that it is only necessary for the conductor to loosen the trolley rope when turning the car, and the trolley wheel will be guided in its path by the spring points of the overhead switches. Thirty-seven electrically operated track switches have been installed. The control apparatus of these switches has been designed largely by the company's men and the results are said to have been excellent.

The views shown on Plate VI were taken in the streets of Denver and illustrate the very attractive types of poles used in certain localities. These poles are owned jointly by the Denver City Tramway Company and the city and are



Denver City Tramway—Typical Pole-Top Construction for 13,200-Volt Lines

used not only to support trolley spans, but also to carry the ornamental arc lamps for illuminating the street, and one pair of city wires. In placing these poles, set on 90-ft. centers, the Denver City Tramway Company bore the expense of removing the old trolley poles and of furnishing the interior steel tubular poles which are set in concrete and which carry the trolley span wires. The city furnished and placed the outside ornamental cases and the Denver Gas & Electric Company furnished and wired the electric lamps.

LAMP MAINTENANCE

A portion of the work of the overhead line department is the maintenance of car lighting. This department also takes care of the lamps and lighting circuits of all car houses and installs the wiring in the buildings. The department has control of the distribution of all incandescent lamps and has originated a system whereby it not only distributes lamps promptly, but sees that all useless lamps are returned.

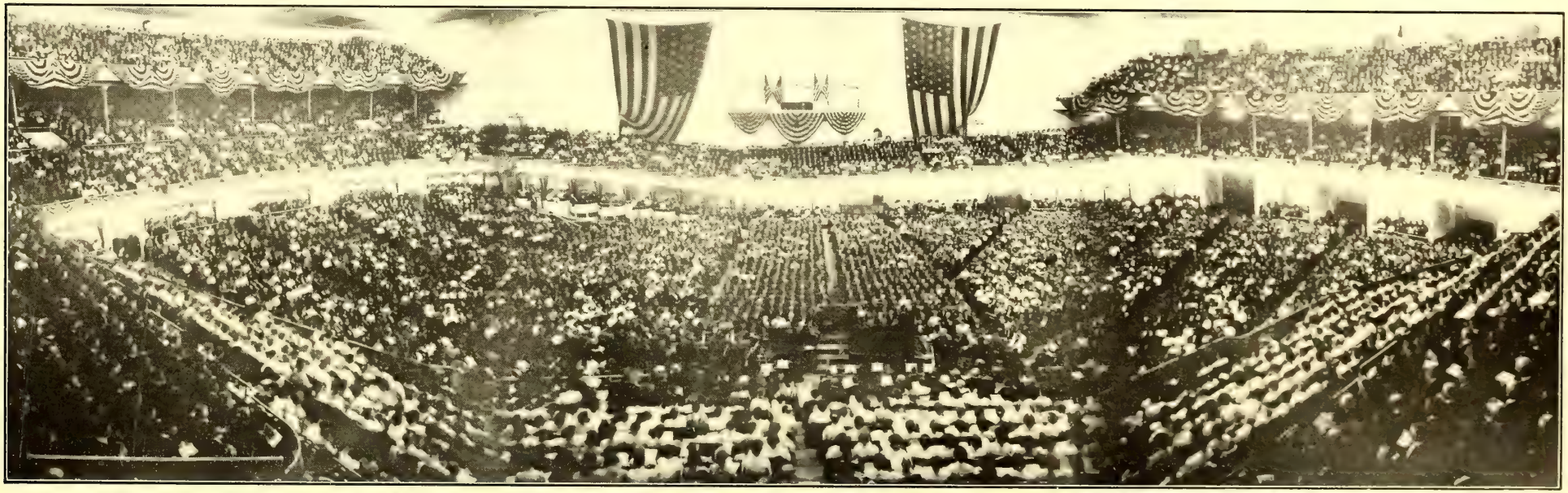
The lamps in the cars are maintained by two men who cover the entire system in the daytime, and by another man who is stationed at the central loop during the evening. This man at the central loop trims all the arc headlights and makes certain that the emergency lamp repairs on the cars are all taken care of quickly. Whenever a car crew finds that made to the dispatcher, who calls the lamp repair man on duty and tells him of the defect and advises when the car will reach the central loop. As the car passes the repair man rides along and makes the necessary repairs. When this man goes off duty at 11 p. m. the car crews may then obtain lamps from a supply box kept in the dispatcher's office at the central loop. Extra arc headlights also are kept at this central location.

A close check on the distribution and return of lamps is kept by using specially constructed storage boxes containing a temporary supply. Such boxes are placed at each car house, in each department of the shops, at each substation, and at the central loop. The boxes have two compartments, each under lock and key, one compartment contains lamps to be used by the night man and one by the day man. The lamps in these boxes are not used if the lamp repair men can make all the replacements during the daytime, and so the supply

Plate I

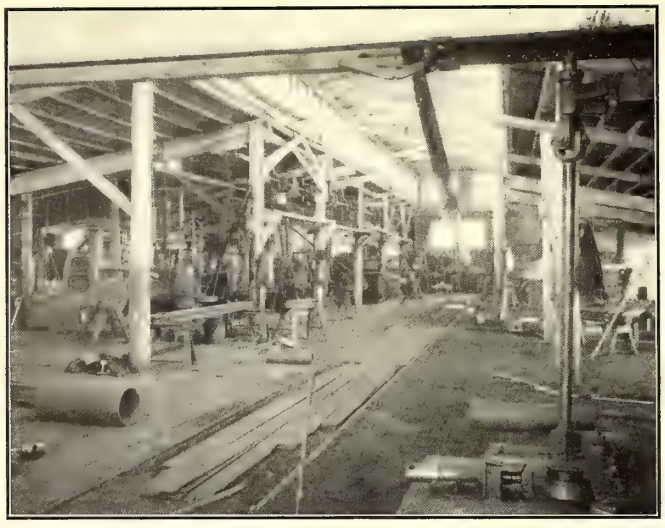


Denver City Tramway—Panoramic View of the Business Center of Denver



Denver City Tramway—Interior of Denver Auditorium

(Copyright by Mile High Photograph Company, Denver, Colo.)



Denver City Tramway—Special Track Work Shop



Denver City Tramway—Special Track Work Yard



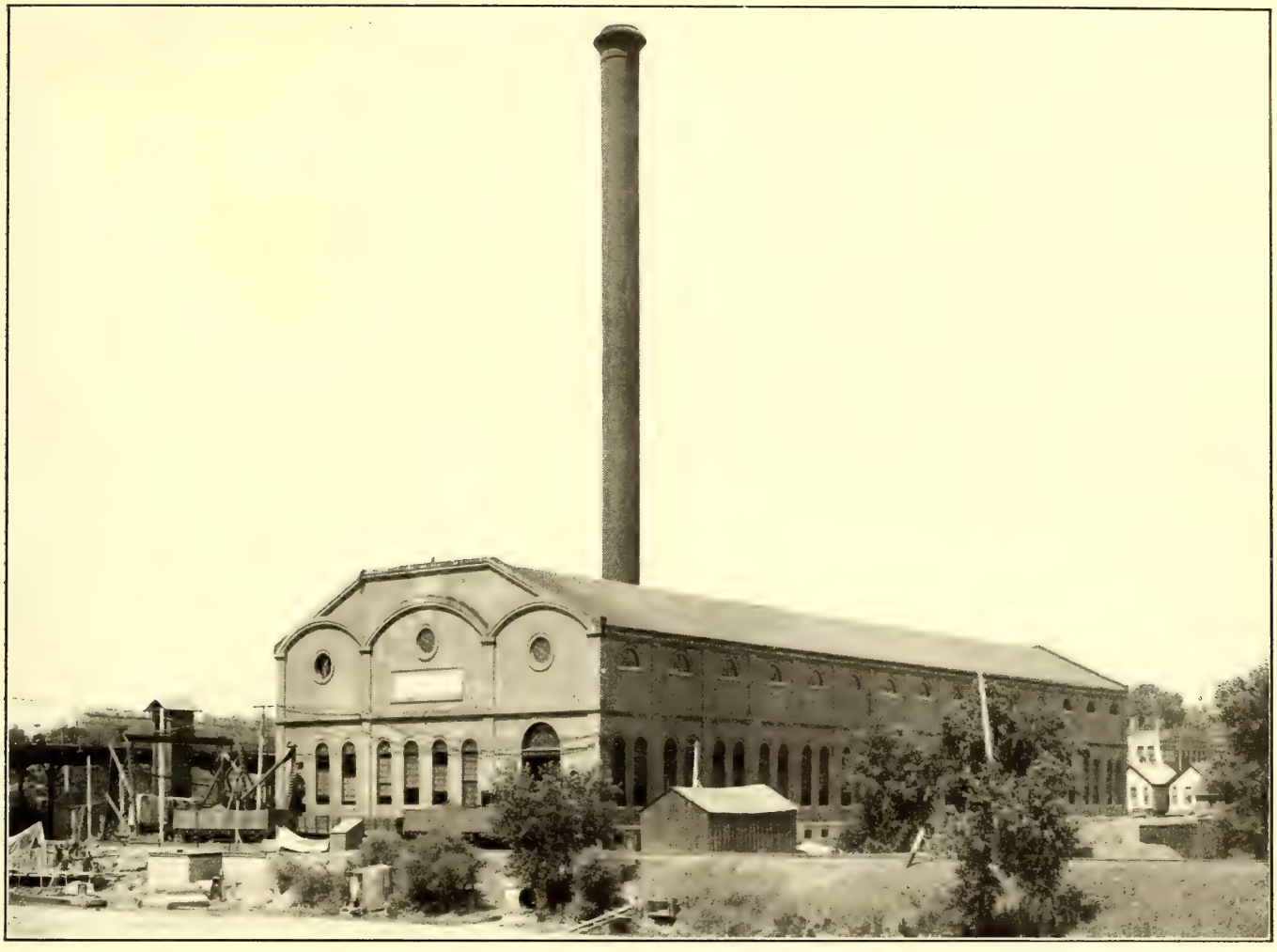
Denver City Tramway—Track Department Material Yard



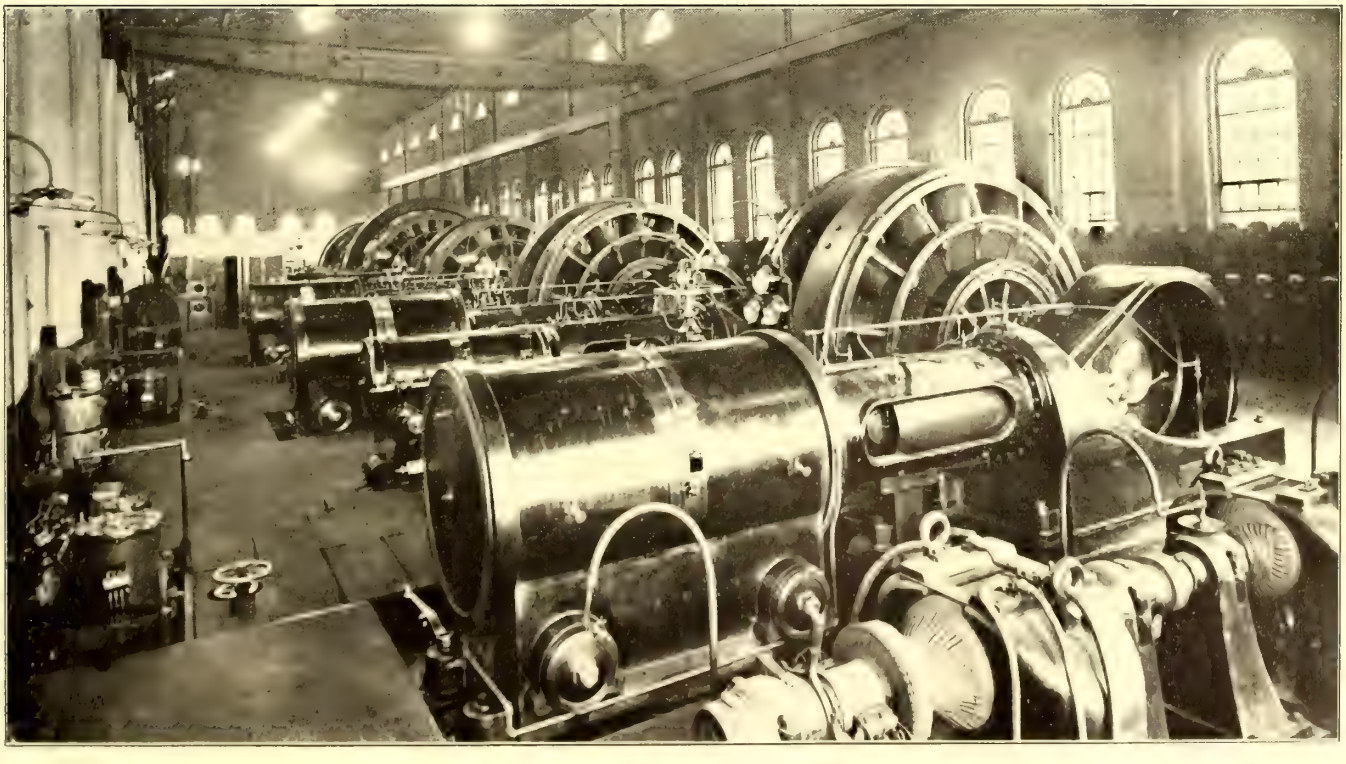
Denver City Tramway—Concrete Street Surface



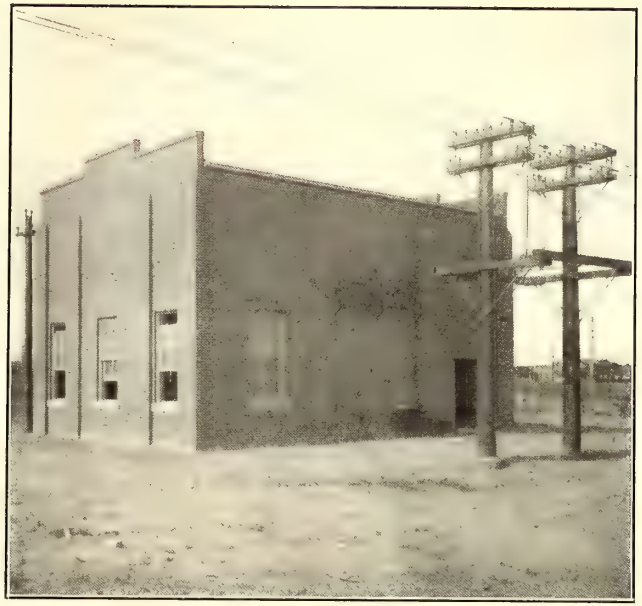
Denver City Tramway—Basalt Rock Quarries



Denver City Tramway—Exterior of Main Power Station



Denver City Tramway—Interior of Main Power Station



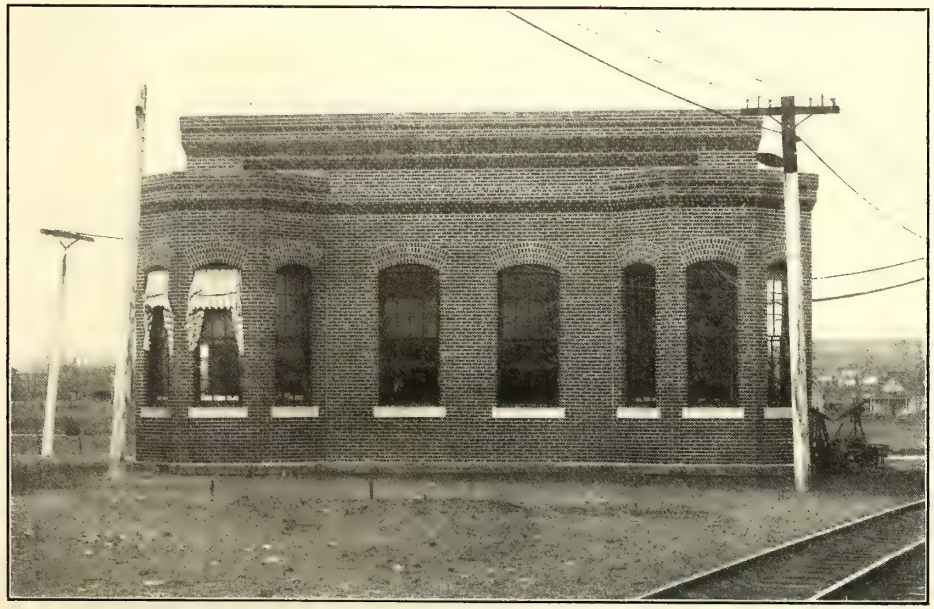
Denver City Tramway—Argo Substation



Denver City Tramway—Interior Colfax Substation



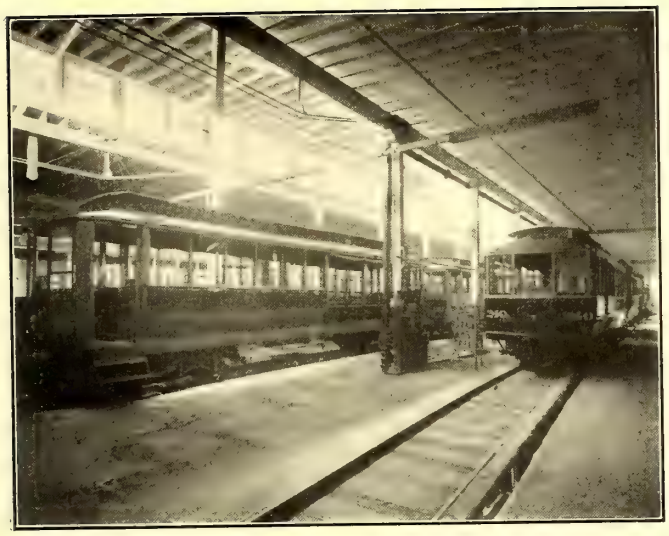
Denver City Tramway—Colfax Substation



Denver City Tramway—Clear Creek Substation



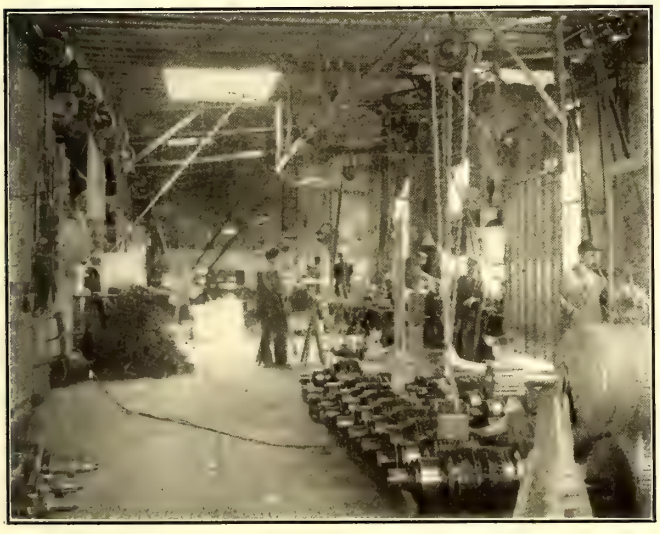
Denver City Tramway—Leyden Coal Mines



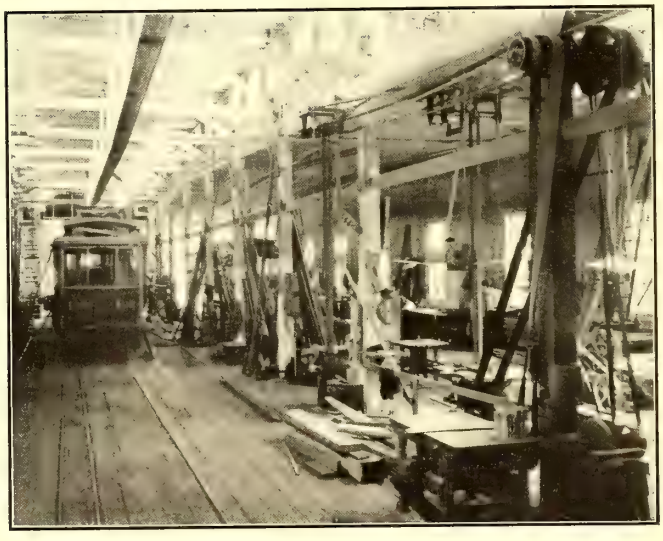
Denver City Tramway—Paint Shop



Denver City Tramway—Jacking-up Shop



Denver City Tramway—Armature Shop



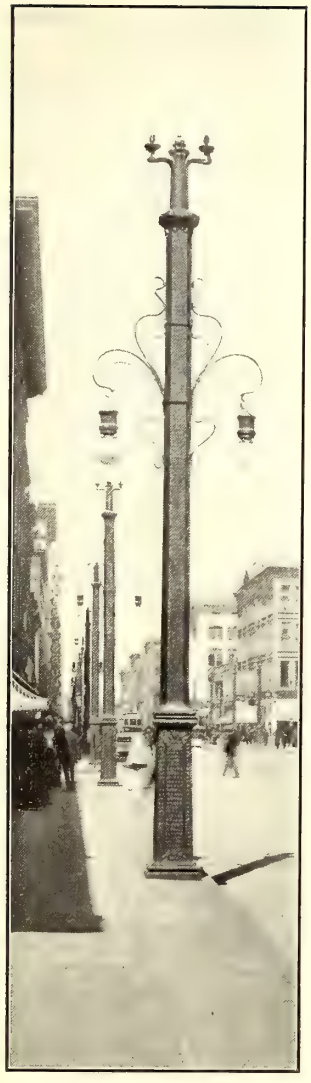
Denver City Tramway—Carpenter Shop



Denver City Tramway—Broadway Stock Room

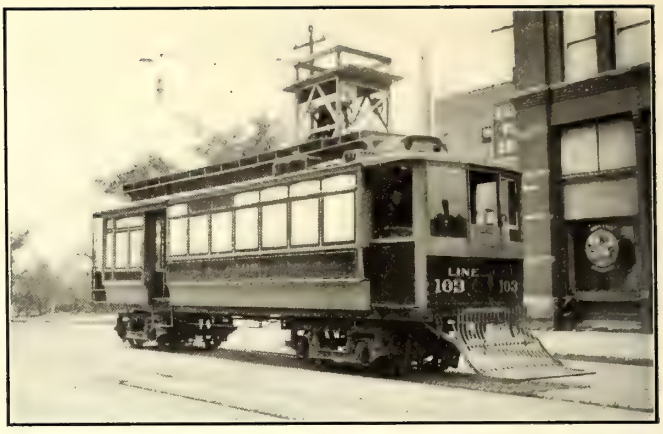


Denver City Tramway—Blacksmith Shop





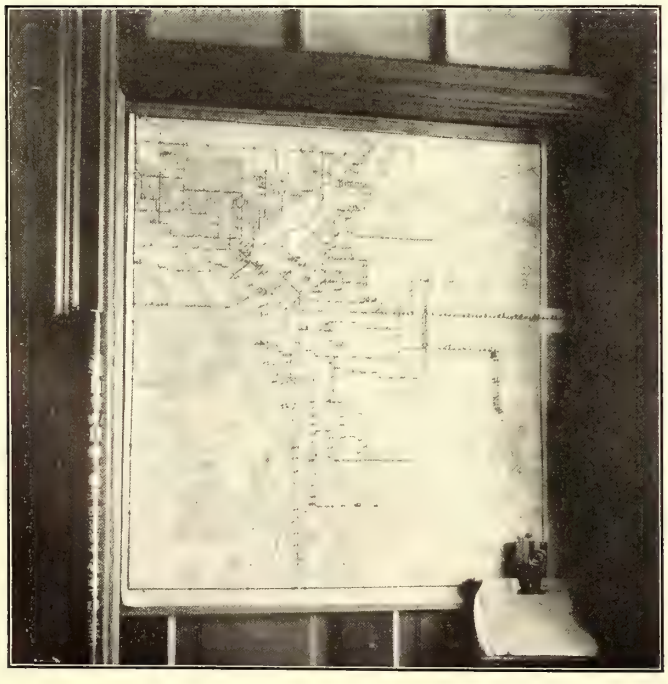
Denver City Tramway—Ornamental Trolley Poles



Denver City Tramway—Exterior of Line Car



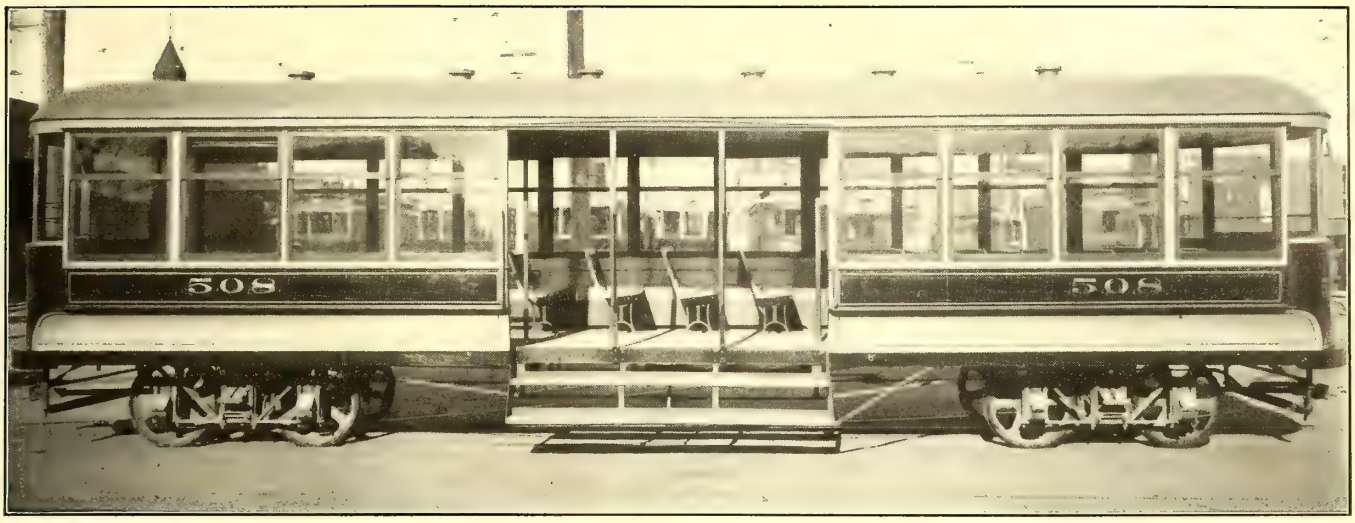
Denver City Tramway—Interior of Line Car



Denver City Tramway—Lightning Map



Denver City Tramway—Boiler Plant



Denver City Tramway—Standard Type 13,000-lb. Trailer



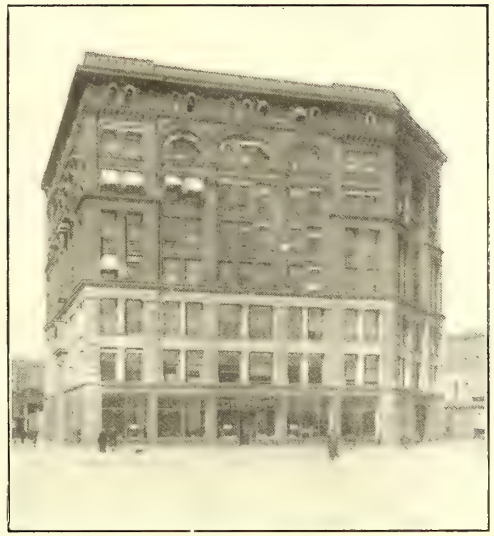
Denver City Tramway—Latest Type Side-Entrance Motor Car



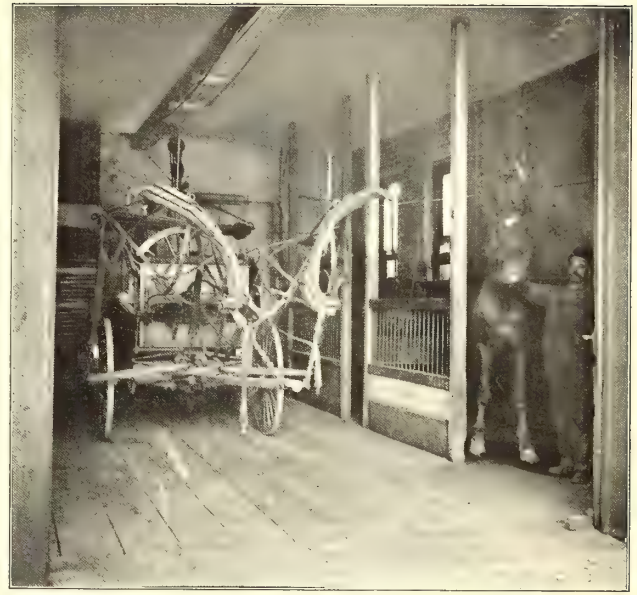
Denver City Tramway—Coal Train and Motor Car on Denver & Northwestern Division



Interior of Wreck Car



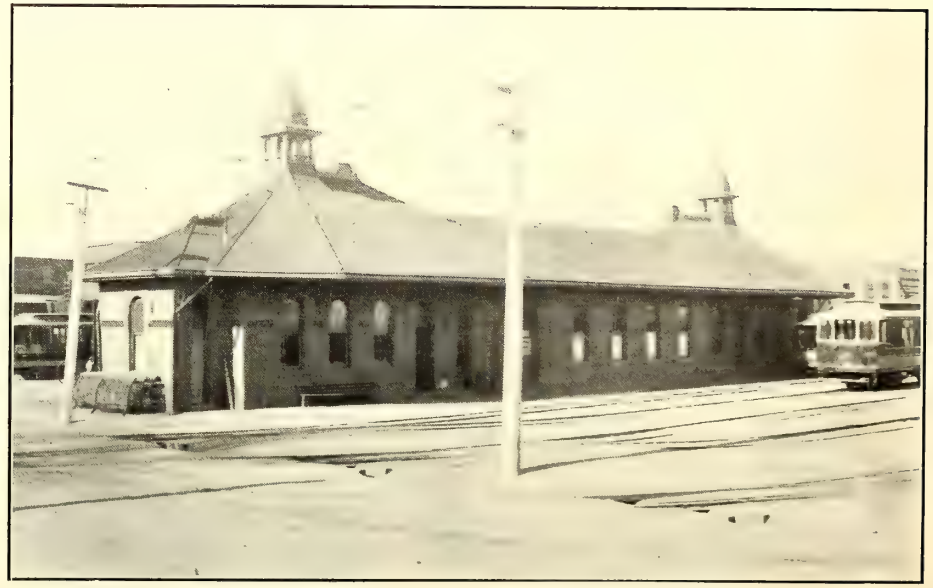
Majestic Office Building



Emergency Wreck Wagon Stable



Denver City Tramway—Central Terminal Loop



Denver City Tramway—South Broadway Trainmen's Quarters

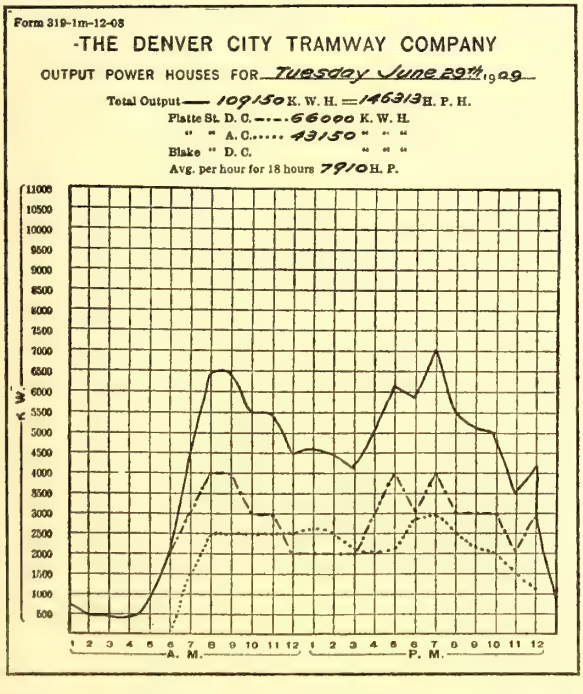
boxes serve ordinarily only as reserves. The line department has duplicate keys for the boxes, so that the renewal man on his regular trips can take out the poor lamps and replace them with good ones. As the racks in the boxes are kept full at all times it is easy to account for the total number of lamps.

In addition to the general reports of work done and material used by the department, two forms, the headings of which are shown, are used to indicate the "lamps used to-day on car repairs," and the "lamps used in buildings, pole clusters and signals."

POWER GENERATION

Power for the operation of the entire tramway system is generated in a large station located on the Platte River just north of the business district of the city. The station building is an attractive fireproof structure of brick and steel. Its location on the bank of the river and close to both steam and electric lines assures low costs for obtaining fuel and condensing water. The power station building is rectangular in plan, with a fire wall separating the interior into a boiler and an engine room. A switching house for handling the alternating current transmitted to substations is located about 30 ft. east of the engine-room side of the main station and opposite the switchboard. This power plant is of particular interest because it contains both a.c. and d.c. generating equipment operated by reciprocating engines and also steam turbines. The total capacity of the station is 7,500 kw, of which 3,500 kw are delivered to outlying substations; the remainder is fed direct to the d.c. distribution system.

It is proposed in the near future to extend the station building for the accommodation of two 2,000-kw a.c. generators to be driven either by steam turbines or vertical engines. This increase in engine capacity will call for the installation



Denver City Tramway—Curves Showing A.C. and D.C. Output of Power Station

of seven additional 850-hp boilers and additional condensing plant. In order to maintain a continuous and ample supply of condensing water it also is planned to build a concrete reservoir of 10,000,000 gal. capacity to be located at an elevation near the plant so that the water will flow by gravity to the condensers. Two 20-in. motor-driven centrifugal pumps will be used to lift the water from the river to the storage reservoir. Preliminary drawings are now being made for these improvements.

The Denver City Tramway Company and a number of capitalists interested in that company own and operate a coal mine at Leyden located on the Denver & Northwestern division of the electric railway system. Coal from this mine is handled in trains drawn by locomotives. An engraving of the elevating and loading machinery above the mine is presented on Plate IV. It is interesting to note that from the time the miners shovel the coal into the cars far below ground until it reaches the grates in the power plant the coal is handled entirely by mechanical means. The surplus output of coal from this mine which is not required at the power plant, is sold by the mining company from its yards located on the Denver City Tramway tracks in the northwestern portion of the city. The product of the mine is lignite slack, which costs $1.40 per ton delivered. With the boiler-house equipment, which includes mechanical draft, this is found to be a satisfactory fuel.

As received at the power plant in the special Denver & Northwestern coal cars, the fuel is dumped into the receiving hopper of a McCaslin conveyor which elevates and distributes it into a series of plate-steel bunkers having a total storage capacity of 1,100 tons. From these bunkers the coal is fed by gravity to Stirling chain grates. The ashes fall into hoppers built as a part of the boiler settings from which they are carried by the conveying system to cars on the siding at the south end of the building. The boiler plant includes thirteen 500-hp Stirling boilers with internal superheaters. Steam is delivered to the engines at 170 lb. pressure and 75 deg. of superheat. The exhaust gases from the furnaces pass to a large breeching which leads them to four stacks, three of which are equipped for mechanical draft. The engine and generating equipment, a view of which is presented on Plate III, includes the following units:

Three Green-Wheelock engines direct connected to G.E. 800-kw 570-volt d.c. generators.

One Allis-Chalmers cross-compound Corliss engine direct-connected to a G.E. 1,600-kw 570-volt railway generator.

One Allis-Chalmers cross-compound Corliss engine direct-connected to a G.E. 1,500-kw 2,300-volt 25-cycle a.c. generator.

One Westinghouse-Parsons 2000-kw 13,200-volt 25-cycle a.c. turbo-generator with Worthington surface condenser.

The Corliss engine units are equipped with individual jet condensers. The alternating current generated in the 2,300-volt machine is fed to a transformer bank in the nearby switching station and stepped up to 13,200 volts, so that this unit may operate in parallel with the turbine-driven generator for feeding the outlying substations.

Distribution is made to four substations over aerial lines having a total length of about 16 miles. Where these lines emerge from the switching house at the generating station they are protected from lightning by electrolytic arresters, of the aluminum cell type. These arresters operate very satisfactorily and have greatly reduced the amount of lightning trouble formerly experienced. Similar arresters are installed at substation entrances. It has been noted in connection with the excellent service rendered by these arresters in this climate subject to severe electrical storms, that sometimes the arresters will begin to discharge fully 30 minutes before an impending storm is noticed outside.

The d.c. railway feeders of which there are 35 controlled from the main power station switchboard, are also equipped with aluminum cell lightning arresters. At the present time these feeder lines are carried from the switchboard to the street in a concrete-lined tunnel 5 ft. x 6 ft. in cross section and about 300 ft. long. The return circuit using bonded scrap rails, also is placed in this tunnel. Plans

are now being made for mounting the outgoing d.c. feeders on specially constructed steel towers, so that the concrete tunnel may be used as a discharge conduit for the barometric condensers which will serve the proposed 6,000-kw generating capacity soon to be installed.

The chart on page 497 is reproduced from a blueprint plan of the d.c. feeder system. One of these charts is posted in each of the company's generating and converting stations and shows the arrangement of the d.c. feeders and tie lines for supplying current to the various sections of the trolley network.

NEGATIVE RETURNS

An interesting bonding installation has been completed recently in the neighborhood of the main generating station with a view to minimizing the electrolytic action on neighboring waterpipes. Formerly the railway company received considerable criticism on account of the corrosion of pipes in this district, but since the installation of special negative returns the reason for criticism does not exist. The former sources of trouble were two 14-in. pipes each about 800 ft. from the station and one 16-in. pipe about 1,600 ft. from the station. From each of the pipes a 500,000-circ. mil cable has been run to connect with the negative bus within the station. An ammeter is permanently connected in each circuit at the station so that the amount of current collected from the pipes may be observed. In this connection it is noted that a nearly constant ratio exists between the station load and the current returning to the negative bus by way of the special cables connected with the water pipes. When the total d.c. output of the station is 4,000 kw the ammeter in the negative return from the 16-in. pipe, 1,600 ft. away, reads 175 amp. The station operators are familiar with the ratio between the current returning on these auxiliary negative leads and the station output, and therefore can readily note any disturbance in the negative circuit.

The connections between these large water pipes and the auxiliary negative cables were made by using large copper bands under which were compressed quantities of Brown's plastic alloy. Before placing the bands and the alloy the pipes were filed and the surfaces of both pipes and copper bands amalgamated with the alloy.

POWER RECORDS

As a means for preserving a record of the power station performance and for observing load conditions the chief engineer of the plant each day prepares three power-house reports. One of these, for the boiler plant, as illustrated, exhibits the condition of the draft on the various fires, the detail repair work done and the cleaning work done on each boiler; the temperatures in the economizers, the running time of the fan engines, the amount of coal received, amount of ash shipped and the time the conveying system was used, together with a report of the condition of the auxiliary engines and pumps in the boiler room and a miscellaneous report of repair work, etc., done during the day. The second report, for the engine room, exhibits hourly kilowatt readings, both a.c. and d.c., the period of operation of the engines, and similar details regarding condensers, vacuum, etc. The third report is an exhibit of the findings of the generator and motor inspector and a report of the work which has been done. Each day a curve is plotted showing the output of the power house, both a.c. and d.c. Copies of these curves are forwarded to the general manager daily.

Alternating current for the operation of outlying substa-

Form 406--1M--1-08--40P

ENGINE ROOM

THE DENVER CITY TRAMWAY CO. DENVER, June 29 1909

POWER HOUSE REPORT

TIME	D. C. KILOWATTS	A.C. KILOWATTS NO. 5	A. C. KILOWATTS NO. 6
Midnight	9916100	107493	9458500
6 A.M.	7400		
7 A.M.	7700		9460000
7:30 A.M.	7900		1250
8 A.M.	8100		2500
8:30 A.M.	8300		4000
9 A.M.	8500		5000
10 A.M.	8800		7500
11 A.M.	9100		9470000
12 M.	9300		2500
1 P.M.	9500		4250
2 P.M.	9700		5750
3 P.M.	9900		9480000
4 P.M.	9920200		2250
4:30 P.M.	400		3500
5 P.M.	600	107507	4250
5:30 P.M.	700	107519	9483000
6 P.M.	0900	107519	9486000
6:30 P.M.	1100	107526	9487000
7 P.M.	1300	107532	9487750
8 P.M.	1600	1,400	9490250
9 P.M.	1900		9492500
10 P.M.	2200		9494500
11 P.M.	2400		9496000
12 P.M.	9922700		9497250
	66900		38750

	ENGINES CUT IN AND OUT — EXACT TIME			
NO. 1	IN 2.00 P M.	OUT 9.00 A M.	IN M.	OUT M.
	IN 6.30 A M.	OUT 9. P M.	IN M.	OUT M.
NO. 2	IN M.	OUT 12.20 A M.	IN M.	OUT M.
	IN 6 — A M.	OUT M.	IN M.	OUT M.
NO. 3	IN M.	OUT 5.35 A M.	IN M.	OUT M.
	IN 11.30 P M.	OUT M.	IN M.	OUT M.
NO. 4	IN M.	OUT 7.15 A M.	IN M.	OUT M.
	IN 5.35 A M.	OUT M.	IN M.	OUT M.
NO. 5	IN 4.40 P M.	OUT 7 — P M.	IN M.	OUT M.
	IN M.	OUT M.	IN M.	OUT M.
NO. 6	IN 6.10 A M.	OUT 12 — P M.	IN M.	OUT M.
	IN M.	OUT M.	IN M.	OUT M.
Air Compressor	IN M.	OUT 5.45 — A M.	IN 7.15 A M.	OUT M.
	IN M.	OUT M.	IN M.	OUT M.

CONDENSERS		VACUUM				
Descr.	WORK DONE ON, ETC.	8 A.M.	12 M.	4 P.M.	6 P.M.	11 P.M.
NOS. 1 & 2		22	22	22	22	22
NO. 3						
NO. 4	Cleaned	20	20	20	20	20
NO. 5					22	
NO. 6	Cleaned	22	22	22	22	22

BREAKERS OUT					
TIME	CIRCUIT	CAUSE	TIME	CIRCUIT	CAUSE
1.30 A	4 - A.M. Wire	In 4.30 down	A.M.		

WORK DONE ON — REPAIRS ETC.	
Steam Piping	
Steam Separators	
Autom. Engine Stops	
Auxiliaries	
Air Compressors	

TEMPERATURE OF CONDENSER DISCHARGE	8 A.M.	12 M.	4 P.M.	8 P.M.	11 P.M.
Nos. 1 & 2 Jet					
No. 3 Jet					
No. 4 Jet				90	80
No 5 Jet				88	88
No. 6 Surface				100	96
INTAKE					

CYLINDER OIL USED ON			
NO. 1	2-1 QTS.	NO. 4	12- 9
NO. 2	5 3	NO. 5	3 - 1
NO. 3	2 -	Auxil's	3 - 5
ENGINE OIL IN TANKS			
ENGINE OIL ADDED TO TANKS			
TURBINE OIL PUT IN NO. 6			

REPORT ANY EQUIPMENT NOT IN PERFECT CONDITION, ALSO ALL WORK DONE ON EQUIPMENT.

Rep Sump Pump 9 Hrs E. N. Dexter

APPROVED: D. B. Wilson, Superintendent of Power

SIGNED: E. L. Dean, DAY ENGINEER. E. L. Ingraham, NIGHT ENGINEER.

Denver City Tramway—Daily Power Station Engine Room Report (Original 11 3/8 in. x 9 3/8 in.)

tions is transmitted at 13,200 volts on overhead three-phase transmission lines with both one and two circuits of No. 2 weatherproof wire per pole. There are four substations located as shown on the accompanying map. Two of them contain three 500-kw rotaries and two contain two 500-kw rotaries each. The interior arrangement of the substations conforms to a standard plan in so far as the location of the more important pieces of apparatus is concerned. The exteriors of the buildings are not of uniform design, but the architectural treatment of each has been adapted to the particular location in which the substation is built. Illustrations of the Argo substation, Colfax substation and Clear Creek substation exteriors are presented on Plate IV. The Argo substation is located in a sparsely populated district and therefore is not ornamental. The Colfax substation is located in a high-class residence district and is built with an attractive exterior. The Clear Creek substation is located at the junction of two diverging suburban lines. A detailed description of the East Colfax substation was presented in the ELECTRIC RAILWAY REVIEW for December, 1906, page 991. In the design of this and the other substations of the Denver City Tramway it has been the aim to have buildings and installations of machinery which will afford the greatest reliability of service; therefore, the enclosing structures are made of non-combustible materials and the apparatus is so arranged that an accident to one section will not necessarily incapacitate the others. An accompanying engraving is a reproduction of a daily substation report as made out for the information of the chief electrician of the company.

ROLLING STOCK EQUIPMENT

The rolling stock equipment of the Denver City Tramway Company is of special interest for two equally important reasons. First, the management and mechanical department have designed and had constructed types of equipment which are especially low in weight, but which have shown a low maintenance cost record. Second, the management and transportation department have developed methods for successfully operating a type of light trailer much appreciated by the riding public and effecting a considerable saving in operating cost. The detail methods of trailer operation will be described under the section devoted to the transportation department.

The equipment available for use includes the following cars: Sixty-four four-motor passenger, 215 two-motor passenger, 44 standard passenger trailers, 18 open passenger trailers, 62 miscellaneous utility cars and 106 freight cars, including motors, dump cars and gondolas used in handling coal. Illustrations are presented on Plate VII showing the more recent types of cars.

1909 TYPE CAR

During the present summer the Woeber Carriage Company of Denver has built 25 car bodies, which represent the latest type of two-motor equipment used in Denver. These cars are similar in general design to the larger part of the com-

BOILER ROOM — **THE DENVER CITY TRAMWAY CO.** — **POWER HOUSE REPORTS** — DENVER *June 29* 19 *9*

BOILER	DRAETS 8 A.M.	12 M.	6 P.M.	11 P.M.	CONDITION OF WORK DONE ON REPAIRING, RENEWAL, CLEANING, SEALING, ETC. BRICKWORK	STOKERS	GRATES	DRUMS	TUBES	SUPERHEATERS
1	*60*									
2	*55*									
3	*50*									
13	*33*									

TEMPERATURES OF	8 A.M.	12 M.	6 P.M.	11 P.M.
Steam Main Header				
Economizer Intake	*250*	*270*		
Economizer Discharge				
Flue Gases	*425*	*410*		

FAN ENGINES NO.	CUT IN	CUT OUT	CUT IN	CUT OUT	CUT IN	CUT OUT
1					*3.45pm*	*8.35pm*
2			*7.00am*	*8.10am*	*3.30pm*	*8.45pm*
3					*4.45pm*	*6.30pm*

ECONOMIZERS—CONDITION, REPAIRS, CLEANED: SET | TUBES | DUST BOX

COAL: Tons on Hand *478* | Rec'd Slack | M.R. | Ash Shipped *2 cans*

CONDITION, REPAIRS, OVERHAULING, ETC.,		CONDITION, REPAIRS, ETC.,	Time Operated	CONDITION, REPAIRS, ETC.	Time Operated
Fan Engine No.1		Coal Conveyor Long	*13*	Stoker Engine	
Fan Engine No.2		Coal Conveyor Short	*7*	House Pump 1	
Fan Engine No.3		Ash Conveyor	*6*	House Pump 2	
Fan No.1		Coal Crusher Large		House Pump 3	
Fan No.2		Coal Crusher Small		Sump Pump	
Fan No.3		Boiler Pump No.1		Tunnel Pump	
Flues		Boiler Pump No.2		Tank Pump	
Main Steam Header		Boiler Pump No.3			
Steam Piping		Boiler Pump No.4			
Steam Valves		Dampers		NO. GAUGE GLASSES BROKEN	*1*

REPORT IN DETAIL- ALL REPAIRING, CLEANING, BLOWING OFF, OVERHAULING, ETC., DONE DURING DAY:

REPORT HOUR AND CAUSE IF STEAM PRESSURE FALLS BELOW 165 LB. GAUGE:

Boilers blown out 4.00 am water columns blown out 8.00 am
Surface blow off blown out 11.00 pm to 1.30 am
Blow off pipe on No.2 boiler repaired boiler cut in
Owl run with No.5 boiler No. of boilers in 12

APPROVED *D. W. Nelson* Supt. of Power — FOREMEN *H. West* SHIFT NO.1 / SHIFT NO.2 / SHIFT NO.3

Denver City Tramway—Daily Power Station Boiler Room Report (Original 11 3/8 in. x 9 3/8 in.)

pany's motor equipments, but they include many refinements and new improvements in minor detail. The general dimensions of the equipments follow:

	Ft.	In.
Length over bumpers	43	10
Length over vestibules	42	10
Length over end bulkheads	34	11½
Width over sills on panels	7	10
Width over belt rail	8	4
Width over water table	8	8
Height from rail to bottom sill		31
Height from rail to top of roof	11	8
Height from bottom of sill to top of roof	9	1
Height from floor to ceiling	7	11½
Height from rail to highest point on trolley base	13	2
Truck centers	24	
End overhang (front and rear the same)	9	11

Accompanying line engravings illustrate the underframe construction, brake and truck arrangement and seating plan of this type of car. A characteristic feature is the center side entrance having an opening the width of two panels, 4 ft.

11 3/4-in., with a dividing post in the middle of the entrance and three grabhandles. These handles, in connection with the 1 3/4-in. round hickory stanchion held securely in place in front of the first seat near the entrance, greatly facilitate loading and unloading. The arrangement of center entrance, with the side sill offset 7 in., affords comparatively low steps.

THE DENVER CITY TRAMWAY CO.
ELECTRICIAN'S DAILY REPORT

Sub-Station at East Colfax — 6—29—1909

Starting Rotary, No. 1, 6. A.M.
" " " 2, 6. "
" " " 3, 6.20 "
Shut Down " " 1, 12.15 P.M.
" " " 2, 12.15 "
" " " 3, 12.15 "
Fans and Motors, Condition of, O.K.

Breakers Out, Time and Cause, D. C. and A. C., None

	476,220	954,350	769,290
Condition of Breakers, O.K.	472,860	950,980	766,010
" " Switches, "	3,360	3,370	3,280
" " Instruments, "			10,010 K.W.H.

Output, Average Ampere from 4 to 7 o'clock p. m., 1060
" Maximum Ampere from 4 to 7 o'clock p. m., 1800
" Average D.C. Voltage from 4 to 7 o'clock p. m., 570

Lightning Arresters, Condition of, O.K.

Number of Discharges, and on What Line. None

General Remarks:

Signed: Geiter
Day Man.
Signed: Dickey
Night Man.

Electric Ry. Journal

Denver City Tramway—Form of Daily Substation Report

At the main entrance there is a depression of 4 3/8 in. in the floor and the depressed portion is but 38 in. above the top of the rail. This rise is divided as follows:

Rail to top of first step, 14 in.
First step to top of second step, 12 in.
Second step to top of floor at entrance, 12 in.

The floor at this entrance point is covered with a 5/8-in. thickness of flexolith composition carried on 13/16-in. tongue and grooved flooring. As this floor receives the most severe wear it is desired by the use of this composition to obtain a life longer than that which might be had by the use of wood. Whenever the floor becomes unduly worn the composition can easily be repaired or replaced.

The new cars have a seating capacity for 52 passengers and weigh, completely equipped, 35,350 lb., thus showing a dead weight of a little less than 680 lb. per passenger for a two-motor car with a total of 130-hp and a length of 43 ft. 10 in. over all. The general details of the equipment include the following:

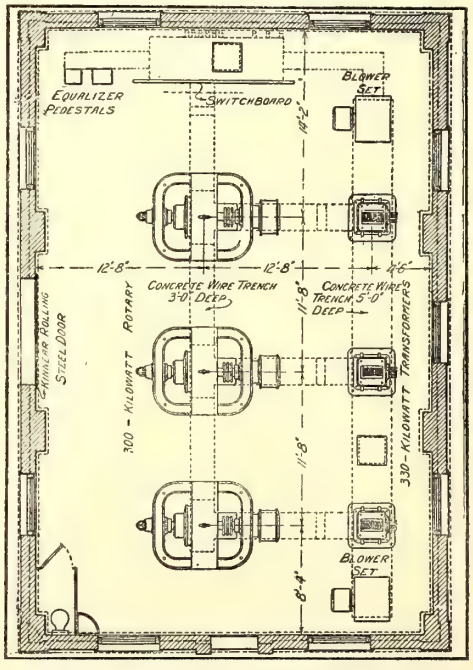
Two GE 218 65-hp interpole motors mounted on axles No. 2 and No. 3; two K-36 controllers; Brill 27 GE 1 trucks with 4-ft. 6-in. wheel base and 33-in. 500-lb. Griffin Wheel Company cast-chilled wheels; two Nichols-Lintern air sand traps mounted respectively over No. 1 wheel on the right side and No. 3 wheel on the left side; two Tomlinson couplers, type A, form 2, with spring carrier; Crouse-Hinds, type W, stationary headlight, with 32-cp incandescent lamps; Ohmer fare register and Automotoneers.

The cars are lighted by 14 16-cp lamps, hanging vertically from the ceiling in the center of the car, and four lamps used to illuminate the car steps.

ROLLING STOCK FEATURES

In 1907 30 new two-motor cars, each seating 48 passengers and weighing complete 29,000 lb., were put into service. These cars have the general design of those built during the present year, but are somewhat lighter on account of differences in the length and in the electrical and other equipment. The heaviest cars used on the system are those operating between Denver and Golden and Leyden, the termini of the Denver & Northwestern Railway. These cars are 43 ft. long and are equipped with four Westinghouse 101 F motors, mounted on 5-in. axles, carrying 33-in. rolled-steel wheels.

In connection with the problem of reducing car weights as carried out by the Denver City Tramway Company, it is not thought that the design of these cars is less substantial than that of many cars of like capacity which weigh much more. With low weight, if the design provides for reasonably low maintenance, the advantages are obvious. The extreme lightness of these cars has not been obtained by sacrificing a good factor of safety for any important structural members, but rather by carefully trimming all useless materials until there remains a mechanical structure of accepted design suitable for carrying the desired number of passengers with the lowest possible dead weight per passenger. The value of a center side entrance for cars used in city service is quite generally recognized. With the steps at the center of the car the conductor is never more than one-half the car length from the entering and leaving passengers and he is at this extreme distance only momentarily. Also, with the center entrance the load divides, part taking seats in each half of the car. In unloading the movement of the passengers is the opposite, and thus it is seen that the passengers at the extreme ends of the car are but one-half a car length from the door, which they can reach quickly. During operation the conductor's



Denver City Tramway—Floor Plan, Colfax Substation

position is close to the door where he can carefully observe all movement within the car and watch the progress of loading and unloading.

An important feature in the handling of traffic in these center side entrance cars is the placing of lamps and reflectors directly over the top step. The lamps are recessed in pockets in the deck rail. On account of the curved shape of the

reflectors these lamps illuminate the steps of the car and the street for a considerable distance away from the car, this feature being of particular value in the outlying portions of the city where the streets may be muddy and not well illuminated.

In connection with the use of step lights the company is considering the adoption of a device for cutting in and out the lamps as a car stops and starts. Such a device manufactured by the Automatic Signal Light Company, of Colorado Springs, is now being tested at Denver. The device is arranged to make and break the circuit which feeds the step lights so that the lamps will burn when the car is slowed down to about 4 miles per hour and remain burning during the stop, to be cut out when the car has again reached a speed of 4 miles an hour. All of the Denver cars are equipped with motormen's mirrors and the motormen state that with the automatically operated light the sudden reflection on the mirror forcibly attracts their attention, causing them to be more vigilant in watching the steps.

TRAIL CARS

A few years ago 44 trail cars, which exhibit an especially interesting type of construction, were put into service. The standard trail car is 38 ft. long over all and 8 ft 2 in. wide. The center entrance has a width of three window sashes, 8 ft. 2 in. in all. This extra width over that of the motor car entrance was given the trailer entrance with a view to facilitating the loading so that when stops were made passengers on the trail car would not delay the starting of the train. The car roof is built without the use of a monitor and considerable weight is thus saved. The seating capacity of this standard type of trailer is 46 passengers, and when equipped with hand brakes and Westinghouse schedule S M E air brakes, the car complete weighs but 13,000 lb.

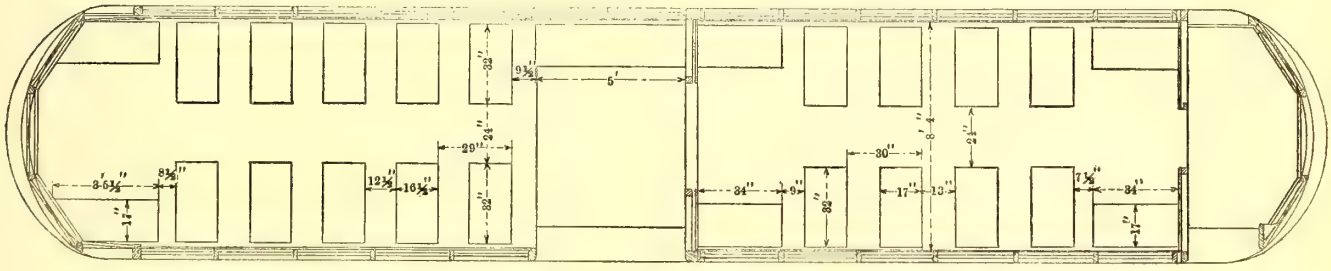
Some of the car bodies operated in Denver are mounted on a truck of entirely new design, evolved in the engineering department of the Tramway Company. The principal members of this truck are built of channel sections and the arrangement of parts conforms in general to the M. C. B. type of truck. The design has been carefully worked out with a view to obtaining minimum weight consistent with the necessary strength to support the motors and the car bodies. This type of truck has a wheel base of 4 ft. 10 in. and the cast-iron wheels used are 33 in. in diameter and weigh 475 lb. each. The driver axles are 4 1/2 in. and the idler axles are 4 in. in diameter. Without motors two trucks complete with wheels and fittings ready to run weigh 9400 lb.

With the exception of the 19 short, two-motor cars of Brill manufacture, operating on the Union Depot loop, all the cars in Denver are single-ended. Controllers and hand-brake handles, however, are placed on the rear end for emergency and switching use.

The special equipment operated by the company includes a double-end wrecking car, two "chartered" cars and a hearse car. The wrecking car is a substantially built, double-end, 35-ft. equipment, with four GE 58 motors and Brill trucks. This car weighs 18 tons without its load of emergency materials and appliances. It is provided with four push-pole pockets and a heavy underframing so that it may be used for wrecking purposes. Entrance to the body, which is undivided, may be had through two large sliding doors. The window sashes are filled with sheet steel, except at the vestibule ends. Inside of the car body is to be found a very complete equipment of tools, blocking tackle, etc., carefully placed on frames and racks. One end dash is provided with a movable panel so that poles or large timbers may be loaded into the body. The control equipment comprises two K-6 controllers with a specially high resistance so that the car may be operated slowly. Attachments are provided for mounting snowplows on either end, these attachments being designed to provide for the easy raising or lowering of the plows from within the car body. Braking power is had with a Peacock hand brake equipment.

The following tools and equipment are ordinarily carried on this car:

Double blocks with 200 ft. of 2-in. rope, 100 ft. of 2-in. rope, three blocks used for snubbing, 150 ft. of 1½-in. rope for loop to handle upset car or wagon, five No. 19 15-ton Barrett jacks, three No. 18 10-ton Barrett jacks, two small screw jacks, five 25-ft. chains with ⅝-in. links, one 15-ft. chain with ⅝-in. links, one 10-ft. chain with ½-in. links, one 8-ft. chain with ⅜-in. links, 10 grab chains with harps 4 ft. long. The car carries the latest type of replacers, beveled dutch-boards and large home-made dutch boards, also a stock of ties and 30-ft. rails with "stay-rods," 25 tunnel plank and a large quantity of blocking, two push-poles for moving wagons or cars, one wagon wheel with extra bushing in hub to fit any axle, four crowbars, four large chisel-bars, six small chisels, two sledges, three small hammers, one wood saw, one ax, one hack-saw (24 blades), one spike maul and spikes, one wire cutter, three monkey wrenches, two screwdrivers, wire jumpers, extension wire 50 ft. long on wooden pole, used for trolley in case car is beyond the reach of regular trolley pole, one track gage, one extra trolley base, stand and pole with rope, two "pick ups" for broken trolley wire, switch brooms, three shovels, two picks, four different types of king bolts, as well as a variety of other bolts, bolted clamp used for picking up broken iron axles on wagons, one extra cluster of 15 lamps with pole to hang on trolley wire in case of long detainment. Other illumination sources consist of 2-gal. kerosene torches. A "dolly" truck with a temporary track is carried. This is raised or lowered by blocks and small chain.



Denver City Tramway—Seating Plan of 1909 Type Car

An illustration is presented on Plate IX, showing the emergency car truck built at the company's shops and so designed that it can be coupled to the wrecking car and drawn to the scene of an accident and quickly used to replace a broken truck.

SHOP FACILITIES

The shopping and car-house facilities include a main repair shop plant known as the Broadway shops, a paint shop rebuilt from an old car house, and storage car houses at the operating centers of the north, east and west divisions. All car cleaning and inspection work, including light repairs and armature replacements, is carried on at the outlying car houses, but other shop work and all manufacturing of car parts are done at the Broadway shops.

On account of the rapid increase in the rolling stock equipment, necessitated by the growth of the city and the extension of lines to the new suburban districts, the railway company has outgrown its repair shop facilities. The best possible use is being made, however, of the limited quarters, and plans have about been completed for the construction of a modern shop plant to be located in the Argo subdivision north of the business district and within the city limits. The present shop includes many late designs of machine and other tools which can be moved to the new shops. With this equipment the Broadway plant, although crowded, is successfully fulfilling its part of the work by maintaining the company's cars in uniformly good condition.

The shop subdivisions are located in several adjoining buildings and the departments are organized as ordinarily found in railway plants which must maintain in the neighborhood of 400 cars. One bay of the main shop is set apart for truck overhauling work. In this bay are four 3000-lb. and two 1000-lb. air lifts, serving the five tracks. Repair work also is done in the open air over pits also equipped with air hoists.

There are five tracks in the wood shop, with entrances at either end of the bay. The equipment here includes the following tools, group-driven by electric motors:

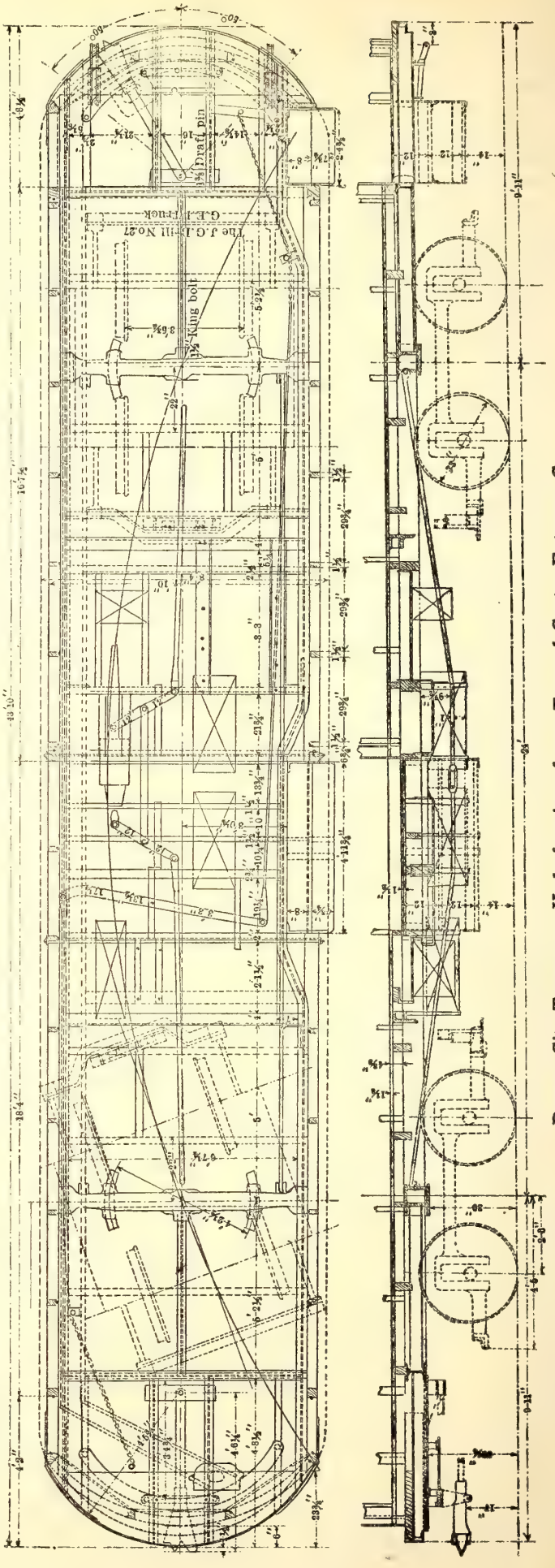
Fay & Egan double surfacer No. 140.
Fay & Egan 16-in. jointer.
Fay & Egan rip saw.
Hall & Brown 36-in. band saw.
Fay & Egan sand drum.
Motor-driven drill press.
Emery grinders.
Wood-turning lathes.
Double spindle shaper.
Mortiser.

The blacksmith shop has an especially modern equipment, including the following:

Williams, White & Company motor-driven double-punch and shear; capacity to shear 1½ x 10 in., capacity to punch 2½ x 1½ in.
2000-lb. Niles steam hammer.
1100-lb. Niles steam hammer.
350-lb. steam-operated hammer with foot-control attachment.
Air-operated bulldozer with 14 x 26-in. cylinder.
Two coke furnaces.
Six forges.

It is the usual practice to purchase old axles from the Pullman Car Company's plant in Denver and use the metal in these to make all forgings needed by the special track work construction shop of the tramway company located nearby. Some of the axles used on the company's cars also are hammered from old Pullman axles. A brass foundry with complete equipment for making all the castings used by the company forms one division of the shops.

The electrical department of the shop is housed in a brick building and has a complete equipment, including a system of overhead trolley hoists for handling electrical repair work. The company does all its own motor repairing and rewinds and manufactures its armature and field coils. Armature coils are wound on four Ford-Oliver winding stands and field coils on either of two American General Engineering Company's field coil stands or one that is homemade. Coils are insulated by submersion in an 18-in. x 24-in. tank filled with insulating compound. This tank has a strong cover so that when the coils are placed therein the shop air pressure of 80 lb. per square inch may be applied to the surface of the liquid, thus serving to impregnate the coils thoroughly. Field coils are baked before and after the application of the insulating compound in a bake oven built of brick standing on the shop floor. This oven is large enough to allow the workmen to walk inside and give the coils close attention. Heat is supplied by car heaters mounted below an iron checker-plate



Denver City Tramway—Underframing of 1909 Type of Center-Entrance Car

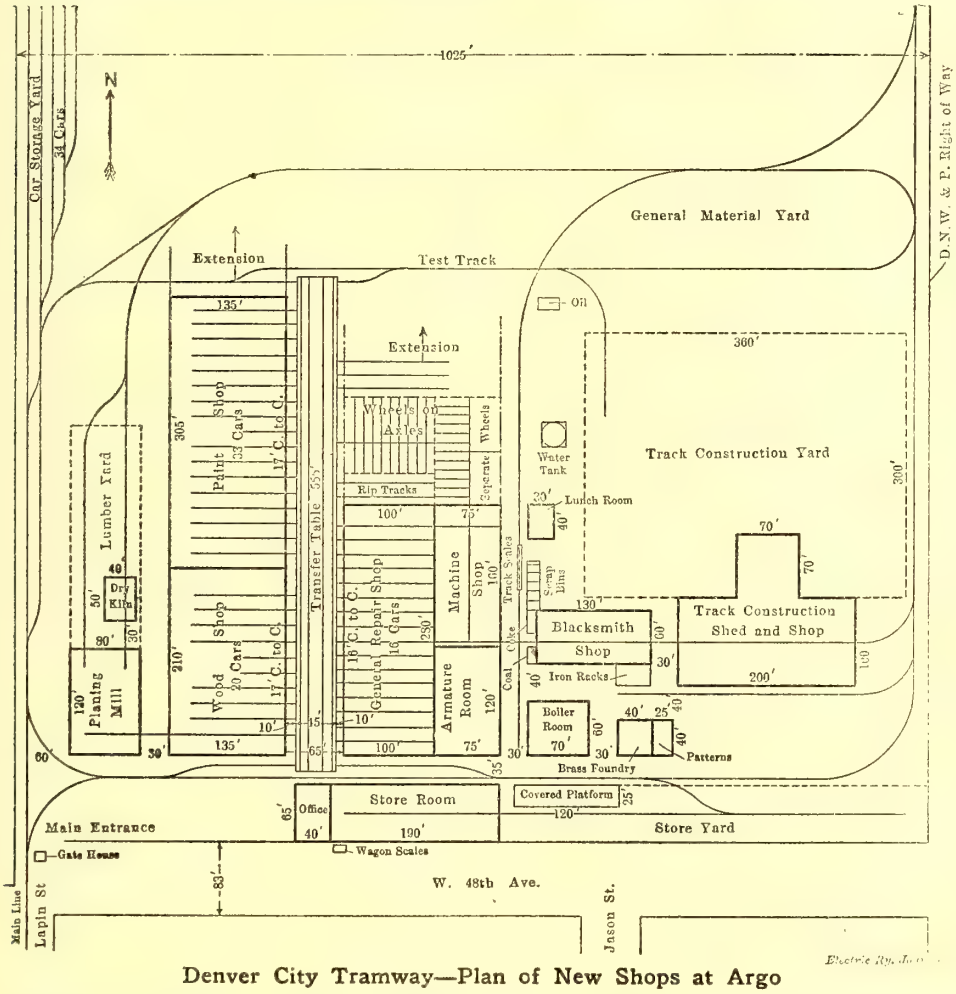
floor and vent pipes are provided to carry off waste gases. A temperature of 175 deg. is maintained within the bake oven. The supply of compound for dipping coils is kept in a tank enclosed in a house built of transite board and angle irons. This house is located outside of the electrical shops. Additional equipment in the electrical shop includes two good lathes on which the commutator and bearing work is done, an American General Engineering Company's banding machine, and a coil taping machine.

STOREKEEPING DEPARTMENT

The five car houses and shops located throughout the city of Denver together with the power houses and track construction work are all supplied with stores from a central stockroom and yard located at the Broadway shops. The method of distributing stock is as follows: On Monday of each week requisitions are made for supplies withdrawn from the small local stocks during the previous week. These requisitions are filled and the materials delivered on Thursday of the same week, the deliveries being made on flat cars pulled by work cars ordinarily used in handling track construction. The supplies needed for special jobs and for keeping complete the stock in the central store room are ordered of the purchasing agent on a requisition blank which includes spaces ruled for indicating quotations made by various supply dealers.

Shipments of supplies received at the stock room are acknowledged by a "goods received" slip made out in triplicate, the storekeeper's office retaining one copy, the delivery man a second and the third being kept in a book as a stub for reference. A record of all materials thus received is kept in a book 22 1/2 in. x 18 in. ruled to indicate the source of supply and to automatically distribute the cost in accord with the shop accounting system. A very complete description of the accounting methods of the storekeeping department was presented in the ELECTRIC RAILWAY REVIEW for Jan. 12, 1907, page 40. This system is such that each month an intelligent statement of all the business done by the storekeeping department can be rendered by it to the auditor. The statement makes available the stores accounts, distributed as to operating expense, construction expense, balance on hand, etc. When the information thus exhibited is checked by the auditor the storekeeping department balances its ledger in which all materials received are debited to the material and stores account and all disbursements are credited to the same account, the balance thus showing the stock on hand. A special book is kept for recording the material used for and costs of articles manufactured in the company's shops. By carefully entering up the items of material and labor in this book the net costs are obtained for goods returnable to the store room stock.

For several years past the expense of maintaining the storekeeping department, including the costs of the office work and the handling and care of the materials, has averaged about 1 per cent of the total value of the materials handled by the department. During the past 10 years it is said that the semi-annual inventories have each balanced within $200 of the correct amount as shown on the auditor's books, and three such inventories have shown such a slight variation that no adjustment was necessary in the auditor's office.



Denver City Tramway—Plan of New Shops at Argo

The Denver City Tramway has in daily operation 242 regularly scheduled cars and also operates 28 trippers, hourly interurban cars to Leyden and Golden, two sightseeing cars and a funeral train. The immediate control of the operation of all cars is centralized at a loop station located in the heart of the business district of Denver. On the property adjoining this station are buildings containing the offices of the superintendent of transportation and his assistants, the train dispatching office, headquarters of the overhead line department, emergency houses, lost and found department, and the transfer issuing and receiving stations. The careful detail with which this system of operating practically all cars through a "central loop" has been developed is especially worthy of the consideration of those not acquainted with the excellence of Denver's electric railway service. The headway through this station is 15 seconds.

The facilities at the central loop include a long ornamental shelter shed with loading tracks on either side. Each of these tracks branches two ways at each end and switches also lead to side tracks so that disabled cars may quickly be shunted over an emergency repair pit and the headway not be disturbed.

DISPATCHING

During the past 17 years a system of dispatching street cars by telephone from the central station has been successfully followed out in Denver. On account of the arrangement of central-loop tracks and nearby through tracks in the business center of the city the lines of the Denver City Tramway Company are particularly well adapted to being handled by a dispatcher, with his office located at the central loop. The telephone dispatching system affords the superintendent the greatest facility for keeping in touch with every detail of the operation of the cars. Should an accident occur the particulars are communicated at once to the dispatcher and no time is lost in summoning the necessary officials, city ambulance or wrecking crew. In case a car should become disabled the crew can immediately notify the dispatcher and ascertain means for obtaining the quickest remedy. The flexibility of the car service and the rapidity with which it enables the dispatcher to adjust the headway on any line are the strongest points in favor of this telephone system. In every city the condition of travel demands the addition of extra cars on most lines at certain periods of the day, usually in the morning and late afternoons. By means of the telephone system the dispatcher can so space his cars that trippers can be put out without confusion and at night when the extras are withdrawn the dispatcher again can equalize the spaces between cars as fast as the trippers go to the depots. Any congestion of cars caused by accident or blockade also may be adjusted without difficulty in the same manner.

The Denver City Tramway has a regular method of "pulling down" the lines at night, but if the dispatcher finds that the travel on any line is such as to demand increased service he may hold the full quota of cars and if necessary use cars which are not needed on other lines. In this way through the agency of but one man, who is enabled to keep fully alive to the needs of the patrons on all lines, the service is reduced to a minimum.

A view of the dispatching station located in the group of buildings at the central loop is shown on Plate XI. The dispatching circuits are operated in the same way as a party line, each circuit having from two to four reporting telephones of different car lines. There are 30 lines in all and care has been taken not to put two busy telephones on the same circuit.

A train sheet 26 x 24 in. in size is used. This sheet is ruled with spaces for the car numbers of all lines and for noting the leaving time of each car from the reporting stations. After a car has been switched at the end of the line the conductor calls the dispatcher from a nearby telephone instrument and tells him the number of his car and the name of the line on which he is running. Aided by his familiarity with the running time and his experience in making quick computations the dispatcher announces without hesitation the proper leaving time of the car. The motorman then repeats this time and receives the dispatcher's O.K. before departing. At the same time the dispatcher records on the train sheet opposite the car number the time of leaving. The running time of all lines and the time allowed for running between given points along the line, are published for the benefit of all trainmen. As soon, therefore, as the motorman receives the leaving time at one terminal from the dispatcher and the conductor, he knows at what time his car is due at the other terminal and just when his car should pass the "time points" along the route.

The records of the train sheet prove valuable in many ways especially when it is necessary to gather information regarding an alleged accident. The train sheets are also valuable for use in the auditing department.

TRAIL CAR OPERATION

The successful operation of trail cars in Denver clearly illustrates that during rush hours there appears a marked advantage as regards freedom from accidents to passengers and employees. This freedom undoubtedly is largely due to the use of a uniform number of car units on the street during the entire day. During the rush-hour period the uniform headway is especially noticeable in contrast with the plan of single-unit operation when the downtown districts of most cities are crowded with single cars running on much shorter headway than exists during the middle part of the day. By using trailers to accommodate the peak traffic with trains on the same headway that exists during the entire day all cars are operated by motormen well acquainted with their work and the usual plan for meets and stops is not interfered with. Again, there is only one train unit (consisting of two cars) to move through a crowded street in contrast with two units, the second one of which frequently is manned by an inexperienced crew. Thus the regularity of headway and the use of experienced crews helps materially to lessen the accident costs. The total accident and claim cost of the Denver City Tramway does not exceed 1.4 per cent of the yearly gross receipts.

The use of trail cars introduces a much desired economy in the original cost of rolling stock and in its maintenance costs when the design of motor and trail cars are satisfactory. In Denver the motor cars seating 52 passengers, cost about $6,000 each and the trail cars, seating 46 passengers, cost $2,000 each. Thus, if the road has a sufficient number of motor cars to fulfill its regularly midday schedules a considerable original investment is avoided by the purchase and use of trail cars so designed that they can be operated behind the regular motor cars. Insurance charges also are lessened, which saving, combined with the reduction in interest charge on idle investment, make a sum worthy of consideration.

It is stated that the Denver trail cars although practically always fully loaded when in operation, and although stored out of doors at other times, cost less than one-tenth as much to maintain as do motor cars. This advantage is largely brought about by the especially low weight of 282.6 lb. per unit seating capacity of the Denver type trailers.

About two years ago the engineering department in Denver made a detailed investigation of the power consumption required for operating certain lines with single motor cars and with motor cars hauling trailers during the rush hours. The approximate load at the switchboard as determined for the three types of cars used in Denver was as follows:

	Kw-hour per car-mile.
Two-motor car, seating 48 passengers	2.0
Four-motor car, seating 52 passengers	3.5
Trailer car, seating 46 passengers	1.25

Accompanying these figures, which were published in the Electric Railway Review for May 4, 1907, was a statement that during a full year the average power consumption per car-day for the entire system, including all cars, was 405 kw-hours. The average consumption for the same period was at the rate of 2.32 kw-hours per car-mile and the cost of current at the power-station switchboard was 0.66 cent per kw-hour. This detailed investigation of power costs extending over a period of 30 days and including readings on a large number of cars, showed that the use of trail cars, for handling double the load carried by motor cars, required but from 27 to 41 per cent additional power. Thus it is seen how effective the use of trail cars may be in reducing the peak load on power generating equipment.

The use of trail cars also reduces the cost for platform ex-

pense. In Denver the average cost for platform employees on a motor car is 50 cents per car-hour. With the addition of a trailer the passenger carrying capacity may be doubled at an increase of but 25 cents per hour.

METHOD OF TRAILER OPERATION

The regular rush-hour schedules require the use of 25 trailers. During the middle of the day these trail cars are stored in trains at the car houses which happen to be situated at about the midpoints on the lines on which trailers are used. Just before the rush-hour period a train of trailers is taken to a siding close to the line on which the motor cars are operated so that when the loads on the motor cars increase and instructions are given, the trail cars can be attached quickly to the motor cars as they pass. This work of coupling has so been systematized that it is found that trail cars can be attached to motors on lines having four-minute service without any derangement of the headway and with no additional time allowance. All motor and trail cars are equipped with Tomlinson radial couplers and Westinghouse schedule S M E air brakes.

The flexibility of this system of trailer operation is further illustrated by the statement that on some of the long city lines the motor cars haul trailers for only a portion of their routes and on one line in particular, through the medium of the telephone dispatching system, the service is adjusted to satisfy the needs of the traffic by using six trail cars in connection with ten motor cars.

SCHOOLROOM

All motormen before being placed on a car are given a course of instruction in a schoolroom located in the group of buildings at the central loop. The course of instruction includes training a man to understand his duties as fully as possible before he is sent out on the road with an instructing motorman. The equipment of the schoolroom includes dummy car fronts with complete control, brake, headlight, cut-out and lighting apparatus. All the important parts of the overhead circuits also are mounted in the room. In the course of his instruction the best methods of avoiding accidents are discussed with the student and he is shown how to use the brakes and sander most effectively and also how to quickly trip the fender. The principle underlying the instruction given in this school is calculated to impress upon the learner the practical workings of the machinery and apparatus under his charge and the necessity for strict economy in its operation. He is made to understand, also, that his first thought must be for the safety and comfort of his passengers and that he must exercise gentlemanly courtesy toward all. After a course in the schoolroom under a competent teacher the man is placed under the guidance of an experienced motorman on a car and he is invited and expected to return to the instruction room for information on any subject which may come to his notice during his working experience.

SPECIAL CARS

A hearse car is operated in connection with one of the motor parlor cars owned by the company. The running time to the city cemetery is about 30 minutes from the loop and the charges made for funeral and special car service are given on the accompanying table.

RATES FOR FUNERAL AND SPECIAL CARS—CITY SYSTEM

Funeral Car—Maximum time for trip, 3 hours, $12.
Funeral Train—Maximum time for trip, 3 hours, $25.
Overtime, $4 per hour.
Special Car—First hour, $6; and $4 per hour thereafter.
For any car run after midnight, minimum price is $10. Waiting time of $2 per hour will be charged for car laying over.
Illuminated Car—First two hours, $12, and $4 per hour thereafter.
Charges are computed from time car is ordered at starting point until surrender at final destination.
To Littleton or vicinity, single car, round trip, $20. Train, $30.
If cars are held awaiting return of party, charge of $2 per hour per car, or $3 per train will be made.
Funeral Car or Train, same as above, except that no waiting time will be charged while party is conducting burial service.

INTERURBAN SYSTEM

	Car.	Train.
Funeral Cars:		
Denver or Leyden, to Olivet	$25	$35
Arvada or Golden, to Olivet	20	30
Golden or Leyden, to Denver	25	35
Arvada, to Denver	20	30
Special Car or Train, Denver to Golden, Leyden or for any 3-hour trip	25	35
Running Time, exceeding 3 hours	4	7
Waiting Time, if time of trip consumed more than 3 hours	2	3

In all cases not enumerated above, the charge for trailer should be 60 per cent of the motor-car charge.

The emergency equipment kept at the central loop includes the wrecking car previously described, a wrecking wagon and a fire wagon.

The wrecking wagon is used in the city for quick calls, such as those resulting from cars off the track or disabled in any way, wagons broken down or stuck on the track. It is equipped with drop harness, making the process of hitching very rapid and easy. The horses stand in stalls facing the pole at all times. The wagon is built very strongly, weighing about 1800 lb. empty and about 4000 lb. when loaded. It has two side boxes for tools, replacers and chains. The center of the wagon box is used for carrying jacks and blocking. A wagon wheel equipped with a false bushing to fit any axle from 1 1/2 in. to 3 3/4 in. in diameter is secured in a pocket on the front end.

The fire wagon is 11 ft. long, 4 ft. 6 in. wide and weighs about 1800 lb. It carries four bridges at all times, six others remaining in reserve at the barn—sufficient equipment to bridge 20 hose lines in case of big fire. The wagon is equipped with quick touch, drop harness. Alarms are transmitted to the company's fire crew by the dispatcher, who gets the signal simultaneously with the fire departments over the city's system.

DENVER TRAMWAY MUTUAL AID ASSOCIATION

The Tramway Mutual Aid Association of Denver was organized through the efforts of the officers of the Denver City Tramway Company and its employees in July, 1903. The object of the association is to provide life insurance and aid the unfortunate employees of the company who are disabled through sickness or accident.

During the first 30 days of the organizing period 411 employees became members of the association without having to pass a physical examination. Since that time the membership has increased to 798. On July 1, 1909, the total insurance carried by the members was $615,375, which amount was fully guaranteed by the Denver City Tramway Company. The company also pays all of the running expenses of the association and annually pays into the disability fund a sum equal to one-fourth of the amount of money collected as dues from the men.

The membership of this association is divided into three classes. The class to which an employee is eligible is regulated by the salary he receives, the only exception to this rule being that relating to trainmen who, at the time of joining the association, may elect the class to which they desire to become members. The following are the classes:

Class 1—This class is made up of employees who receive

a monthly salary of $80 or over. The monthly dues for this class are $1 and in case of disability the members receive a benefit of $6 per week. In case of death $1,000 is paid to the heirs.

Class 2—This class is made up of employees who receive a monthly salary of $60 and less than $80. The monthly dues for this class are 75 cents and in case of disability the members receive a benefit of $4.50 per week. In case of death $750 is paid to the heirs.

Class 3—This class is made up of employees who receive a monthly salary of less than $60. The monthly dues for this class are 50 cents and in case of disability the members receive a benefit of $3 a week. In case of death $500 is paid to the heirs.

The benefits referred to in these three classes are applicable only to employees who become members before they are 41 years of age. Employees who join the association between the ages of 41 years and 51 years are allowed 75 per cent of the death benefit. Members who join after they are 51 years of age are allowed 50 per cent of the death benefits of their class.

Members may double the death benefit by paying double the monthly dues for their class. This, however, does not double their disability benefit.

The annual report of the association issued on June 30, 1909, showed the membership of the three classes and the insurance carried by each class to be as follows:

Class 1—428 members, insurance	$415,750
Class 2— 73 members, insurance	52,875
Class 3—297 members, insurance	146,750
Total, 798 members, insurance	$615,375

The annual statement for the year ending June 30, 1909, shows the association to be in a satisfactory financial condition. The statement follows:

Receipts—		
From members	$7,761.95	
From the Tramway company	1,939.60	
From interest on bond investment	779.17	
		$10,480.72
Disbursements—		
Disability benefits	$2,232.06	
Five death benefits	4,250.00	$6,482.06
Net gain for year		$3,998.66

The *Tramway Bulletin*, a small magazine published by the Denver City Tramway Association, is the official organ of the Tramway Mutual Aid Association.

PENSION DEPARTMENT

The Denver City Tramway Company has an employees' pension department. Any employee who gives his entire time to the service of the company is eligible to a pension. The pensions as provided for are divided into four classes as follows:

1. All officers and employees who shall have attained the age of 70 years, and who shall have been 25 years or more in the service.
2. All officers and employees, 65 to 69 years of age, inclusive, who shall have been 25 or more years in the service, and shall, in the opinion of the board of officers, have become physically disqualified.
3. All present employees of the company who shall attain the age of 70 years, and who shall have been 15 years or more in the service, and shall, in addition, be members in regular standing of The Tramway Mutual Aid Association.
4. All officers and employees 65 to 69 years of age, inclusive, who shall have been 15 years or more in the service, and shall, in addition, be members in regular standing of The Tramway Mutual Aid Association, and who, in the opinion of the board of officers, have become physically disqualified.

The pension allowances paid monthly are on the following basis:

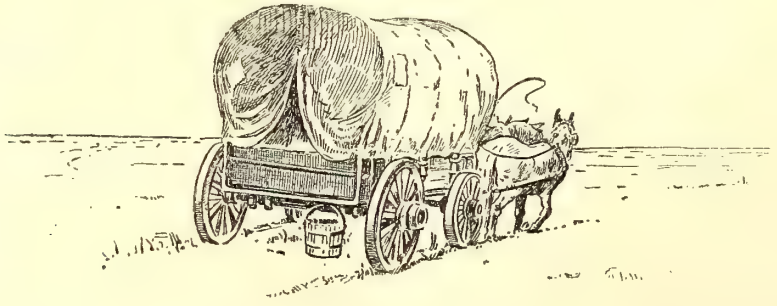
Twenty-five dollars a month pension to all uniformed em ployees in the regular train service of the company.

Twenty-five dollars a month pension to all employees who shall have received average monthly wages of $80 or more, during the 10 years immediately preceding application or recommendation for retirement.

Twenty dollars a month pension to all employees who shall have received average monthly wages of $60 or more, to $79, inclusive, during the 10 years immediately preceding application or recommendation for retirement.

Fifteen dollars a month pension to all employees who shall have received average monthly wages of less than $60 during the 10 years immediately preceding application or recommendation for retirement.

The authorized amount of money to be spent in any one year has been fixed at $18,000.

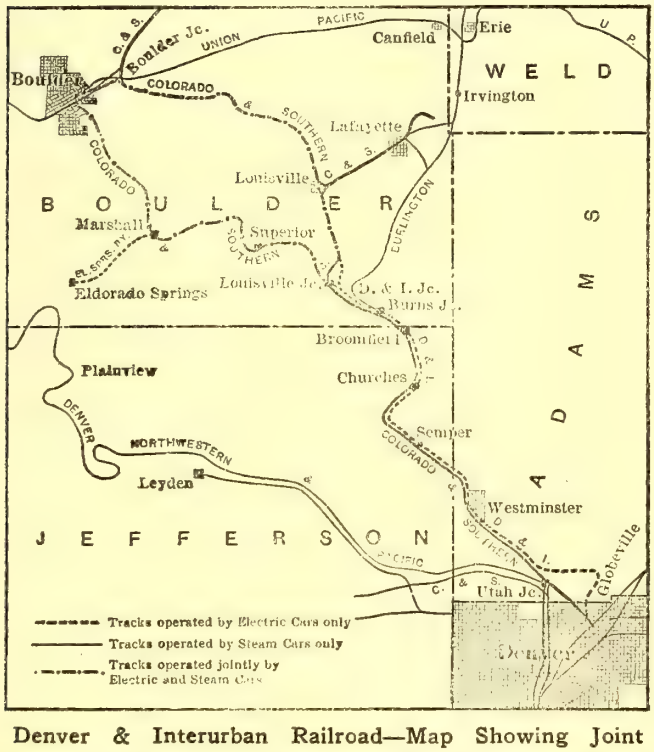


INTERURBAN ROADS OF COLORADO

THE DENVER & INTERURBAN 11,000-VOLT RAILROAD

THE Denver & Interurban Railroad is an electrified division of the Colorado & Southern Railway system between Denver and Boulder, Colo., which has been equipped for operation with 11,000-volt. alternating current. A general description of the methods used in the catenary trolley construction on this road appeared in the ELECTRIC RAILWAY JOURNAL for Sept. 5, 1908, page 595. Some of the more novel and interesting operating features to be found on this property will be described in the following pages.

Electric operation over this line was begun on June 23, 1908. Prior to that time the Colorado & Southern Railway,



Denver & Interurban Railroad—Map Showing Joint Operation of Steam and Electric Trains

which is affiliated with the Burlington system, operated frequent steam train service between Denver and Boulder, Colo. These trains were operated over a single track from Denver to Louisville Junction, and from there over either of two tracks to Boulder. A branch line from the southern one of these two routes between Louisville Junction and Boulder extended 3 miles southwest to El Dorado Springs, where a popular watering place and summer resort has been developed at the mouth of South Boulder Canyon.

During the work of electrification that section of the road between Globeville, at the north city limits of Denver to Louisville Junction (see map) was double tracked, and one of these tracks equipped for electric service. From Louisville Junction northwest the tracks divide to follow two routes which are jointly used by the electric passenger trains and the steam passenger and freight trains to Boulder. From Globeville the electric trains reach the Denver terminus at Sixteenth and Arapahoe Streets over standard-gage city tracks of the Denver City Tramway Company. The distance from the city terminal to Globeville is 4.26 miles and from Globeville to the junction point from whence the two routes extend to Boulder, 15.23 miles. From this junction point to Boulder via the southern or Marshall route, the distance is 13.24 miles and via Louisville, the northern route, 13.04 miles. The El Dorado Springs branch leaves the through line at Marshall and is 3.3 miles long. The through electric passenger trains are routed from Denver to Boulder over one route going and over the other returning. The entire line from Globeville to the city limits of Boulder is operated with 11,000 volts on the trolley. The section of the route through the built-up portion of Boulder, 1.78 miles long, is fed with 500-volt direct current and direct current is also used within the Denver city limits. In one round trip a car operates for 54.97 miles on 11,000-volt trolley and for 10.3 miles on direct-current trolley.

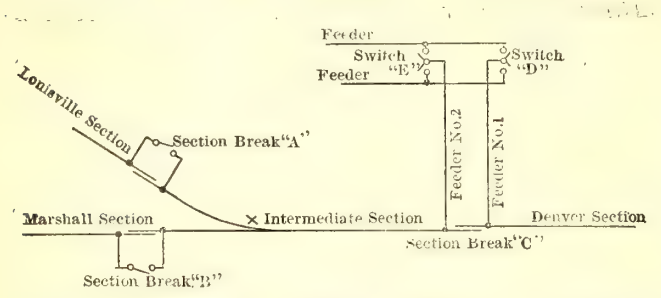
The track construction throughout is according to the standards used for the Colorado & Southern Railway and is laid with 70-lb. and 80-lb. steel rails electrically connected with No. 0000 Protected rail bonds. On account of joint operation with heavy steam passenger and freight trains, both narrow and standard gage, the track is well maintained. Views on Plate XII show the character of the roadbed. The ties for the entire distance are ballasted with slag which was blasted from the waste pile of the Globeville smelter. In the 13 miles from Globeville to Louisville Junction there are 102 crossings with irrigation flumes or pipes. The maximum grades on the main line are about 1.25 per cent., while the branch line to El Dorado Springs, which has an elevation of 6,000 ft., is nearly all on a grade of 2 per cent, compensated on curves.

POWER DISTRIBUTION

The power distribution system is the most interesting feature of the Denver & Interurban Railroad. Power for the operation of all the cars is furnished by the Northern Colorado Power Company from its steam generating station at Lafayette, near Louisville. Two feeders connect the generating station with the feeding-in switches located near the center of the route and at the point where the line from Denver divides to follow two routes to Boulder. Switching arrangements are provided so that either or both of the two feeders may be used to supply current to one or all of the three trolley legs.

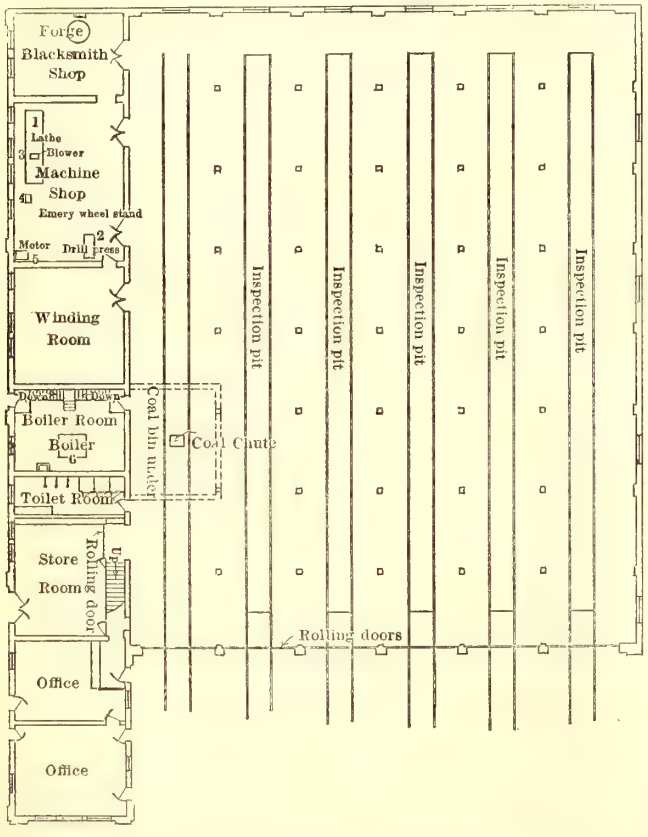
The 11,000-volt 25-cycle operating current is fed to the cars through a catenary supported No. 0000 "phono-electric" trolley wire carried 22 ft. above the running rail and supported by a Bessemer steel cable 7/16 in. in diameter. No additional feeders are required. The messenger cable is carried on Thomas porcelain insulators supported by angle-iron brackets. The poles are spaced 120 ft. apart on tangents and guyed to Matthews' anchors. On curves the poles are set sufficiently close so that pull-offs need not be used. Porcelain insulation is provided in spans and strand wires wherever used. A ground wire consisting of 7/16-in. stranded galvanized steel cable is strung over the pole tops for the entire length of the line. This ground wire affords a cheap and convenient means for grounding the brackets, it affords effective lightning protection and serves as a continuous return circuit in addition to the bonded and cross-bonded

track rails. The overhead ground wire is connected to the tracks at every fifth pole and the track is provided with ground plates. Westinghouse, Church, Kerr & Company were the contractors on the catenary construction and also built the power plant of the Northern Colorado Power Company from which current is supplied to the railroad.



Denver & Interurban Railroad—Diagram of Switching Connections at Feeding Point on 11,000-Volt Trolley

A map is presented showing the trolley wire and feeder layout. The switching scheme at the junction point where the feeder lines from the power plant are connected with the trolley wires is shown in diagram. Section-breaks are placed at an average distance of 3 miles and are located at passenger stations where someone is always on duty. The a.c. line is subdivided into 12 sections by these breaks. Special a.c.-d.c. section breaks are installed at Globeville and at Boulder, where the 11,000-volt a.c. catenary trolley joins

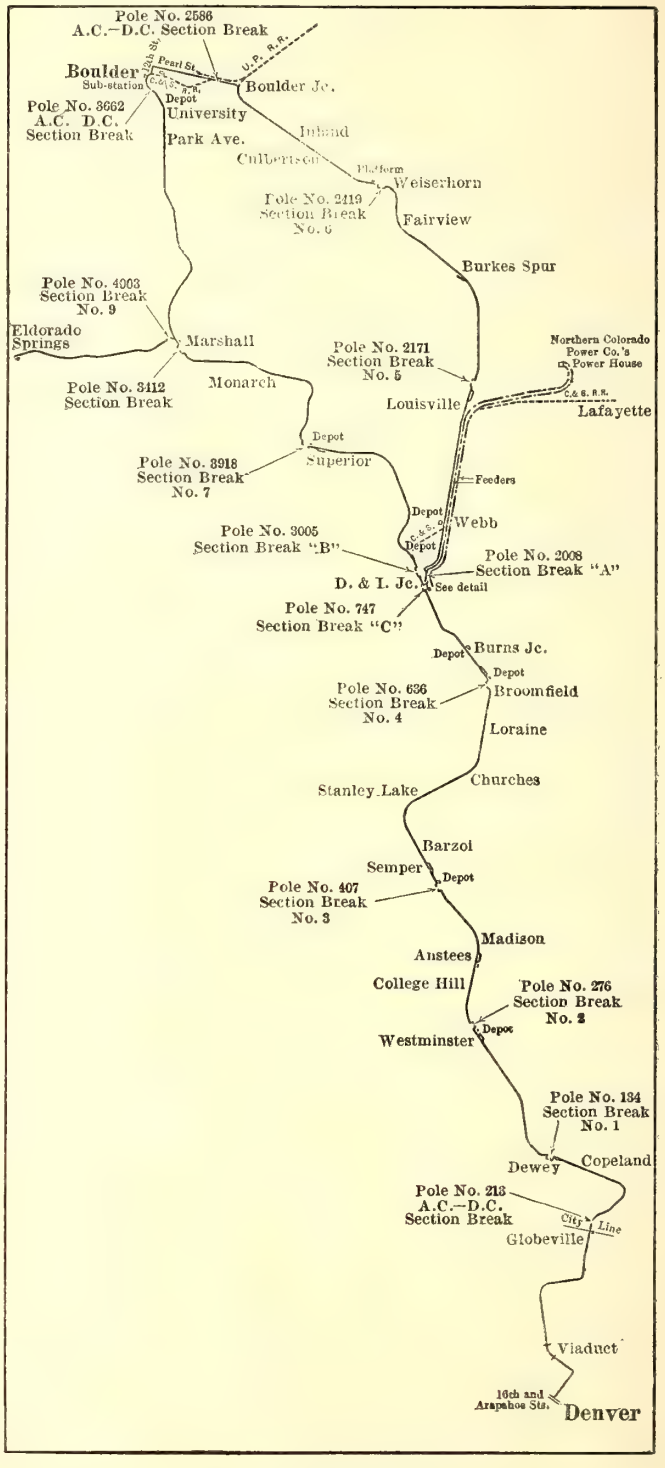


Denver & Interurban Railroad—Floor Plan of Denver Car House

the 550-volt d.c. trolley. At the a.c. section breaks the trolley wires overlap so that there is no interruption in current fed to a car under normal conditions.

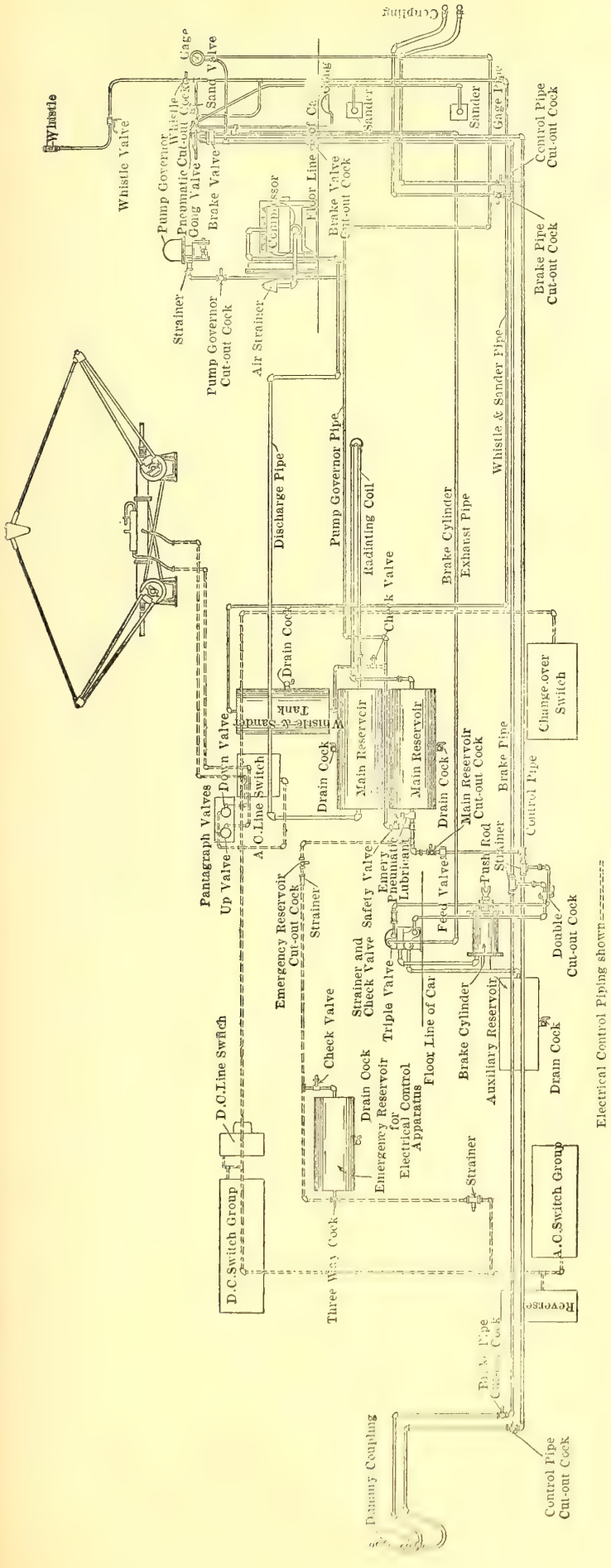
Specially constructed trolley derailers form a part of the overhead structure at the ends of the d.c. sections. These trolley derailers are so designed and placed that should the car crew neglect to pull down the trolley pole as a car enters the d.c. section the wheel would be thrown from the wire and the pole automatically lowered by the retriever before it could come in contact with the 11,000-volt catenary.

Local conditions made it necessary to operate the cars with direct current for 1.78 miles through Boulder and a motor-generator substation is provided to supply the power. The



Denver & Interurban Railroad—Map Showing 11,000-Volt Trolley Sections

substation equipment is installed in a substantial fireproof building located close to the track in the western edge of the city. The equipment of the substation includes a 300-kw General Electric synchronous motor-generator set with a compensating transformer which receives current through a feed wire connecting with the 11,000-volt trolley and delivers it at 2300 volts to the synchronous motor.



Denver & Interurban Railroad—Diagram of Air Piping for Motor Car

Electrical Control Piping shown ======

ROLLING STOCK

The rolling stock equipment of the Denver & Interurban includes eight motor cars, four trail cars with bodies of the same design as the motor cars and two Colorado & Southern passenger coaches used as trailers. The interurban passenger car bodies were built by the St. Louis Car Company and are mounted on especially heavy trucks built by the American Locomotive Company. These trucks which have a load-carrying capacity of 38,000 lb. at the center plate, were illustrated and described in the ELECTRIC RAILWAY JOURNAL for Oct. 3, 1908.

The motor car bodies are 55 ft. 6 in. long, 10 ft. wide and seat 60 passengers. The trailer cars are 53 ft. 10 in long, 10 ft. wide and seat 58 passengers. The weight of a motor car body without load is 46,000 lb. The underframing is of structural steel and the body framing of wood. The structural steel underframe is entirely covered with a floor of steel plates which are used as a protection against fire. The roof of the car is covered with sheet metal which is electrically grounded to serve as a protection against fire in event of low trolley wire. The interior of the car bodies is trimmed with mahogany.

The car bodies are subdivided into a motorman's cab, a baggage compartment and a general passenger compartment. End doors are provided for train operation. The motorman's cab has a side window. Located in this cab, in addition to the electrical and brake control apparatus, is a switch cabinet and the 1/6-hp 110-volt a.c. 14-volt d.c. dynamotor for charging the control storage battery while operating on a.c. trolley. The a.c.-d.c. motor-driven air compressor also is located in the cab. Above the motorman's head is a rack containing red and green fusees, flags, four marker lanterns, two red and two white hand lanterns, two extra lantern lenses and a supply of torpedoes.

Washburn M.C.B. type couplers are provided on all motor and trailer coaches. The platforms of the steam railroad coaches used as trail cars have been extended so that they have round ends and these couplers are installed with radius bars to support them when rounding city curves. On a portion of the equipments the multiple-unit train-line coupler head is carried on top of the coupler knuckle.

In the rear of the cab is a baggage compartment with a large door on either side of the car. This compartment is finished in mahogany and has drop seats which will accommodate eight people. A swinging door leads from the baggage compartment to the smoking compartment in which are four fixed and four reversible green Pantasote upholstered seats with mahogany arm rests. Another swinging door leads from the smoking compartment to the main compartment, which has four fixed and ten reversible seats of the same type. A toilet room is provided at one end. The aisle space is covered with heavy rubber floor mats. The step openings on the platforms are covered during running with spring-actuated trap doors.

The electrical equipment of these cars is of particular interest because it is the first used in the West for operating with both 11,000-volt alternating current and 550-volt direct current. Each motor car has four Westinghouse 148-A 125-hp motors with a control equipment for train operation. Current is collected from the 11,000-volt line with a Westinghouse air-operated pantograph and from the d.c. line with an ordinary trolley wheel and pole. The control equipment was supplied by the Westinghouse Electric & Manufacturing Company and in general conforms to its electro-pneumatic unit-switch system.

The 11,000-volt current is taken from the pantograph trol-

ley to an oil-insulated double-break electrically operated line switch and thence to the primary of an auto-transformer carried under the car and thence to ground. From the secondary of the auto-transformer eight taps are taken to supply running current at graded voltages. This current, before being fed to the motors, is passed through preventive coils and through the group of unit switches. Separate switch groups are provided for the a.c. and d.c. motor control. The train-line cable carries 12 wires.

The air-brake equipment for these cars is the schedule AMM of the Westinghouse Traction Brake Company, which includes automatic features for train operation. An engraving presents the details of the piping layout for the air-brake apparatus. In the lubrication of the moving parts of the air-brake system of these cars and the moving parts of the unit-switch system excellent results are said to have been had by the use of the Emery pneumatic lubricator, which is manufactured by the Emery Pneumatic Lubricator Company, St. Louis, Mo.

This lubrication system consists of a receptacle fitted into the pipe system in the outlet pipe from the main reservoir containing a stick of lubricant having its lower end exposed to the action of air passing into the pipe system. The composition of the stick of lubricant is such that it is gradually dissolved by the moisture contained in the compressed air and thereby is carried through the entire pipe system, reaching and lubricating all bearing surfaces of feed, brake and triple valves and brake cylinders. The lubricating stick is placed in a tube having its lower end composed of brass wire netting and the amount of surface of the lubricant exposed to the air can readily be adjusted. The stick feeds by gravity, being controlled by the frequency of brake applications and the amount of moisture contained in the compressed air, as well as the amount of exposure to the air current.

In connection with the electric-pneumatic control system for operating the multiple unit there are 28 valves and 22 cylinders on each car, and while the service is very severe, including many stops and covering 5000 to 6000 miles per car each month, there are said to have been no failures whatever in regard to automatic lubrication.

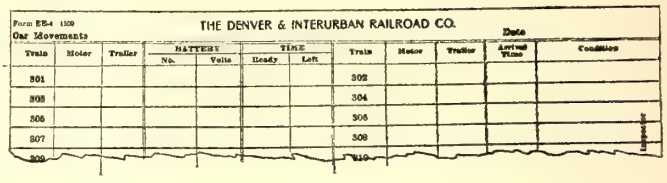
The principal features of the motor cars of the Denver & Interurban Railroad Company are as follows:

Length, 55 ft. 6 in.
Width, 10 ft.
Seating capacity, 60
Body, wood
Underframe, steel
Interior trim, mahogany
Air brakes, Westinghouse A M M
Axles, 6 1-2 in.
Bolsters, cast steel
Brakeshoes, Diamond S flanged
Control system, Westinghouse electro-pneumatic
Couplers, Washburn
Curtain fixtures, Forsyth
Curtain material, Pantasote
Door hangers, Duner
Hand brakes, Peacock
Heating system, Consolidated electric
Headlights, Crouse-Hinds a.c.-d.c.
Journals, 1-2 in. x 9 in.
Journal boxes, Franklin
Motors, four Westinghouse 148-A
Pilot, locomotive type
Registers, Ohmer
Roof, sheet metal
Sanders, Lintern
Seats, St. Louis Car Company
Seat material, pantasote
Springs, Railway Steel Spring Company
Step treads, Mason safety
Trolley retrievers, Lord No. 4
Trolley base, Nutall and pantograph
Trucks, American Locomotive type A
Wheels, Standard rolled steel, 38-in.

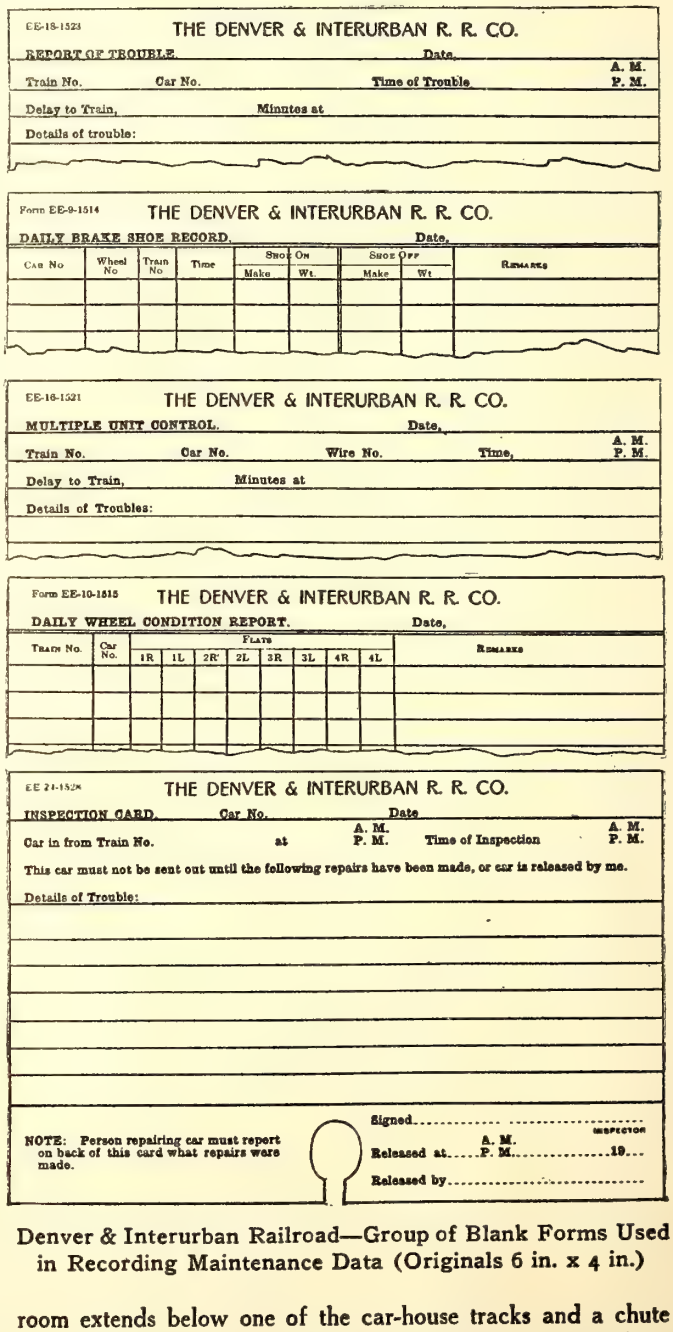
Weights—
Car body light 46,000 lb.
Air and electrical equipment (except motors), 15,000 lb.
Trucks without motors, 13,900 lb.
Total weight without passengers, 117,000 lb.
Total weight trailer without passengers, 66,250 lb.

The inspection and repair shop, where all car work is done, is located in Denver and comprises a rectangular shaped building with a row of shop rooms and offices on one side and a general inspection and repair bay with six tracks, five of which have pits and all of which are of sufficient length to accommodate two cars. The building is of brick with a concrete floor and a mill-type roof. Yard tracks are provided for storing the trailers. The car-house door openings are fitted with Kinnear rolling steel doors.

The southern section of the building is entirely enclosed and subdivided with brick partitions. The subdivisions are used as follows: Offices of electrical engineer and trainmaster; store room, toilet room, boiler room, winding room, machine shop and blacksmith shop. The coal bin for the boiler room extends below one of the car-house tracks and a chute is provided so that fuel may be unloaded by gravity from hopper-bottom coal cars.


Form EE-4 1509
Car Movements
THE DENVER & INTERURBAN RAILROAD CO.
Date
Train | Motor | Trailer | Battery No. | Battery Volts | Time Ready | Time Left | Train | Motor | Trailer | Arrival Time | Condition
801 | 802
803 | 804
805 | 806
807 | 808
809 | 810

Denver & Interurban Railroad—Car Movement Record (Original 8 in. x 5 in.)


EE-18-1523
THE DENVER & INTERURBAN R. R. CO.
REPORT OF TROUBLE. Date.
Train No. Car No. Time of Trouble A. M. P. M.
Delay to Train, Minutes at
Details of trouble:

Form EE-9-1514
THE DENVER & INTERURBAN R. R. CO.
DAILY BRAKE SHOE RECORD. Date.
Car No | Wheel No | Train No | Time | Shoe On: Make, Wt. | Shoe Off: Make, Wt. | Remarks

EE-16-1521
THE DENVER & INTERURBAN R. R. CO.
MULTIPLE UNIT CONTROL. Date.
Train No. Car No. Wire No. Time, A. M. P. M.
Delay to Train, Minutes at
Details of Troubles:

Form EE-10-1515
THE DENVER & INTERURBAN R. R. CO.
DAILY WHEEL CONDITION REPORT. Date.
Train No. | Car No. | Flats: 1R 1L 2R 2L 3R 3L 4R 4L | Remarks

EE 21-1528
THE DENVER & INTERURBAN R. R. CO.
INSPECTION CARD. Car No. Date
Car in from Train No. at A. M. P. M. Time of Inspection A. M. P. M.
This car must not be sent out until the following repairs have been made, or car is released by me.
Details of Trouble:
NOTE: Person repairing car must report on back of this card what repairs were made.
Signed..... Inspector
Released at..... A. M. P. M. 19...
Released by.....

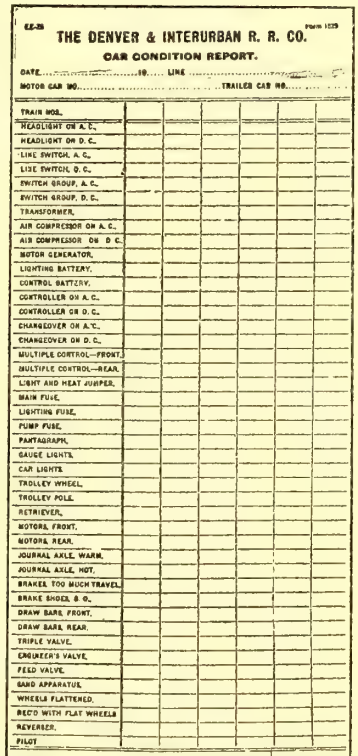
Denver & Interurban Railroad—Group of Blank Forms Used in Recording Maintenance Data (Originals 6 in. x 4 in.)

The shop machine equipment now installed includes the following:

Machine	Maker's Name
24-in. engine lathe with 92-in. centers	American Tool Works Company
Vertical drilling machine with 12-in. spindle traverse	Rockford Drilling Machine Company
No. 1 forge blower	Buffalo Blower Company
Emery wheel stands for two 12-in. x 2-in. wheels	Glizbe Manufacturing Company
10 h.p., three-phase motor	Westinghouse Electric & Manufacturing Company
Ideal steam heater No. S-36-8	American Radiator Company

MAINTENANCE RECORDS

A very complete record of the defects and maintenance work on the rolling stock equipment is being kept by the electrical engineer, who is responsible for its condition. Accompanying engravings show the blank forms which exhibit the maintenance records. The "car condition" report and the report of trouble are filled out by the car crews and turned in with the equipment. The "car movement" card serves to show the numbers of the trains in which the various cars were operated and is kept by the hostler. The inspection report is made out by the carhouse inspectors and unless it is properly signed by the inspector in charge the car cannot be used by the transportation department. The additional record cards bear information regarding train delays, brakeshoe life, multiple-unit control performance, motor operation, wheel condition and car body defects. These latter cards are filed according to the vertical system and present a complete record of the performance obtained from the equipment. Since operation was begun in June, 1908, the motor cars have been making an average of 318 miles per day. A list of the officials of the Denver & Interurban Railroad Company follows: A. D. Parker, president; J. D. Welsh, general superintendent; H. W. Cowan, chief engineer; F. W. Mahl, mechanical engineer and purchasing agent; J. H. Bradbury, auditor; F. W. Darlington, electrical engineer; S. S. Morris, superintendent; W. B. Grenamyre, trainmaster.



THE DENVER & INTERURBAN R. R. CO.

CAR CONDITION REPORT.

DATE..... 19.... LINE .....

MOTOR CAR NO..... TRAILER CAR NO.....

TRAIN NOS.						
HEADLIGHT ON A. C.						
HEADLIGHT ON D. C.						
LINE SWITCH, A. C.						
LINE SWITCH, D. C.						
SWITCH GROUP, A. C.						
SWITCH GROUP, D. C.						
TRANSFORMER.						
AIR COMPRESSOR ON A. C.						
AIR COMPRESSOR ON D. C.						
MOTOR GENERATOR.						
LIGHTING BATTERY.						
CONTROL BATTERY.						
CONTROLLER ON A. C.						
CONTROLLER ON D. C.						
CHANGEOVER ON A. C.						
CHANGEOVER ON D. C.						
MULTIPLE CONTROL—FRONT.						
MULTIPLE CONTROL—REAR.						
LIGHT AND HEAT JUMPER.						
MAIN FUSE.						
LIGHTING FUSE.						
PUMP FUSE.						
PANTAGRAPH.						
GAUGE LIGHTS.						
CAR LIGHTS.						
TROLLEY WHEEL.						
TROLLEY POLE.						
RETRIEVER.						
MOTORS, FRONT.						
MOTORS, REAR.						
JOURNAL AXLE, WARM.						
JOURNAL AXLE, HOT.						
BRAKES TOO MUCH TRAVEL.						
BRAKE SHOES, S. O.						
DRAW BARS, FRONT.						
DRAW BARS, REAR.						
TRIPLE VALVE.						
ENGINEER'S VALVE.						
FEED VALVE.						
SAND APPARATUS.						
WHEELS FLATTENED.						
RECD WITH FLAT WHEELS						
REVERSER.						
PILOT.						

SIGNED..... Motorman

SIGNED..... Conductor

NOTE—See reverse side for explanations. Check only parts out of order

Car Condition Report
(Original 4 in. x 9½ in)

An hourly service consisting of two and four-car trains is given between Denver and Boulder. The one-way rate is 70 cents and the round-trip rate, weekdays, $1.25, and Sundays, $1; family and individual commutation tickets also are sold at reduced rates. The running time for the 29 miles between Denver and Boulder is 1 hour and 7 minutes via Marshall and 1 hour and 15 minutes via Louisville. The operation of the trains conforms strictly to the rules of the Colorado & Southern system, except within the city limits of Denver while the cars are on the Denver City Tramway Company's tracks.

DENVER & INTER-MOUNTAIN RAILROAD

THE Denver & Inter-Mountain Railroad was built in 1890 and operated with steam locomotives until February, 1909, when it was equipped for electrical operation. Since the change of motive power a considerable increase in traffic has been brought about by the more frequent and more regular electric service. As the route of this railway traverses an attractive suburban district, the growth in traffic which electrification has brought about will undoubtedly continue.

The principal sources of passenger traffic of this road are, in the order of their distance from Denver, the Colorado Golf Club, Colorado State Rifle Range, a shooting park; Colorado State Industrial School, Colorado State School of Mines and the thriving town of Golden at the base of the foothills of the Rockies. There are many interesting trips for the tourist, which can be made from Golden, and, therefore, it is expected that a substantial amount of pleasure traffic can be built up.

The Denver terminus of this road occupies part of a city block, between Fourteenth and Fifteenth Streets, on Arapahoe Street, in the center of the businss district and across the street from the central terminal loop property of the Denver City Tramway. The Denver & Inter-Mountain has an attractive brick terminal station and office building, 62 ft. 6 in. x 125 ft. in ground dimensions.

The route of the line from the terminal station includes a run of one mile over tracks laid in the city streets, and thence for two miles on a private right of way to the city limits. The private right of way is 50 ft. wide and is continuous to the terminal in Golden, 13.1 miles from the end of the city track in Denver. In addition to the Denver-Golden main line, a 3-mile branch is operated to Barnum, a suburb of Denver. The total trackage is 22 miles.

Golden has an elevation about 500 ft. higher than Denver, and in reaching Golden the line surmounts a ridge 600 ft. higher than the elevation at Denver. Thus a car in running west from Denver to Golden has a steady climb with grades ranging from 1.25 to 1.75 per cent for 11 miles to the summit and then down grade at an average of 1 per cent for two miles into Golden. As the road was originally built for steam operation, it has long easy curves and a good substantial roadbed. The track is laid with 70-lb. steel on sawed ties. The joints are made with six-hole angle plates and are bonded with No. 0000 American Steel & Wire soldered bonds.

Power for the operation of the line is generated in a d.c. plant owned by the company and located 4.5 miles west of the Denver terminal station. The equipment of this plant includes two Allis-Chalmers 925-hp Corliss engines, each belted to a 500-kw General Electric railway generator, and four 200-hp railway generators, which can be utilized at times of overload. Good boiler feedwater is obtained from an artesian well 744 ft. deep, the flow from which is delivered to a 40,000-bbl. storage tank by a Fairbanks-Morse deep-well pump.

The output of the power plant is distributed to the trolley wire by supplementary feeders. One No. 0000 bare copper feeder extends west to the summit of the grade 2 miles east of Golden, and a 500,000-circ. mil feeder extends 2 miles east of the power house to the city limits of Denver. Standard overhead construction is used, the parts of which include No. 0000 grooved trolley span-supported with Ohio Brass Company fittings from 35-ft. Idaho cedar poles. The butts of all poles were treated with preservative compound, and each

span pole is back-guyed to a Matthews' anchor. The trolley wire is protected from lightning by Garton arresters spaced one-half mile apart.

The repair shops are located at the western city limits of Denver. The group of buildings includes an engine house, electrical repair shop and car house equipped with the usual complement of tools for the maintenance of interurban cars and the steam locomotives used in freight service.

The rolling stock equipment owned and operated by the company includes the following:

Three 48-ft. passenger cars, one equipped with four, and two equipped with two 50-hp General Electric motors; one combination baggage and passenger car equipped with four 50-hp General Electric motors; four city cars with Westinghouse 12-A and W P. 50 motors; two express cars with W.P. 50 motors; two steam passenger coaches; two Baldwin 10-wheel locomotives; forty-six gondola cars, 60,000 lb. to 80,000 lb. capacity; five box cars and one caboose.

Illustrations are presented on Plate XIV, showing the 48-ft. passenger cars which were built by the McGuire-Cummings Manufacturing Company, and are mounted on McGuire-Cummings No. 10-A trucks with 6-ft. 3-in. wheel-base and 24-ft. truck-center distance.

The underframing of these cars consists of two center sills built up of 6-in. 14.75-lb. I-beams and side sills reinforced with 8-in. x 5-in. steel plates. The center sills are continuous from bumper to bumper. The car bodies are 8 ft. 5 in. wide and were built according to the standards of the manufacturing company for substantial interurban equipment. The interior fittings of these cars include Hale & Kilburn seats, Peter Smith hot-water heaters, Ohmer fare registers and continuous parcel racks. The combination baggage and passenger car conforms in size to the straight passenger cars. The cars used on the Denver-Golden service are all equipped with Westinghouse air brakes.

FREIGHT AND PASSENGER SERVICE

The regular week-day schedules include passenger cars from Denver to Golden on an hourly headway, and between Denver and Barnum on half-hour headway. On Sundays and holidays the Denver-Golden service is operated on half-hour headway. The running time from Denver to Golden is 45 minutes, and from Denver to Barnum 25 minutes. The one-way fare from Denver to Golden is 25 cents. Round-trip tickets are sold for 40 cents. As the Barnum service is entirely within the city limits, a fare of 5 cents is received for a maximum ride of three miles. Ticket stations are maintained at the terminals, where the standard form of one-way and round-trip tickets are sold. All fares collected on cars are rung up on Ohmer registers. For special car service between Denver and Golden a round-trip rate of $25 is made with no limit as to the number of passengers carried. All trains are ordinarily operated by schedules, but when a schedule cannot be followed the cars are dispatched by telephone. A set of Western Electric telephone instruments is installed at each of the five sidings between Denver and Golden.

A considerable portion of the revenue of the Denver & Inter-Mountain Railroad is derived from freight traffic. This traffic includes the handling of clay between the pits located along the route and the brickyards in Denver, the delivering of coal and the handling of general merchandise, lumber, etc. The tariffs of the road, both local and foreign, are published in the form prescribed by the Interstate Commerce Commission. An average of about 25 carloads of freight are handled each day, 20 of which are delivered to connecting steam lines. The freight equipment is handled by steam locomotives after midnight.

A regular express service of two round-trips a day between Denver and Golden is operated. The rate for handling express packages is 25 cents per 100 lb. All less-than-carload freight is handled on the freight trains at night at a rate of 12 cents per 100 lb.

The officials of the Denver & Inter-Mountain Railroad Company are: George W. Hutton, president, Chicago; Caldwell Yeaman, first vice-president; Charles F. Probst, second vice-president; James E. Gaule, secretary; F. L. Butler, superintendent, and William F. McDermott, auditor, Denver.

The controlling interest in the road is owned by John J. Cummings, president, McGuire-Cummings Manufacturing Company, Chicago, Ill.

COLORADO SPRINGS & INTERURBAN RAILWAY

COLORADO SPRINGS, Colorado City and Manitou are furnished electric railway service by the well constructed, 39-mile property of the Colorado Springs & Interurban Railway Company. A suburban line to the company's amusement resort—Stratton Park—at the mouth of the Cheyenne Canyon, also is operated. Five miles of extensions have been built during the present year.

TRACK WORK

The track throughout the entire line is laid with standard 65-lb. T-rail on native red spruce ties, purchased locally, and laid to standard gage. All main lines are doubled tracked on 11-ft. centers.

The rails are electrically bonded with American Steel & Wire Company's No. 0000 twin-terminal bonds. Before installing these bonds, which are placed on the head of the rail, the terminals are amalgamated. This improves the contact between the copper and the steel, filling any voids that may remain after the bonds have been driven home. An amalgam, for this purpose, is made as the work progresses. In making the amalgam tinfoil is first dissolved in mercury and then when it is desired to coat the bonds sodium is added to the mixture. The sodium drives off the water and evaporates, thus leaving a pure amalgam of tinfoil and mercury. The bond terminals and the holes are carefully cleaned with cotton waste, then the inside of the holes is tinned with the mixture and the bond terminals likewise are tinned and driven home. This method of bonding has given exceptionally good results.

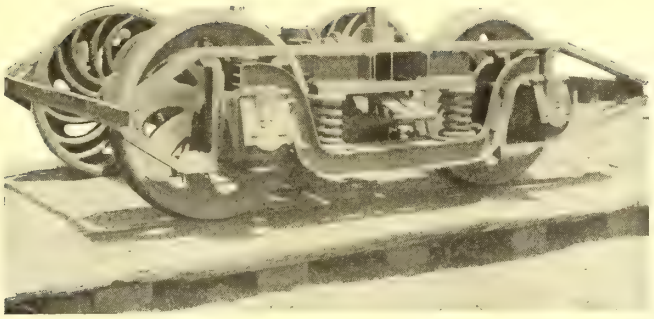
POWER STATION

Current for the operation of the road is generated in a steam plant located within the city. The following figures will illustrate the efficiency of this plant, which uses lignite, containing less than 10,000 b.t.u. per pound. On account of scarcity of water it is necessary to operate the plant non-condensing. These figures represent the actual cost of operation during the full year of 1908:

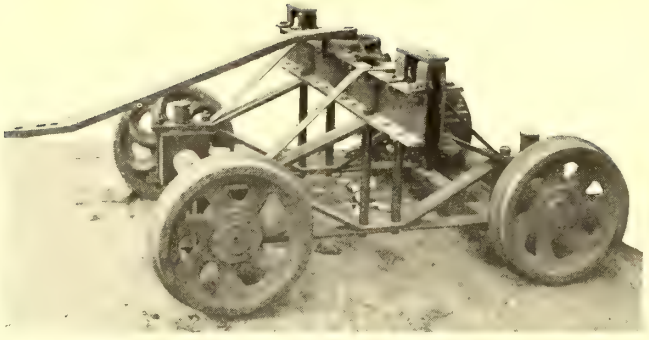
Coal per kw-hour	7.623	lb.
Cost of coal per kw-hour	0.51293	cent
Cost of labor	0.2	"
Shop labor, repairs and supplies	0.09462	"
Total cost of current per kw-hour	0.80755	cent

The plant operates with a railway load only and averages 20 hours' run per day. The total kw-hours generated during the year 1908 was 5,236,655. The daily average for 20 hours was 14,308 and the hourly average 715.4 kw-hours.

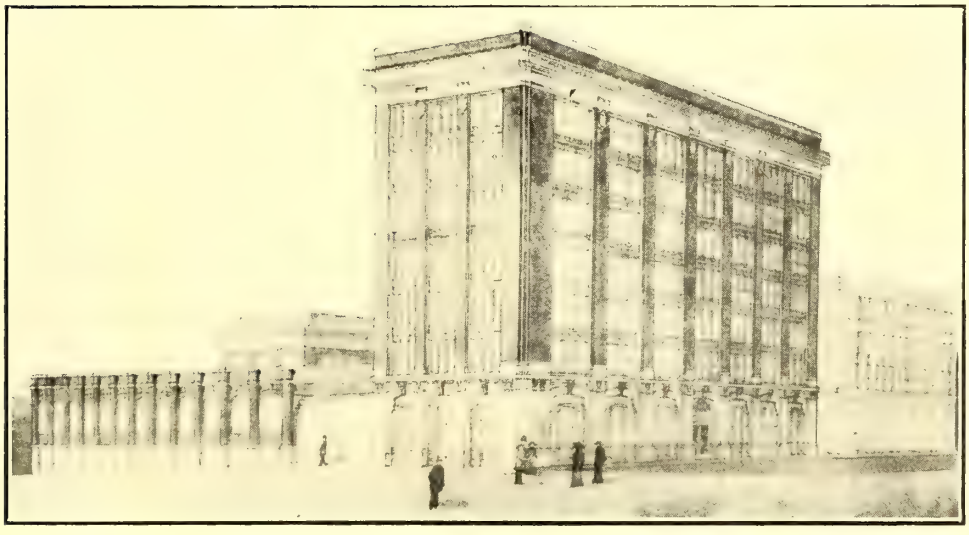
Ten men, besides the power-house superintendent, are required regularly for the operation of the plant—three in the engine room, five firemen, one conveyor man and one utility man.



Denver City Tramway—Channel Iron Motor Truck



Denver City Tramway—Emergency Truck



Denver City Tramway—Sketch of New Office Building and Car House



Denver City Tramway—Interior 1909 Type Motor Car



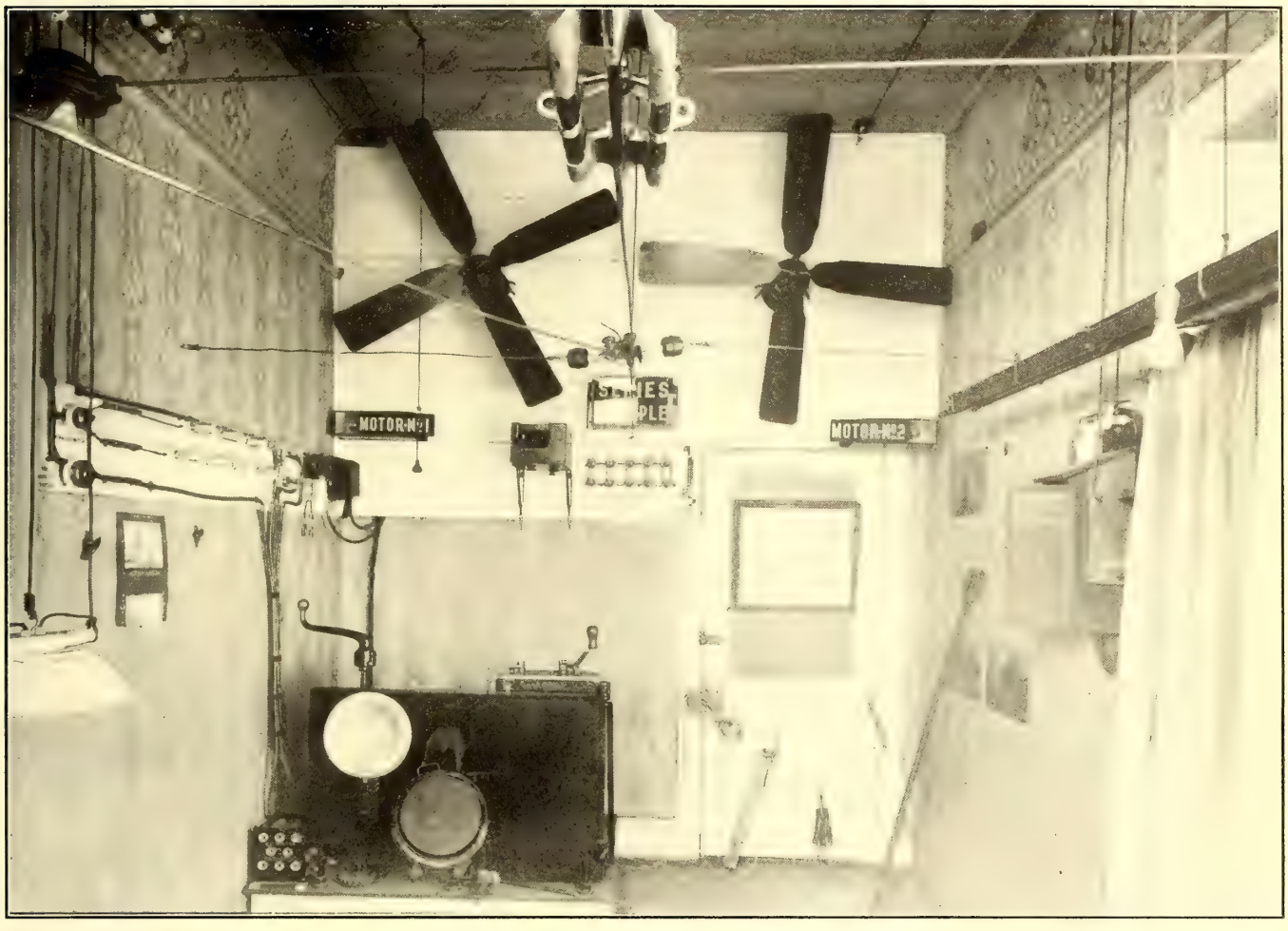
Denver City Tramway—Concrete Mixing Car



Denver City Tramway—South Broadway Trailer Storage Yard



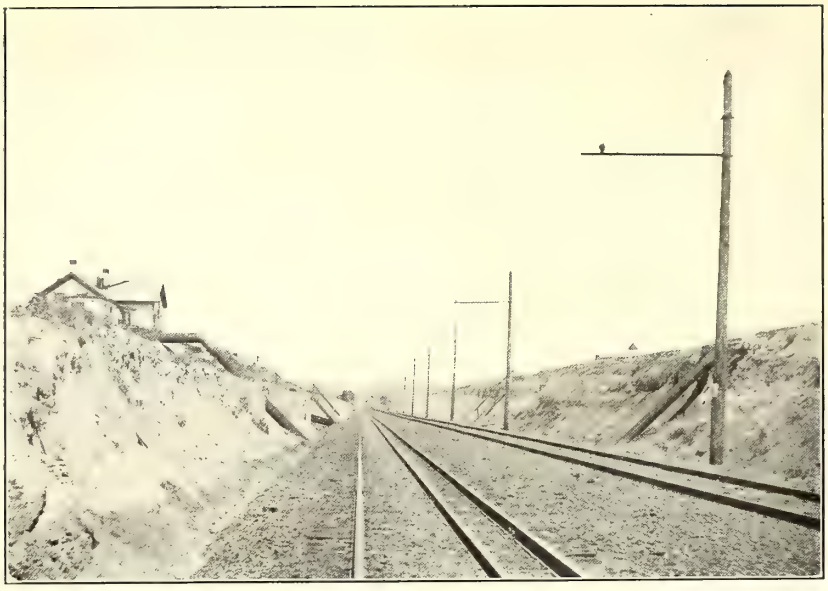
Denver City Tramway—Passenger Depot at Golden



Denver City Tramway—Interior of Instruction Room



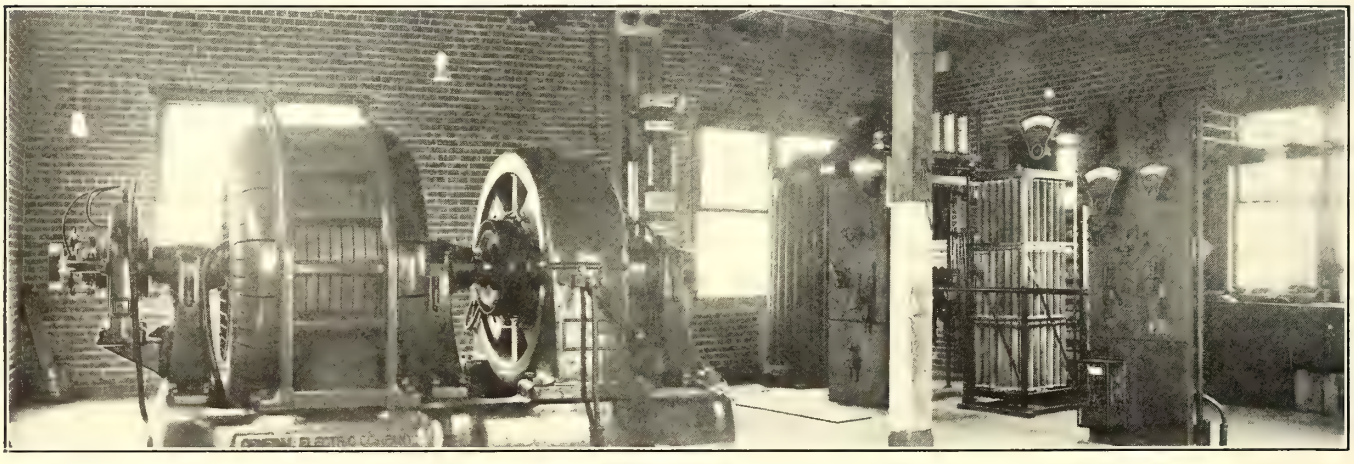
Denver City Tramway—Central Car-Dispatching Office



Denver & Interurban Railroad—Electric Track and Double-Gage Steam Track



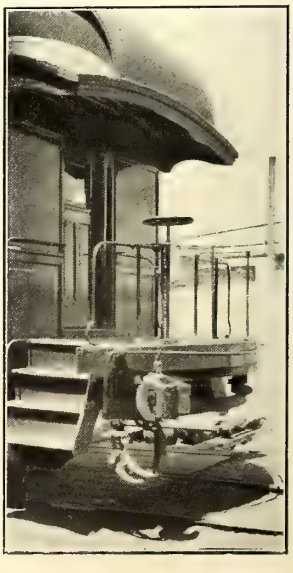
Typical Section Break



Denver & Interurban Railroad—Interior Motor-Generator Substation at Boulder



Denver & Interurban Railroad—Motor Coach



Radial Coupler



Denver & Interurban Railroad—Deflector at Switch



Denver & Interurban Railroad—Denver Shops



Colorado Springs & Cripple Creek District Railway—Birdseye View of Route



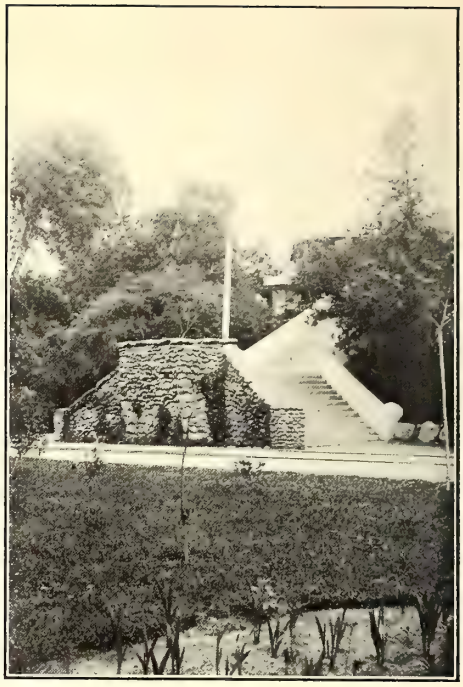
Denver & Interurban Railroad—Smelter Slag Ballast



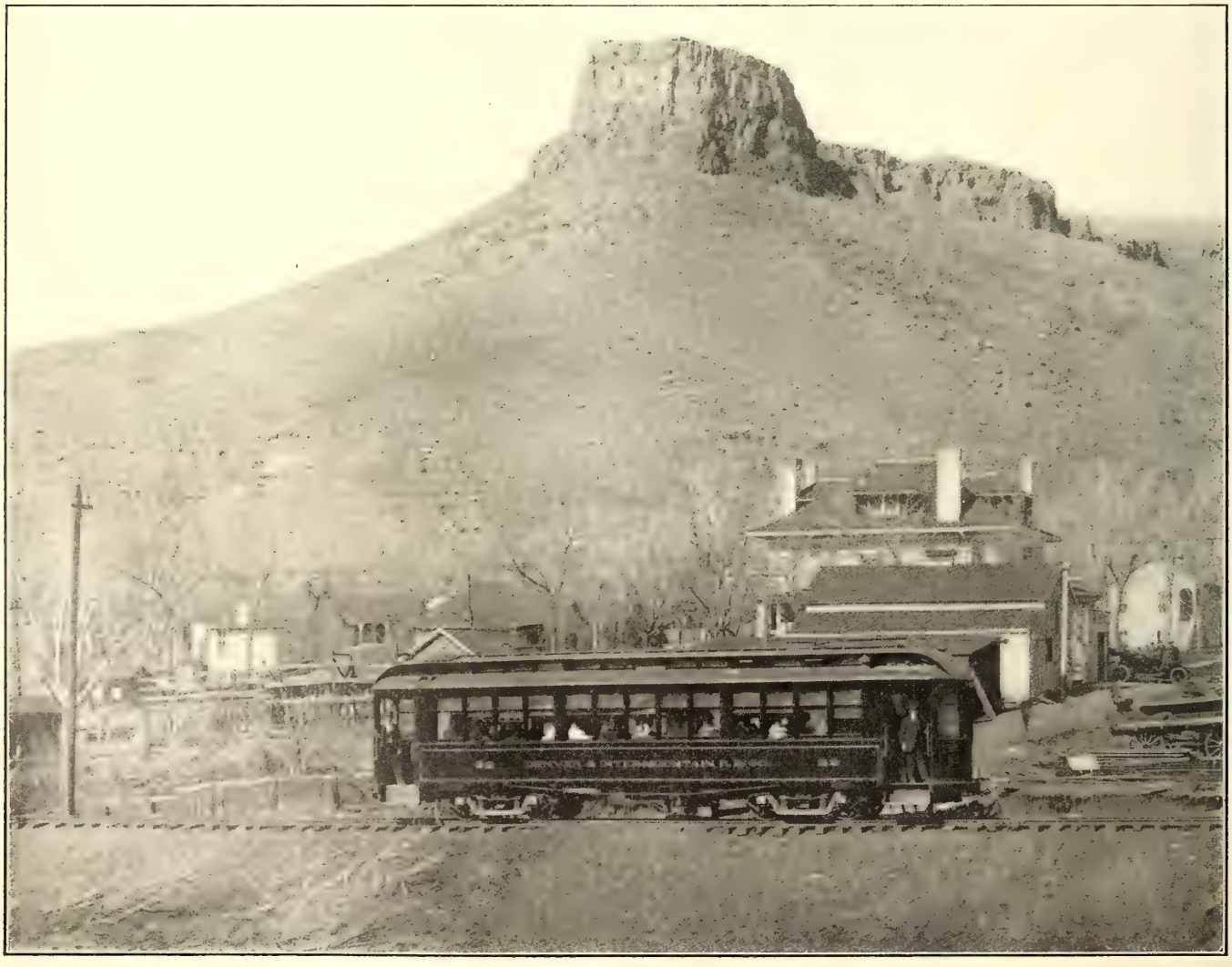
Denver & South Platte Railway—View in Park



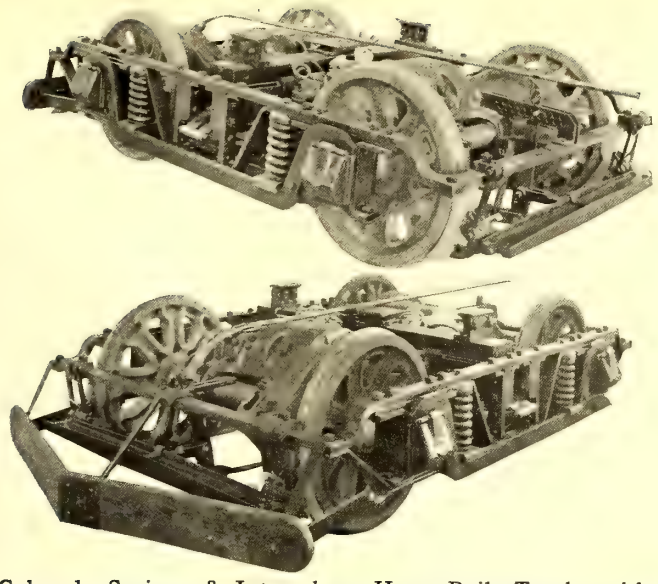
Denver & Inter-Mountain Railway—Interior of Passenger Coach



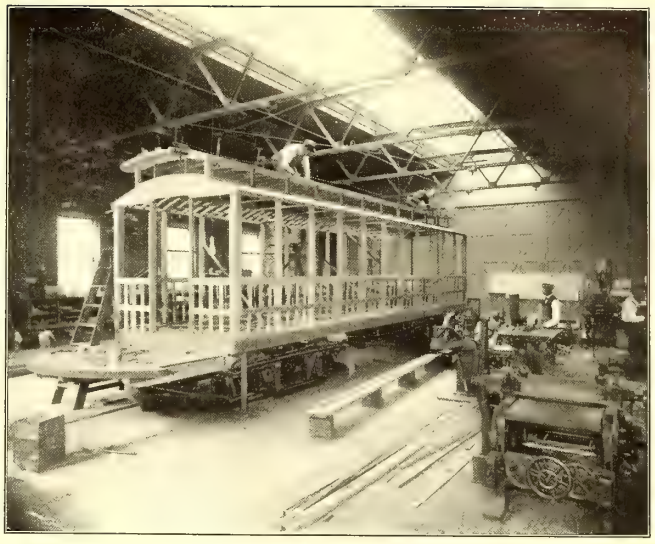
Stratton Park at Colorado Springs



Denver & Inter-Mountain Railway—View of Car and Castle Rock near Golden



Colorado Springs & Interurban—Home-Built Trucks with Special Brake Rigging



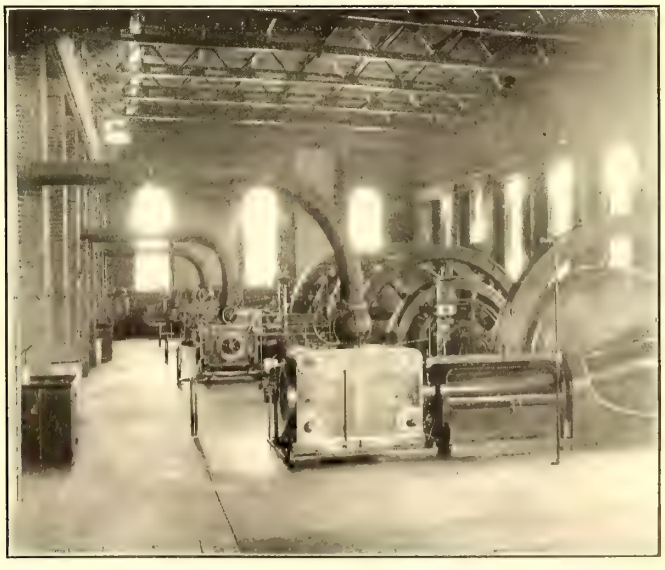
Colorado Springs & Interurban—Interior of Shop with Car Under Construction



Colorado Springs & Interurban—Central Car House and Operating Headquarters



Colorado Springs & Interurban—Exterior of Power Station



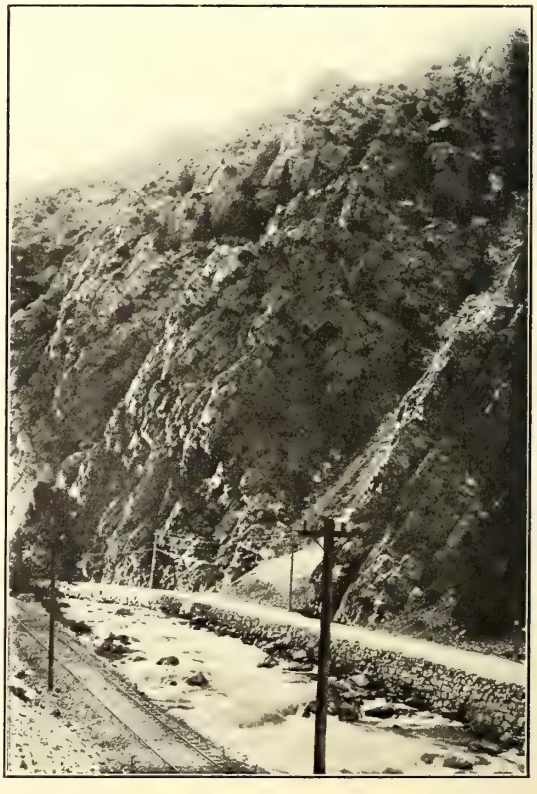
Colorado Springs & Interurban—Interior of Power Station



Salt Lake & Ogden Railway—General View of Lagoon Park



Utah Light & Railway—Yards of New Car House



New Electric Road in Ogden Canyon

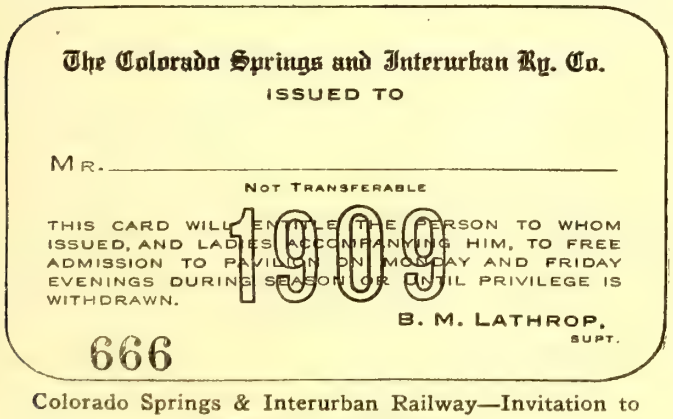
The boiler-house is equipped with a continuous conveyor for coal and ash handling. Whenever mine-run coal is obtained it is crushed to the size of slack so that uniform firing conditions are secured. The boiler equipment is made up of four 300-hp and two 400-hp B. & W. type boilers. One of the 400-hp boilers has an extension Dutch oven firebox, supplied by the Johnson Furnace & Engineering Company, of Colorado Springs.

The generating equipment includes two Allis-Chalmers Corliss engines, driving 500-kw General Electric generators; one Allis-Chalmers Corliss engine driving a 300-kw General Electric generator; and one Wisconsin Engine Company's Corliss engine, driving a 500-kw Allis-Chalmers-Bullock generator. A 30-ton overhead crane serves the entire engine room. The engines are all operated non-condensing and the generators are all standard, direct-connected, d.c. machines. A portion of the exhaust steam from this plant is piped one-half mile to the car houses, shops and offices, where it is used for heating.

On account of severe lighting conditions the regular line arresters are supplemented with a tank arrester, built behind the railway feeder switchboard at the power-house. As installed, the tank arrester consists of a water-box with a row of carbon pencils extending just above the surface of the water. Each pencil is connected with one of the outgoing feeder lines and when a storm is in progress the pencils are inserted in the water to give a leakage path for lighting direct to ground through the resistance of the carbon pencils.

SHOPS

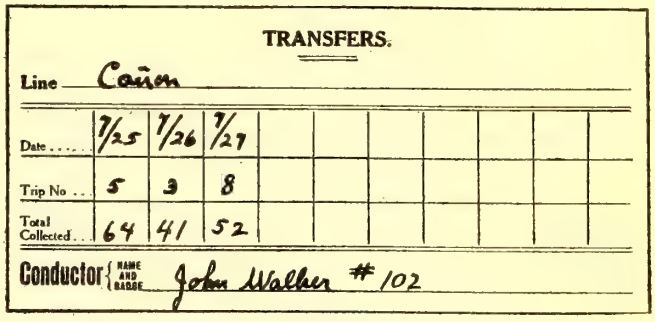
The railway company has a very complete shop plant located on the same property with its operating offices and car houses, a view of which is shown on Plate XV. All of the cars required by the company for several years have been constructed in these shops. On account of the difference in the winter and summer schedules it is necessary, ordinarily, to make a considerable change in the number of men employed for operating cars, and instead of discharging these men each fall particular care is taken when new men are employed to get workmen skilled in some trade which forms a part of car-construction. The men serve on the car platforms during the summer and in the winter are transferred to the shop force,



Colorado Springs & Interurban Railway—Invitation to Series of Park Dances

which is engaged in building new cars for use the following summer.

A view is presented on Plate XV, showing the interior of the wood-working shop and a new car in course of erection. Another view shows the design of truck equipment built in the company's blacksmith and machine shops. These trucks, which are of the M.C.B. type, have brake-rigging similar to that used on steam railroad freight cars, but adapted to electric double-truck service. The brake-rigging is easily adjusted on the road if necessary. Braking pressure is applied to the shoes by an I-beam with a floating lever which has the pulling rod connected to its top, passing over the motors and the tie rod between the two ends of the truck connected at its lower end and passing beneath the motors. At



Colorado Springs & Interurban Railway—Conductor's Envelope for Depositing Transfers

the inside end of the truck the brake-beam lever is supported on a bracket, drilled with two rows of staggered holes. The easy adjustment of the positions of the brake-shoes is made by moving from hole to hole the single pin against which the brake lever rests.

TRANSPORTATION FEATURES

In the regular winter schedule 25 cars are operated. In summer this number is increased to 30 cars. Additional rush-hour business or special business is handled with extra cars sandwiched in so as not to disturb the regular schedule. A supply of these cars is kept at the central operating loop in the business district where they can be dispatched quickly to handle peak loads.

A special method is used in handling transfers. This method reduces the number of transfer envelopes required to one-tenth of that needed ordinarily. The transfer envelopes, which are 6 1-2 in. x 3 3-5 in., in size as illustrated, are printed with rows of spaces for entering information on 10 different days. The conductor uses these envelopes in the ordinary way for delivering transfers, filling in one column each day that the envelope is used. In this column he notes the date, the trip number and the total number of transfers collected. The first time he uses the envelope he indicates the name of the line in the space at the top and signs his name and badge number on the line at the bottom.

When the transfer envelopes are collected each day they are checked, and those signed by each man are held together in a bunch with a rubber band and put in a box in the transportation headquarters. Before starting out on the second day the conductor gets his supply of envelopes from this box and thus uses on the second and successive days up to 10, envelopes which he has used before. The information required in turning in the transfers on the succeeding days is entered as on the first day the envelope was used. When the auditing office removes the transfers from the envelopes and checks them, different marks are used, not only by different checkers, but for different days. These marks are always the same for the same conditions and serve for future reference as to who checked any envelope on any day.

During the past year a method of checking the money turned in by the conductors has been put into use. This method obviates all quibbling between the conductors and the accounting department and saves many arguments that might arise on account of a mistake on the part of either the conductors or the checker in the count of tickets, cash, trans-

fers, etc. It was the practice formerly to check one day and balance the next, but this arrangement brought about many petty differences and has been changed. Conductors turn in their receipts in money sacks numbered with figures corresponding to their badge numbers. A complete set of sacks, consecutively numbered, one for each conductor, and 20 sacks numbered specially for extra men, are put into the conductors' room each night. The conductor in turning in his daily receipts picks out that sack which is numbered to correspond with his badge number and uses this sack for depositing his tickets, transfers and cash in the receiver's safe. Each morning two men are present when the safe is opened. One of these men is provided with a mimeographed sheet exhibiting all the conductors' badge numbers and numbers X-1 to X-20 for the extra men. After the safe has been opened one of the men removes the bags from the safe and as he takes each one out he announces to the other the number on that bag. This number is checked on the printed list held by the second man, who puts a blue mark opposite the number on the printed list corresponding to the number on the bag. Then the numbers of the unused sacks are similarly checked in order and when all the sacks have been handled over all the numbers on the printed list should be checked, either with a blue mark, indicating a bag with receipts in it, or a red mark indicating an empty bag. Thus the receiver knows that all the sacks used on the previous day have been turned in and the presence of two men to open the bags assures a complete check.

Formerly it was the practice to check conductors' receipts each day and balance with the conductors on the second day. To reduce the number of petty arguments over little differences and the time required to adjust these differences, it was determined to make settlement but once in two weeks at the time of issuing pay checks. However, if there is a difference of $1 or more the conductor in whose account the error occurs is sent a notice to call at the office the following day and adjust the account. If the amount is less than $1 it is entered on a record card and a notice of the amount is mailed to the conductor. These record cards are balanced once in two weeks and a cash settlement made at the time of paying off. Because the shortages and overages usually balance very closely a considerable amount of the dissatisfaction ordinarily experienced is done away with. The settlements for $1 and over are made at once, thus preventing the men from holding out a portion of the receipts, using the money for a few days and then turning it in as an overage in their receipts.

STRATTON PARK

Stratton Park, which is operated by the Colorado Springs & Interurban Railway, is located near the entrance to Cheyenne Canyon at the foot of the Rocky Mountains. This park is 80 acres in extent and has been highly developed by careful gardening and by the construction of simple amusement devices for children and a large pavilion. It is served by two lines of the railway, each double tracked, terminating at opposite ends of the park near attractive passenger stations. The distance to the park from Colorado Springs is 4 miles and a fare of 10 cents each way is received.

The main amusement pavilion at Stratton Park was built at a cost of approximately $24,000. It is a steel-supported structure with a large stage at one side. The pavilion is used three nights each week for select dances. In connection with these dances the company reserves the right to permit no gentleman on the floor unless he has been given an invitation card of the form shown herewith. The issuing of these cards has been the means of maintaining a very high character to the patronage of the dances. While the company does not require the presentation of cards at the doors of the pavilion the representatives in charge of the dancing floor may call for them in event of ungentlemanly conduct. The floor of the dance hall will accommodate 1,000 couples and the pavilion is well lighted, tastefully decorated and has a seating capacity around the edge of the dance floor sufficient for all the dancers and a large number of spectators.

Concerts by a band of 40 pieces are given three days each week, from June to October, in a specially constructed bandstand. After the close of the regular season concerts of an exceptionally artistic character are given at intervals in the pavilion by a large orchestra of accomplished musicians. These concerts and the dances are free to the public.

COLORADO SPRINGS & CRIPPLE CREEK DISTRICT RAILWAY COMPANY

THE Colorado Springs & Cripple Creek District Railway, which is said to be constructed at a higher altitude than any other electric railway in this country, connects ripple Creep with Victor, Goldfield, Independence and many smaller towns located in the mining district of Colorado. The company was chartered in April, 1897, when the first work was done toward building this railway system, which now consists of 18.5 miles of electric line and 58 miles of steam railroad.

The electrified portion of this company's railway is divided into two divisions. One of these, known as the "low" line, which connects Cripple Creek and Victor, is 6 miles in length. The other line, known as the "high" line, follows a more circuitous route through the Rocky Mountains for a distance of 12.5 miles, and eventually reaches the city of Victor, where connection is made with the "low" line division. These two divisions of the railway form a loop which affords the miners of that district excellent transportation between the mines, their homes and the leading cities of the territory. Hourly service is operated on the high line and 30-minute headway on the low line.

Although the lines operated by this company pass through one of the most rugged districts of the Rocky Mountains, the tracks are laid with maximum curves of 24 deg. outside of the city streets, and maximum grades of 8 per cent. The average grade for the entire length of the railroad is 3 per cent. The tracks are built to standard gage. The cost of constructing the roadbed was about $25,000 per mile.

A part of the power for operating cars over these lines is generated hydraulically at Canon City, a distance of nearly 50 miles from Cripple Creek and is transmitted at 20,000 volts to the company's reserve steam power plant at Cameron. It is here converted and delivered to the trolley as direct current at a line pressure of 580 volts. The cars operated by the company are of the interurban type. They are 41 ft. long and weigh about 30 tons. Each car is equipped with Westinghouse automatic air brakes, four GE 57 motors and McGuire-Cummings No. 57 trucks.

REHABILITATION OF THE UTAH LIGHT & RAILWAY PROPERTY

ABOUT three years ago the City Council of Salt Lake City granted the Utah Light & Railway Company a new 50-year franchise, and shortly thereafter control of the property passed to the Harriman interests. Since the change in ownership a plan of general reconstruction has been followed and a considerable portion of the rehabilitation is now completed.

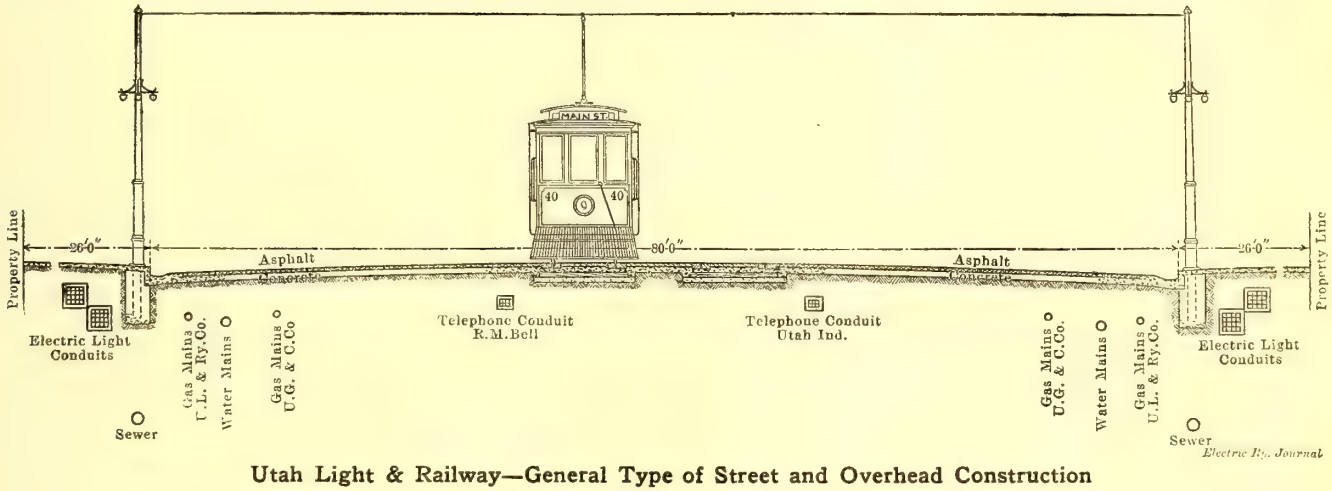
The Utah Light & Railway Company has 100 miles of track, practically all within the corporate limits of Salt Lake City. This track, before reconstruction, was not in the best condition, because it had been built originally for much lighter cars than have been operated during the last few years. The track now being laid is of the latest approved type with high T-rails and concrete substructure. During the past three years the track has been rehabilitated as follows:

1907	28.84 miles
1908	29.25 miles
1909 (to October)	20.00 miles

All of the work of track construction is done by company forces except the street paving, which is laid by the city contractor. The type of track structure adopted as standard for the Utah Light & Railway is made up of 7 in. 80-lb. T-rails in 62-ft. lengths laid on sawed carbolineum-treated ties spaced 16 and 13 ties to the rail. Two ties are used under each joint. The ties are ballasted with gravel, supported on a 6-in. concrete bed, and the foundation for asphalt paving is a layer of concrete beginning 6 in. below each rail and carried up to a height of 3 in. between the rails completely covering the ties. The following table shows the volumes of concrete, gravel and excavation per lin. ft. of double track, with 16 and 13 ties to each 62-ft. rail length:

Gage Lines.	Volume of Concrete Ties 4-ft. Centers.	Ties 5-ft. Centers.
7 ft.	.6516 cu. yd.	.6566 cu. yd.
6 ft.	.63306 cu. yd.	.63804 cu. yd.
	Volume of Gravel	
7 ft.	.1987 cu. yd.	.2022 cu. yd.
6 ft.	1987 cu. yd	.2022 cu. yd.
	Volume of excavation	
7 ft.	1.14228 cu. yd.	
6 ft.	1.1296 cu. yd.	

The concrete used in the track construction comprises a 1:3:7 mixture of cement, sand and gravel. Gravel for this track work is obtained from a large pit of the Oregon Short Line located on an extension of the electric railway just north of the city. This gravel is hauled in side-dump cars by electric locomotives for distribution along the streets. On the same line with the gravel pit is a stone quarry from which the principal portion of the crushed rock for street work is obtained. The rock also is hauled electrically and is locally distributed with dump wagons. The wagons for street distribution are loaded from a portable bunker which is set up on the street near the center of distribution. This bunker is made of timbers, each of which is numbered and so bolted together that they may be taken down and moved as the center of distribution changes. The cars carrying the stone are run over the bunker on a portable electric railway track from where they are automatically dumped into the large storage bin. Wagons are driven under the bin and loaded by gravity.



Utah Light & Railway—General Type of Street and Overhead Construction

The joints in the 80-lb. track rails used in paved streets are made either with thermit welds or with continuous plates. In the latter case the rail ends are electrically connected with 300,000-circ. mil pin-driven American Steel & Wire 1-in. terminal bonds.

The streets in Salt Lake City are exceptionally wide, 132 ft., and the blocks unusually long, being 660 ft. from curb to curb, or 792 ft. from street center to street center. There are approximately seven blocks to the mile. The tracks are laid in the center of the streets and there is ample room for special trackwork with large-radius curves. On account of the large amount of curved rail needed for the reconstruction of the entire track layout in Salt Lake City, the engineering department has installed a rail-bending and cutting plant at the yards of the new shop property. The special-work track layouts are made with frogs and switches in which manganese steel rail and hard centers are used. This special work is supplied by the Pennsylvania Steel Company and William Wharton, Jr., & Company. The electric railway company bends its own curves in its rail shop, the equipment of which includes a large power-driven rail saw, bending rolls and a complement of forges, drill presses and smaller tools.

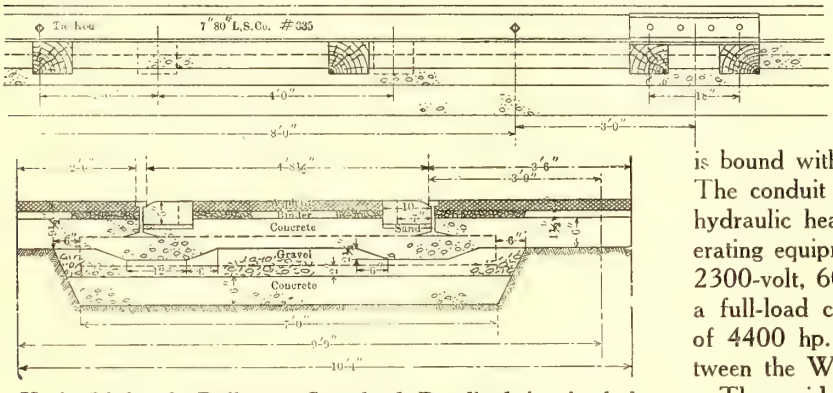
TROLLEY CONSTRUCTION

On all of the paved streets of Salt Lake City the center-pole type of trolley construction formerly used is being removed and the trolley wires supported by spans from poles set on the curb line. The very wide streets ranging from 60 ft.

to 92 ft. between curb lines and the resulting long spans, necessitated the use of 12 standard sizes of steel poles. On some of the streets these poles carry a few of the company's lighting and feed wires. Of these 12 standard sizes there are only four or five main sizes that are generally used. The poles range from 8-7-6 in to 10-9-8 in., vary in height from 28 ft. to 32 ft. and in weight from 650 lb. to 1575 lb. They are set in concrete and are given a backward rake of about 7 or 8 in. The steel poles are painted a red shop coat and finished with two coats of dark olive green.

Three poles are set on each corner of a wide street intersection. Where there is an extensive special track work layout a 10-in. pole is set at the curb intersection and 8-in. poles are set 27 ft. along the curb in each direction. A part of the strain from the corner pole is transmitted to the auxiliary poles through heavy anchor cables. In the commercial district where the blocks are 660 ft. long between curbs the steel poles are set 107.17 ft. apart between the nearest of the group of three corner poles and are 18 in. back of the curb line. At grand union crossings the center bull ring, to which the curve pull-offs are attached, is supported by four heavy steel strand cables which in turn are supported by the poles at the curb intersections. An engraving shows the arrangement of pull-offs and the location of the overhead special work at such a crossing.

Ornamental cast-iron bases which are 30 in. high and 21 in. in diameter at the ground are placed around the butt of each



Utah Light & Railway—Standard Roadbed in Asphalt Pavement

of the steel poles within the commercial district. A lead ring is poured around the tops of these bases to provide a tight connection. These cast-iron pole bases were required by the city. Outside of the business district the center-bracket poles are being replaced with wooden poles painted green.

As the new tracks are laid throughout the city this pole reconstruction is completed and the existing No. 2 and No. 4 copper trolley wires heretofore used are replaced with No. 00 round wire supported by 5-16-in. stranded steel spans. These spans are insulated at the steel poles with Brooklyn insulators and at the wooden poles with 8-in. wood breaks. The trolley wire is connected to the span by the use of Ohio Brass, General Electric or H. W. Johns-Manville insulated hangers.

The removal of practically all transmission wires in the business district of Salt Lake City necessitated placing the railway feeders underground. The new feeders have been installed in vitrified clay ducts. These feeders vary in size from 500,000 to 1,500,000 circ. mils, and on the more important streets are laid so that there are three in parallel. Facilities are provided in conduit manholes so that in event of trouble to any portion of the feeders the damaged cables can be disconnected from the circuit and power fed with those cables which are in operating condition. A new system of negative buses has been installed in conduit on the streets surrounding the block containing the central power station, which is within the business district. This negative collection bus has cross sections equivalent to 6,000,000 and 3,000,000 circ. mils of copper and is connected to the tracks at frequent intervals.

POWER IMPROVEMENTS

The power generating equipment of the Utah Light & Railway Company includes both steam and water-power-driven generators. The water-power plants are located in the Wasatch range of mountains just east of the city. In the Cottonwood canyon, 16 miles southeast of Salt Lake City, the company's water-power plant has a capacity of 2000 hp, which is transmitted at high voltage to a receiving station in Salt Lake. A second plant in Cottonwood canyon has 4000-hp capacity, and a plant at the mouth of Ogden canyon, 37 miles northeast of Salt Lake City, has 5000-hp capacity. A 1500-hp reserve steam plant is located within the commercial district in Salt Lake City, and power is purchased from the transmission systems of the Telluride Power Company and from the plant of the Utah Sugar Company, located 85 miles north of the city. The switching of current from these several sources and the synchronizing of the company's water-power plants is controlled from a main receiving station in Salt Lake City equipped with water-cooled transformers and oil-break high-tension switches.

Construction work is now well advanced on a 4000-hp water-power plant which the company is building in Weber canyon, 14 miles east of Ogden. A hollow reinforced concrete dam 66 ft. long has been built across the canyon at this point. Water from the dam is conveyed to the power plant through a 72-in. wood-stave pipe 7050 ft. long, and 2000 ft. of 8-ft. concrete conduit. The wood-stave pipe is bound with 3-4-in. round steel hoops, placed 3 in. apart. The conduit is 9 in. thick and is heavily reinforced. The hydraulic head at the power plant is 180 ft., and the generating equipment consists of one 2500-kva Western Electric 2300-volt, 60-cycle alternator driven by a Pelton wheel with a full-load capacity of 3500 hp and a maximum capacity of 4400 hp. Duplicate transmission lines will be built between the Weber canyon plant and Salt Lake City.

The rapid increase in the number and size of the cars operated in Salt Lake City has made necessary several changes in the relay steam plant and the substation in Salt Lake City. During the past year two 1500-kw Allis-Chalmers motor-generator sets have been installed in the central station. Each of these units comprises a 4000-volt 60-cycle 3-phase motor direct connected to a railway generator. The installation of the two motor-generator sets at this plant has released two 450-kw rotary converters from railway service, and these are now used to supply power to the three-wire d.c. 250-500 volt commercial power circuit.

If the present rate of increase in the power demand continues it is expected that another railway substation will soon be needed in the southeast portion of the city. The company is now extending its tracks 12 miles south to Bingham Junction, and plans are under way for the construction of a railway substation to be located at Murray, which will feed this suburban division. The normal railway load has increased during the last two years from about 1500 kw to 2900 kw. The total rated capacity of the railway power supply without steam is 2500 kw, and with steam, 3050 kw.

ROLLING STOCK

The regular schedules require the operation of about 100 cars in summer. The total number of cars available is 144, of which about 15 are held in for inspection each day. During the last year the company has purchased 50 new semi-

convertible cars, which are now in use on the principal lines of the city. These cars are equipped with four 40-hp motors and air brakes. They have 6-ft. platforms and are 30 ft. long over corner posts and 44 ft. long over bumpers. The seating capacity is 44. The maintenance of equipment is carried on systematically. All cars are inspected every night, and after five days, or when, approximately, 1000 miles have been run, each car is taken off the road and given a general inspection during the daytime so that such repairs as are necessary may be made. It is planned to put each car through the shop for a general overhauling once each year.

The present shop facilities of the company have been in use for a long time, and plans have been made and work soon will be started on the erection of a large modern shop plant to be located on the same property with the new car house described later. The shop facilities will include the following:

Machine shop, 140 ft. x 160 ft.
Blacksmith shop and foundry, 140 ft. x 48 ft.
Carpenter shop, 120 ft. x 112 ft.
Paint shop, 120 ft. x 32 ft.
Store house, 120 ft. x 44 ft.

A transfer table 50 ft. wide and 280 ft. long will serve these buildings. Additional room is available for the future erection of buildings, which room is now in use as a material yard.

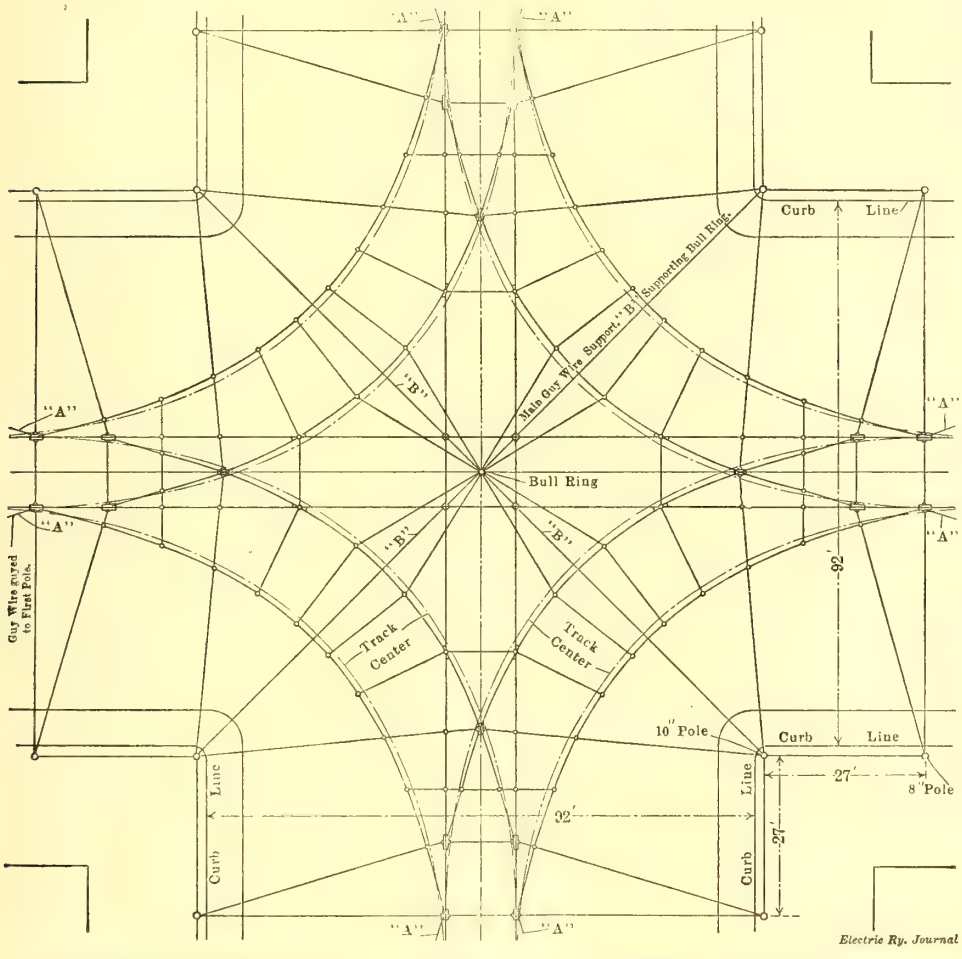
NEW CAR HOUSE

A new fireproof car house with a capacity for 144 double-truck cars has just been completed. This structure and the shop buildings soon to be erected will occupy an entire block 680 ft. square located six blocks east and five blocks south of the business center of the city. The new car house is 430 ft. long by 229 ft. wide, and has 16 through tracks laid on a 1 per cent grade sloping toward the rear of the building. At the front of the building these tracks join in a ladder leading to a double-track line on Seventh East Street. This special track work, which is illustrated, was largely built in the company's plant earlier mentioned. It is made up of 65 lb. rails and Wharton manganese steel frogs. At the rear of the car house the 16 tracks are connected, eight with each of two ladder tracks leading to the lines on Fifth South Street. This arrangement of double-ladder tracks will permit the handling of two cars at a time between the car house and the street, or will permit the simultaneous movement of one car between the car house and the street and another between the car house and the shop transfer table. The track layout as shown in the ground plan is such that three cars may be sent out to service in either direction at three corners of the shop and car house property.

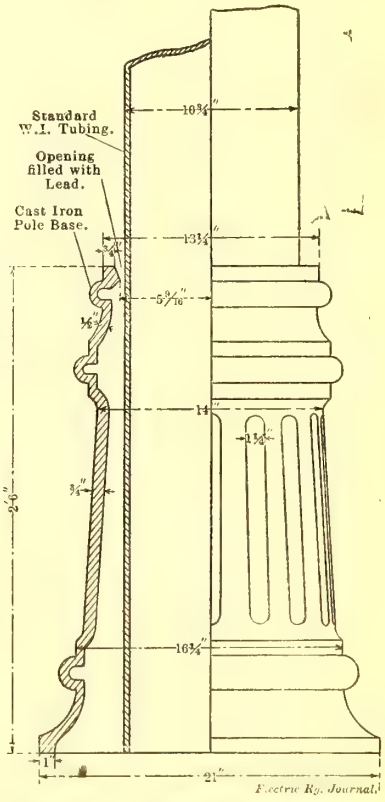
Within the car house the tracks are laid on concrete pit walls for a length of 220 ft. The pit floors have a 1 per cent grade and are of concrete construction with depressed troughs on either side, which are designed to collect drippings from snow brought in by the cars and quickly lead them to the sewers, thus affording a dry floor. All of the pits are piped for hot-water heating. The pit space is illuminated with 16-cp lamps set 10 ft. apart, staggered on opposite walls.

The car-house superstructure is subdivided into four 4-track bays with concrete floors. The floor of one bay is 2 ft. below the level of the track rails to provide for the convenient inspection of trucks. Each bay is divided at its midpoint between the inspection and storage ends of the building by a row of Kinnear rolling steel doors, thus separating the fire risks The front and sides of the building are laid with pressed brick and cement mortar.

All foundations for the end and side walls were made of concrete strengthened with American Steel & Wire reinforce-



Utah Light & Railway—Trolley Wire Layout for Double-Track Grand Union Crossing with 92-ft. Roadway

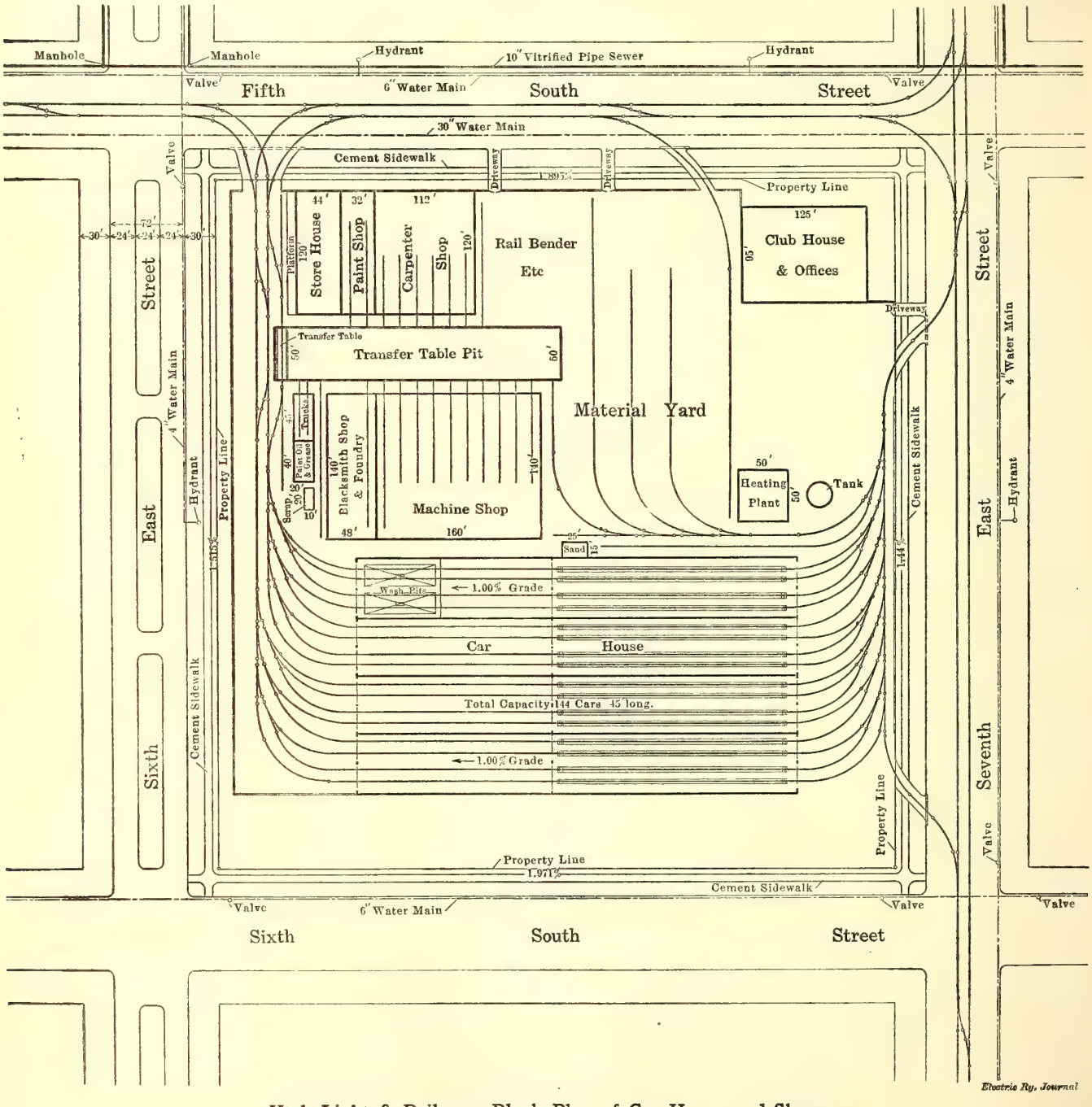


Cast-Iron Base for Tubular Trolley Pole

ment, and the concrete work throughout the structure was laid against galvanized iron forms and therefore presents a smooth surface. The walls are surmounted by concrete copings and pilasters to support the structural steel roof trusses.

The front of the building, which is designed in "Mission" style, is a series of reinforced concrete arches supported by brick piers and structural steel posts enclosed in concrete, protected on the outside by cast-iron boxes. Each of the arches spans two tracks and supports the brick end wall. These arches are made up of two 18-in. 55-lb. I-beams 28 ft. long,

The roof of this car house has 83,600 sq. ft. of waterproofed surface and 204 skylights, each 16 ft. x 8 ft. in size. The skylights are filled with wire glass 1-4 in. thick fitted in galvanized iron frames. The roof, which is supported by structural steel trusses spanning each four-track bay, is a concrete slab 3 in. thick reinforced with 6-in. Kahn mesh. The surface of the roof is water-proofed with four-ply Carey-magnesia roofing. This roof construction cost 25 cents per sq. ft. and the skylight construction 61 cents per sq. ft. The inside of the roof and the end walls of the car house are cal-



Utah Light & Railway—Block Plan of Car House and Shops

from which a curved steel plate ribbed with angles is supported by 5-8-in. hook bolts. The entire structural steel work of the arches is enclosed in a body of concrete 21 in. thick and 34 in. deep at the crown. In the end wall of each bay over the pier supporting the pair of arches is the monogram of the railway company. These monograms are 6 ft. x 6 ft. in size, and were cast of concrete and set in the 13-in brick wall. The opening under each arch is fitted with a Kinnear rolling steel door equipped for operation by an electric motor.

cimined cream color down to the height of 6 ft. above the floor. The wainscot is painted black.

Over each track current is fed to the cars through a trolley trough made of 4-in. 5 1-2-lb. channel irons with the edges turned down. These channel irons are put up in lengths of 31 ft. 9 in. and are held together with cast-iron clips. They are electrically bonded and are insulated from the steel roof structure with wood. By the use of the channel irons it is practically safe to run cars in either direction within the car

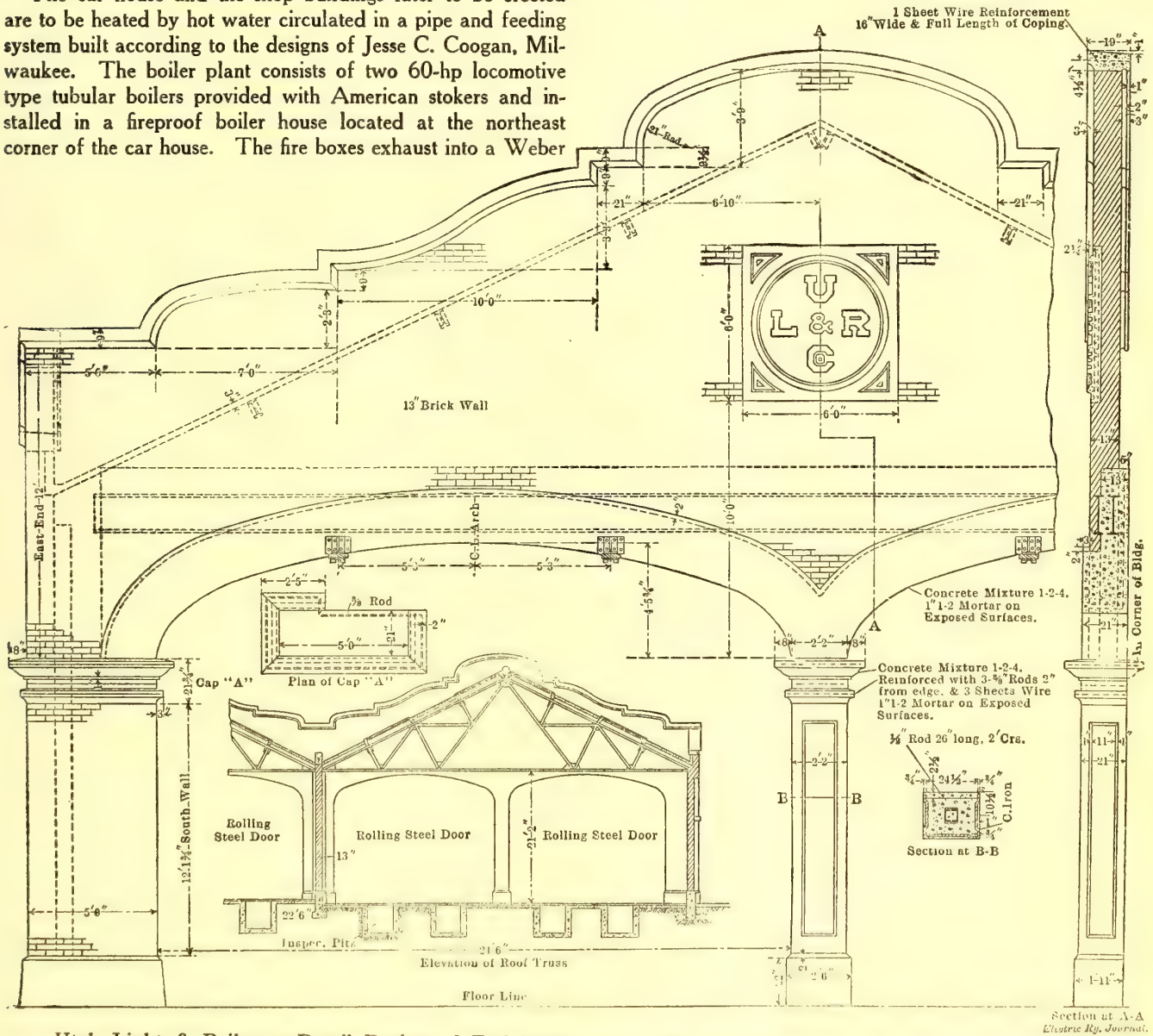
house without turning the poles, which hardly would be possible otherwise on account of the close proximity of the aisle sprinklers.

The entire interior of the car house is protected from fire with an installation of dry-pipe sprinklers made by the International Sprinkler Company. The valves controlling the admission of water are so equipped that they can be opened from several points throughout the car house by pressing electric contact buttons. Sprinkler lines are installed under the roof directly over each track, and there are also six lines of aisle sprinklers in each four-track bay with the sprinkler heads so located that the water will strike the top sash of a car window. A reserve supply of water is held in a 50,000-gal. tank erected by the American Bridge Company. The top of this tank is 97 ft. above the car house tracks.

The car house and the shop buildings later to be erected are to be heated by hot water circulated in a pipe and feeding system built according to the designs of Jesse C. Coogan, Milwaukee. The boiler plant consists of two 60-hp locomotive type tubular boilers provided with American stokers and installed in a fireproof boiler house located at the northeast corner of the car house. The fire boxes exhaust into a Weber reinforced concrete stack 100 ft. high. A thermostatic regulator controls the dampers on the boilers so that the temperature of the circulating water may be regulated automatically. This arrangement permits the circulation of water at 100 deg. in very mild weather, and also permits the raising of the temperature of the circulating water to 300 deg. in cold weather. Inasmuch as this possible variation in the temperature of the circulating water can be controlled continuously and the amount of coal burned also cut down in direct proportion to the rise in outdoor temperature, a considerable economy is said to result over the use of live steam, which would require sufficient fire at all times to keep the piping under pressure and afford circulation. It is expected that it will be possible to heat the entire plant in all except the most severe weather with the use of only one of the 60-hp boilers.

The front half of the car house, which is occupied by 16 pits, each 210 ft. long, is heated by a continuous coil of two pipes on each side of each pit. These coils are fastened to the concrete side walls with hangers which permit expansion movement. Series of coils are supplied with water from flow and return mains enclosed in a concrete trench, which extends from the boiler house across the full width of the building. The rear section of the car house, which will be used for storage, has a similar installation of supply mains and each of the four divisions in this end of the building is to be warmed by series of radiation coils, each 200 ft. long, supported on the side and division walls.

In the boiler house a Coogan turbine pump driven by a 3-hp motor circulates the hot water through the entire piping system. It is said that the load on this motor will be 1 1-2 hp for the entire plant. The small pump and its driving motor are the only mechanical devices, except stokers, used in the heating plant.



Utah Light & Railway—Detail Design of End Wall Arches and Elevation of Roof Trusses of Car House

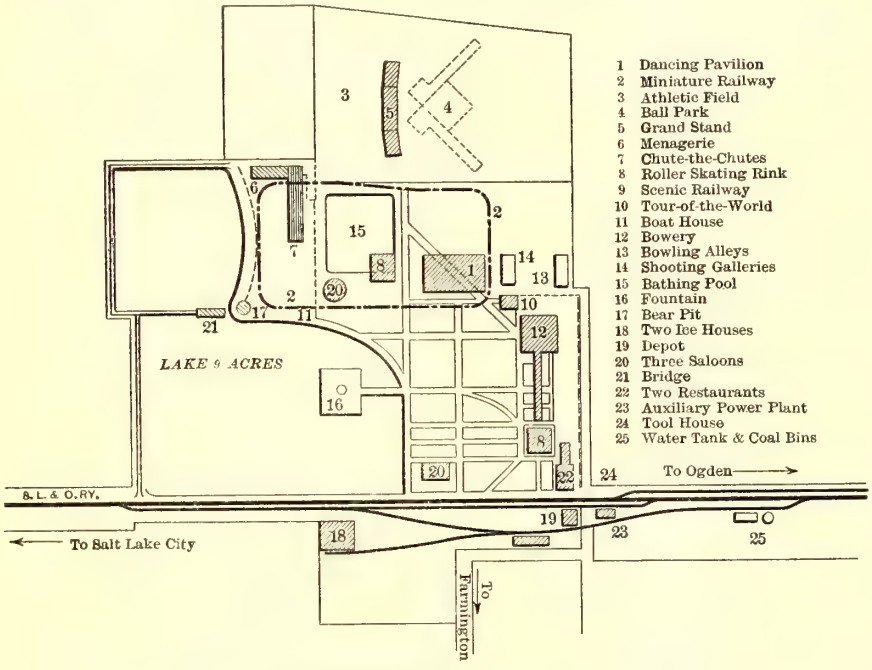
Electric Ry. Journal.

ELECTRICAL EQUIPMENT OF THE SALT LAKE & OGDEN RAILWAY

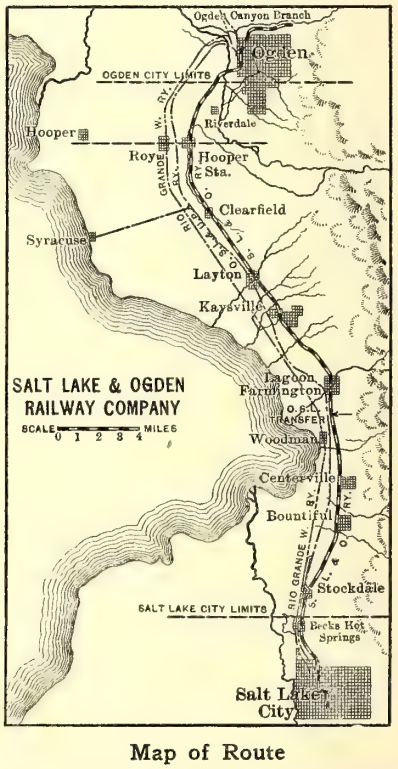
ELECTRIFICATION work on the line of the Salt Lake & Ogden Railway has progressed satisfactorily during the summer, and it is announced that electric cars will be running over the entire line from Salt Lake City to Ogden, Utah, by Jan. 1, 1910.

The Salt Lake & Ogden Railway began operating steam cars over its line between Salt Lake City and Layton, Utah, in 1892. Since that time the freight and passenger business has developed to such an extent that about two years ago it was found advisable to make provisions for facilitating the handling of this traffic. Accordingly H. A. Strauss, vice-president of the Falkenau Electrical Construction Company, Chicago, Ill., was engaged to act as consulting engineer, and after making a study of traffic conditions and the terminal facilities he recommended that the line be rebuilt and equipped for electrical operation.

Early in 1909 the active work of rebuilding the system was begun. The work now under way includes the construction of a new roadbed and track from Layton north into Ogden, a distance of 16 1-4 miles, also the regrading of many parts of the existing track and roadway, elimination of short-radius curves, lowering of heavy grades, relaying of tracks with heavier steel, bonding of rails, stringing of feeder and trolley wires and rearranging of the city terminals. The plans also called for the purchase of electric motor cars, rebuilding steam railway passenger cars for electric railway train operation, building substations and making arrangements for an adequate supply of electric power.



Salt Lake & Ogden Railway—Plan of Lagoon Park



Map of Route

The Salt Lake & Ogden Railway has its two terminals located in the principal cities from which it derives its name. The corporate limits of these two cities, Salt Lake City and Ogden, are 29.5 miles apart. The tracks connecting these cities, together with the branch lines and the lines that have been provided in the city streets, aggregate nearly 40 miles. The road is built on private right-of-way averaging 66 ft. in width between terminals. At both Salt Lake City and Ogden excellent terminal facilities are owned.

The line, which runs in a general north and south direction, traverses a fertile belt lying between the western slope of the Wasatch Mountains and the eastern shore of Salt Lake. The track, which has a maximum grade of 1.1 per cent and maximum curves of 6 deg. outside of the cities, is laid with 85-lb. steel and is bonded with No. 0000 twin terminal bonds. Franchises owned by the company provide for the operation of cars in Salt Lake City over 4 miles of track occupying some of the important streets of that city and around a block adjoining the Federal Building, near the center of the business section of the city. Part of these tracks will be used jointly with the Utah Light & Railway Company. The company also owns several pieces of property fronting on the streets traversed by its tracks, which will be utilized as needed for an additional car shop and storage tracks and for freight and passenger stations and other terminal purposes. At Tenth North Street the company's tracks cross the lines of the Oregon Railway & Navigation Company and the Rio Grande Western Railroad Company, with which roads the Salt Lake & Ogden Railway has definite arrangements for the interchange of freight. This crossing is one of the important junctions from which a large amount of business is derived.

Within the city of Ogden at the northern end of the railroad, the company owns a private right-of-way to a depot on the main street. From here the electric cars will operate along the public streets to a terminal loop located opposite the Federal Building of that city. Branch lines connect with the main line at Stockdale, Bountiful and Kaysville. These spur lines are from 1-4 to 1 3-4 miles long and each serves brick and stockyards, which originate a substantial amount of freight traffic.

For the present, heavy freight will be handled over the electrified road by steam locomotives, which will be run only at night. The freight traffic during the past year exceeded 190,500 car-miles. This figure, however, includes practically 90 car-miles per day of light freight, which will be handled by electric cars. A substantial milk, perishable freight and express business has been developed and soon will be handled on the electric cars.

The track has been rebuilt for high-speed operation. An hourly local service with running time of 1 hour and 45 min-

utes between terminals will be maintained. In addition to local trains a limited train will leave each terminal every three hours during the day and is scheduled to cover the distance between terminals in 70 minutes, making only three stops en route. It is planned to operate single motor cars during the hours of light traffic. Trail cars will be added, however, to suit the needs of the traffic and also additional motor cars with train control when required.

At Farmington the company controls a summer resort known as "The Lagoon," which is freely patronized by the residents of the entire State of Utah and has been self-supporting for several years. This resort includes 40 acres of land situated between the Wasatch Mountains and the great Salt Lake. Among the many amusements provided here are the following: Dance pavilion, miniature railway, athletic field, ball park, menagerie, shoot-the-chutes, roller skating rink, scenic railways, boats, 9-acre lake, bowery, bowling alleys, shooting galleries, bear pits, etc. During the year 1908 there were about 250,000 admissions to the park. As soon as it is possible to give a more frequent service on the line leading directly to the gates of this resort it is expected that these figures will be surpassed.

POWER SUPPLY

Power for the operation of the line will be supplied either from a power house to be built by the company or from the high-tension lines of a hydro-electric power company, which run almost parallel with the railroad. Four substations, which are being built at intermediate points along the line, will be equipped each with two 400-kw rotary generator sets and the necessary auxiliary equipment. Direct current at 700 volts will be distributed to the cars by two No. 0000 grooved trolley wires supported on 3-8-in. Siemens-Martin steel-strand spans from poles back-guyed to St. Louis malleable iron guy anchors. One line of poles will be 35 ft. high and the other 30 ft. The poles are being treated with carbolineum at the butts and set 6 ft. in the ground. They are protected at the ground surface by a collar of concrete 23 in. deep extending 5 in. above ground to form a water table. A supplementary copper feeder of 750,000 circ. mil cross-section is being erected on one line of poles over the entire distance. The overhead fittings for this trolley and feeder installation were supplied by the Westinghouse Electric & Manufacturing Company, and the pole hardware by the Western Electric Company.

ROLLING STOCK

Ten motor cars have been built by the Jewett Car Company for use on this railroad, and 40 steam railroad passenger coaches will soon be rebuilt at the company's shops for electric train operation. The motor cars, which have a seating capacity for 60 passengers, are designed to conform as nearly as possible to standard M.C.B. specifications. The following are the dimensions of the cars:

Length over buffers	56 ft. 6 in
Length over corner posts	44 ft. 0 in.
Length from center to center of trucks	35 ft. 0 in.
Width over all	9 ft. 0 in.
Width over side sills	8 ft. 2 1-4 in.
Width, inside measurement	7 ft. 11 1-4 in.
Height from top of rail to center of drawbar	0 ft. 34 1-2 in.
Height from bottom of sill to top of car	9 ft. 7 in.
Wheel base	6 ft. 6 in.

The interiors of the cars are finished in solid mahogany with full-vaulted Empire ceilings. The main compartment has 15 reversible and four stationary seats of the Hale & Kilburn No. 199 type. The smoking compartment has four reversible and four stationary seats.

The baggage compartment occupies a space 11 ft. long at the front end of the car, and has two sliding side doors. This compartment is lined on the sides and ends with 2-in. ash strips. Two folding seats are placed along the side walls. The vestibules, which are 4 ft. 6 in. long, have end doors for use during train operation. The front end of the car is set off as a motorman's cab. The cars are built for single-end operation, but are equipped for double-end control. They are lighted by 16-cp frosted globe incandescent lamps, arranged as follows: Two lamps in the vestibule; 19 lamps on the deck rail, and 12 lamps on the ceiling of the main compartment; two ceiling lamps in the toilet room and eight deck and three ceiling lamps in the smoking compartment. Combination arc and incandescent headlights will be used. The lamps are grouped in circuits to allow for partial lighting, if desired.

The cars are equipped with Janney radial M.C.B. couplers and McConway & Torley draft gear adapted for train operation in heavy interurban service. Other equipment installed on these cars includes: Baldwin class 78-30 trucks, Symington ball-bearing centerplates, Woods roller side bearings, Keystone air sanders, Edwards window fixtures, Curtain Supply Company's ring curtain fixtures, Duner toilet fixtures, Westinghouse AMM brake equipments, General Electric 205-B motors, General Electric type M automatic control and Peter Smith hot-water heating system.

NEW OGDEN CANYON LINE

THE Ogden Rapid Transit Company operates a 12-mile street railway line within the city of Ogden, Utah, and is just completing a scenic suburban extension up the deep canyon of the Ogden River, 3 miles, to a popular hotel and resort called "The Hermitage." The road, which is built against the base of the mountainside, has largely been cut out of solid rock. The roadbed is just above a tumbling stream, on the opposite side of which is a highway. An illustration on Plate XVI shows a portion of the roadbed, the stream and the highway. This view was taken before the trolley wire had been placed. The cost for constructing the three miles of roadbed in this canyon was $85,000.

EMIGRATION CANYON RAILROAD

A FREIGHT and passenger road extending from the southeastern part of Salt Lake City to quarries located 14 miles away recently has been equipped for electrical operation by the Emigration Canyon Railroad Company. In the length of this line the road climbs to an elevation of 7000 ft. in the Wasatch Mountains. This trip affords many beautiful views of rugged mountain scenery. The original reason which called for the building of the road was the transportation of lime and sandstone from quarries in the mountains to Salt Lake City, where these materials are used for building purposes. The electrification of this road has brought about the location of many summer homes along the canyon and steadily-increasing passenger traffic. Power for the operation of the line is obtained from the Utah Light & Railway Company as high-tension alternating current and is converted at a sub-station located about the midpoint of the line. The rolling stock equipment includes two Washington type motor cars and two 40-ft. 6-in. open trail cars with canopy tops, manufactured by The J. G. Brill Company. The closed motor cars are designed for all-the-year service and have sufficient motor capacity to haul the trail cars for handling the heavy summer traffic.

ELECTRIC RAILWAYS IN AND ABOUT SPOKANE

STREET AND INTERURBAN RAILWAY SYSTEM OF THE WASHINGTON WATER POWER COMPANY

THE Washington Water Power Company owns and operates 75 per cent of the street railway system in Spokane, Wash., and also interurban lines extending southwest to Medical Lake and Cheney. Within the City of Spokane the company operates 75 miles of well-built track, and the interurban lines comprise 29 miles of track. The principal investment of the company is in several large water-power developments and a steam relay station, all of which are connected by a high-tension transmission system with 450 miles of pole line, tying the stations together and distributing power to many of the important cities in Eastern Washington and to the mining districts between Spokane, Wash., and Coeur d'Alene and Wallace, Idaho.

TRACK CONSTRUCTION

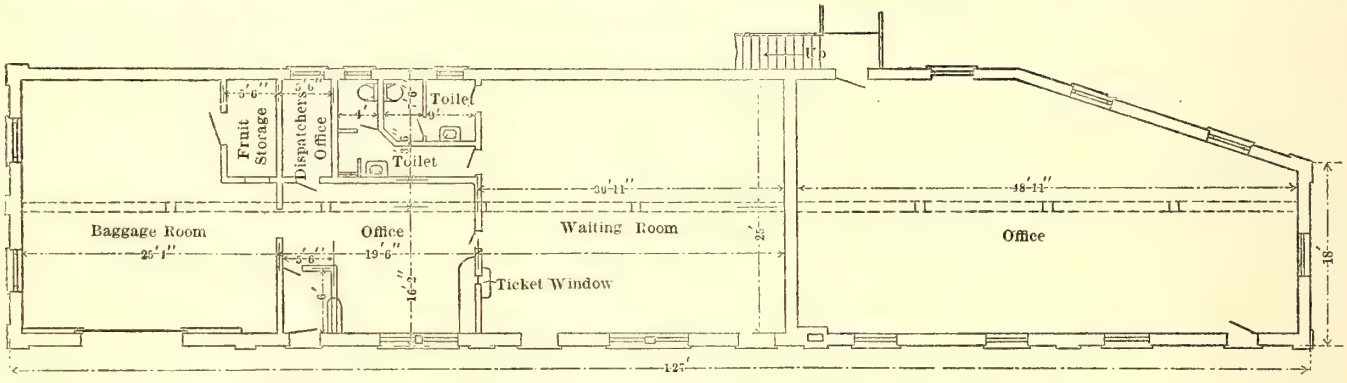
The company's tracks within the city limits of Spokane are laid with 7-in. 70-lb. T-rail connected by continuous rail joints and bonded with American Steel & Wire twin terminal bonds. Before installing these bonds the terminals are tinned and after the bonds have been placed in the rail the terminals are soldered to the steel, thus protecting them from corrosion. This method of soldering the bonds after installation was developed by the company's engineers.

The interurban lines are built on a private right-of-way and are modern in every respect. The tracks are laid with 60-lb. standard section rail and are well ballasted. The roadways are fenced and shelters are provided at important crossings. Attractive passenger stations have been built at the towns served. The overhead construction is standard flexible-suspension-supported d.c. single trolley.

It is the practice when building track to keep the cars operating on the street all the time and give up only one of the tracks to the construction forces during the time it is necessary to make the excavation and lay the rails. It is thought that by this means the continual passage of the cars over the track tends to set the ties into their foundation more securely than otherwise, and it is certain, also, that all the settlement takes place before the pavement is laid.

The track substructure includes a rock-ballast foundation on the top of which is a floor of concrete brought up above the rail base. Many of the streets in Spokane are paved with asphalt, and trouble has been experienced by the top coat of the asphalt being wedged up against the outside of the rail and above the running surface. In the track lately laid this troublesome feature has been obviated by a change in the method of placing the asphalt binder near the rail. Instead of bringing the binder level across the street and against the web of the rail, it is sloped down so that it does not come within more than 3 in. or 4 in. of the rail. The top coat thus fills the space along the rail from the concrete foundation to within 1/4 in. of the head of the rail. This top coat is pliable and so adjusts itself in expansion and contraction that it does not pile up, as it did when the binder was laid against the rail web.

The company makes its own trolley ears at its large repair shops in Spokane. These ears are cast in the brass foundry and finished on a shaper in the machine shop. Formerly when finishing one of these ears it was necessary to use three settings of tools and take three cuts to smooth the interior groove and the outside of the two lips. To effect an economy in this process an improved tool with a removable center was made, and with this tool the groove and lips of a trolley ear can be finished both inside and out on a shaping machine with one setting. The cutting tool has a V-shaped edge, in the center of which a removable piece of tool steel, ground with a round nose, is set. This removable piece serves to finish the inside of the ear and it may be lifted out for sharpening.



Washington Water Power Company—Floor Plan of New Station Building

BUILDINGS

The Washington Water Power Company's headquarters are in an especially fine office building owned by the company. The first floor of this building is used by the lighting department for a display room and as a public business office. The upper three floors are occupied entirely by the company's engineers and officials.

A terminal passenger station is now being built on Wall Street in Spokane. This station will be two stories and a basement in height, 127 ft. long and 27 ft. 2 in. wide. Along the street side of the station a projecting roof will form a passenger shelter and protect the loading space between the track and the building. The interior of the first floor of this building will be subdivided into a baggage room 25 ft. by 25 ft., an office 13 ft. 6 in. by 16 ft. 2 in. for the dispatcher, toilet accommodations, a waiting room 30 ft. x 25 ft., and a general office for the transportation department 50 ft. x 25 ft. in size. In one corner of the baggage room will be a compartment 10 ft. x 5 ft. for fruit storage. The structure is being built of brick.

The interurban station at Cheney, the southern terminus of one of the interurban lines, is an attractive looking brick building, rectangular in shape and 26 ft. x 89 ft. in ground dimensions. The building has a wide overhanging roof covered with tiling. Suitable accommodations are provided for passengers, freight and baggage. The freight platform is 28 ft. in length.

The Washington Water Power Company has the only amusement park within the city of Spokane. This resort, known as Natatorium Park, has attractive natural surroundings which have been fully developed. During the present summer the company has completed an elaborate bathhouse with a concrete swimming pool 75 ft. x 152 ft. in size and ranging in depth from 3 ft. to 12 ft. The enclosing building is 107 ft. x 184 ft. in ground dimensions. A continuous stream of water is warmed and fed into the bathing pool by steam ejectors which lift the water from the well. The use of steam ejectors in this connection is thought to be unique. Steam for the operation of the ejectors is generated in three 80-hp boilers.

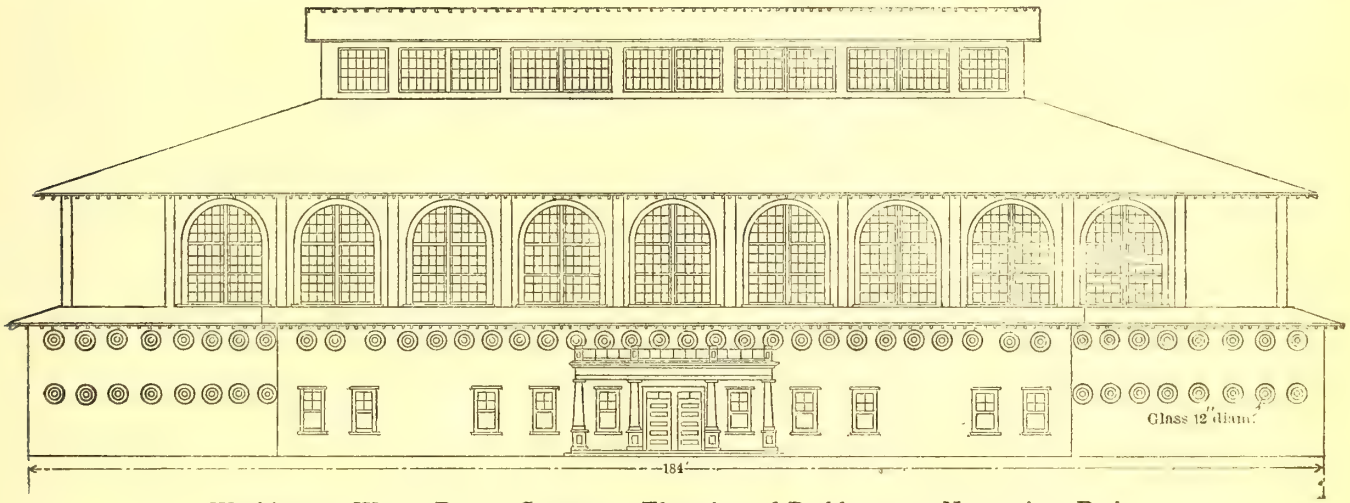
POWER STATIONS

The total generating capacity of the several power plants feeding the extensive transmission system is 40,500 kw. A power plant now in course of construction at Little Falls, on the Spokane River, will have an immediate additional capacity of 20,000 kw developed by four G.E. generators driven by I. P. Morris central-discharge horizontal turbines. The oldest water power station of the company is located within the commercial district of the city of Spokane, in the gorge of the Spokane River. This plant is now developing 13,000 hp and later, by the development of the total fall of 144 ft. within a distance of 1200 ft., the total capacity will be increased to 40,000 hp at low water. This plant is equipped with both a.c. and d.c. machines. The alternating-current machines operate in parallel with the transmission system and the direct-current machines feed the local street railway system.

At Post Falls, 24 miles east of Spokane, on the Spokane River, near its source at the foot of Lake Coeur d'Alene, the company has a power plant with an equipment of six 2,250-kw G.E. alternators driven by horizontal waterwheels. The plant is located at natural falls in the river. Just above the falls a bear-trap dam with Tainter gates diverts the water into the power-house canal. There is a head of 57 ft. The natural storage reservoir of the Post Falls plant is Coeur d'Alene Lake, which has an area of 45 square miles. Thus the company is not bothered with a shortage of water during the dry seasons. The power-station structure is a fireproof brick building supported on concrete foundations. Adjacent to the generator room is a transformer and switching station. In the transformer and switching station the current from the generators is stepped up to 60,000 volts potential, and fed to Spokane over either of two transmission lines and to Wallace, Idaho, on another line which is built in duplicate.

The steam relay station in the City of Spokane is an example of the latest type of plant and equipment. It is a brick structure supported on piling and concrete foundations. The boiler plant is made up of twelve 514-hp Aultman & Taylor hand-fired boilers. Steel stacks provided with four induced-draft fans built by the Buffalo Forge Company supply draft. Coal is unloaded automatically and transferred to the firing aisle by a bucket conveyor. The boilers are equipped with Mason steam pressure regulators and Spencer damper-operating mechanisms.

The main generating units are one 5,000-kw and one 9,000-kw 13,200-volt 60-cycle Curtis turbines. This plant is provided wtih a very complete switching gear for handling the 60,000-volt current delivered to the company's transmission system at its central substation in Spokane. The 60,000-volt transmission lines extending in three directions from Spokane center at a transfer substation located just south of the city. This station is provided with transfer buses and high-tension switching gear, as well as transformer equipment to lower the voltage for local distribution. An interesting feature of the 450-mile 60,000-volt transmission system of this company is the installation of open-air switches at the principal junction and branching-off points. These switches, which are of the horn type, are mounted on the tops of poles and are operated by long wooden rods which can be manipulated from a platform about 10 ft. below them.



Washington Water Power Company—Elevation of Bathhouse at Natatorium Park

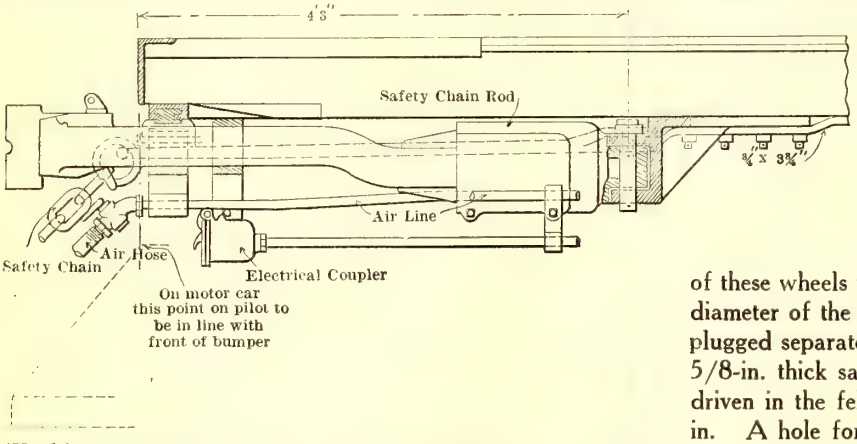
A large central receiving substation is now being built in the heart of the commercial district of Spokane. This building is to be 200 ft. x 107 ft. in ground dimensions and its equipment will include 30,000-kw capacity in transformers. The output of these motor generators will be used to supply the local railway system and the company's lighting feeders.

ROLLING STOCK

The shops of the Washington Water Power Company recently have completed a very useful combination wrecker and line car. This car has a substantially built box body mounted on Brill trucks carrying four GE-52 motors. The car complete weighs 21 tons and is equipped with National Brake & Electric Company's air brakes, two arc headlights, an elevating tower with swinging platforms which serves two tracks, and a reel stand for trolley wire. A swinging bracket and

chain block are provided at the entrance door of the car so that heavy supplies or tools can be lifted easily and swung onto the car floor. The roof of the car is floored over so that the linemen are free to use the entire space in their work. Several of the operations of the car and its equipment are controlled by compressed air. At the motorman's position there is the usual type of engineer's valve, also one which admits air to a large piston for raising and lowering the trolley tower, and a valve which operates an air brake on the trolley-wire pay-out wheel. An electric bell circuit is provided with a push button on top of the tower and a bell within the body of the car so that the linemen may conveniently signal the motorman. The telephone equipment is a wall set mounted with a hinge and so weighted that when it is not in use it will be held against the roof of the car and out of the way. A work bench, vise and a complement of small tools are carried on the car.

The rolling stock equipment of the Washington Water Power Company includes 108 city and interurban passenger, freight and miscellaneous cars. The passenger equipment bodies are mounted on a special type of Brill trucks with reinforced corners and milled pedestal guides. The trucks under the interurban cars have a 6-ft. wheel base with inside-hung motors and brakes. Both city and interurban cars have 34-in.



Washington Water Power Company—Method of Attaching Coupler for Train Operation

Midvale steel wheels weighing 790 lb. Solid gears are used throughout. The standard city passenger car is a double-truck equipment with longitudinal seats at either end and cross seats in the center. The interurban freight cars are operated in trains and are mounted on M.C.B. type Brill and Baldwin trucks and, as in the case of the interurban passenger cars, have Washburn M.C.B. type couplers.

SHOPS AND CAR HOUSES

The main repair shops and car houses of the Washington Water Power Company are located in the western part of the city of Spokane. The group of buildings comprises a shop structure 255 ft. square, subdivided into a main repair bay and car storage with 10 tracks, a paint shop, stock room, blacksmith shop, machine shop, armature room, foundry and office.

The central operating headquarters for the city and interurban service are located in the two-story office portion of the main car house and repair shop building. The receivers' office on the second floor of this building has been designed to provide against burglary. The room has brick walls and a door and front covered with heavy boiler plate. There is no view through this side of the room into the general trainmen's quarters. Cash is received in a swinging metal drawer arranged similarly to the deposit trap of a receiver's safe. The adjoining car house has concrete side walls with an average length of 450 ft. The building is 130 ft. wide at the rear wall. There are 10 storage tracks ranging in length from 300 ft. to 575 ft. The car house and a portion of the shops are protected against fire by a dry-pipe automatic sprinkler system with 18 main distribution pipes. The sprinkler heads in the car houses are spaced one for every 8-ft. square at the ceiling and are located 8 ft. apart along the aisles at the level of the car transoms. The water supply for this system ordinarily is obtained from the city pipes, but there is a 50,000-gal. reserve tank mounted on a steel tower 75 ft. high, located in the car-house yard. This car house has concrete walls and timber roof and pit construction.

A new car house is being erected at Cedar Street. This building is 256 ft. long by 225 ft. wide and will have pit tracks to hold 180 50-ft. cars. The car house tracks are laid on 12-ft. 6-in. centers and at the connecting ladder the shortest curves are 45-ft. radius. Four concrete fire walls divide the building longitudinally. The steel doors over the track entrances are operated by electric motors.

SHOP PRACTICE

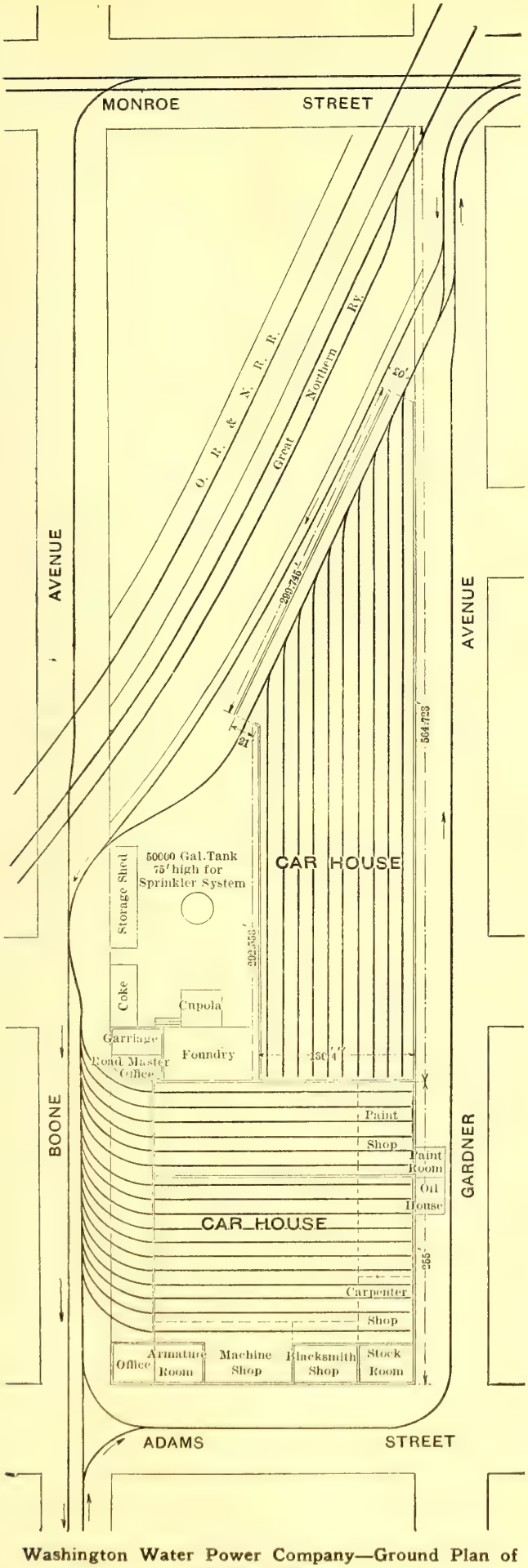
A view of the interior of the machine shop is presented on Plate XXI. The repair plant has a very complete equipment of machine and woodworking tools, and in this plant the company manufactures a considerable portion of its rolling stock parts and general supplies for the track and roadway department.

A type of trolley wheel is manufactured in the shops with which remarkably good results have been obtained. This wheel has the usual shape of web and rim. The hub, however, is fitted with a scheme for lubricating which has been developed by the company's employees. In the manufacture of these wheels the hub is first bored somewhat larger than the diameter of the bearing pin. Both ends of the hole are then plugged separately, and between the two plugs a layer of felt 5/8-in. thick saturated in oil is placed. When the plugs are driven in the felt is compressed to a thickness of about 3/64 in. A hole for the axle is then drilled in the ordinary manner. This felt washer retained at the center of the axle continually wipes it with the lubricating oil, which feeds outward, thus excluding the dust and affording a longer life to the bearing than can be had from the rim of the wheel.

In the truck shops a considerable number of welds of important parts are made with thermit and good results have been obtained. Controller repairing is not done on the cars, but when it is necessary to remedy some defect in a controller it is removed from the car and a new controller put in its place. In this way a car otherwise in operative condition is not held in for a minor repair.

In the maintenance work good results are being had from the use of a babbitt mixture comprising 100 parts of tin, 10 parts of antimony and 10 parts of copper. It is necessary to pour this mixture quickly and to have the molds hot. There results from this process a very tough metal which can be remelted often if not overheated. Special care is taken not to get any zinc into the babbitt mixture. As a precaution against this the babbitt is chipped and not melted out of the brass linings. To provide against overheating the babbitt mixture a large body of metal is used, heated by a wood fire which is easily controlled.

All of the wire from burned fields is cleaned and reinsulated with a machine purchased from the American Insulating Machinery Company. This wire-insulating machine will handle any size of wire from No. 10 to 1/2-in. square, but is used principally in reinsulating field wire. When a coil



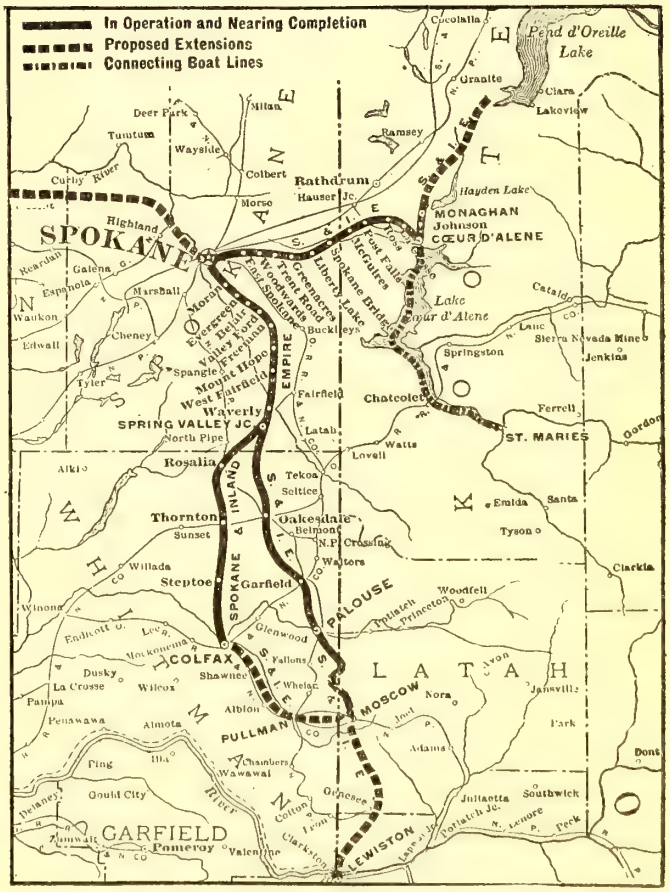
Washington Water Power Company—Ground Plan of Spokane Shops

of field wire is to be reinsulated the field spool is heated until the insulation is carbonized. Next the wire is fed through a scraper and then into the winding machine, where it is straightened thoroughly, cleaned and a cotton covering of single, double or triple braid applied. No. 80 S. I. 18-end cotton is used. The cost for reinsulating wire with this machine is stated to be less than 2 cents per pound for labor and material.

The oil house and paint storage rooms for the repair shop are concrete structures built underground and outside of the main shop wall. The rooms connect with the shops by concrete stairways, the openings to which can be closed by fire doors. The oil pumps are located below the floor level and the storage tanks are filled from out of doors. Oil is drawn from these tanks by six Bowser measuring oil pumps. The sprinkler system is extended into the underground oil house and into the paint storage room.

SPOKANE & INLAND EMPIRE SYSTEM

ONE of the two street railway systems in Spokane is owned and operated by the Spokane & Inland Empire Railroad Company. The other, as described, is owned by the Washington Water Power Company. The principal investment of the Spokane & Inland Empire Company, however, is its well-built interurban electric railway system, serving the large cities of eastern Wash-



Spokane & Inland—Map of Routes

ington and extending into Idaho at two points about 90 miles apart. From the passenger terminal at Spokane the lines of this railway radiate in two directions. To the east along the Spokane River a direct-current operated line serves a highly developed irrigated valley between Spokane and Coeur d'Alene, and an extension from Coeur d'Alene reaches Hayden Lake, an attractive resort. From Spokane south the single-phase division is a single-track line to Spring Valley junction, 40 miles, from which point two branches extend: one

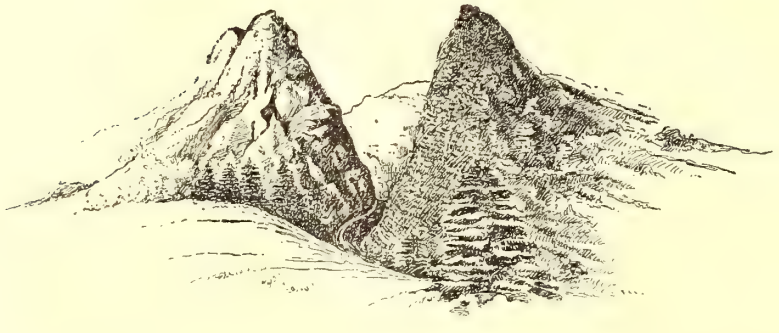
directly south to Colfax, 77 miles from Spokane, the other in a southeasterly direction to Palouse, 76 miles, and to Moscow, Ida., 90.4 miles from Spokane. The territory through which this southern division passes is a rolling wheat belt and a fruit and truck-gardening district.

In constructing the roadbed of the entire Spokane & Inland Empire system actual steam railroad standards have been so closely followed that no difficulty is experienced nor are special precautions needed when handling any train that a competitive steam railroad may handle.

The principal constructional and operating features of the Inland Empire Railway system have been described in earlier issues under the following references: STREET RAILWAY JOURNAL for April 27, 1907, page 725, general description; Feb. 8, 1908, page 207, special train service. ELECTRIC RAILWAY JOURNAL for Oct. 10, 1908, page 898, hydro-electric power plant; Oct. 15, 1908, page 1085, an article on publicity methods by Charles E. Flagg, advertising agent; Feb. 27, 1909, page 364, description of park and lake resorts. ELECTRIC RAILWAY REVIEW, Feb. 20, 1907, page 148, description of terminal station and office building at Spokane; Sept. 7, 1907, page 279, description of mail trains; Oct. 19, 1907, page 678, facilities for handling foreign shipments of grain; Oct. 26, 1907, page 697, power system, including description of phase-changing and storage battery plant; Dec. 7, 1907, page 891, repair shop; Dec. 28, 1907, page 997, an article on the parlor-car service.

The Spokane terminal of the Inland Empire system is located in the heart of the city in the block adjoining the new Federal Building and close to the Spokane River. The freight terminal is about one-half mile distant up the river. Work is now in progress on the driving of a tunnel which will permit all the interurban trains to pass under the business center of the town, between the end of the right-of-way at the freight terminal and the passenger terminal without operating over street tracks, as now is done. The view of the terminal station and office building presented on Plate XXII shows a large crowd of people about to take trains on the Coeur d'Alene division to participate in the drawing for the Indian reservation lands which were opened during July of this year.

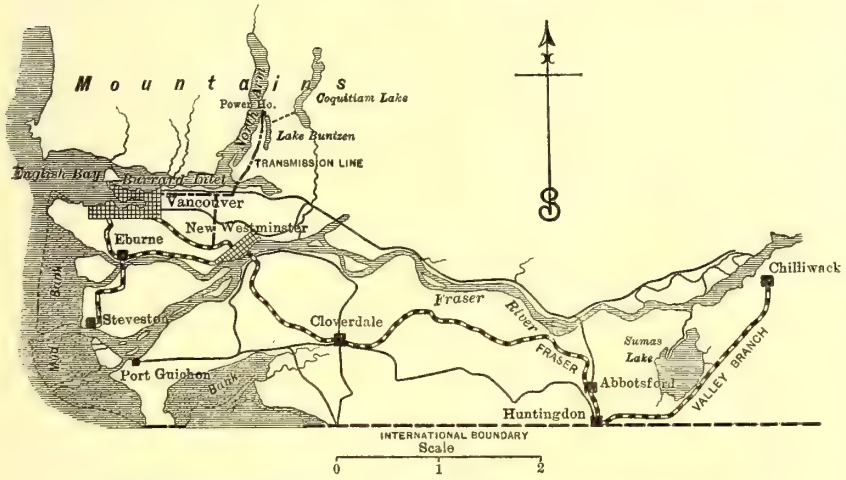
One of the many resorts on the Inland Empire system is Liberty Lake, Wash., which, in the past two years has been promoted by the railway interests. This resort is 17 miles east of Spokane on the Coeur d'Alene division. Liberty Lake is a beautiful body of water nestled among the foothills of the Mica Mountains at an elevation of 2,000 ft. The railway company owns property on the east shore of the lake and has built an attractive passenger station here with a loop track for turning its lake service trains. The Liberty Lake resort has been developed by the construction of dance and dining pavilions, bathing and boat piers and many smaller structures, all built according to the Swiss chalet style of architecture.



THE BRITISH COLUMBIA ELECTRIC RAILWAY

BRITISH COLUMBIA has shown a remarkable growth in the last 10 years. Vancouver, the largest city in the Canadian Northwest, is the commercial center of British Columbia. Since the first train over the Canadian Pacific Railway arrived in Vancouver in May, 1887, the population of that city has increased from 3,000 to 100,000, and its neighbor, New Westminster, has grown to be a city of 12,000 population. Vancouver has excellent water, rail and street transportation facilities. The British Columbia Electric Railway operates 24 miles of track within the city and has a total of 97 miles of track, centering in Vancouver. At the present time this road is being largely extended and many substantial improvements are under way.

The British Columbia Electric Railway now operates high-speed interurban lines to New Westminster on the Fraser River, 12 miles, to Steveston at the mouth of the Fraser River, about 20 miles, and a connecting service over the electrified Canadian Pacific Railway tracks between Eburne, the midpoint on the latter line, and New Westminster. By means of these lines it is possible to give direct service from Vancouver to Steveston and New Westminster and from New Westminster to Eburne, Steveston and Vancouver. The British Columbia Electric Railway has the railway, light and power franchises in all of these and other suburban cities. It is also giving similar service in North Vancouver, a city of 3,000 population, and owns and operates the 20-mile street and suburban system in the city of Victoria with 20,000 population on Vancouver Island. The company has under way a number of extensive projects which will include the construction of 12 miles of suburban trolley and the installation of lighting and power service wires through the district, which will be reached by the new lines. The old interurban line between Vancouver and New Westminster has been reconstructed within the past year and double tracking for half of its length completed. The proposed plans for expansion include the construction of an interurban line on Vancouver Island, leading out of the city of Victoria, but the most important project now in hand is the construction of a 63-mile line up the Fraser River valley. It is anticipated that the first 20 miles of this line will be in full operation before the close of the present year and work well in hand on the remainder of the line. The constructional details of this long interurban line are presented later.



British Columbia Electric Railway—Map of District Served

OPERATION

The operating headquarters of the British Columbia Electric Railway are in Vancouver. During the year ending June 30, 1909, the lines in Vancouver and its suburbs carried 25,250,000 passengers. This was an increase of 3,160,000 passengers over the number carried the year before, and these were carried with but a small additional increase of trackage. The headquarters of the transportation department are in the group of buildings which includes car houses, central repair shops and a substation near the commercial center of Vancouver.

Sixty-two regular city cars, 15 trippers and an observation car are regularly operated in Vancouver. The local service in New Westminster includes six regular cars. In Victoria the company has 40 cars. Six regular freight trains are operated daily between New Westminster and Vancouver.

The observation car, an illustration of which is presented on Plate XXIII, is built with cross seats rising in steps from the front to the rear. This car has a seating capacity for 50 persons. The heavy underframe is mounted on two pairs of Brill trucks, each carrying two inside-hung GE-67 motors. Westinghouse air-brake equipment and platform control are provided. This car, which presents an attractive appearance, was built in the shops of the British Columbia Electric Railway, and makes two trips a day throughout the city and suburbs, visiting the bathing beaches, the ocean shore and Stanley Park.

On its city lines in Vancouver the company collects three classes of fares other than the straight 5-cent fares. Commutation tickets, good at any time, are sold six for 25 cents; workmen's tickets, good between the hours of 6 and 9 a. m. and 5 and 7 p. m., and are sold eight for 25 cents; children's school tickets are sold eight for 20 cents. Transfers given on any line are acceptable on any other line. Formerly a separate transfer was printed for each line, but a new transfer has been put into use, which covers all of the lines and thus a considerable saving in cost of printing is made by the use of the universal transfer. A sample transfer is reproduced on page 530. The original size of these transfers is 4 1-4 in. x 2 1-2 in. Fares and transfers are collected on the cars with Coleman portable fare boxes similar to those used in Montreal.

In training new men the course of instruction includes service on the cars with five different instructors, one of whom is an air-brake expert. After these five men have certified to the ability of a student he serves two weeks in the car house to familiarize himself with the details of the equipment and then is examined by the superintendent of transportation. The student is not required to write his answers, but dictates them to a stenographer in the presence of the superintendent. When the notes are transcribed one copy is retained by the superintendent and the other is sent to the general manager. The company maintains a course of lectures delivered daily by electricians and traffic experts. The men are invited to at-

tend these lectures and to broaden and refresh their knowledge on operating and maintenance subjects.

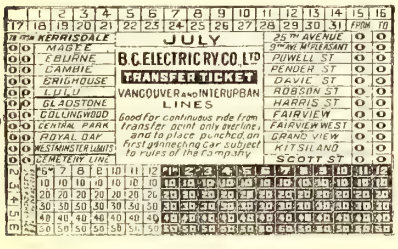
Trained ambulance corps fully equipped for the handling of emergency cases until the hospital surgeon arrives with more complete equipment, are maintained at the traffic headquarters and at one of the substations. The equipment for these ambulance corps includes two hand ambulances with very complete "first aid" outfits.

The shop forces of the British Columbia Electric Railway are divided into maintenance and car construction organizations. The maintenance shops are in Vancouver, while the construction shops are located on a large property just north of New Westminster. These shops have in hand the construction of 26 city passenger cars, built with platforms on which the pay-as-you-enter method of fare collection may be used if desired, work locomotives and two portable substations for the new Fraser valley interurban extension.

Seventy men are regularly employed in the car construction shops, which are fully equipped for building car bodies and trucks. Views of the interior of the shops and of a passenger car and freight locomotive built here are presented on Plate XXIII.

POWER GENERATION

Power for the operation of the cars and for feeding the lighting and commercial circuits is generated in a large hydraulic station owned and operated by the company and located at tidewater on the north arm of Burrard Inlet, 16 miles from Vancouver. The generating equipment consists of four pairs of 3,000-hp Pelton wheels, each pair driving a Westinghouse 1,500-kw 3-phase 2,200-volt generator and one pair of 5,000-hp Pelton wheels driving a GE 5,000-kw 2,200-volt generator. Construction work is well advanced on an extension of the plant, which will permit the installation of a 5,000-kw Dick-Kerr generator to be driven by a 10,000-hp Doble waterwheel.



Universal Transfer

The water supply for operating this plant with its present capacity of 22,000 hydraulic horse-power now developed and 50,000 hp total capacity, is taken from Coquitlam Lake, a body of water about 6 miles long, located 3 miles over a mountain ridge from the power house. The original outlet of this lake led to the Fraser River, about 18 miles south of the south end of the lake. Flowage through this outlet was stopped by the construction of a 12-ft. dam, and thus the lake made into a large reservoir. From this lake a tunnel 12,774 ft. long was driven under a mountain nearly a mile high, and a new outlet for the waters of Coquitlam Lake was thus made. The tunnel discharges into Trout Lake, a body of water about 3 miles long, the north end of which is about 1.5 miles from the power house. From Trout Lake the waters are led through flumes and steel pipes to the power house located at the foot of a steep mountainside at sea level. The hydraulic head on the waterwheels is 400 ft., and water is fed to the Pelton wheels through riveted steel pipes varying from 54 in. to 60 in. in diameter. The 10,000-hp Doble wheels will be fed by similar pipes varying from 7 ft. to 6 ft. in diameter.

Provision for the large increase in the generating capacity of this plant is being made, not only by the extension of the power station building, in which work 7,000 cu. yd. of rock were blasted out of the side of the mountain and a very complete reinforced concrete wharf built on which to unload new machinery, but also by the enlargement of the tunnel between the two lakes and the construction of a new diversion dam at the foot of Coquitlam Lake. The original tunnel, 2.5 miles long, between Trout and Coquitlam lakes, was 8 1-2 ft. square in section. Its size is being enlarged to 13 1-2 ft. square, which will more than double the capacity. The diversion dam is being raised in height from 12 ft. to 60 ft., thus greatly increasing the storage capacity.

The output of the generators of this plant at 2,200 volts is controlled by a new switchboard with Westinghouse instruments and is conducted to a large reinforced concrete transformer house located on the mountainside, just above the power plant. In this transformer house is an equipment of air-blast step-up transformers with Sturtevant blast fans belted to Westinghouse induction motors. Here the pressure is stepped up to 40,000 volts and the current fed 18 miles by a transmission line to a receiving substation in the center of the city of Vancouver. A branch line feeds two substations, one located in New Westminster and one about 3 miles west of New Westminster on the interurban line to Vancouver. A new substation has been built on the Vancouver-Steveston line, and plans have been made for the construction of several stations on the Fraser River valley line to Chilliwack.

FRASER VALLEY BRANCH

An interesting description of the Fraser valley interurban extension now under construction, was read by Robert Howes, electrical engineer, before the last annual meeting of the Canadian Street Railway Association, and acknowledgment is made for the following information regarding the most interesting features of this line.

Immediately to the east and south of Vancouver and between the Fraser River and the international boundary line lies a strip of land measuring practically 60 miles in length and averaging 10 miles in width, through which the British Columbia Electric Railway Company is now building a modern interurban electric railway. This line, when completed, will be 63 miles long and will serve the territory referred to between the city of New Westminster and the town of Chilliwack. The line will pass lengthwise near the center of this tract of land and will serve the towns of Cloverdale, Abbotsford and Huntington. The road has been designed for high-speed operation, and the franchises secured by the company provide for the carrying of passengers, express, baggage and freight. The overhead trolley system with a line pressure of 600 volts d. c., will be used. At New Westminster the line will connect with the existing line, also owned by the company, between New Westminster and Vancouver.

PORTABLE SUBSTATIONS

The power used by this company for the operation of cars on all of its lines is obtained from a hydro-electric plant located on the north arm of Burrard Inlet, as earlier described. Along the new line substations will be located at New Westminster and Chilliwack and at four other intermediate points. The substations will be an average distance of 12 miles apart. They will be equipped with motor generators and air-blast transformers, which have a factory insulation test guarantee of 88,000 volts from primary to secondary and to the core. The incoming high-tension current will be controlled by 45,000-volt hand-operated oil switches. The motor generators will receive current at 2,300 volts. Two portable substations are now being built for use in case of emergency. These portable substations will be equipped with apparatus



Utah Light & Railway—Large Special Work Layout



Utah Light & Railway—Portable Bunker for Crushed Stone



Utah Light & Railway—Welding Track Joints by Thermit Process





Utah Light & Railway—Main Street, Salt Lake City, with and without Center Poles



Utah Light & Railway—General View at Front of New Car House, Showing Heating Plant and Elevated Water Tank for Supplying Sprinkler System



Utah Light & Railway—Interior of New Car House in Salt Lake City, Showing Skylight Arrangement and Lines of Aisle Sprinklers

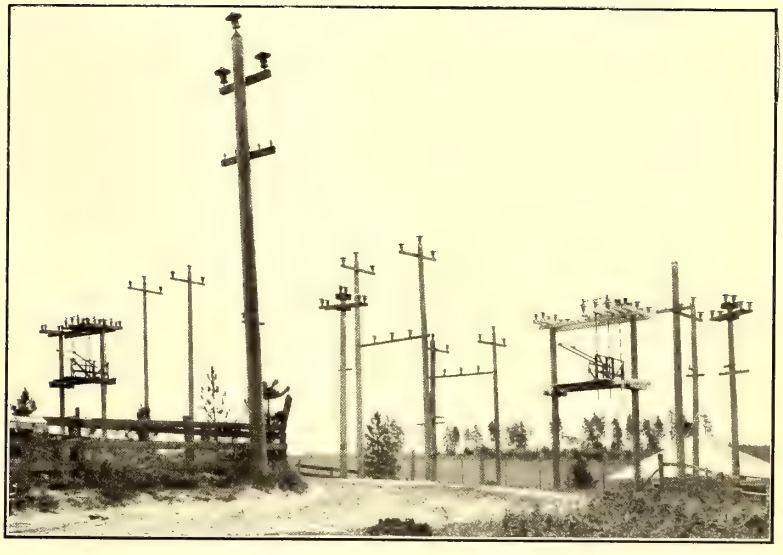


Washington Water Power Company—Dam and Tainter Gates at Post Falls

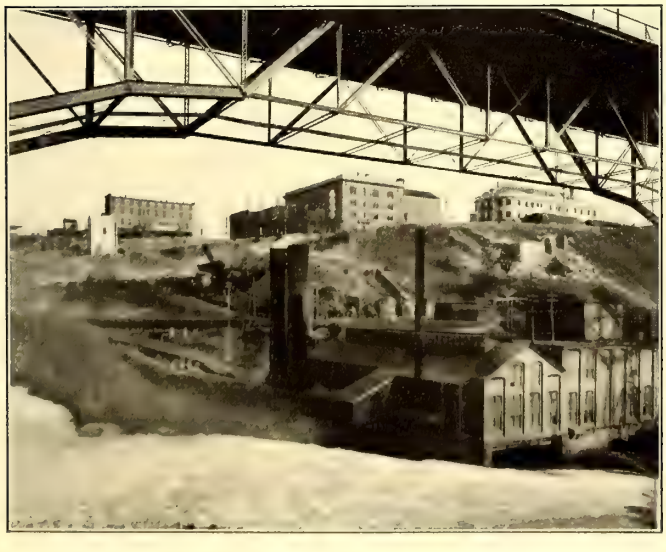


Washington Water Power Company—Interior of Post Falls Power Station





Washington Water Power Company—Cheney Interurban Line and Typical Open-Air Switching Station



Washington Water Power Company—Old Water Power Plant in Spokane



Washington Water Power Company—Boiler House of Steam Relay Station



Washington Water Power Company—New Spokane Car House





Washington Water Power Company—Receiving Substation and Steam Relay Station at Spokane





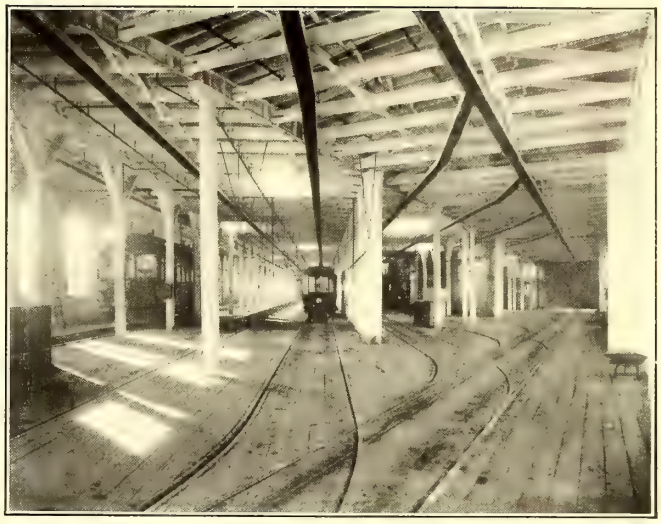
Washington Water Power Company—Interurban Station at Cheney and Spokane Office Building



Washington Water Power Company—Main Repair Shop and Car House



Washington Water Power Company—Line Car



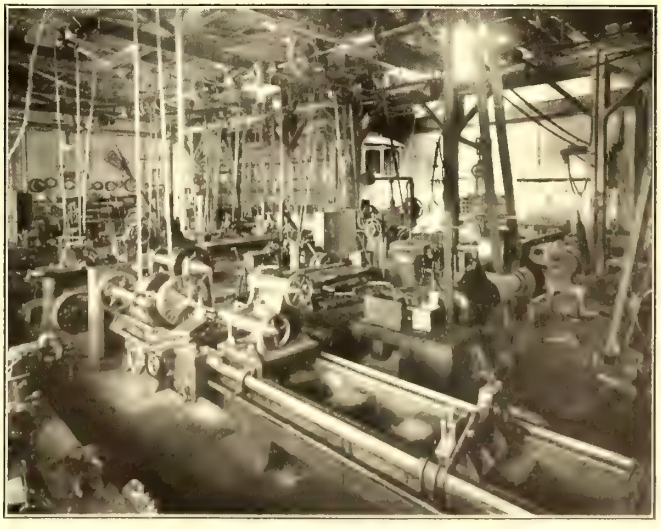
Washington Water Power Company—Car House



Washington Water Power Company—Standard Home-Built Freight Train



Washington Water Power Company—Standard Double-Truck Car Used in Spokane



Washington Water Power Company—View of Machine Shop Looking Toward Repair Bay



Spokane & Inland Empire—Terminal Station and Loading Tracks at Spokane



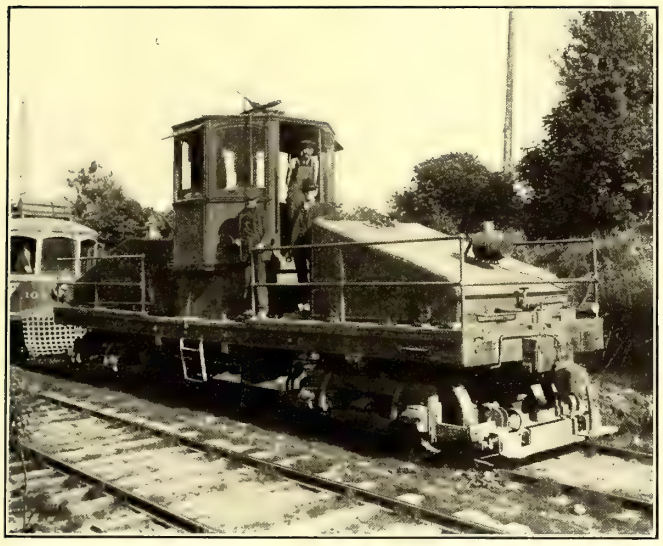
Spokane & Inland Empire—Beach at Liberty Lake



Spokane & Inland Empire—Liberty Lake Station



Spokane & Inland Empire—Heavy Freight Train on Single-Phase Division



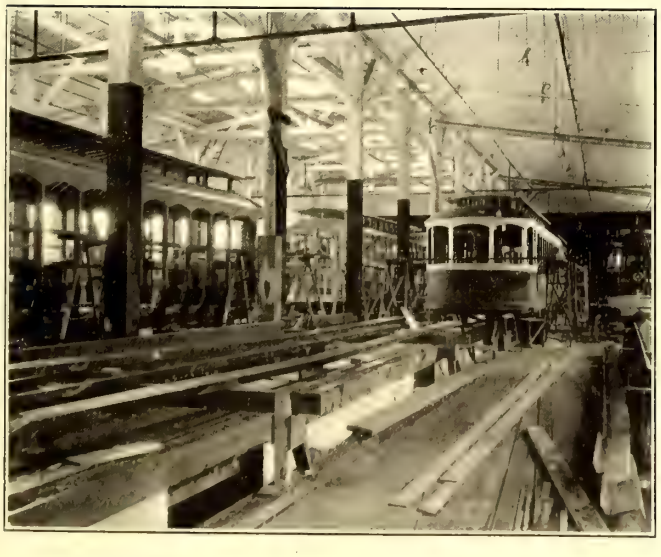
Vancouver, B. C.—Electric Locomotive



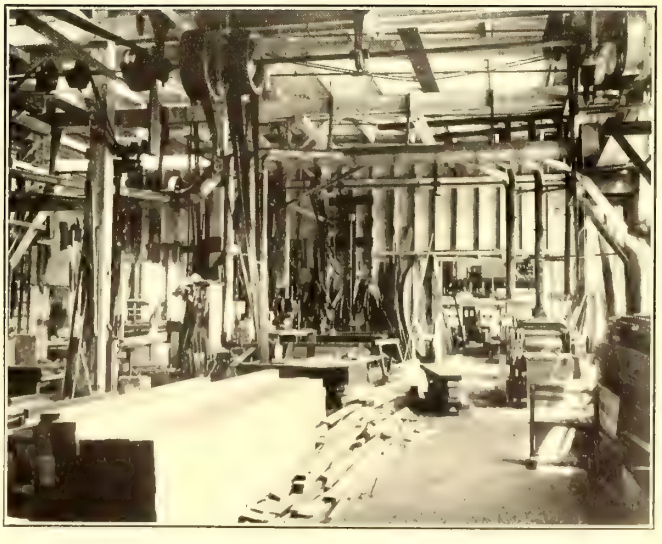
Vancouver, B. C.—Standard Passenger Car



Vancouver, B. C.—Observation Car Built in the Company Shops



Vancouver, B. C.—Interior of Erection Shop



Vancouver, B. C.—Interior of Mill at Car Shops



Seattle Electric Company—Standard Motor Equipment and Trailer



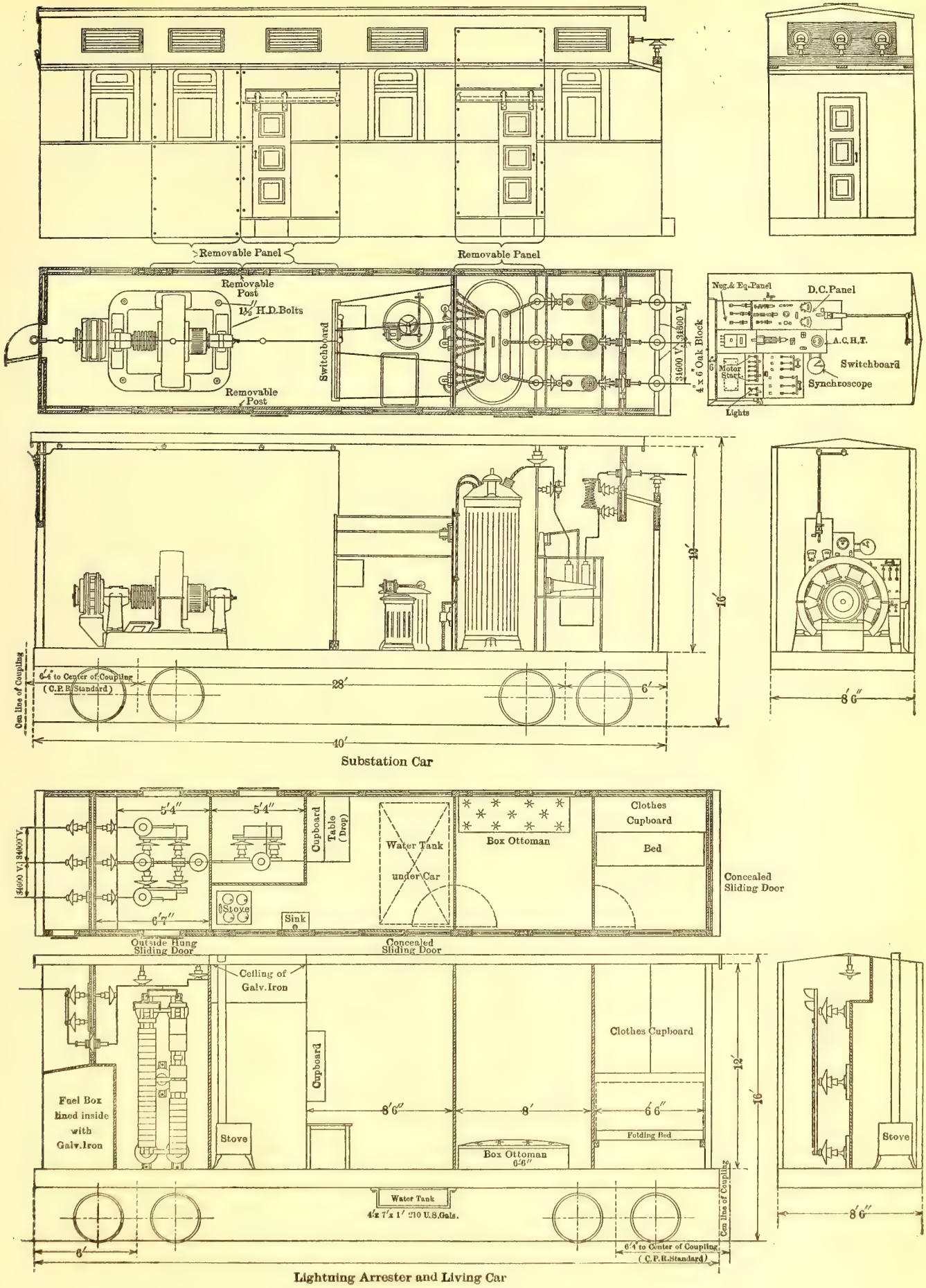
Seattle Electric Company—Division Superintendents, Station Masters and Traffic Aides



Seattle Electric Company—One Corner of Instruction Room



Seattle Electric Company—Division Headquarters, North Seattle



British Columbia Electric Railway—Plans and Sections of Two-Car Portable Substation

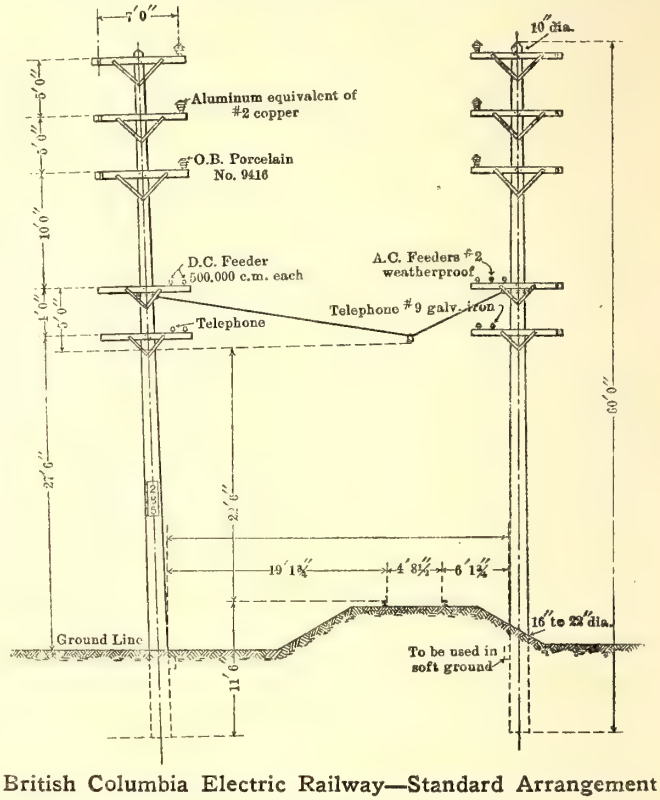
similar to that installed in the stationary substations, with the exception of one three-phase transformer instead of three single-phase transformers will be used to save space and weight.

The British Columbia Electric Railway and its subsidiary corporations operate in conjunction with their electric railway properties an electric light and power business. As there is a possibility of securing a great deal of power business through the territory served by this new railway, and to minimize the chances of a shutdown, the company is building duplicate pole lines, on each of which there will be strung wires for a three-phase transmission line. The poles are set on each side of the roadbed and are spaced 100 ft. apart. They will be used to support the span wires for the trolley-wire suspension.

The poles used in the construction of the pole lines are 60 ft. in length and have minimum 16-in. butts and 10-in tops. The cross-arms used on these poles are 8 ft. x 4 in. x 4 1-2 in. and are bolted to the pole by 1-4-in. x 4-in. lag screws. The arms are sway-braced by 1-4-in. x 1 1-4-in. x 3-ft. iron braces. To allow for future extensions three cross-arms for the transmission lines are provided on each pole. These are spaced 5 ft. apart. As the poles are exceptionally heavy and the transmission wires are light, it was decided to string the three-phase lines one above another and only on the track side of the poles. This arrangement precludes the use of equilateral triangular spacing of wires, but permits a wide spacing of the transmission wires on the short cross-arms. The arrangement also provides for the future possibility of running two sets of three-phase wires with short cross-arms on one set of poles. By this arrangement, an illustration of which is presented, either of the circuits can be repaired without shutting off the current from the other one. An easy means is provided also for making taps for branch lines. No. 0 stranded aluminum cables are to be used as transmission wires. These will be supported on triple-petticoat porcelain insulators tested to withstand 100,000 volts.

When necessary, current for light and power will be supplied from the railway transmission line, although in normal operation one of the three-phase lines will be used exclusively for railroad purposes and the other for light and power purposes. One of the objects of building duplicate tranmission lines was to have available at all times a supply of current which would enable the operators to keep the railway running in emergencies.

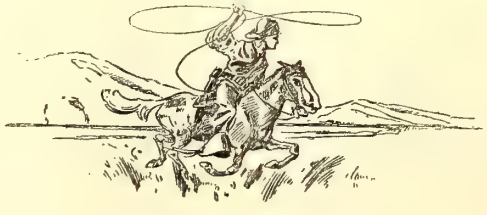
The track is being built with long-radius curves and a maximum of 2.7 per cent grades, which, when completed, will allow the operation of passenger trains at high speeds and the hauling of freight trains of large tonnage. The territory served by this line has not yet been fully developed, so it is not anticipated that the passenger traffic for the next few years will be exceedingly heavy, but it is expected that the freight traffic in lumber and farm products will tax the capacity of the line. About 20 miles of this new railway will be completed and ready for operation in December of the present year, and it is anticipated that construction work on the balance of the line will be well under way by Jan. 1, 1910. Already it has been announced by the officers of the company that if traffic warrants the arrangement, three-car trains will be operated over the first division of the line on a two-hour schedule. By this arrangement it is thought that ample



British Columbia Electric Railway—Standard Arrangement of Poles

provision can be made for handling the freight, which is awaiting the completion of the first division of the line.

Included in the rolling stock equipment ordered for this branch are three 50-ton electric locomotives, each of which will be equipped with four 160-hp 600-volt motors. These locomotives are to be provided with two trolley poles, which were thought necessary to give ample contact surface for gathering the requisite amount of current to supply the motor equipments when operating under load. The locomotives are to be built by Dick, Kerr & Company, Ltd., of England, and are to be of sufficient tractive power to haul freight trains made up of standard M. C. B. freight cars.



RAILWAYS OF THE PUGET SOUND DISTRICT

RAILWAY SYSTEM OF THE SEATTLE ELECTRIC COMPANY

SEATTLE, the metropolis of the State of Washington, is built on several long ridges which rise sharply to an elevation of from 250 ft. to 350 ft. above the water level of Puget Sound, which forms the western boundary of the city. Between these ridges are two lakes, the shores of which are occupied by fully developed residence properties. The uneven topography of the city brings about an unusual amount of riding and calls for especially careful operation. Because of the natural features of the city's location and of the marvelous increase in population served, the railway system of the Seattle Electric Company presents an interesting subject for study.

TRACK AND ROADWAY

The Seattle Electric Company has 191 miles of track in the city and its nearby suburbs. It is interesting to note that on account of the topography, 70 miles of this track originally were built on trestles. These trestles were necessary to adjust the grades and in some instances were required for tracks which serve a tide-flat area of about 5 square miles. Other lines are built along the water front, and in many instances, are located outside of the shore line at high tide.

The latest type of track construction installed by the Seattle Electric Company was illustrated in the ELECTRIC RAILWAY JOURNAL for April 3, 1909, page 590. The substructure supporting the rails comprises two stringers of concrete 16 in. x 10 in. in horizontal and vertical dimensions, tied together with a 6-in. floor of concrete. A mixture of 1:4:7 of cement, sand and broken stone is used. Rail chairs similar to those used in Philadelphia, spaced on 5-ft. centers and entirely buried in this concrete foundation, support the T-rails, which are tied with rods spaced on 5-ft. centers. The rails are fastened to the cast-iron chairs with lugs held on by bolts on either side of the foot of each rail. In placing brick or granite pavement a 3:1 mixture of sand and cement is used as a cushion for the paving blocks, which are grouted with a 1:1 mixture.

A large amount of track reconstruction has been made necessary in Seattle by the regrading work which the city has carried on in the business district during the past year. There are four regraded districts in which the original surface of the ground beneath thickly settled residence and business property has been lowered in some instances 105 ft. The larger part of the earth was removed by sluicing with water pumped from Puget Sound. Large nozzles served to turn the force of this water against the face of the hills. As the dirt was broken away it mixed with the water and was carried through sluices either to depressions to be filled in between hills or to the tide flats south of the commercial center which are being filled in and will form valuable railroad terminal properties.

The expense of this work to the railway company can be realized when it is stated that the company must stand the cost, not only for lowering its tracks and diverting its traffic (except on cable lines where the tracks were cribbed and the schedules maintained), but in some instances for removing a prism of earth 18 ft. wide and 105 ft. deep.

This regrading work now under way or completed was subdivided into three districts: Jackson Street regrade, 2500 ft. long, had a maximum cut of 95 ft., and the dirt was sluiced down the hill to make new land on the tide flats; Pine Street regrade was 3000 ft. long, and had an average fill of 20 ft.; Denny Hill regrade included 5000 ft. of track, which had to be lowered a maximum of 105 ft. Dirt from this regrade project was sluiced into Puget Sound. During the regrade work continuous service was maintained on the cable lines by supporting the track yokes on cribbing. The Madison Street cable line was operated on cribbing 30 ft. high at some points. As the work progressed the track was lowered or raised on cribbing at night.

The main business streets of Seattle paralleling the water front formerly had grades as high as 30 per cent, but these have been cut down to a maximum of 12 per cent. The regraded districts included several car-house sites, where it has been necessary to build new structures and place them on concrete posts, awaiting the completion of the filling-in work. At the location of the company's car house, office buildings and freight terminal, near the center of the commercial district, the grade was changed so that the sidewalks are now at the height of the tops of the car-house doors.

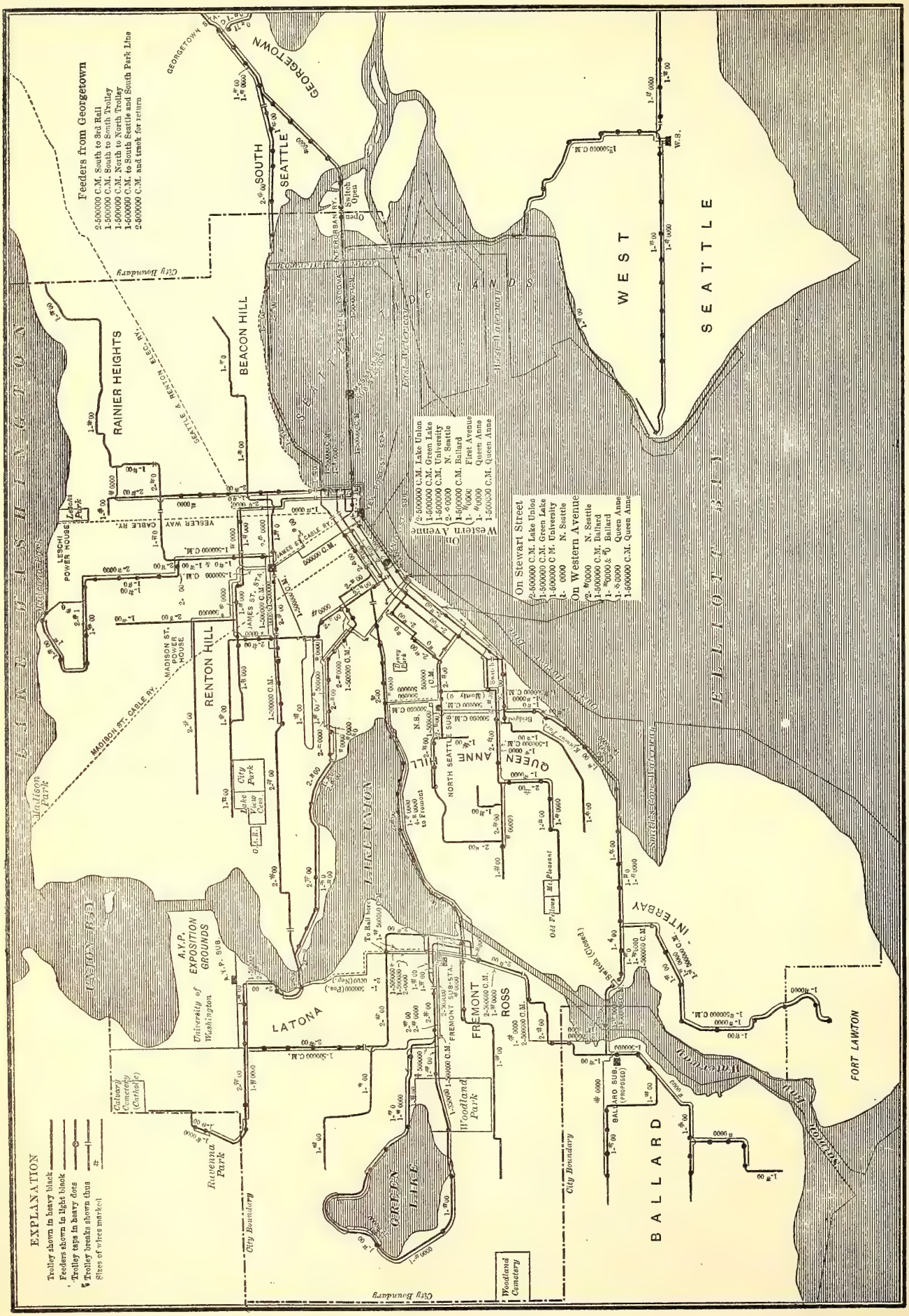
The great increase in the value of the car-house property brought about by the regrade work made it advantageous for the company to sell this car house and office property, and plans have been completed for a new modern office building to be located not far from the old site. The new building will be wholly occupied by the Seattle Electric Company, and its allied interests controlled by Stone & Webster, of Boston. It will be seven stories high, located on the corner of Olive Street and Seventh Avenue, and will be fireproof, having two floors below ground and dimensions of 60 ft. x 120 ft. A new freight house also will be built close by this building, with ground dimensions of 120 ft. x 240 ft. This structure will serve as a freight collection or distribution center for the extensive city package freight service carried on by the Seattle Electric Company.

TRANSPORTATION FEATURES

The Seattle Electric property is operated with four transportation divisions having headquarters at the more important car houses. The company has four car barns for electric cars, one for the electric and cable cars and two for cable cars only. Four hundred and twenty-five scheduled cars are now operated, 55 of which are cable cars. A year ago 318 cars were sufficient for handling the traffic. This increase of more than 100 regular cars has been brought about partly by the Alaska-Yukon-Pacific exposition, and more largely by the phenomenal growth of the city.

The shopping and office district of Seattle is about five blocks wide and a mile long, the main thoroughfares of which run parallel to Puget Sound. This district is shut in on its eastern side by a hill, also parallel with the Sound. The company has trunk lines on the four principal business streets through this district, and has three cable cross-town lines, which climb the steep hill separating the business district from the principal residence portion of the city in the rear. On account of these topographical conditions the traffic on the street car lines within the business district is especially heavy. Headways of 27 and 30 seconds are necessary on the more important lines.

The cross-town cable lines, which serve to carry the people up the steep grades to transfer points with electric lines, also



Seattle Electric Company—Map of Seattle, Showing Location of Trolley Wires and Feeders

serving a residence district, are known as the Yesler Way, James Street and Madison Street lines. On the Madison Street cable line there is a headway of 65 seconds and grades up to 15 per cent are negotiated. This line is about 2.25 miles long and 32 cars are operated. The cars are 29 ft. long, seat 44 passengers and are equipped with slipper track brakes. On an average heavy day these cars handle 28,000 passengers. The cables used in this service cost about $8,000 and last, ordinarily, about six months. During the rush hours the regular conductor on these cable cars is assisted by a "hill conductor," who rides with the car and helps to collect fares until the top of the hill leading out of the business district is reached. The hill conductor uses a portable register and the regular conductor the permanently installed car register.

The Seattle Electric Company operates a sight-seeing car, which makes two 26-mile trips daily. The features of most interest to visitors, which are reached by the sight-seeing trips, are: Leshi, Madrona and Madison Parks, attractive resorts originally promoted by the company. These parks are all located on the shores of Lake Washington and afford scenes of much natural beauty. The sight-seeing trip also takes the visitor to Woodland Park, Queen Anne Hill observatory, Ft. Lawton, Ravenna Park, with its big trees, several amusement parks and to the Alaska-Yukon-Pacific exposition grounds.

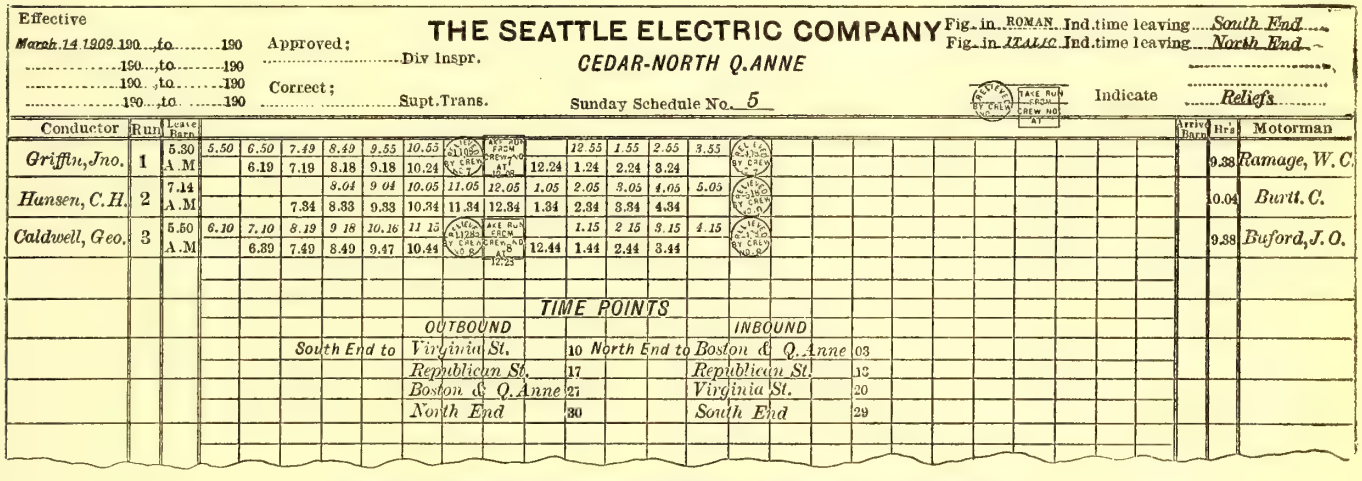
SCHEDULES

The transportation department of the Seattle Electric Company includes a traffic subdivision in charge of the assistant superintendent. This division studies traffic conditions and adjusts the schedules on all lines to suit the traffic, thereby reducing the car mileage to the lowest consistent figure. The basis for this schedule-making work is a chart on which the number of passengers carried on the regular cars and trippers each hour is shown by separate curves. On each chart a line is drawn to indicate the seating capacity of the cars, and thus there is available a graphical record indicating at what time during the day the loads were above or below the seating capacity, at what time the cars passed the reporting points and the headway.

These charts are supplemented by a system of reports from the traffic aides stationed at the more important traffic centers. If any curve shows an overcrowded or an unfilled condition of the cars, the assistant superintendent notes the fact and sends the chart to the schedule clerk, who superintends the formulating of the operating schedules. The schedule clerk has two assistants, and he not only carries on the work of making up the schedules, but also makes up the working lists. He is assisted in the latter duty by the division station masters.

Whenever the traffic charts show that a schedule needs readjustment the schedule clerks make up the first draft of a new schedule and the assistant superintendent then confers with the line inspectors or "traffic aides," as they are called in Seattle, regarding changing the number of cars. It is a part of the work of the traffic aides to observe closely how well the existing schedules are handling the loads, and to report frequently to the office with any suggestions that may assist in the improvement of the service. Whenever a new schedule is put into effect, the assistant superintendent gets frequent reports from the aides as to how the new schedule is handling the loads.

Three classes of schedules are now used by the Seattle Electric Company: Saturday, Sunday and week-day. One of these schedules, showing the use of rubber stamps for indicating the relief of crews, is reproduced. With the rubber stamp indicating the time of relief or the time of taking a run, and the number of the crew interested, there is little opportunity for a misunderstanding. Two forms of stamps are used. The stamp indicating the relief time for a crew is



Effective March 14 1909. 190 ... to ... 190 Approved: ..... Div Inspr.
190 ... to ... 190
190 ... to ... 190 Correct: ..... Supt. Trans.
190 ... to ... 190

THE SEATTLE ELECTRIC COMPANY
CEDAR-NORTH Q. ANNE
Sunday Schedule No. 5

Fig. in ROMAN Ind. time leaving South End
Fig. in ITALIC Ind. time leaving North End
TAKE RUN FROM CREW NO. AT
Indicate Reliefs

Conductor	Run	Leave Barn														Arrive Barn	Hrs	Motorman
Griffin, Jno.	1	5.30 A.M	5.50	6.50	7.49	8.49	9.55	10.55	RELIEVED BY CREW NO 8	ACT RUN FROM CREW NO AT 12.25		12.55	1.55	2.55	3.55	RELIEVED BY CREW NO 8			9.38	Ramage, W. C.
				6.19	7.19	8.18	9.18	10.24			12.24	1.24	2.24	3.24						
Hansen, C. H.	2	7.14 A.M				8.04	9.04	10.05	11.05	12.05	1.05	2.05	3.05	4.05	5.05	RELIEVED BY CREW NO 8			10.04	Burtt, C.
					7.34	8.33	9.33	10.34	11.34	12.34	1.34	2.34	3.34	4.34						
Caldwell, Geo.	3	5.50 A.M	6.10	7.10	8.19	9.18	10.16	11.15	RELIEVED BY CREW NO 8	ACT RUN FROM CREW NO AT 12.25		1.15	2.15	3.15	4.15	RELIEVED BY CREW NO 8			9.38	Buford, J. O.
				6.39	7.49	8.49	9.47	10.44			12.44	1.44	2.44	3.44						

TIME POINTS

OUTBOUND			INBOUND		
South End to	Virginia St.	10	North End to	Boston & Q. Anne	03
	Republican St.	17		Republican St.	13
	Boston & Q. Anne	23		Virginia St.	20
	North End	30		South End	29

Seattle Electric Company—Typical Sunday Run Schedule

circular in shape, and that indicating to a crew that it is time to take a run from some other crew, is square. Black ink is used with the round stamp and red ink with the square stamp. Thus there is a prominent distinction between the two. The schedule sheets are posted in glass in frames mounted along the walls of the trainmen's quarters.

A training school for platform men is maintained at the general headquarters of the company. On account of the rapid increase in the number of cars used by the Seattle Electric Company, its school of instruction has been rather busy during the past year. During the month of May, 1909, 300 men took the course in this school. The apparatus of the school consists of three skeleton cars complete in every detail with working apparatus. Student classes are taken over the various routes in the city in a school car and given an opportunity for practice work and observation under the eye of instructors. The company furnishes the transportation employees with commodious quarters in each of the division car houses, supplies reading material and encourages club activities.

ROLLING STOCK

The rolling stock equipment of the Seattle Electric Company includes the 100 combination open and closed side-entrance cars, which were described in the ELECTRIC RAILWAY JOURNAL for April 10, 1909, page 693, and a complement

of special cars for handling sight-seeing traffic and special parties. Some of the new cars received during the present year are operated as trailers in connection with the other new cars used as motors. The company has received 130 cars of its standard stype from the St. Louis Car Company during the year 1909. These cars are equipped with Standard motor trucks, GE-80 motors and K 28-J control. Thirty of them have Standard steel wheels, and all have Tomlinson couplers and National air-brakes. The trailer service is found to be very satisfactory, but is adapted only for lines with moderate grades.

FREIGHT HANDLING

The Seattle Electric Company has industrial connections with many plants located about the city, and acts as local distributor for the freight brought into Seattle by the Puget Sound Electric Railway from its interurban districts and from Tacoma and Renton. The street railway company also makes local deliveries for steam roads and boats operated on Puget Sound and on Lake Washington. The principal freight station of the company is located close to the general office building in the heart of the city. Other stations are located at Ballard and at Massachusetts Avenue. The Ballard station will be shared jointly by the Seattle Electric Company and the Seattle-Everett Interurban Railway, which is now completing a line north from Seattle along the Sound to Everett. This station is near the docks of the Chicago, Milwaukee & Puget Sound Railway, on which docks the Seattle Electric Company has tracks so that it can receive and deliver lumber, wood and heavy materials. The Massachusetts Avenue station is located in the steam railroad terminal district and is used jointly with the Puget Sound Electric Railway.

The freight traffic in Seattle includes the collection of lumber, shingles and wood from the mills and their delivery to steam railways. About 50 carloads of this freight are handled daily, for which a switching charge of $5 per car is received. The company has 19 freight motor cars and 44 miscellaneous freight cars. Part of the motor cars are equipped with four 50-hp motors and those of later design have four 75-hp motors with multiple-unit control. The work of the freight department is under two heads: a freight agent who reports to the auditor and who handles rates, bills, solicitation work, etc., and a "freight inspector," who reports to the trainmaster and is in charge of all freight-car movements.

SHOPS

All important car maintenance and construction work is carried on in a very complete group of concrete shop buildings, which was built for the Seattle Electric Company in 1907 by the Stone & Webster Engineering Corporation. Constructional details of these buildings were presented in the Electric Railway Review for June 22, 1907, page 806. The shops are located at Georgetown, just outside of the Seattle city limits, and on a large property which is occupied partly by the Georgetown turbo-generating relay station of the company. The repair shop buildings, all of which are of solid concrete, include a machine shop, erection shop, paint shop, blacksmith shop and a combination store house, office and car house. Views of some of these structures showing their substantial appearance are presented. In addition to the group of concrete buildings there is a special track-work shop building of mill construction. With the exception of the store house, which has two stories, all of the buildings are one story high. All have concrete roofs with ribbed glass skylights.

The erection shop, 98 ft. x 180 ft., has four tracks leading from the transfer table and a complete equipment of woodworking tools. A mezzanine floor over a portion of the machine tool floor is used for wood storage. The paint shop, 100 ft. x 192 ft., which is across the transfer table from the erection shop, has 10 tracks. The building is subdivided across one end, forming a room in which the paint and varnish supplies are kept. Adjustable scaffolds are provided between the pairs of tracks in the paint shop and the floors are sloped to provide rapid drainage of wash water.

The machine shop is 160 ft. x 180 ft. in floor dimensions, and one corner of this building is set off as an armature room, 80 ft. x 64 ft. Seven tracks lead from the transfer table into the machine shop, one of which passes on through the building and into the blacksmith shop, 80 ft. x 32 ft., located at the rear. As cars are received in the machine shop from the transfer table, the bodies are lifted clear of the trucks by screw hoists, so that if desirable the separate parts of the car may be moved to the different shops. Within the machine shop, which has a complement of modern tools, is located the office for the shop foreman, a tool room under lock and key and a drafting-room for the machine shop draftsman.

The armature shop does all the winding for the lighting and power department as well as for the railway department of the Seattle Electric Company. This shop is provided with I-beam hoist tracks extending over the larger tools. The heavy parts are lifted by a Sprague electric hoist supported from this overhead track which extends outside of the building and above the siding close to the door, so that the electric hoist may be used in unloading supplies from freight cars. The equipment of the armature shop includes a home-made commutator grooving machine, a home-made pinion puller and an armature oven, which has been built of sheet steel and asbestos. This oven is large enough so that a man can walk inside. It is heated by steam in winter and electricity in summer.

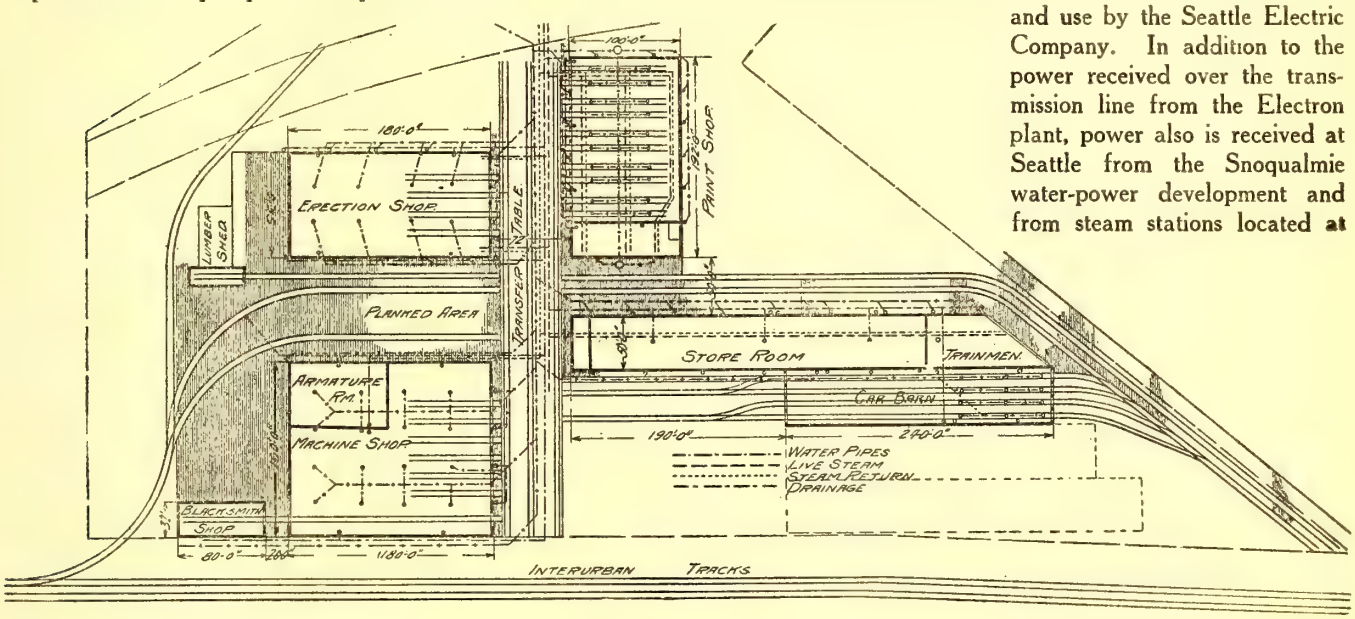
In winding railway motor field coils it is the practice to use Deltabeston wire and apply an insulation mixture of black Stirling insulating varnish and powdered mica. The coils are then baked for about 18 hours at 170 deg. F. The outside of the coil is protected from abrasion by asbestos tape and the completed coil is dipped in Mica Insulator Company's paint. The results from this winding practice are said to have been very satisfactory.

It is necessary to do a comparatively large amount of foundry and blacksmith work in these shops on account of the long distance from the more important sources of supply for such material. For this reason the blacksmith shop has a rather complete equipment of tools for car repair work and special track-work construction. The air-supply plant for the shops is located in a room in one corner of the blacksmith shop. This includes two Chicago Pneumatic Tool Company motor-driven compressors and a National Brake & Electric Company three-cylinder 225-ft. compressor direct-driven by a 40-hp Westinghouse induction motor. Oil-burning furnaces are used for melting babbitt.

The special track-work shop is a three-story frame building with no side walls for the first floor. This type of construction affords a large open space protected from rain in which long rails can be turned. The second floor of the shop is reserved for laying out curves and intersections. The third floor is a loft for the storage of templets. The templets which are used are built up of two flat wrought-iron pipes bent sidewise to the desired curves and bolted together by cross pieces, thus affording a rigid templet, which may be handled rather roughly without damage. The company builds its own hard-center special work as well as lighter special track work. All

machine and assembly work is done at these shops. Manganese steel centers are inserted in cast-iron frog blocks and held in place by bolts and babbitt. The special work yard is served by a large gin-pole crane and under the track shop building are a heavy bulldozer and portable forges.

The car house, office and store house sections of the shop group form a single structure 432 ft. long and 100 ft. wide, divided in the center by a concrete partition. The store-house section, 320 ft. x 50 ft., has two floors. The second floor is used for storing original packages and surplus stock. The estimated load capacity for this floor is 250 lb. per square foot. A switch track connecting with the Northern Pacific Railway facilitates the unloading of supplies directly at the door of the store house. Then they are trucked over scales onto an elevator, which carries them to the second floor. The car-house portion is 240 ft. x 50 ft. in ground dimensions and has four storage tracks. One end of the building is provided with open pits for inspection, another section with a plank floor and another with a concrete floor for car washing. Just through the wall from the car house is a part of the building used as the division headquarters. This section has a width of 50 ft. and an average length of 75 ft. It is fitted with tables, benches, lockers and toilet facilities. Rooms are provided for the storage of stationery and an office also is set off for the starter.



Seattle Electric Company—Plan of Shops

CONCRETE CAR-HOUSE CONSTRUCTION

The North Seattle car house is typical of the reinforced concrete structures which the Seattle Electric Company is erecting at its several division headquarters. A floor plan of this car house was presented in the ELECTRIC RAILWAY JOURNAL for Oct. 31, 1908, page 1275. The building is 190 ft. 2 in. wide by 191 ft. 8 in. long, and is supported on a series of concrete piers 20 ft. high. The elevated position of the floor was made necessary because of the proposed re-grade at this location. The building encloses 12 tracks built with open pits. This inspection and storage trackage is subdivided into two bays by a longitudinal wall of reinforced concrete. Along one side of the car storage portion is a very complete suite of offices and rooms for trainmen. The car house has a capacity for 60 cars and storage tracks are laid within the yard for 140 cars.

The front of this car house is made up of a continuous concrete beam supported in the center, each half spanning six tracks. The halves of the beam in turn are supported by the ends of the concrete cantilevers resting on columns 16 ft. back of the face line of the building. This construction feature provided car clearance so that the building could be set comparatively close to the street. The designs of the reinforced concrete columns, roof slabs, girders and the cantilevers which support the front of the building are presented on page 539.

POWER GENERATION AND DISTRIBUTION

The chief source of power for the Seattle Electric Company is the Electron plant of the Puget Sound Power Company, the stock of which is controlled by the Seattle Electric Company. The Puget Sound Electric Railway and the Tacoma city lines also are supplied from this plant. The power is transmitted 45 miles to Seattle at 60,000 volts. During the maximum load period the Electron plant supplies power to Seattle at the rate of about 12,000 kw, for distribution and use by the Seattle Electric Company. In addition to the power received over the transmission line from the Electron plant, power also is received at Seattle from the Snoqualmie water-power development and from steam stations located at Post Street in Seattle and in Georgetown, a suburb of Seattle. The respective amounts of power supplied from these various sources are indicated by the daily load diagram on page 539, which also shows the proportionate amounts of railway, lighting and power load.

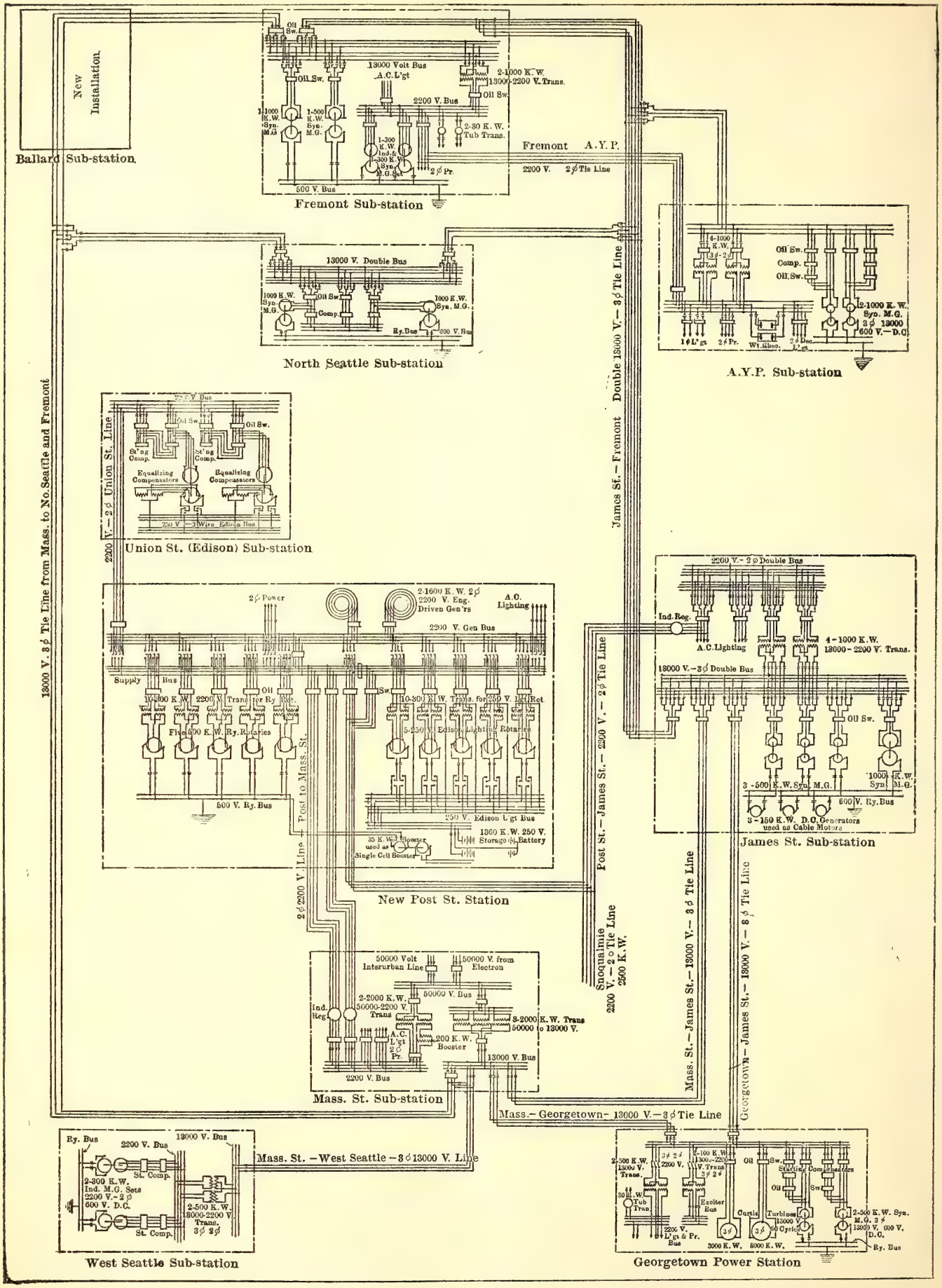
Power brought into the city over the high-tension transmission lines is received at the Massachusetts Avenue substation. Here it is transformed by 6000-kw capacity of transformers into 13,200-volt 3-phase current for railway motor-generators and by 4000 kw of transformer capacity into 2300-volt 2-phase current for lighting and power use. The 13,200-volt distribution to the company's seven substations is made on bare wire lines carried throughout the city on the tops of the lighting distribution poles. A map on page 534 shows the location of the trolley wires and feeders, the locations of the substations and the Post Street and Georgetown generating stations. The transmission circuits and their switching arrangements and types of converting units also are shown by an engraving on page 538.

The following table presents the types and capacities of units in the several substations now operated:

MASSACHUSETTS AVENUE SUBSTATION

Two 2000-kw G.E. step-down transformers, 50,000 volts to 2200 volts for tie-line system, local lighting and two-phase power.

Three 2000-kw G.E. step-down transformers 50,000 volts to 13,800 volts for tie-line system.



Seattle Electric Company—Plan of A.C. Power Distribution System, Showing Location and Capacities of Substation Apparatus and Steam Generating Stations

JAMES STREET SUBSTATION

Three 500-kw and one 1000-kw G.E. synchronous motor-generator sets, 13,200 volts three-phase to 600 volts d.c.

Four 1000-kw G.E. transformers Scott connected in two banks, 13,200 volts three-phase to 2200 volts two-phase, used for local a.c. lighting and transmission to Post Street over 2200-volt tie-line.

Three 150-kw 600-volt Edison bipolar generators used as motors to drive James Street cable.

FREMONT SUBSTATION

One 1000-kw and one 500-kw G.E. synchronous motor-generator set, 13,200 volts three-phase to 600 volts d.c.

One 300-kw G.E. synchronous motor-generator set, 2300 volts two-phase to 600 volts d.c.

One 300-kw G.E. induction motor-generator set, 2200 volts two-phase to 600 volts d.c.

Two 1000-kw G.E. transformers Scott connected, 13,800 volts three-phase to 2200 volts two-phase; for railway motor-generator sets, two-phase power and a.c. lighting.

Two 30-kw 6.6 amp tub transformers.

NORTH SEATTLE SUBSTATION

Two 1000-kw G.E. synchronous motor-generator sets, 13,200 volts three-phase to 600 volts d.c.

WEST SEATTLE SUBSTATION

Two 300-kw G.E. induction motor-generator sets, 2200 volts two-phase to 600 volts d.c.

Two 500-kw G.E. transformers Scott connected, 13,800 volts three-phase to 2200 volts two-phase.

ALASKA-YUKON-PACIFIC SUBSTATION

Two 1000-kw G.E. synchronous motor-generator sets, 13,200 volts three-phase to 600 volts d.c.

Four 1000-kw G.E. transformers in two Scott connected banks, 13,800 volts three-phase to 2200 volts two-phase; used for fair lighting.

BALLARD SUBSTATION

Two 1000-kw G.E. synchronous motor-generator sets, 13,200 volts three-phase to 600 volts d.c.

Three 1000-kw G.E. transformers, 13,200 volts to 2200 volts.

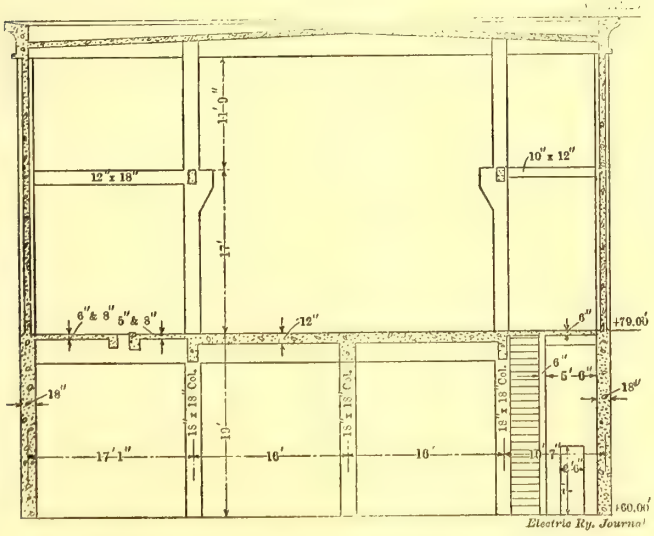
Below is listed the power apparatus in each of the steam power generating stations:

NEW POST STREET GENERATING STATION

Two 1600-kw Westinghouse 2200-volt two-phase engine-driven alternators.

Five 500-kw Westinghouse 500-volt–2200-volt rotary converters for railway service.

Five 500-kw Westinghouse 250-volt three-wire 2200-volt two-phase rotary converters for Edison Lighting service.



Seattle Electric Company—Dimensions of Reinforced Concrete Substation Structure

One 1360-kw 250-volt storage battery on Edison lighting service.

One 35-kw battery booster.

GEORGETOWN GENERATING STATION

One 8000-kw and one 3000-kw 13,800-volt three-phase Curtis vertical steam turbo-generators.

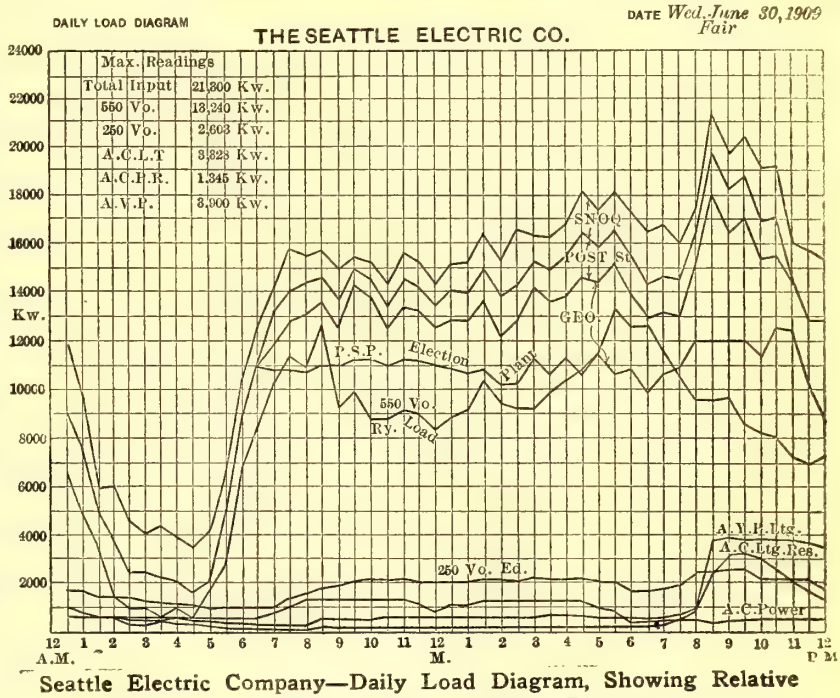
Two 500-kw G.E. synchronous motor-generator sets 13,300 volts, three-phase to 600 volts d.c.

Two 500-kw G.E. transformers 13,200 volts three-phase to 2200 vo two-phase for lighting and two-phase power.

One 30-kw G.E. 6.6-amp tub transformers for street lighting.

Two 100-kw G.E. transformers 13,200 volts three-phase, 2200 volts two-phase; used for station lighting and power.

The large power station at Georgetown is housed in a concrete structure which, together with the installation, was designed and erected by the Stone & Webster Engineering Corporation. The structure rests on a concrete monolith supported on piles set on 24-in. centers under the engine room and in rows of six under the boiler-house walls. The general dimentions of the building are: Engine room, 64 ft. 3 in. x 79 ft.; boiler house, 73 ft. x 151 ft. A floor plan of this station showing the arrangement of the turbine room and the boiler house with the firing aisle at right angles to the dividing wall was presented in the ELECTRIC RAILWAY JOURNAL for March 27, 1909, page 538. The areas per kilowatt of station capacity are, 0.43 sq. ft. for the engine room and 1.01 sq. ft. for the boiler room.



Seattle Electric Company—Daily Load Diagram, Showing Relative Amount of Power from Each Plant

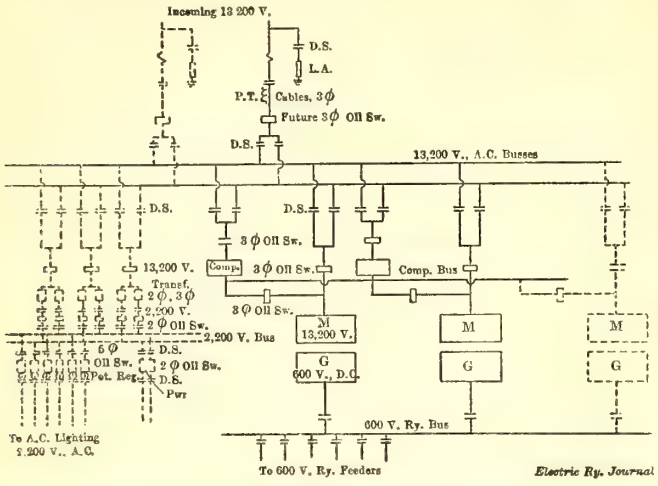
NORTH SEATTLE SUBSTATION

The North Seattle substation, a brief description of which was presented in the ELECTRIC RAILWAY JOURNAL for Oct. 31, 1908, represents the latest type of the Seattle Electric Company's installations. The main parts of the equipment of this station have been given in a preceding table. The building is a reinforced concrete structure, 61 ft. 2 in. x 72 ft. 1 1-2 in. in over-all dimensions, with a machinery room 32 ft. wide by 70 ft. long and 18 ft. 9 in. high to the lower side of the concrete roof beams. Crane girders are placed 17 ft. above the machinery room floor.

The machinery room floor, which is made up of 12-in. reinforced concrete floor slabs, was designed for 800-lb. live load plus 50,000 lb. concentrated load on the main 18-in. x 36-in. girders, which are spaced 14 ft. 1 1-2 in. between centers. The roof slab is 5 in. thick and is supported by concrete girders with 32-ft. span. The side walls are 6 in. thick.

As the construction of the Seattle-Everett Interurban line progresses the new substation at Ballard will be completed and another station will be built at Everett in which a 400-kw railway unit will be installed. These stations at Ballard and

Everett will supply the ends of the interurban line and a motor-generator substation at Hall's Lake, about halfway be-



Seattle Electric Company—Wiring Diagram of North Seattle Substation

tween the two cities, will feed the middle section of the catenary supported trolley now being erected.

TRAFFIC AND TRANSPORTATION FEATURES OF THE PUGET SOUND ELECTRIC RAILWAY

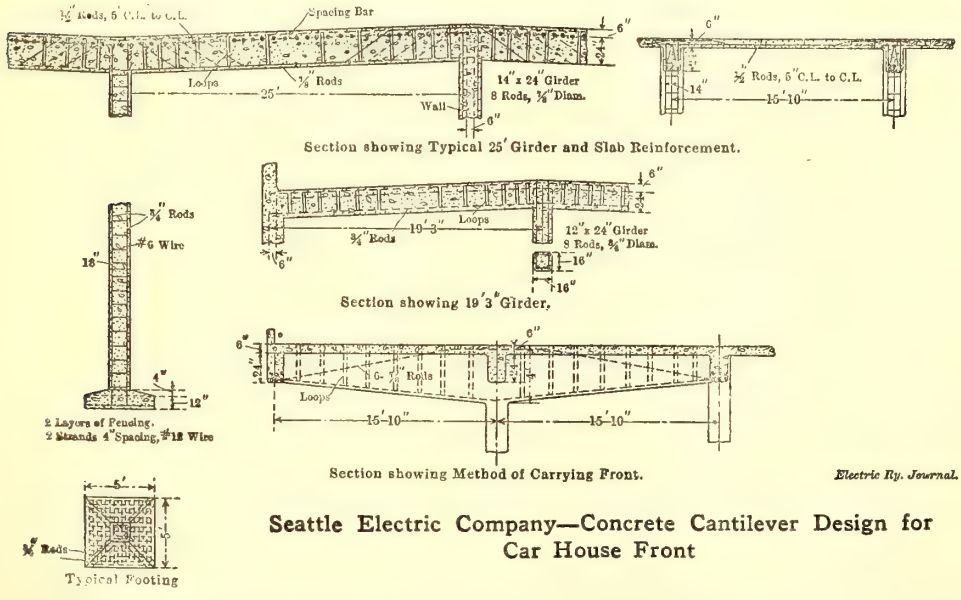
THE Puget Sound Electric Railway connects Tacoma and Seattle, the two largest and most important cities of the fast-growing and attractive Puget Sound district. Both termini are seaports which are favored with exceptional harbor facilities. The route of the interurban line between Tacoma and Seattle follows a very productive river valley, except near the Tacoma end, where distance is saved by cutting through a range of hills. The length of the line from terminal to terminal is 36.5 miles and measured as single track, the total length is 52 miles.

The equipment of this road, which is operated by third rail, is of the heavy interurban type for passenger service with M.C.B. standard steam cars for freight service, the freight trains being handled by electric locomotives. Eighty-four per cent of the track between Tacoma and Seattle is tangent, and 75 per cent of the curvature has a radius of 574 ft. or more, so that fast running time can be made. The track is of standard construction, with 70-lb. running rails and a 100-lb. third-rail. The road was first opened for service on Oct. 5, 1902.

The Puget Sound Electric Railway controls the Tacoma Railway & Power Company, and both properties are managed by one organization, which is a part of the Stone & Webster Management Association. W. S. Dimmock, manager of the Tacoma Railway & Power Company and the Puget Sound Electric Railway, has had charge of the operation of these properties since the interurban line was built, and under his guidance the amount of traffic handled has shown a great increase. During the summer season this year the passenger traffic of the Puget Sound Electric Railway has been considerably augmented by tourists visiting the Alaska-Yukon-Pacific Exposition at Seattle. On account of the excellent transportation facilities between Seattle and Tacoma, Tacoma has shared largely in entertaining Seattle's visitors.

SERVICE

The operation of the passenger and freight trains is conducted with about the same methods as those used by single-track steam railways. The standard code of rules of the American Railway Association is used and is followed very closely. The passenger service over the main line between Seattle and Tacoma includes a three-car train each way every hour from 6 a. m. till 11 p. m. The running time of these trains is 1 hour and 30 minutes, which includes the time required to traverse 1.64 miles of slow-speed track in Seattle and 2.36 miles of track in Tacoma. Two limiteds are operated each way each day, one in the morning and one at night. The running time of the limiteds is 1 hour and 15 minutes. Between Seattle and Renton two-car trains are run hourly in each direction. These trains operate for 11.5 miles south of Seattle over the main line and for 2.2 miles over the Renton branch. On account of the heavy traffic between Seattle and Tacoma during the morning and at night it is necessary to dispatch extra passenger trains until the service is equivalent to three-car trains running on 20-minute headway for two hours in the morning and three hours in the evening.



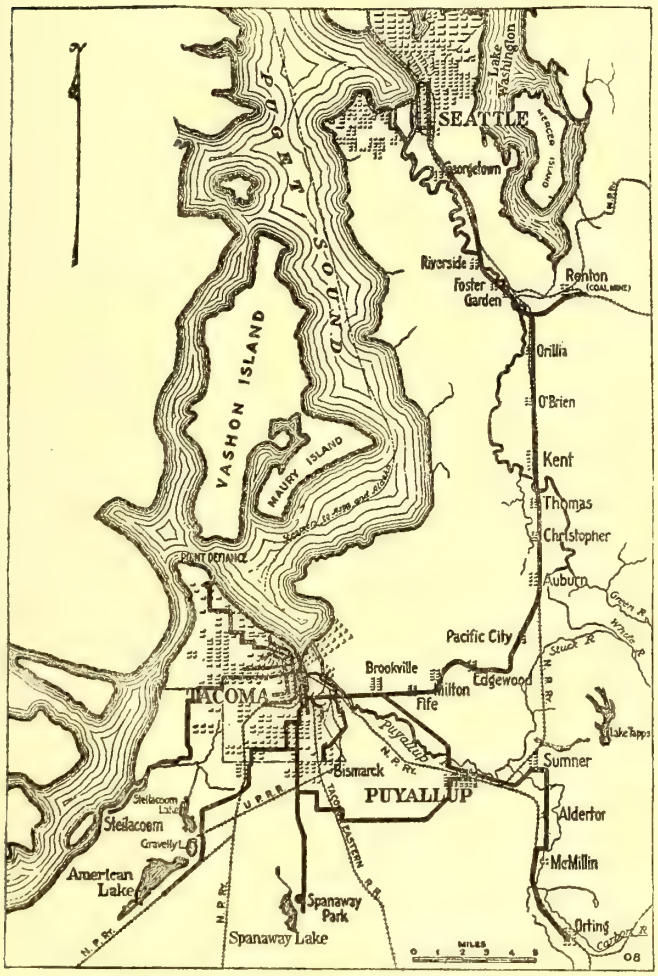
Seattle Electric Company—Concrete Cantilever Design for Car House Front

The rolling stock equipment used in this service is luxurious and was designed especially for train operation. An illustration on Plate XXX shows the handsome appearance of a three-car train standing at the Tacoma station. These trains are made up of a combination baggage and smoker motor car, a passenger motor car and a parlor observation car on which an extra fare of 25 cents per passenger is charged. The observation end of this car in summer is guarded by an ornamental brass grille, which is replaced in winter by a curved glass end. Thus the observation end space may be fully occupied during both seasons. Ohmer fare registers are used on all passenger cars.

POWER SUPPLY

Power for the operation of the interurban lines and the city lines in Tacoma is obtained over a transmission system

from Electron, Wash., where it is hydraulically generated in the water-power plant of the Puget Sound Power Company, also controlled by Stone & Webster. From the power house two parallel transmission lines extend for a distance of 22 miles to Bluffs, a station on the interurban line 9 miles from Tacoma and 25 miles from Seattle, where the transmission lines divide and follow the interurban right-of-way to the terminal cities. A duplicate transmission line parallels the railway throughout its length. Current at 60,000 volts is transformed and converted for railway use in three substations, located respectively at Milton, Kent and Georgetown. An additional substation is now nearly completed at Puyallup on the Orting suburban line, which extends southeast from Tacoma for a distance of about 20 miles. Motor-gener-



Puget Sound Electric Railway—Map of Lines

ator sets are used in the substations for converting current, and at each substation a storage battery of 288 type-G chloride accumulator cells has been installed.

SELECTION OF TRAINMEN

It is not the general practice to use street railway trainmen in the service of the Puget Sound Electric Railway, either from this company's or other city lines. An ample number of applicants to fill all vacancies is available, so that a high-grade personnel is maintained, notwithstanding the rigid requirement that applicants for interurban train service must have had previous experience on either steam or electric roads operating under the standard code of rules of the American Railway Association.

After a new man has been examined by the superintendent as to his references, antecedents, previous service, etc., he is put into the railway company's shops for five days if he has not had previous experience in operating an electric car. In the shops he becomes generally familiar with the important parts of a car and its equipment. When this preliminary schooling in the shops is finished the new man rides for 100 hours' time on the platform with an instructing motorman, and then returns to the shop, where the master mechanic examines him on the principal features of operation and emergency work. During the course of his preliminary instruction the new trainman must pass a physical examination at the hands of the company's surgeons, and his watch also must pass inspection. The examination period concludes with an oral examination by the superintendent on train operation, train rules and the duties of employees. Separate examinations are given for motormen, conductors and flagmen.

The photographic system of identification was instituted by the operating department about two years ago, and it is said that no friction occurred at the time because portraits were not requested from the men then in service. When an applicant is being investigated the company requires that he furnish six portraits 2 1/2 in. by 1 5/8 in. in size, which are made by the company photographer at a charge of 25 cents. One of these portraits is attached to the application and filed with the permanent records of the office. Other portraits are sent out attached to the reference blanks. During two years' use of photographs for identification not less than 50 men have been detected using assumed names who would have been undesirable employees. A copy of the reference blank used in investigating the past history of applicants for employment is reproduced on page 542.

DISPATCHING

For train movements not provided by time-table, train orders are issued by the authority and over the signature of the superintendent. Train orders are written on the standard No. 19 and No. 31X forms and are transmitted by telegraph from the office of the chief dispatcher in the terminal station at Tacoma. All freight trains are run as extras. Passing sidings have been put in at an average distance apart of 1 1/2 miles, and telegraph operators are on duty at eight stations, which are also passing points between Seattle and Tacoma. In regular operation on a normal day the dispatcher's office issues about 100 train orders besides keeping the regular train sheet which exhibits the time progress of each train, regular and extra, the train number, motor and other car numbers and the names of the crew. The number of passengers carried and the causes of all delays longer than five minutes are reported by the conductors and are recorded by the dispatcher under the head of "remarks" below the record of running time on the train sheet.

Formerly the dispatcher's train record was kept on a single sheet, which covered the entire record for the day. On account of the large number of trains operated (122 regularly scheduled and many extras) these sheets were about 9 ft. long, and therefore were inconvenient to handle on the dispatcher's desk. To serve their purpose with less inconvenience to the dispatcher and with greater reliability a scheme has been adopted for using a single progress card for each train. One of these cards is reproduced on page 543, and an engraving on Plate XXXI shows the method of mounting the cards on the dispatcher's desk. With this arrangement the general scheme of entering the records of the trains as they are reported along the route is identical with that ordinarily followed by steam roads, but there is the additional feature that as soon as a train has completed its run the section of the train sheet for that train may be removed from its pocket

on the dispatcher's desk and a new card inserted for the next train leaving. The dispatcher has before him the time-progress record of only those trains which are operating, and therefore he is neither confused nor, as formerly, hindered in his work by being obliged to enter train time reports at various scattered points on a large record sheet.

OFFICE OF
PUGET SOUND ELECTRIC RAILWAY
TACOMA RAILWAY & POWER CO.

Tacoma, Washington ..... 19..

To .....

Gentlemen:

.....has made application

to this company for a position as .....

and states in his application that he was employed by you from .....

to ..... as.....

We would esteem it a favor if you would reply to the following questions, which we shall consider strictly confidential. Enclosed find stamped envelope for reply.

Thanking you in advance, and assuring you of our willingness to reciprocate at any time, we are,

Yours very truly,

.....

Superintendent.

1 Does the attached photograph resemble the applicant?.....
2 Did applicant work for you as above stated?.....
3 Why did he leave your employ?.....
4 Were his services entirely satisfactory?.....
5 Is he in the habit of using intoxicating liquors in any form?.....
6 Do you consider him a sober reliable and industrious man?.....
7 Would you recommend him for a position of .....
which requires him to use extraordinary care for the safety of passengers and the public?.....
8 Was the applicant loyal to the company or were his interests elsewhere?.....
9 Has he ever, to your knowledge or belief been interested in organized labor or participated in strike?.....
.....
10 Has he ever sustained personal injuries, or caused them, by accident while in your employ?.....
.....
11 Please state anything you may know about him which, in your judgment, would disqualify him from holding a position of..... for this company.....
.....
.....
.....

Signed. .....

Puget Sound Electric Railway—Reference Blank for Employees (Original 8 in. x 11 in.)

One feature of train operation which is very thoroughly carried out by the Puget Sound Electric Railway is train protection and flagging. When the leading train is delayed a fusee is dropped to protect against a following train. These fusees burn red for five minutes and green for five minutes, thus giving a five-minute stop signal followed by a caution signal of the same length. Frequent use of torpedoes is made in the operation of heavy freight trains, which are sometimes difficult to handle over heavy grades, especially if these trains are made up of many cars of logs.

The traffic department of the Puget Sound Electric Railway is headed by a general traffic agent. The station agents report to the traffic department insofar as the handling of traffic is concerned. The traffic department is responsible for the handling of all passenger and freight traffic and claims. It has charge of advertising and compiles all freight and passenger tariffs for both the Puget Sound Electric Railway and the Tacoma Railway & Power Company. The general superintendent of the interurban and the city system, of course, is in complete charge of the operation of all trains.

The station agents who report to the traffic agent are, with a few exceptions, telegraph operators who handle the train orders for the transportation department. As these operators have been recruited largely from steam railroad service they are well trained in handling the very complete steam railroad system of freight accounting forms used.

The local agent at Tacoma is also joint agent for the Tacoma Railway & Power Company. He has an office assistant and four warehouse men. The agent at Seattle has two clerks and four warehouse men. At other stations the agents have no assistants. The Seattle and Tacoma ticket offices, both located in the business districts of their respective cities, are open from 6 a. m. to 1 a. m., and the ticket selling is in charge of two agents at each station.

The accompanying table shows the large amount of equipment required for handling the extensive freight traffic over the interurban and the Tacoma city and suburban lines.

Freight equipment of Puget Sound Electric Railway:

2 express motor cars with four GE-66 motors.
3 open-cab motor cars with four GE-66 motors.
35 M.C.B. 50-000-lb. capacity 34-ft. box cars.
25 80,000-lb. capacity hopper cars.
14 60,000-lb. capacity gondola cars.
100 50,000-lb. capacity 36-ft. and 41-ft. flat cars.

Freight equipment of Tacoma Railway & Power Company:

2 express motors each with four GE-67 motors.
1 express motor with four GE-90 motors.
2 open-cab motors equipped with GE-67 and GE-57 motors.
2 open-cab motors equipped with four GE-90 motors.
5 box cars.
100 flat cars.

It is customary to operate freight equipment in trains, and therefore all cars and locomotives are built to M. C. B. specifications and equipped with M. C. B. type couplers.

The remarkable growth of the freight business on the Puget Sound Electric Railway and the Tacoma Railway & Power Company's lines is shown by a comparison of the total gross earnings from freight traffic, which increased from about $8,000 per month in 1904 to $18,000 per month in 1908. These figures do not include any revenue for handling company construction or maintenance materials. The careful handling of freight is evidenced by the amount of freight claims paid, which do not average more than 0.25 per cent of the freight earnings.

FREIGHT EXPENSE BILL PRO. NO.

CONSIGNEE | STATION

ADDRESS OR DESTINATION BEYOND | DATE

TO PUGET SOUND ELECTRIC RAILWAY Dr., for charges on articles transported

BILLED FROM | WAY BILL NO. | DATE | SHIPPER | CAR NO. AND INITIAL

NUMBER AND DESCRIPTION OF ARTICLES AND PACKAGES	WEIGHT	RATE	FREIGHT	

Received Payment..... 19.....
.....Agent.
Per.....

Total
Advances
Total to Collect

Puget Sound Electric Railway—Form of Freight Expense Bill

The freight accounting methods used closely resemble those of steam roads, except that on the Tacoma city and suburban lines there are no agents, and the billing is done by conductors. The accompanying statement showing the cost of freight operations for the first four months of the year 1909 was made with a view to ascertaining whether or not

PUGET SOUND ELECTRIC RAILWAY

REPORT OF OVER-SHORT AND DAMAGED FREIGHT

Agent's No. ..... DUPLICATE ..... Station ..... 190 ....

Car No. ..... Initials ..... Rec'd ..... 190 ..... train No. ..... Conductor .....

Way-Bill No. ..... Dated ..... 190 From ..... To .....

CONSIGNEE AND DESTINATION	ARTICLES AS BILLED	AS RECEIVED	*OVER—*SHORT—*DAMAGED
Seals-East Side			
" -West Side			
" -North End			
" -South End			

Was Car set out, or Freight unloaded from passing train? .....

By whom checked? ..... Did conductor verify check? .....

What is your estimate of amount of damage? .....

What is the Consignee's estimate of the amount of damages? .....

What in your opinion was the cause of the damage, over, or shortage? .....

What disposition was made of the freight? .....

FORWARDING AGENT'S STATEMENT. ..... Receiving Agent

Was shipment loaded in full as per your Way-bill? .....

What car loaded into? ..... Seals-East Side ..... West Side ..... North End ..... South End .....

For what other station did you load freight in this Car? .....

By whom checked and loaded? .....

Remarks .....

*Cross out if not covered by this report. ..... Forwarding Agent

Puget Sound Electric Railway—Over, Short and Damaged Freight Report
(Original 11 in. x 8 3/8 in.)

CONDUCTOR'S WHEEL REPORT

..... Division

Train No. ..... Conductor .....

Left ..... at ..... M ..... 19....

Arrived at ..... at ..... M ..... 19....

Motor No. ..... From ..... To ..... Motorman .....

Numbers must be taken from Cars and not from Way Bills

	Initials	Kind of Car	Car Numbers Loaded	Car Numbers Empty	Taken at	Left at	Contents	Billed From	Billed To	Weight Car	Weight Cont.	Mileage Loaded	Mileage Empty	Seal Record Side N or E	Seal Record Side S or W	Seal Record Ends N or E	Seal Record Ends S or W	
1																		1
2																		2
3																		3
29																		29
30																		30
	Total																	

Conductors will leave spaces below vacant

	Car Mileage			Loaded	Empty
Motor Miles	P. S. E. Co. Tracks		P. S. E. Co. Cars		
Train Miles	T. R. & P. Co. Tracks		T. R. & P. Co. Cars		
Car Miles	S. E. Co. Tracks		S. E. Co. Cars		
			Foreign Cars		
Ton Miles	Total		Total		

INSTRUCTIONS

1. This report must be made out in duplicate, promptly at end of each single trip, original forwarded to Auditor and duplicate to Superintendent, immediately.
2. Conductors of work trains will make but one report for each day, showing nature of service, number of trips, and other information necessary.
3. Exact time of leaving and arriving at terminals must be shown.
4. Cars must be taken to give correct numbers and initials of all equipment reported.
5. Cars should be reported in order as much as possible. Cars of this company first, then foreign cars.
6. Column for Seal Record will apply only to through cars and not to Way-freight cars.
7. Mileage figures must be written in opposite each car number in the column so provided: Ditto marks must not be used.

Puget Sound Electric Railway—Conductor's Wheel Report
(Original 8 1/2 in. x 14 in.)

88—23m-8-09

Puget Sound Electric Ry.

DATE 7/21-9 TIME TABLE No. 12a

DIRECTION North

TRAIN NO. 14

CONDUCTOR Caperton

MOTORMEN Herrod

BRAKEMAN Alexander

MOTOR 510-517-523

TIME ORDERED

	Cordovial and Trenton Way
Nm	SEATTLE
1030	1.00
	MASS. ST. 1.21
	SPOKANE AVE. 1.01
	ARGO 0.76
	GEORGETOWN 2.28
	MEADOWS 1.44
	DUWAMISH 1.69
	FOSTER 1.11
	BLACK RIVER 0.52
1006	RENTON JCT 2.44
	RENTON 1.70
	ORILLIA 2.04
	O'BRIEN 2.12
1001	KENT 1.89
	THOMAS 0.93
	MEREDITH 2.27
1122	AUBURN 1.60
	FARROW 0.46
	VALLEY 1.40
	BLUFFS 1.37
	JOVITA 0.85
	EDGEWOOD 2.27
1234	MILTON 1.95
	WILLOW JCT. 0.58
	McALEER 1.13
	ARDENA 1.15
	FIRWOOD 1.64
	BERRYTON 0.76
	PUYALLUP 1.33
	MEEKER
	BROOKVILLE 1.16
	BOSWORTH 0.80
	BAY ST. 2.26
115	TACOMA Eighth and A Streets
Nm	DISPATCHERS
GVP	

DELAYS

119 Through Passenger

23 Parlor Car

Puget Sound Electric Railway—Train Card
(Original 1 3/4 in. x 17 in.)

the freight traffic was profitable as compared with the passenger business. This statement is for the Puget Sound Electric Railway only, and it is said that the operating costs on the Tacoma Railway & Power Company lines are even less for freight, because the latter company has fewer agents and does not maintain extensive terminal facilities.

CHARACTER OF TRAFFIC

Inasmuch as the freight traffic of the Puget Sound Electric Railway is very closely indicative of the lines of business and trade which are serving to build up the Puget Sound district so rapidly, it may be of interest to summarize the character of the freight, the amounts handled and the rates paid between each of the important shipping points on the line.

At Renton, the terminus of a 2-mile branch which leaves the main line 11.5 miles south of Seattle, the company owns

and operates a coal mine having an output of from 400 to 500 tons per day. A large glass bottle factory and a brick-making plant with a capacity of 600 tons of pressed vitrified brick and tile per day are also located in Renton. In addition to its well-filled two-car passenger trains operating hourly in and out of Renton the company handles part of the products of the coal mine and the manufacturing plants located there. An average of about 400 tons of coal is distributed each day to various stations on the line. The rate on coal for the 28-mile haul between Renton and Tacoma is 55 cents per long ton, in addition to which a local switching charge of 30 to 50 cents per ton is made in Tacoma. The company. The bodies of these cars are large enough to hang the beef in halves instead of in quarters, as is usually done. Meat is loaded and unloaded from the warehouses directly into the cars by means of overhead trolley systems, which are extended into the car body.

The interurban line operates a milk train, which leaves Tacoma at 5 a. m., and, after stopping at country loading platforms, takes an average of about 4000 gal. of milk into Seattle each morning. A charge averaging about 1 1/2 cents per gallon is made for delivering the milk and returning the cans. In the fall of the year the interurban line handles from three to five cars of market garden stuff each

STATISTICS OF FREIGHT TRAFFIC, 1909

	January	February	March	April	4 Months
Gross earnings	$10,627.03	$10,613.55	$12,355.35	$12,092.85	$45,688.78
Operating expenses:					
Maintenance of cars	426.68	770.73	428.35	772.74	2,458.50
Maintenance electric equipment of cars	38.32	30.77	17.65	39.79	126.53
Hired power	1,175.74	1,052.87	1,034.10	1,172.75	4,435.46
Wages of conductors	369.68	319.07	349.24	328.87	1,366.85
Wages of motormen	414.04	353.74	386.84	363.92	1,518.54
Wages of other car service employees	1,471.70	1,154.60	1,484.91	1,490.42	5,601.63
Miscellaneous car service expenses	56.16	25.95	17.50	13.60	113.21
Salaries of general officers	65.00	65.00	65.00	65.00	260.00
Salaries of clerks	115.00	115.00	115.00	115.00	460.00
Printing and stationery	50.00	50.00	50.00	50.00	200.00
Damages	15.00	15.00	15.00	15.00	60.00
Rent of tracks and terminals	390.80	269.45	269.45	259.85	1,189.75
Insurance	40.00	40.00	40.00	40.00	160.00
Total	$4,628.12	$4,262.38	$4,333.04	$4,726.94	$17,950.48
Net earnings	$5,998.01	$6,351.17	$8,022.31	$7,365.91	$27,738.30
Per cent expenses to earnings	43.5	40.1	35.1	39.1	39.03
Tonnage	16,573	15,614	18,817	17,412	68,416
Gross earnings per ton, cents	64.12	67.97	65.66	69.45	66.78
Expense per ton, cents	27.93	27.30	23.03	27.15	26.24
Net earnings per ton, cents	36.19	40.67	42.63	42.30	40.54
Mileage	35,396	33,927	40,281	39,183	148,787
Gross earnings per mile, cents	30.02	31.28	30.67	30.86	30.71
Expense per mile, cents	13.08	12.56	10.76	12.06	12.07
Net earnings per mile, cents	16.94	18.72	19.91	18.80	18.64

coal is weighed on the scales at the mine before shipment. The rate on coal from Renton to Seattle, 13.5 miles, is 30 cents per ton of 2000 lb., and a local switching charge is made by the Seattle Electric Company for delivery over its tracks.

The traffic in brick from January 1 to July 15, 1909, amounted to 3,000,000 brick, having an average weight of 7 lb. each, carried from Renton to Tacoma. The regular rate on brick for this distance is 50 cents per ton over the interurban line, in addition to which the Tacoma Railway & Power Company makes a switching charge of from 20 cents to 25 cents per ton for delivery on its tracks in Tacoma. The rate on brick from Renton to Seattle is 30 cents per ton, and deliveries are made by the Seattle Electric Company over its city lines at regular switching charges. The minimum carload weight of 20 tons is charged for in brick hauled over the interurban and the Tacoma city lines. The average carload weight, however, is about 56,000 lb.

The through freight business between Tacoma and Seattle includes three cars of merchandise and two cars of fresh meat daily from Seattle to Tacoma and three carloads of manufactured products and three carloads of fresh meat daily from Tacoma to Seattle. About four cars of local merchandise are delivered daily from Seattle to way stations and about two cars from Tacoma. The meat traffic is handled in specially built refrigerator cars owned by the packing night. Because the interurban line has direct competition with several boats operating between Tacoma and Seattle a large commodity tariff is published and the traffic department maintains an aggressive campaign for new business.

Lumber and timber handling is an important part of the freight traffic. Sawmills are located along the line at Milton, Valley City and Ardena. There are two mills at Milton, one of which is owned by the electric railway interests. In Tacoma, which is famous for its lumber trade, the railway company has track connections with all of the important mills. The Tacoma Railway & Power Company handles logs, piling and poles from points on its suburban lines to the sawmills and shingle mills in South Tacoma. This local traffic includes about six cars of logs, which are brought into Tacoma each night. A large part of the lumber-mill traffic along the interurban lines is made up of building lumber and slabs, of which from 5 to 10 cars are transferred each night. There are 19 spurs into wood, coal and industrial plants on the Tacoma Railway & Power Company lines and 23 on the Puget Sound Electric Railway. The rate on logs for a 10-mile haul is $1 per 1000 ft. b.m. with a minimum of 5000 ft. per car. The rates on lumber, lath, posts, piling and poles range from 2 cents per 100 lb. for 10 miles and under to 3 1/2 cents per 100 lb. for 40 miles and under, with a minimum carload weight of 40,000 lb. The rate on wood and slabs, with a minimum carload of 12 cords, varies

from 60 cents per cord for 10 miles and under to 80 cents per cord for 35 miles and under.

The Tacoma Railway & Power Company operates express and freight cars over its 85 miles of city and suburban tracks, and charges for general merchandise freight 10 cents per 100 lb. with a minimum of 15 cents within the city and 25 cents outside of the city. A freight house 30 ft. wide by 300 ft. long accommodates the freight of both city and interurban lines in the city of Tacoma. The following switching charges are made for terminal delivery in Tacoma:

Lumber, 50 to 75 cents per 1000 ft. b.m.; minimum, 12,000 ft.
Gravel, 40 to 50 cents per yd.; minimum of 20 yd. capacity of car.
Brick, 30 to 35 cents per ton; minimum, 20 tons.
Furniture and household goods, $7 per car.
Merchandise and commodities, 50 to 60 cents per ton; minimum of 24,000 lb.

No freight collections or deliveries are made and the charges here given include only transportation over the companies' lines.



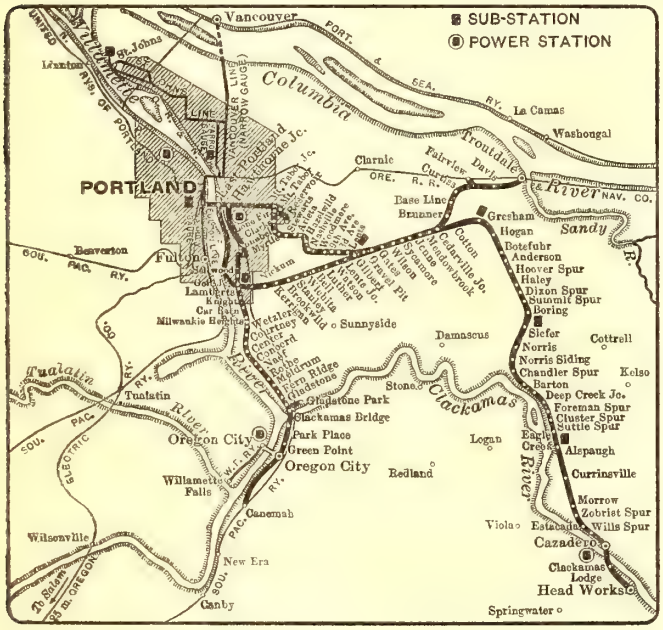
THE ELECTRIC RAILWAYS OF OREGON

OPERATING FEATURES OF THE PORTLAND RAILWAY, LIGHT & POWER COMPANY

THE Portland Railway, Light & Power Company controls and operates the properties of the Portland Railways Company, Oregon Water Power & Railway Company, Portland General Electric Company and the Vancouver (Ore.) Light & Power Company. A map is presented showing the general location of the district which the interurban lines operated by this company serve. The total mileage of the railway system, which is made up of city and interurban tracks of 3-ft. 6-in. gage and standard gage, is 226 miles. The rolling stock equipment includes 497 passenger cars and 160 freight cars. Fares are collected on some lines according to the pay-as-you-enter plan.

SHOP RECORDS AND METHODS

The rolling stock equipment is maintained in three shops—one shop with standard gage tracks for freight equipment, one for passenger equipment and one narrow-gage shop also



Portland Railway System—Map of Portland Interurban Lines

for passenger equipment. A peculiar organization of the shop forces of this company is brought about by reason of the two gages of track and the consolidation with the parent company of several properties, each with its own shops. Besides the three shops there are five car houses with day and night forces, all under the jurisdiction of a superintendent of equipment. Reporting to him are a shop superintendent and a car-house superintendent. The car houses are located at an average distance of about 3 miles apart and two of the shops are located 1.5 and 6 miles distant, respectively, from the third. The foundry is located about 10 blocks distant from the largest shop, which is at Twenty-third Street.

A uniform system of shop and maintenance reports is followed at all car houses and shops. This systematic scheme for obtaining permanent records of the work done is of interest and will be described as used in the Twenty-third Street shop. The first information in this system of records is presented on a large blackboard mounted on one wall of the repair shop. All men engaged in maintenance work make a record under the proper heading on this board of what they do and these records are transferred by an office clerk to a daily shop report blank 25 in. x 18 in. in size, with headings as reproduced in Fig. 1, page 547. This blank has exactly the same arrangement of rulings and headings as painted on the blackboard.

When an armature or field is taken out of a motor a tag is attached, as illustrated in Figs. 2 and 3. These tags show the armature or field number, its location in the motor and the name of the man who takes it out or puts it in. One tag is securely attached to the armature or field and remains with the part during its course through the shop until it is returned to a motor. The use of these tags assists the electrical repair man in learning what repairs, other than those found by easy inspection, are necessary.

Referring again to Fig. 1: After the information contained on the blackboard has been copied on this blank by the shop foreman or his assistant, it is sent to the office of the superintendent of shops and the blank so filled out forms the shop foreman's report of what his force has done during the day.

A card index for each armature and field is kept in the office. The headings presented on one side of an armature card are shown in Fig. 4. One of these cards, 8 in. x 5 in. in size and ruled on both sides, exhibits the complete record of one armature or field from the time it was first put in service. A similar record for smaller parts of the equipment, such as pinions, gears, etc., is kept in a book with pages ruled similarly to the armature and field record card.

A car record card of heavy manila paper, 8 1-2 in. x 11 in. in size and ruled on both sides, is kept for each car. This card is shown in Fig. 5. The data showing the repairs or changes made on the car are taken off from the daily shop report each day. One of these car record cards lasts about 12 months and affords a very useful means for the head of the shop to locate weaknesses in any part of the car equipment. After all the data exhibited on the daily shop report have been transferred to the car record card the clerk in charge of the records then fills out a truck record, Fig. 6. This record blank, 8 1-2 in. x 11 in. in size, is printed on yellow paper. The reverse of the blank form presents truck data and also statistics regarding controllers, car wiring, brakeshoes and trolley. The truck records, when filled out, are sent to the general office, where their details are entered on a permanent record kept by the statistical section of the auditing department. These statistics present the record of each part of the equipment under its individual number. The statistical department makes a monthly report to the president showing the performance of the equipment according to mileage. Such reports are of considerable value for comparative purposes, and it is stated that the slight additional expense necessary for obtaining the data is warranted, because when purchases are made the records show actual results and the personal element is entirely eliminated from the decision. The statistical work is carried on by one clerk.

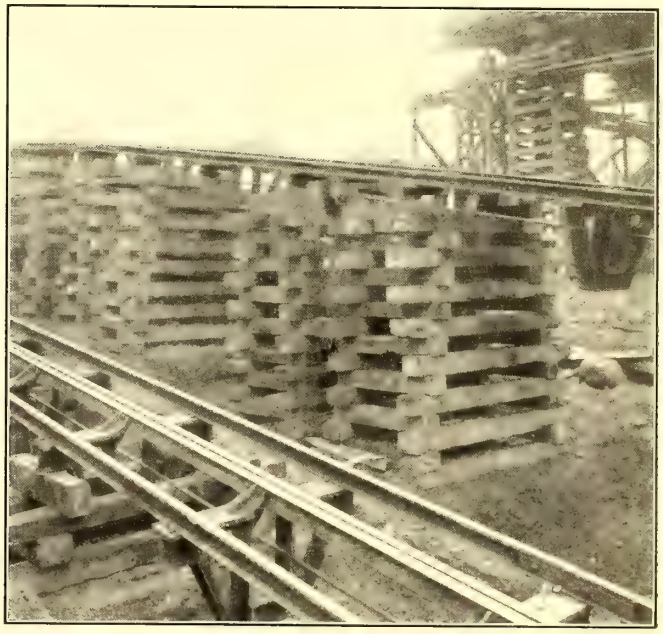
Only light repairs and replacements are made at the car houses, and so the daily car house report is not so complete as the daily shop report, although it presents the same general features of maintenance work. The daily car house reports



Seattle Electric Company—Storage Yards and Rear of North Seattle Car House



Seattle Electric Company—Denny Hill in 1906, Before Commencing Regrade



Seattle Electric Company—Difficult Operation of Cable During the Regrade Work



Seattle Electric Company—Cutting Away Denny Hill in 1907



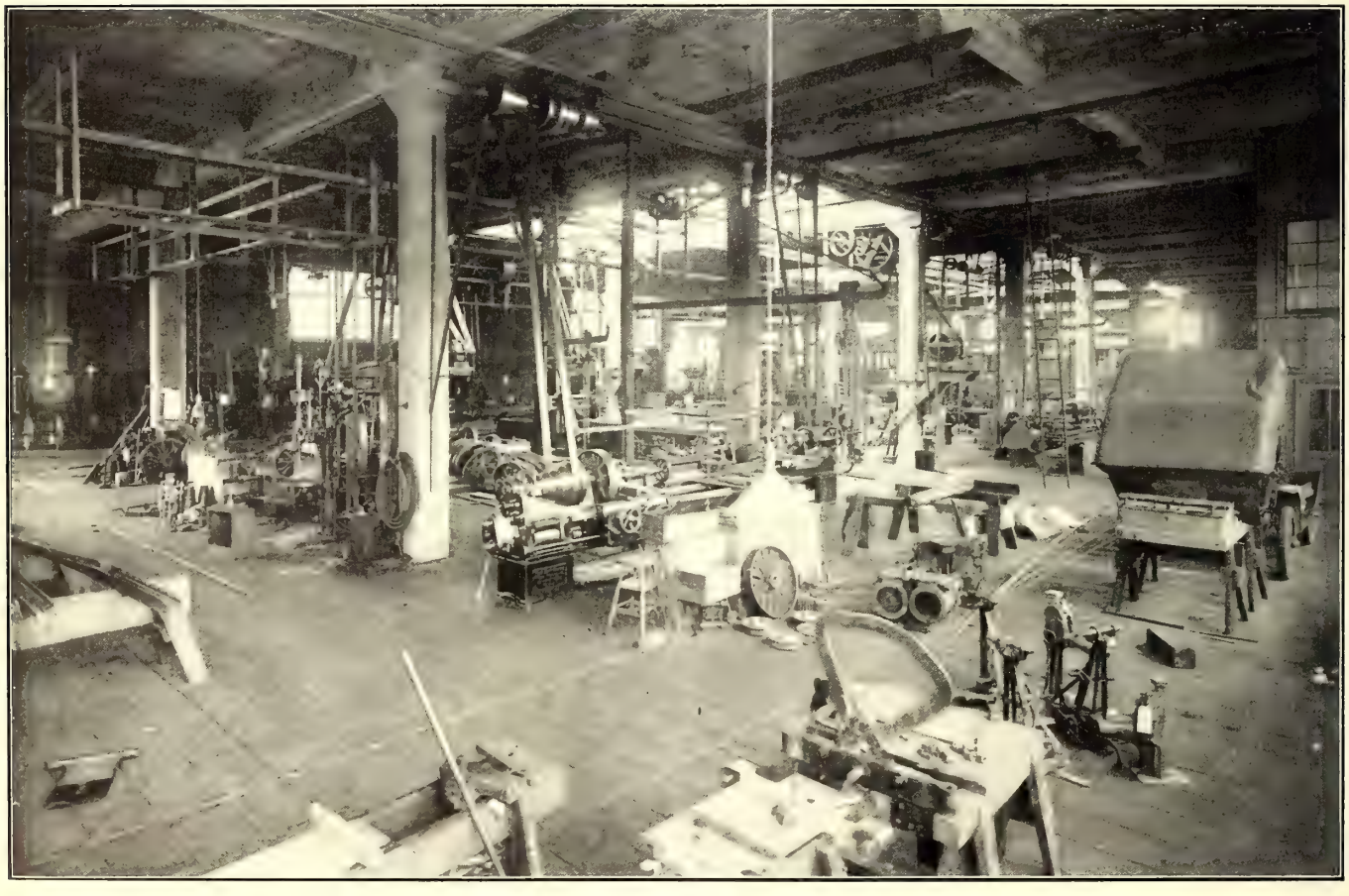
Seattle Electric Company—Denny Hill Regraded and Rebuilt, 1908



Seattle Electric Company—Machine Shop



Seattle Electric Company—Paint Shop



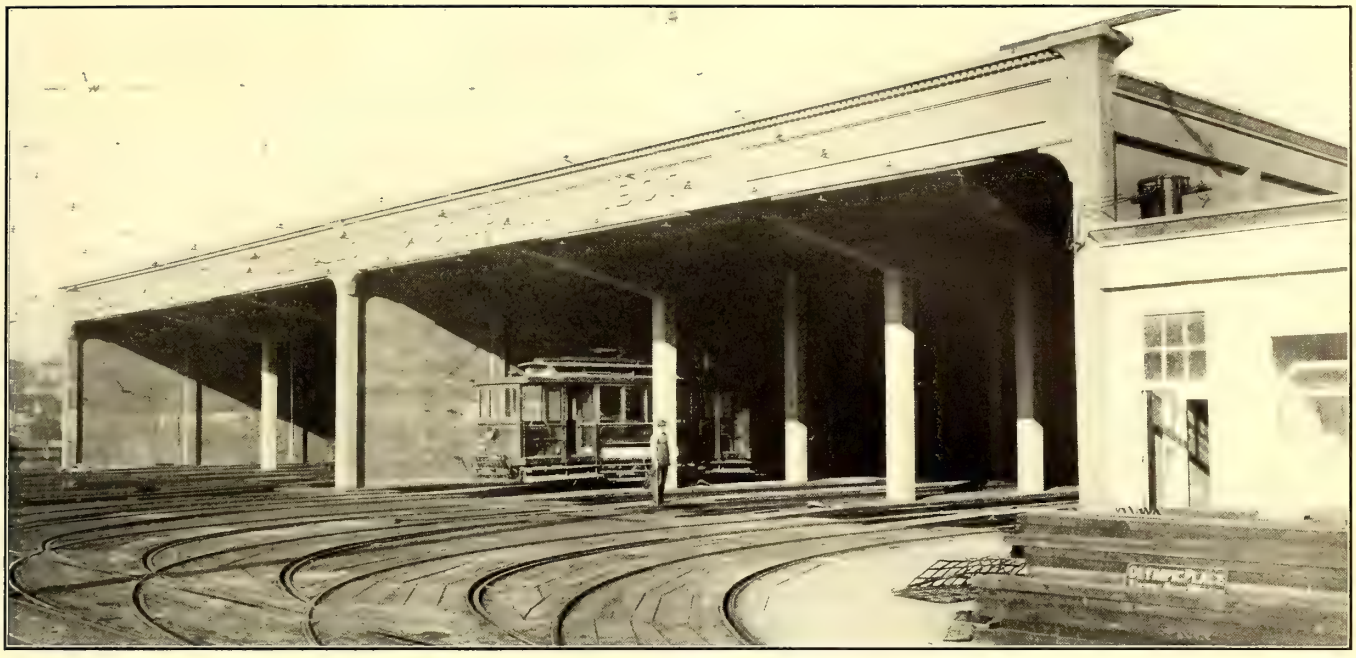
Seattle Electric Company—Interior of Machine Tool Section of Georgetown Shops



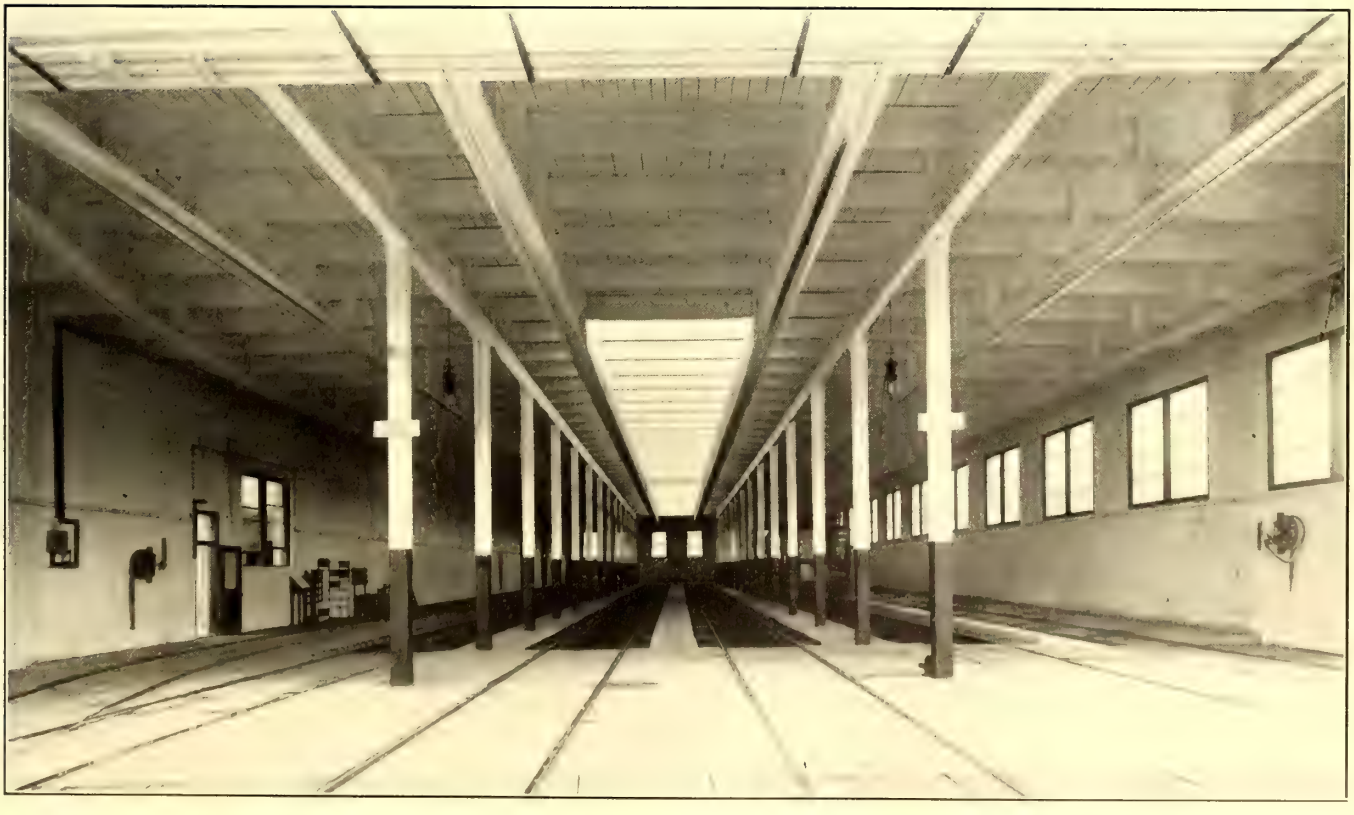
Seattle Electric Company—Erection Shop



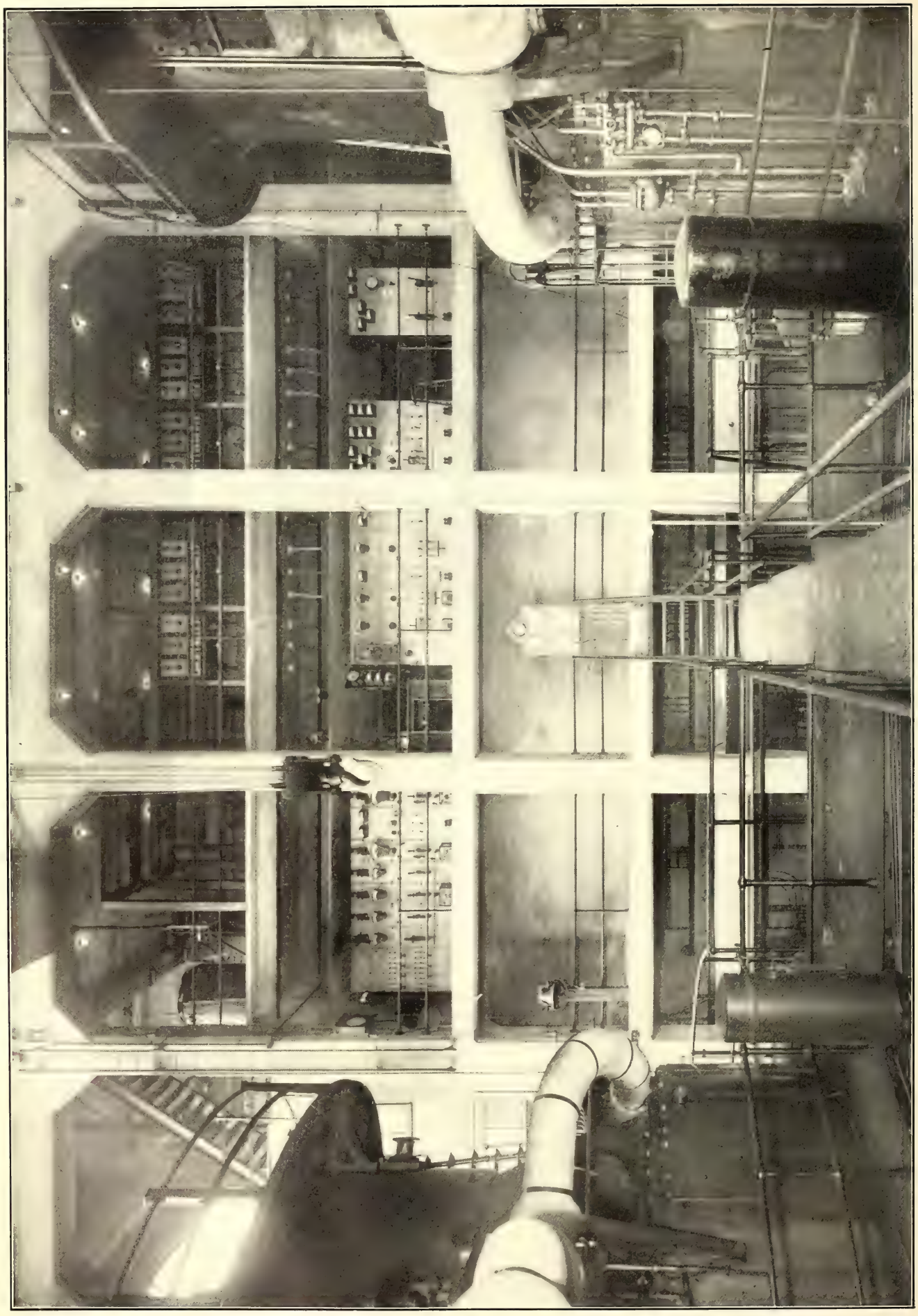
Seattle Electric Company—Storehouse and Offices



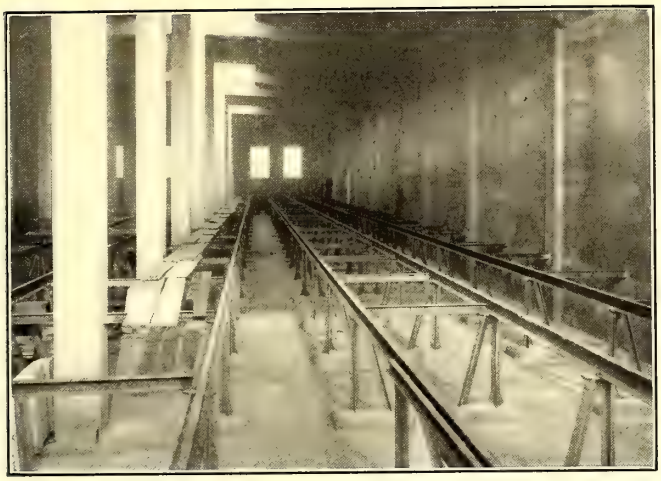
Seattle Electric Company—North Seattle Car House, with Wide Entrances and End Wall Supported by Concrete-Steel Cantilevers Carried on Columns Set Back of Building Line



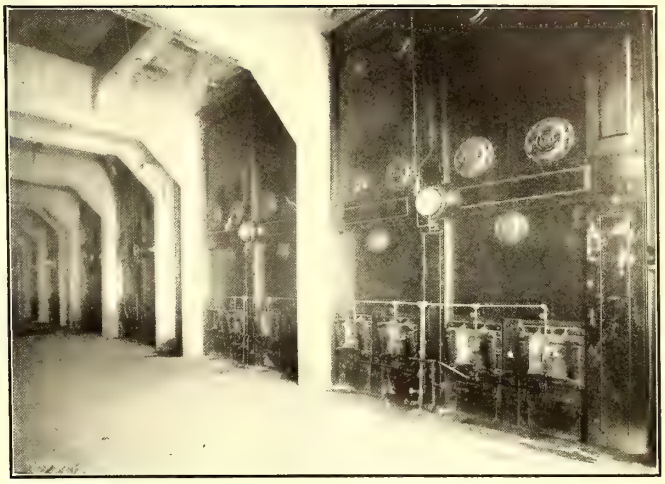
Seattle Electric Company—Interior of Fremont Car House, Showing Type of Structure, with Brick Side Walls, Frame Roof Supports, Plank Floor and Open Pits



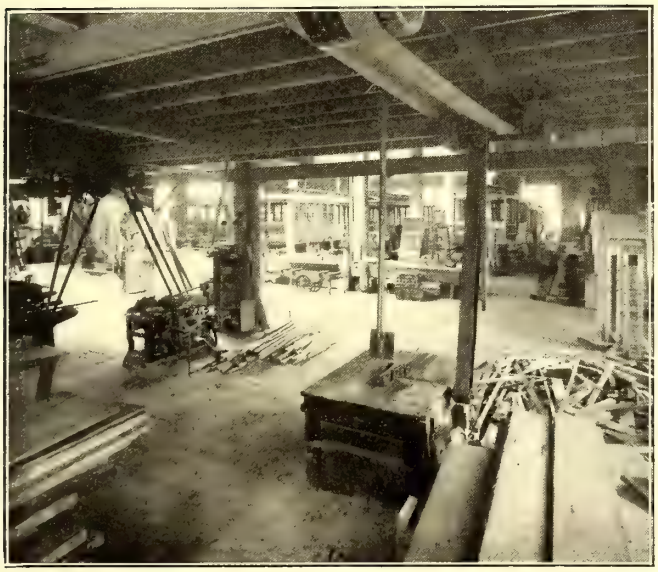
Seattle Electric Company—View of Electrical Galleries in Georgetown Steam Relay Station



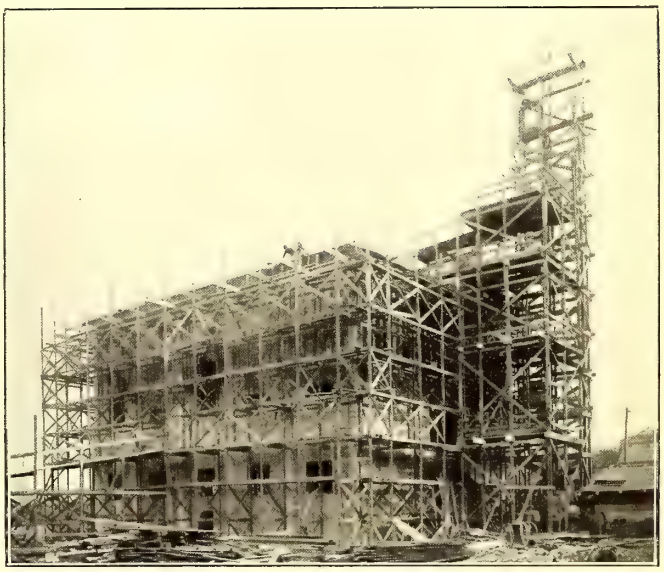
Seattle Electric Company—Track Pit Construction in North Seattle Car House



Seattle Electric Company—Oil Burners at Georgetown Power Station



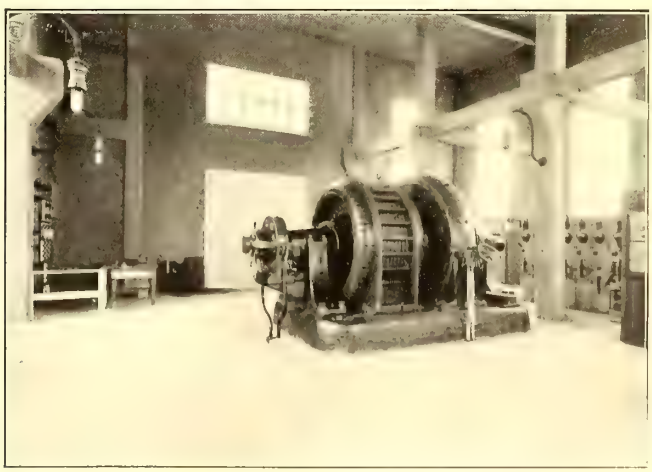
Seattle Electric Company—Interior of Carpenter Shop at Georgetown



Seattle Electric Company—Falsework Used in Erecting Concrete Substation



Seattle Electric Company—Exterior of Georgetown Power Station



Seattle Electric Company—Interior of North Seattle Substation



Puget Sound Electric Railway—Observation Car Train



Tacoma Railway & Power Company—Suburban Train



Puget Sound Electric Railway—Interior of Parlor Observation Car



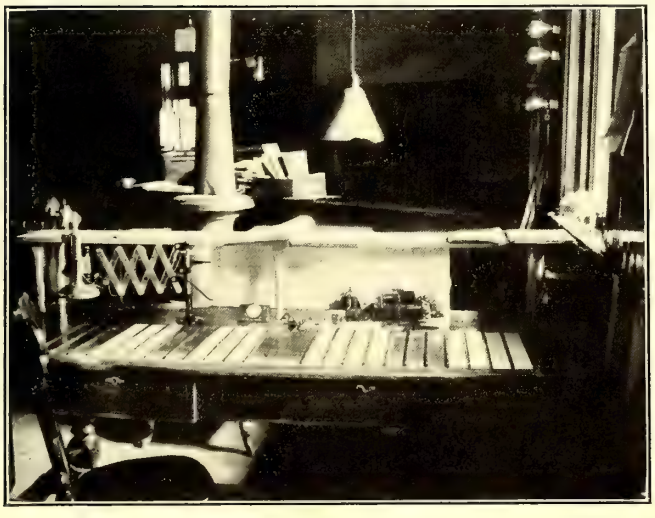
Puget Sound Electric Railway—Interior of Standard Passenger Car



Puget Sound Electric Railway—View Along the Interurban Line Near Tacoma



Puget Sound Electric Railway—Observation Trailer with Platform Enclosed for Winter



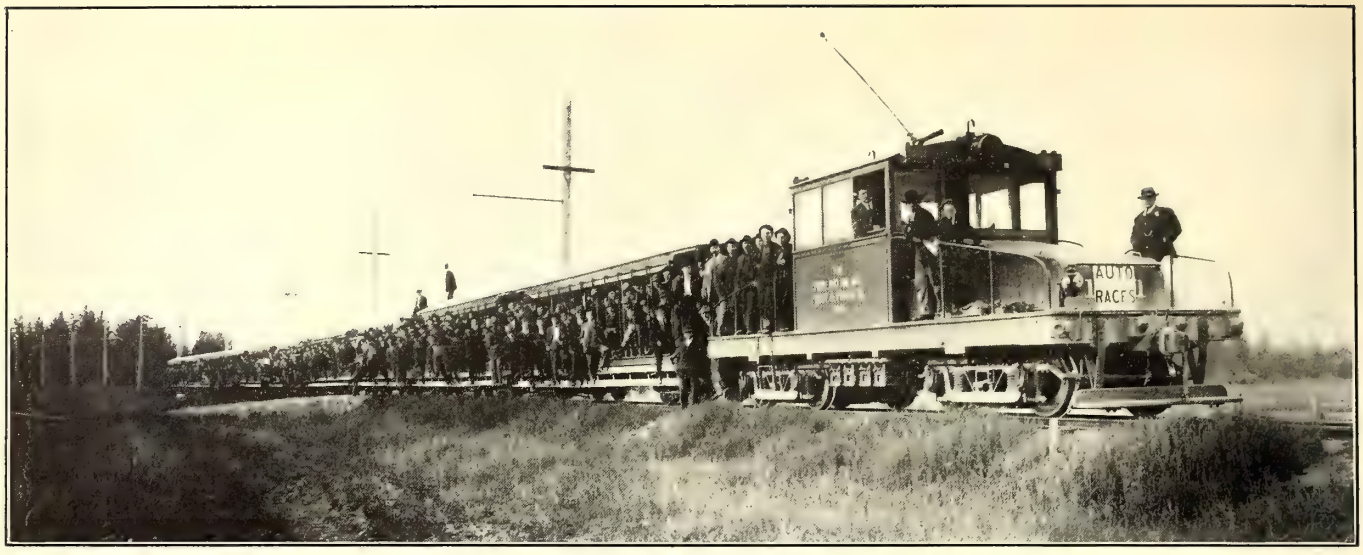
Puget Sound Electric Railway—Dispatcher's Desk and Train Cards



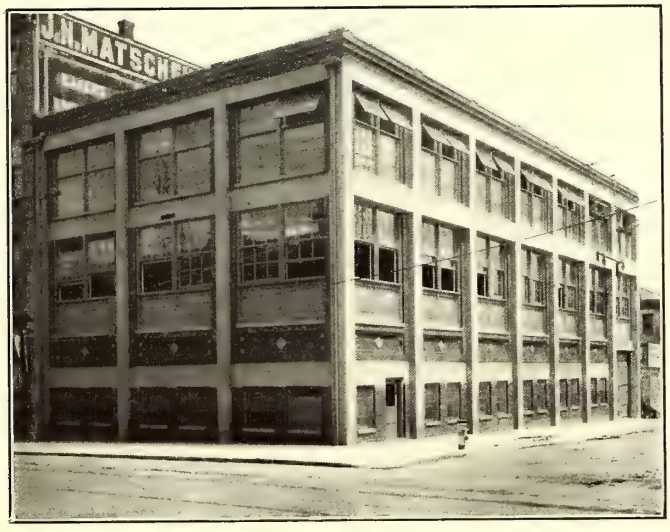
Oregon Electric Railway—Standard Passenger and Express Train



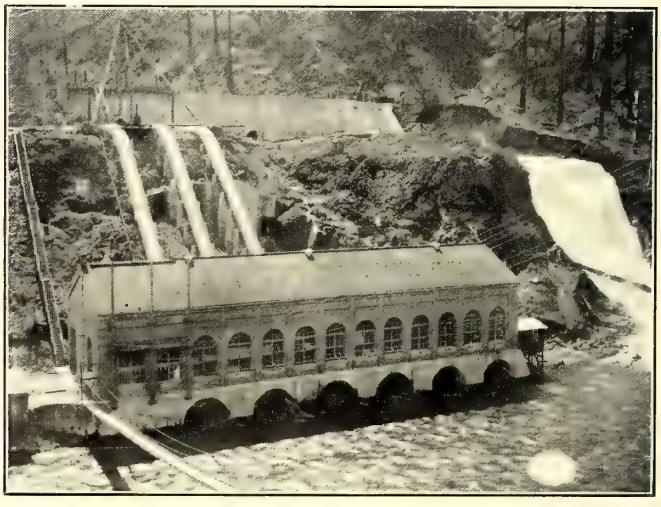
Puget Sound Electric Railway—Combination Baggage and Smoker Motor Car



Portland Railway System—Ten-Car Train Handling Race Track Crowd



Portland Railway System—South Portland Substation



Portland Railway System—Cazadero Power Station



Portland Railway System—New Freight Station and Office for Oregon Water Power Division

DAILY SHOP REPORT

CAR SHOP _____ 19____

TRUCKS										MOTORS											CONTROLLERS				EMPLOYEES	MISCELLANEOUS
Type	No.	Axle	Journal Round	Wheels	Brake Shoe	Cause of Removal	Work Performed	Type	No.	Armature	FIELDS 1	2	3	4	BRUSHTUBE Pin	Com.	Axle	Pinion	Gear	Cause of Removal	Work Performed	Type	No.	Cause of Removal	Work Performed		
In	Out	In	Out																								

Portland Railway System—Fig. 1—Daily Report of Work Done by Shop Employees

TYPE		G. E. 58	G. E. 800	W. P. 30	W. P. 50
ARMATURE NO		IN	OUT	MONTH	DATE
CAR NO.					
END	1	2	3	4	
OUT					
IN					
TAKEN OUT BY					
PUT IN BY					

TYPE			G. E. 58	G. E. 800	W. P. 30	W. P. 50
FIELD No.	OLD					
	NEW					
CAR NO						
MOTOR NO						
POSITION NO IN MOTOR	1	2	3	4	MONTH	DATE	YEAR
TAKEN OUT BY							
PUT IN BY							

Portland Railway System—Figs. 2 and 3—Armature and Field Tags

ARMATURE RECORD

No._____ TYPE_____

IN				OUT				
DATE	CAR	MOTOR	EMPLOYEE	DATE	CAR	MOTOR	CAUSE	EMPLOYEE

Portland Railway System—Fig. 4—Armature Record

CAR RECORD

CAR NO._____ TRUCKS_____ TYPE_____

Date		Truck	Motor		Armature	Cause of Removal	Work Performed	Miscellaneous	Employee
				Out					
				In					
				Out					
				In					
				Out					
				In					
				Out					
				In					
				Out					

Portland Railway System—Fig. 5—Car Record

FORM 158 6-27-09 10M MSP

TRUCK RECORD

TRUCK No _____ CAR No._____ TYPE_____ _____ 190___

OUT

MOTOR	NUMBER 1	CAUSE OF REMOVAL	NUMBER 2	CAUSE OF REMOVAL	NUMBER 3	CAUSE OF REMOVAL	NUMBER 4	CAUSE OF REMOVAL
Armature								
P. Brasses								
C. "								

IN

MOTOR	NUMBER 1	WORK PERFORMED	NUMBER 2	WORK PERFORMED	NUMBER 3	WORK PERFORMED	NUMBER 4	WORK PERFORMED
Armature								
P. Brasses								
C. "								
Axle "								
Journal "								
Pinions								
Gears								
Wheels								
Axle								
Fields 1								
2								
3								
4								

Remarks:

TRUCK IN SERVICE CAR No._____

Portland Railway System—Fig. 6—Truck Record

are printed on two tints of paper to distinguish between reports made by day and night men, and are 13 in. x 11 in. in size. The information exhibited on the daily car house report is handled in the office of the superintendent of shops along with that shown on the daily shop report.

The records kept for the foundry include a continuous inventory of the stock on hand and a record of the castings made. These reports are summarized at the end of each month to show the amount of material used and the castings delivered. This foundry pours each month an average of about 35 tons of cast iron used in special work, brakeshoes, etc., and about four tons of brass used in car fittings, journals, trolley wheels, etc. A continuous record is kept at the shop in the form of a card index covering the supplies most frequently used and thus any shortage of material to work with is avoided. There are 108 men employed in the Twenty-third Street shop and 10 men in the foundry.

SHOP KINKS

The company manufactures a large part of its own special track work and is prepared to do this work in a thorough manner. The standard crossings made are built up with manganese steel centers purchased from Edgar Allen & Company and from local dealers. The rail shop casts compromise joints with about 3 ft. of each weight of rail. These are kept in stock for quick use in connecting old and new track.

In the electrical shop an improvement has been made which has largely prevented the necessity for frequent rewinding of fields. The method of winding now followed is to use Deltabeston wire and paint the layers of the field coils with a thick mixture of Ajax varnish and whiting. In winding the field coil a terminal plate with a rigid terminal stud and two check nuts to hold the connection, is built into the coil. By the use of this stud and the check nuts the connection can be broken easily, even though it is badly burned, and thus the work of drilling out the connection stud, as when a screw-set terminal is used, is saved. The foreman of the armature room is made responsible for the repair work on cut-outs, controllers and electrical winding, and thus no friction can arise on account of lax work in one part of the electrical department being charged against another part.

FREIGHT SERVICE

The Oregon water power division of the Portland Railway, Light & Power Company is made up of 85 miles of interurban line extending south to Oregon City and Canemah on the Willamette River, east to Troutdale on the Columbia River, and southeast to Cazadero on the Clackamas River. This division handles a heavy freight and passenger traffic. The freight equipment includes 185 flat, box and coal cars and seven electric locomotives, one of which was described in the Electric Railway Review, Dec. 21, 1907, page 959. These seven locomotives include two of all-steel construction, two with steel underframes and sloping type cabs, and three heavy express motor cars. Two double-truck cabooses are used with long freight trains. The freight service is handled according to steam railroad practice, and in the accounting work and the filing of tariffs all the requirements of the Interstate Commerce Commission are followed.

The headquarters of the Oregon water power division are located in a large new freight house, which is situated on the Columbia River. The freight house loading tracks have a capacity for 20 cars. A large number of yard tracks nearby provide for the economical storage of cars and for the switching of trains.

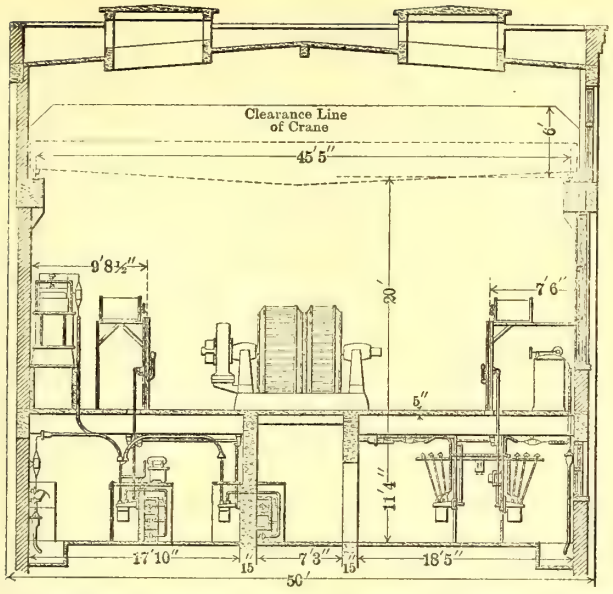
The freight house is 50 ft. x 200 ft. in size, with an office extension 50 ft. x 48 ft. in size. It is built of heavy timbers covered with corrugated iron. On each side of the entire length of the freight house is a row of Wilson rolling steel doors which afford an entrance opposite any car that may be standing on the track. A socket for portable extension lamps which can be used in any car is provided at each door post. The floor of the freight house is made up of 2 in. x 5 in. planks set on edge so that the heaviest loads do not cause sagging. The interior is illuminated with Nernst lamps. Along the river front, at the end of the freight house, the railway company owns a dock 1,000 ft. long, where lumber and other heavy materials can be loaded directly for river or ocean shipment. River boats which carry building stone, paving blocks and other heavy materials are unloaded at this dock and the freight transferred directly to cars for delivery on the interurban divisions.

Practically all of the Portland freight business is handled through this freight house, an illustration of which is presented on Plate XXXII. The daily merchandise traffic from this point includes about eight cars of local merchandise destined for points along the Oregon water power division, two cars of inbound local merchandise, and from 25 to 30 tons of express. The total tonnage in an average month through the Portland freight house in less than carload lots amounts to 3,000,000 lb. On account of the care taken in the design of the loading platforms and the door arrangements of the freight house, freight can be handled from trucks on one side into cars on the other side, or vice versa, at an average cost of 20 cents per ton. The drop-truck system of freight handling, in which the merchandise is not lowered to the floor of the house but is stored temporarily on trucks until the outgoing cars are ready for loading, is used to bring about this low cost for freight handling through the terminal station.

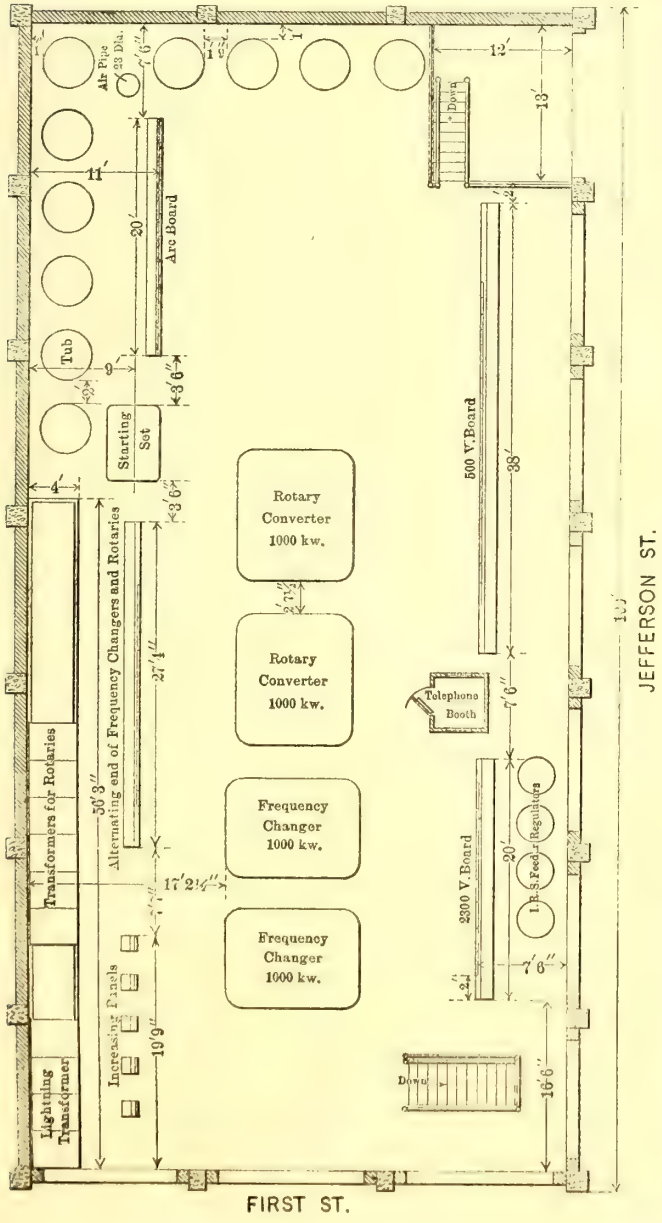
In addition to the merchandise and express freight handled daily, a local freight train is operated daily except Sunday. This train is loaded at night at Portland and deliveries are made at the farthest point, 36 miles away, about 11 o'clock in the morning. The package freight, milk express and miscellaneous traffic is handled by two trains each way daily, and this traffic brings a higher return than that carried on the local freight train. The rates for package freight are the same as those charged by competitive express companies. The milk business amounts to 15,000 gal. per day, for which a charge of from 10 to 15 cents a can is made according to the distance hauled.

The yearly business in and out of Portland which passes through the Portland freight house amounts to 18,000 carloads, and even this large amount does not include l. c. l., or so-called express freight. The local and through freight trains, which are hauled by locomotives, seldom make up with less than 25 cars. The locomotives handling such trains each weigh 40 tons, and are of the slanting cab type with steel bodies. They are equipped with four GE-55 motors and type M control. At one point on the line there is a summit with a 2 per cent grade on either side. An extra locomotive is kept at this point without a crew, so that when a train approaches the heavy grade the extra locomotive may be coupled to the train locomotive and the heavy load drawn over the summit with the two locomotives operating through the medium of the multiple-unit control.

On one division, 26 miles long, there are 31 sidings averaging from 400 ft. to 1400 ft. in length, and as there is so much switching to be done five men are required for a freight-train crew. This crew is made up of a motorman, a trolleyman, a conductor and two flagmen. The trains are operated under the standard code of rules of the American Railway Association, and to conform strictly to these rules the two flagmen are required for protection during the switching.



Portland Railway System—Vertical Section of South Portland Substation



Portland Railway System—Plan of Machine Floor of South Portland Railway and Lighting Substation

The Oregon Water Power line interchanges freight with the Southern Pacific at East Portland and with the Oregon Railroad & Navigation Company at Fairview. This interchange is required by the State and Interstate Commerce commissions, and the electric lines get a local rate on all through business.

INTERURBAN PASSENGER SERVICE

The passenger service on the Oregon Water Power line includes a train every hour to Gresham, located about midway between Portland and the terminus at Cazadero. Every other one of these trains operates through to Cazadero so that there is an hourly service on the more heavily traveled portion of the line, and a train every two hours on the extreme end. As regularly made up these trains comprise a motor car and a trailer car. Frequently trains of four cars are operated on the regular schedule. On Sundays an hourly service is given to Cazadero because of the special travel to the resorts on the Clackamas River.

The Oregon City division of the Oregon Water Power lines operates for 4 miles over the same tracks as the Springwater-Cazadero division. This line is 15 miles long, and a half-hourly service with motor cars and single trailers is given between Oregon City and Portland. On one division between East Portland and Lents Junction, which traverses a thickly populated suburban territory, a 10-minute service is given with two-car multiple-unit trains. These cars are equipped with four GE-81 motors and type M control, and the operation of trains is protected with United States automatic block signals.

CAZADERO POWER STATION

The rapid growth of passenger and freight traffic on the city and interurban lines of the Portland Railway, Light & Power Company has necessitated an increase in the company's power supply. The principal generating station of this company, located at Cazadero on the Clackamas River, 37 miles from Portland, was described in the STREET RAILWAY JOURNAL for May 18, 1907, page 868. This plant is equipped with three 42-in. Victor turbine wheels of the Francis type, direct-connected to three 2500-kw, 11,000-volt, Allis-Chalmers water-wheel type generators. The ultimate capacity of the plant is 25,000 hp. About a mile above the power plant is a dam across the Clackamas River, 130 ft. wide at the base, which diverts a portion of the water into a flume 2622 ft. long leading to a reservoir on the hillside above the plant. This reservoir covers 50 acres when filled to an average depth of 20 ft., and has a storage capacity of 326,480,000 gal., affording a sufficient supply of water to run the wheels of the power plant for six hours after the gates at the dam have been closed.

POWER IMPROVEMENTS

In addition to this plant the company's operating engineers, and Sellers & Rippey, of Philadelphia, consulting engineers, are making investigations and planning the construction of a 25,000 kw or 30,000 kw capacity water-power development to be built 3 miles above the present Cazadero dam. The interurban line will be extended to facilitate the handling of materials at the new water-power development. It is planned to dam the Clackamas River to a height of 135 ft., which will fill the gorge for a distance of 6 miles. The dam will have a crest 650 ft. long. At the present time test drills are at work to determine the geological formation below the bottom of the gorge, and it is thought that work on the bed of the dam can be started in the fall of 1910. Power from this development will be delivered to Portland over high-tension transmission lines.

The water-power plant at Oregon City is now equipped with a 450-kw, 33-cycle, 10,000-volt generator, direct-connected to a 42-in. Victor vertical turbine, and there is an additional 60-in. Victor wheel which may be belted to this generating set. It is planned to install an additional 500-kw railway generator to be driven direct by the 60-in. wheel so that the two machines can be operated independently by the wheels or can be coupled together and disconnected from the wheels for operation as a motor-generator set.

The transmission lines, of which there are three between Cazadero and Portland, are operated at 30,000 volts potential. Between Portland and Oregon City there are also three lines operating at 10,000 volts, two of which are on the west side of the Willamette River, and the third on the east side parallel with the railway. From Oregon City current is transmitted at 33,000 volts to feed the substations of the Oregon Electric Railway which operates high-speed interurban lines extending 50 miles south and 22 miles west from Portland. These transmission systems are interconnected through transformers and are fed by steam power plants at Portland and the water-power plants mentioned.

SOUTH PORTLAND SUBSTATION

A large fireproof substation has just been completed at the intersection of First and Jefferson streets in the business district of Portland. The structure has a reinforced concrete frame designed and built according to the Kahn system. The concrete is filled in with brick panels enclosing the large window frames. The roof is supported by concrete trusses of 50-ft. span, and concrete girders carry a 20-ton capacity single-motor Niles-Bement-Pond crane serving the entire machinery and transformer floor. At one corner of the machine floor there is an opening 13 ft. x 12 ft. in size, through to the street level so that the crane can be used to unload machinery from wagons.

The South Portland substation serves as a distributing center for both railway and lighting current. Its main equipment comprises two 1000-kw, 33-cycle, 60-cycle frequency-changing sets, each made up of one 10,000-volt, 33-cycle motor and one 2300-volt, 60-cycle generator, and two 1000-kw General Electric rotary converters. The lighting equipment includes 10 tub transformers which furnish constant current for circuits of 4-amp magnetite arc lamps operating through a large installation of mercury arc rectifiers. All high and low-tension lines in and out of the building are carried in underground conduit. There are duplicate 10,000-volt buses for the incoming feeding current, and duplicate 2300-volt buses for lighting distribution.

NEW OFFICE BUILDING AND SUBSTATION

A new substation and office building for the accommodation of the operating organization of the Portland Railway, Light & Power Company is now nearing completion. This building is located at the corner of Seventh and Alder streets, and is nine stories high with a basement. The overall dimensions of the building are 100 ft. x 100 ft. A portion of the basement and first floor, 60 ft. x 100 ft. in size, is used as a railway and lighting substation. The load of the seven stories and the roof above the substation operating room is carried on steel trusses 11 ft. deep with a 60-ft. span. A part of the basement will be used as a storage battery room. That portion of the street floor not occupied by the substation will be subdivided into a general office for the lighting department, and the various other floors will be subdivided according to the needs of the executive and operating departments.

TRANSPORTATION FEATURES OF THE OREGON ELECTRIC RAILWAY

A LITTLE more than a year ago the Oregon Electric Railway was opened for traffic between Portland and Salem, Ore., 50 miles. Since that time an additional branch from Portland, 22 miles west to Forest Grove, has been put into service. This new 72-mile d. c. railway has a substantially built roadbed and a catenary-supported trolley. Multiple-unit trains are operated on frequent headway at high speeds, and the first year of operation has been remarkably successful, not only from a traffic standpoint but because of the clear record of the transportation department. Since the first public train was run in February, 1908, until August of the present year not a single passenger had been injured.

Strict adherence to the standard code of rules of the American Railway Association is the reason given for this clear record. Special care also is taken in the selection of men, and for these reasons it may be of interest to review some of the features of the transportation department of this road.

The operating organization of the Oregon Electric Railway is headed by Guy W. Talbot, general manager, to whom report George F. Nevins, the traffic manager and auditor, and C. A. Coolidge, superintendent. The master mechanic, road master and electrical engineer report to the superintendent, with the exception that the electrical engineer reports to the general manager on questions of policy. It will be noted that this organization scheme closely approximates that used by steam railways.

SELECTION OF TRAINMEN

In selecting conductors and motormen for either passenger or freight service the strict rule is followed that all acceptable applicants must have had previous experience with a steam railway operated under the American Railway Association rules, and also must show that their record in this service was satisfactory. In the electric railway organization a freight brakeman is next in line for promotion to a position as passenger car conductor. At the present time all of the motormen are experienced steam railroad locomotive engineers. Portland is an important steam railroad center and there is no scarcity of good men who are willing to leave the steam railroad service for work on the electric trains at the same or even less wages than they formerly received. The Oregon Electric Railway Company is a member of the American Railway Association.

When a man applies for employment in any part of the train, station, yard, signal or crossing service, he is given a thorough test of sight and hearing. Applicants for engineer or train and switching service are also given physical examinations by the chief surgeon of the company. The general questions on the application blank filled out by each applicant are similar to those used in good steam railroad practice. A schedule of the very thorough physical examination record made by the medical examiners is reproduced.

The rule book of the company includes all the American Railway Association rules for train operation that apply to electric railway service, and the rule numbers as used in the steam railroad standard rule book are retained in the rule book of the Oregon Electric Railway so that there may be no confusion, and so that the experienced steam railroad trainmen employed will be familiar with the location of each rule by number. Before accepting a conductor or a motorman he must satisfactorily pass an examination on rules, which includes 173 questions printed on a blank and arranged with

spaces for written answers. These questions refer to train signals, classification and movement of trains, movement of trains by train orders, and require the interpretation of various sample train orders.

After having passed the physical tests and the examinations on rules, the new motorman is put on a train with an instructor, who teaches him the important features regarding the operation of the electrical equipment and the control system, and gives him an opportunity to familiarize himself with the roadway. New conductors also are put on with old men and serve as assistants while learning the road, the tariffs and the methods of handling tickets and making the reports required by the auditing department.

New motormen are required to work a few days in the repair shop, and particularly to study the multiple-unit control system. After their knowledge of this part of the equipment meets with the approval of the master mechanic, and after the instructing motorman certifies to their ability to operate a train, the new men are given runs, but are kept under close observation a sufficient length of time to make the officials sure that each knows his duties.

TRAIN OPERATION

The telegraph system is used exclusively for transmitting train orders, unless this service is interrupted by some accident, when telephones placed in shelter sheds at the sidings may be

Short Trips—SALEM DIVISION—Oregon Electric Railway

Going leave PORTLAND	Returning arrive PORTLAND	DESTINATION And Miles from Portland	Time Required for Round Trip	ROUND TRIP FARE Saturdays Sundays	ROUND TRIP FARE Other Days	TIME At Destination Before Returning
8.50 A M	9.35 A M	GARDEN HOME ....7 Miles	45 min.	$ .25	$ .35	Meet return train.
8.50 "	11.00 "	TUALATIN.....14 "	2 hours 10 "	.55	.75	53 minutes
8.50 "	1.15 P M	SALEM.....50 "	4 " 25 "	2.00	2.75	55 "
9.55 "	11.00 A M	METZGER.....9 "	1 " 05 "	.35	.45	05 "
9.55 "	12.05 Noon	WILSONVILLE ....21 "	2 " 10 "	.80	1.15	10 "
9.55 "	3.05 P M	SALEM .....50 "	5 " 10 "	2.00	2.75	1 hour 10 "
2.00 P M	2.55 "	GARDEN HOME.... 7 "	55 "	.25	.35	05 "
2.00 "	3.05 "	METZGER ..... 9 "	1 " 05 "	.35	.45	05 "
2.00 "	6.15 "	SALEM .....50 "	4 " 15 "	2.00	2.75	15 "
3.45 "	5.05 "	TUALATIN.....14 "	1 " 20 "	.55	.75	Meet return train.
3.45 "	6.15 "	WILSONVILLE ....21 "	2 " 30 "	.80	1.15	38 minutes.
3.45 "	8.20 "	SALEM .....50 "	4 " 35 "	2.00	2.75	35 "
6.20 "	8.20 "	WILSONVILLE ....21 "	2 "	.60	1.15	Meet return train
6.20 "	10.40 "	SALEM .....50 "	4 " 20 "	2.00	2.75	20 minutes

Short Trips—FOREST GROVE DIVISION—Oregon Electric Railway

8.30 A M	9.35 A M	BEAVERTON .....10 Miles	1 hour 05 min.	$ .40	$ .55	Meet return train
8.30 "	11.25 "	FOREST GROVE...26 "	2 " 55 "	1.00	1.45	35 minutes.
10 10 "	1 30 P M	HILLSBORO .....20 "	1 " 20 "	.80	1.15	1 hour 30 "
10.10 "	1.30 "	FOREST GROVE....26 "	1 " 20 "	1.00	1.45	1 "
2 15 P M	4 35 "	HILLSBORO .....20 "	2 " 20 "	.80	1.15	30 "
2 15 "	4.35 "	FOREST GROVE....26 "	2 " 20 "	1.00	1.45	Meet return train.
2 15 "	4.35 "	ORENCO .....16 "	2 " 20 "	.65	.95	47 minutes.
3.30 "	4.35 "	BEAVERTON .....10 "	1 " 05 "	.40	.55	Meet return train.
3.30 "	5.23 "	ORENCO .....16 "	1 " 55 "	.65	.95	18 minutes
3.30 "	5.25 "	HILLSBORO .....20 "	1 " 55 "	.80	1.15	Meet return train.

Oregon Electric Railway—Advertisement Showing Possible Excursion Trips

used. Each freight caboose is equipped with a telephone set and a hook pole so that the dispatcher may be called quickly if the train becomes stalled between stations. Operators are on duty at 10 telegraph stations on the Salem division and at four stations on the Forest Grove division. A number of these telegraph stations are at power substations. Operators for power substation service are recruited from the steam railroad telegraph service, and their duties on the Oregon Electric Railway lines include the operation of both the substation and the handling of train orders. The Postal Telegraph Company uses the railway company's telegraph line, but by agreement the dispatcher always has first right to the wire.

The movement of trains past stations where operators are on duty is controlled by two semaphore blades—one for each direction—which are mounted on a high post in front of the telegraph offices. The semaphore blades are always set in the stop position except when right to proceed is called for by an approaching train. In approaching a station the motorman sounds four blasts of his whistle, and if there are no orders for his train the agent pulls the proper semaphore blade down to the "proceed" position. The motorman acknowledges this movement of the blade by two blasts of his whistle. Should a train come within sight of a station and find the semaphore blade in the proceed position, the motorman must stop and get clearance from the dispatcher, provided that the incident takes place while an operator is, or should be, on duty at that station. This rule, therefore, makes it necessary for the station agent to lower the semaphore blade only after a motorman has called for a proceed signal. The finding of a station semaphore in the proceed position (unless the motorman has seen it lowered) is considered an improper signal.

This method of blocking trains at each station where there is an operator on duty is thought to be as complete a manual block system as could be devised. If the operator does not handle his semaphore properly he is disciplined; for the first offence he is admonished, and for the second he is given demerits, according to the judgment of the superintendent. If a motorman runs his train by one of these station semaphores placed in the stop position or by an improperly displayed sig-

No._____

Physical Test Record.

(To be made by Medical Examiner)

Of_____ Candidate for { Employment / Promotion }

(Name to be written here by the candidate in the presence of the Medical Examiner.)

as_____ on_____ Division

NOTE Employees for promotion to Engineer or Conductor and applicants for employment as agent, operator, station baggageman, train baggageman, engineer, fireman, hostler, engine inspector, conductor, brakeman, car inspector, engine inspector, yardmaster, assistant yardmaster, switchman, switchtender, signalman, signal repairman, towerman, yard flagman railroad-crossing flagman, flagman, gateman, bridgetender, bridge foreman, watchman, section foreman, track walker, and such other applicants as may be designated by proper official are subject to examination in 1st, 2nd and 3d tests.

1st TEST—ACUTENESS OF VISION

DISTANCE VISION				READING VISION	
WITHOUT GLASSES		WITH GLASSES		WITHOUT GLASSES	WITH GLASSES
20 / 20		20 / 20			
Right Eye	Left Eye	Right Eye	Left Eye	Right Eye / Left Eye	Right Eye / Left Eye

2d TEST—COLOR PERCEPTION

WOOL TEST

Test Skeins Submitted	If Skeins are correctly selected to match test skeins, write "Correct," also "Prompt", or "Hesitating" in proper line; otherwise give the numbers of skeins selected.
A Green	
B. Roso	
C. Red	D. Blue

If all lights as shown are correctly named, write "Correct" across space for reporting lantern test; otherwise write initials of name given to all lights as shown

LANTERN TEST

Testing Lantern two lights	Size of Opening	NUMBER SHOWN	1	3	8	4	11	13	12	14	3	5	6	6	13	15	14	16	3	7
		NAME GIVEN																		
		NUMBER SHOWN	6	8	15	17	16	16	2	9	9	10	17	1	18	9	9	11	10	12
		NAME GIVEN																		
Testing Lantern one light	Size of Opening	NUMBER SHOWN	1		2		11		12		3		4		13		14		3	
		NAME GIVEN																		
		NUMBER SHOWN	6		13		16		7		8		17		18		9		10	
		NAME GIVEN																		

3d TEST—HEARING

Number of feet at which numbers or words can be repeated correctly when spoken in a conversational tone.	Right Ear	Left Ear
Number of feet at which ratchet accounter can be heard, and ticks counted.	Right Ear	Left Ear

NOTE Applicants are subject to examination in 4th test, but actual employees are exempt.

4TH TEST—GENERAL PHYSICAL CONDITION

Rate of pulse_____ of Respiration_____ Has he had Smallpox?_____ or been Vaccinated?_____ When?_____

Has applicant ever been or is he now the subject of disease of lungs?_____ heart?_____ stomach?_____

bowels, including rectum?_____ kidneys?_____ genito-urinary organs?_____ nervous system?_____ Skin?_____

Is he the subject of any disabling deformity from injury or otherwise?_____

Has he any present source of disability in hands and arms?_____ feet and legs?_____ spine?_____

If deformity or disability is due to injury, how, when and where received?_____

Has he hernia?_____ what form?_____ present condition of same_____

Has he hydrocele?_____ size?_____ Varicocele?_____ size_____

What other diseases has he suffered from and when?_____

Is his appearance that of a temperate man?_____

He is physically a { first class / average / defective } subject for position as_____

Is he accepted, rejected or referred (when in doubt refer to Chief Surgeon giving No. of test)?_____

Signature_____ M. D.

MEDICAL EXAMINER

Examined at_____ Date_____ 19____

REMARKS

Oregon Electric Railway—Physical Test Record (Original 7 in. x 13 1-2 in.)

nal, the train crew is discharged. Thus the object of requiring the motorman to acknowledge the dropping of a station semaphore by two whistles serves the double purpose of advising the station agent that the signal is seen, and also notifies the conductor that the train has obtained the right to enter the next block. Rules 221 and 221-A regarding this method of blocking trains, as used by the Oregon Electric Railway, follow:

221. A fixed signal must be used at each train order office, which shall indicate "stop" when there is an operator on duty, except when changed to "proceed" to allow a train to pass for which there are no orders. A train must not pass the signal while "stop" is indicated. The signal must be returned to

"stop" as soon as a train has passed. It must be fastened at "proceed" only when no operator is on duty.

Operators must have the proper appliances for hand signaling ready for immediate use if the fixed signal should fail to work properly. If a signal is not displayed at a night office, trains which have not been notified must stop and ascertain the cause, and report the facts to the superintendent from the next open telegraph office.

Where the semaphore is used, the arm indicates "stop" when horizontal and "proceed" when in an inclined position.

221 (A). Clearance card (Form 0.1) will be issued to all trains stopped by train order signal, and will show numbers of orders, if any, for that train.

Enginemen in approaching a telegraph station, after whistling for station, if signal can be seen, will sound four short blasts of the whistle for "proceed" signal, and will acknowledge receipt of same by two short blasts of the whistle, and proceed, unless required to stop for other purposes. If "proceed" is not received, train must come to a stop and not proceed without a clearance card. If signal is at "proceed" when engineman comes in sight of it, he will not whistle for "proceed" but must stop and get a clearance.

Operators in changing position of the train order signal from "stop" to "proceed," should do so only when the movement can be seen by the engineman. If engineman fails to see the movement of arm or light, he must stop and not proceed until after receiving a clearance card. He must always instantly acknowledge the change in signal to "proceed" by two short blasts of the whistle.

Unless some form of block signals is used operators must space trains 10 minutes apart, using the train order signal for that purpose. They must show on clearance card time train will be allowed to depart.

Conductors and enginemen must respect time marked in clearance and follow preceding train as per rule 91.

DEMERIT SYSTEM

The discipline methods of the transportation department of the Oregon Electric Railway are based on an adaptation of the Brown demerit system with dischargeable offences, one of which is "violation of any rule that might cause accident, such as leaving a switch open or an operator overlooking an order." The bulletin regarding the conduct of this discipline system as distributed at the time of its introduction follows in part:

TO ALL EMPLOYES

1. On April 1, 1908, the system of "Discipline by Record" for permanent employes will be put in effect, and upon that date all employes will be considered as starting in with a clear record. As occasion demands an individual account will be opened with each employee, in a book kept especially for that purpose in the superintendent's office.

2. The objects to be attained under this system are
   (a) To avoid loss of wages by person employed;
   (b) To stimulate and encourage employees in the faithful and intelligent discharge of their duties.

3. Under this system a certain number of marks will be entered against the record of each employee for violation of the rules, etc., instead of suspension.

4. Each employee will be notified in writing of any favorable or unfavorable entry against his record; the reason therefor, and the number of marks given.

5. Whenever demerit marks are given a notice will be posted stating how many marks have been given and on what charge, but omitting name, date, train, or location.

6. When an employee's demerit marks have reached the number of 75, he shall be called in by the superintendent, duly cautioned, and advised that when his demerits amount to 100 he will be subject to dismissal from the service.

7. Such acts as disloyalty, dishonesty, desertion, intemperance, insubordination, willful neglect, gross carelessness, immorality, violation of the rules whereby the company's porperty is endangered or destroyed, making false reports or statements, or concealing facts concerning matters under investition, etc., will subject the offender to summary dismissal.

8. Credits will be given on the record, and may also be bulletined, for notably excellent conduct, deeds of heroism and loyalty, good judgment in emergencies, etc.; these special credits will be given full consideration in connection with any charge entered.

9. Employees will be allowed to examine their record at any time upon application.

10. The company reserves the right to discharge any employee under this system.

Merit and demerit marks are given according to the following schedule:

DEMERITS

Incompetent or unsatisfactory service	10–100
Disobedience of rules governing railroad crossings	10–100
Failure to report accidents	10–100
Smoking on duty (passenger crews)	10
Incomplete and poor accident reports	1– 20
Inattention to passengers	1– 10
Failure to show up or report for duty	10–100
Untidy condition of dress	5
Frequenting saloons	10– 50
Accidents when avoidable	10–100
Ungentlemanly conduct	5–100
Disobedience of orders	10–100
Gambling	50
Criticism of management of road	50
Talking about accidents to others than proper officers of road	20
Failure to report negligence or delay	2– 10
Failure to protect trains	10– 50
Failure to transfer orders	10– 50
Signals improperly displayed or failure to notice and answer signals	2– 50
Running ahead of schedule	10–100
Careless or indifferent operation of trains	5– 25
Backing train without proper signals and protection	10– 25
Injury to equipment caused by improper handling	10– 50
Failure to report trouble or any defects with car, roadway or overhead	5– 50
Acts detrimental to good service	3– 20

MOTORMEN'S SPECIAL DEMERITS

Running over circuit breakers with current on	1– 5
Allowing unauthorized persons to ride in cab	25
Headlight not burning according to rules	1–10
Failing to whistle or ring gong at proper places	10
Starting train without proper signals, except to avoid collision	10– 25
Exceeding speed limit within yard or city limits	5– 25
Flattening wheels except to avoid collision or accident	5– 20
Reversing car except to avoid accident	25
Failure to observe slow, stop, or caution signs	5– 50
Improper use of air	5– 10
Splitting switch	5–100
Using current with brakes set	5– 25
Running too close to wagons	5– 25
Leaving car without taking controller handle, throwing breaker and cutting out control	5– 25
Not obeying conductor's signals	25
Running ahead of time	10–100

CONDUCTORS' SPECIAL DEMERITS

Repeated mistakes in reports to auditor	5– 25
Inattention to passengers	1– 10
Bad judgment and carelessness in regulating heat or ventilators	1– 10
Carelessness in using hat checks	5– 25
Failure to cancel tickets	1– 10
Failure to make daily reports to auditor	1– 10
Failure to make daily remittance to bank	1– 10
Failure to hold trolley when necessary	5– 25
Failure to be supplied with tickets, reports and other necessary supplies	5– 25
Failure to give proper signals	5– 25
Failure to call stations or announce train stops at terminals	5– 25

MERITS

Warning persons in act of jumping from moving trains; thus preventing accidents	1– 25
Assistance rendered in case of accident such as to bring commendation from passengers	1– 25
Securing names and addresses of witnesses to accidents other than those on report	5– 25
Politeness and attention to passengers	1– 5
Reporting defects in equipment, track or overhead	1– 5
Complete and perfect accident reports	5– 10
Good judgment and work in case of wrecks, washouts, etc	5– 25
Neatness in personal appearance	1– 10
One month without demerits	5
For any meritorious act which in the opinion of the superintendent deserves recognition	1–100

MOTORMEN'S SPECIAL MERITS

Careful handling of car during previous month	5– 25
Good stop to avoid accident	5– 25
For bringing in defective car without delay to other trains	5– 25
Good judgment in using sander	1– 25

CONDUCTORS' SPECIAL MERITS

Handling boisterous, unreasonable or drunken passengers with tact and judgment	1– 25
Special attention to aged and infirm persons or children	1– 25
Perfect reports to auditor for one month	5– 25

SERVICE

Thirty-eight trains a day are operated in and out of Portland, including one limited train, which makes the run between Portland and Salem, 50 miles, in 1 hour and 30 minutes, or at an average schedule speed of about 33 miles an hour. The local trains make an average schedule speed of 25 miles an hour.

The maximum rate of fare charged for passage between Portland and Salem, and between Forest Grove and Gaden Home and intermediate points, is 3 cents per mile. However, a reduction of 5 per cent from this rate is allowed on daily return tickets which, in the form issued, permit the tickets to be used for two fares going in one direction. The company also sells 60-ride commutation books at 1 1/2 cents per mile. These books are valid for a period of six months

after date of issue, and may be used by any member of a family between points located within a radius of 16 miles from Portland. This latter plan has induced many families to build homes in the suburbs of Portland, and in several of the small settlements along this electric line. A rate of 1 cent per mile is made to school children. This transportation is issued in books of 46 rides, which must be used up in one month from date of issue. Mileage books good for 1000 miles are sold for $25. These books are valid only for the passage of their original purchasers. Week-end return-trip tickets good going on Saturday and Sunday and returning up to Monday night are sold at a rate of 2 cents per mile. When a fare is paid on the car an excess charge of 10 cents is made. A receipt for this excess charge is redeemable on demand at any of the company's offices.

In connection with the promotion of business for the Oregon Electric Railway, the traffic department has issued cards 3 in. x 5 1-2 in. in size, calling attention to the fast round-trip time that can be made between Portland and each of the more important towns on the two divisions. The reverse of one of these cards, which presents a number of possible trips and the time required to make them, and other information, is reproduced on page 551.

UNITED RAILWAYS OF PORTLAND

THE United Railways Company of Portland, Ore., is completing an interurban road 27.5 miles long, from Portland to Forest Grove. This line, of which 17 miles are in operation, traverses suburban territory of Portland along the bluffs on the west banks of the Willamette and Columbia Rivers for 14 miles, serving the towns of Whitwood Court, Linnton, Harborton, Miller's Station and Burlington. At Burlington the line turns west and passes through Helvetia, Glencoe and Centerville to Forest Grove, in Washington County. The territory tributary to this line is either timber land or is under a high state of cultivation for market gardening and farming. Freight terminals have been purchased in the steam railroad terminal district, at the north end of Portland, and plans are being made to handle heavy freight.

In building the roadbed the rugged nature of the country necessitated a comparatively large amount of excavation and filling. Along the river bluffs there are cuts from 50 ft. to 60 ft. deep and trestles from 90 ft. to 100 ft. high. The track is laid with 60-lb. rails and has maximum grades of 1 1/2 per cent and maximum curves of 4 deg. The rails are bonded with Ohio Brass Company's soldered bonds, which were put on with special care and mechanically tested after installation.

In addition to its interurban line the company has 10 miles of standard-gage track within the city of Portland. This track is laid with 114-lb. girder rails in streets paved with Belgian blocks and serves as a city entrance for the interurban line and also as a track connection for the steam and electric freight lines. At the present time the company is handling between 10 and 40 cars of freight each night. A new line, about 3 miles long, is being built to the suburb of Riverdale, south of the city.

The overhead construction of the new road includes No. 0000 grooved trolley, with side suspension, and Ohio Brass Company's overhead fittings carried on 40-ft. poles. The trolley is supplemented with a 800,000-circ. mil aluminum feeder cable. The 10,000-volt three-phase high-tension current is transmitted by No. 0 aluminum strand cables mounted on the tops of the trolley poles and carried on Locke porcelain insulators tested to 14,000 volts. This line feeds a substation 8 miles from Portland with one 250-kw motor-generator set of Westinghouse manufacture.

The rolling stock equipment for the operation of that portion of the line now completed includes four 60-ft. interurban coaches, built by the American Car Company, at St. Louis, two open trailers and one Westinghouse-Baldwin electric locomotive. The interurban coaches have four Westinghouse 75-hp motors carried on Baldwin trucks and Westinghouse electro-pneumatic control. The locomotives have motors rated at a total of 440 hp. Another Westinghouse-Baldwin freight locomotive of 600-hp motor capacity is now under construction and soon will be added to the rolling stock equipment of this road.



ELECTRIC RAILWAYS OF SAN FRANCISCO AND ITS ENVIRONS

OPERATING FEATURES OF THE UNITED RAILROADS OF SAN FRANCISCO

So much has been written of the severe trials through which San Francisco and its electric railway system have passed during the last three years that the history of the rapid reconstruction following the earthquake and fire and the quick resumption of normal service following the strike of 1907 need not here be repeated. The present article will treat of extensive power-plant improvements now under way, the most recent and interesting features in track construction and the methods used in the employment of platform men.

POWER SUPPLY

At the present time the company is operating two generating stations and purchases power from power supply companies with transmission systems fed from water-power and gas-engine driven generators. The railway steam plants are known as the North Beach and the Bryant Street stations. During the past summer the United Railroads of San Francisco purchased control of the water-power property of the Stanislaus Electric Power Company, and a contract between that company and the United Railroads has been made whereby the Stanislaus Company will soon furnish all the power required for the operation of the railway systems in San Francisco.

The present plant of the Stanislaus Company includes four 6700-kw generators, driven by Pelton wheels operating under a 1500-ft. head. The output of this station, which is located in the Sierra Mountains, 140 miles east of San Francisco, is to be carried at 110,000 volts over a steel tower transmission line extending to the city limits of San Francisco, where the voltage will be stepped down to 11,000 volts, three-phase, 60 cycles, for distribution to the substations of the United Railroads and to other users. The ultimate capacity that can be developed by the Stanislaus property is 60,000 hp. The operating contract between the railroad and the power company provides for a purchase rate of about $30 per hp-year, and the railroad company expects to use an average of 20,000 hp. Sanderson & Porter, New York, are the consulting engineers for this extensive hydraulic development. In the operating contract between the two companies it is provided that the power company shall operate the steam stations now owned by the railway company. These stations are to be used for relay and emergency service.

The new power supply, with its 60-cycle current, will make advisable changes in the substation equipment heretofore operated by the railway company. The four substations, known as Turk and Fillmore, Bryant Street, Geneva Avenue and Millbrae, are now equipped with 25-cycle rotary converters. Motor-generator sets will be substituted for these units. The motor end of the new sets will operate on 11,000-volt, 60-cycle current without the use of substation transformers. Most of these motors will be of the synchronous type, although a few of the units will be driven by induction motors to provide against hunting. The generating ends of the motor-generator sets will each have a capacity of 1500 kw.

NORTH BEACH POWER STATION

The North Beach power station was completed during the summer of 1903, and carried the entire alternating-current load generated by the railway company until the time of the earthquake in 1906, when service was interrupted. Directly after the earthquake, which severely damaged the building and stack, but not the boilers or generating machinery, emergency repairs were made so that power could be obtained quickly. Since that time the permanent reconstruction has proceeded until now the station is in better condition than ever before. The reconstruction work included the addition of a 6-ft. top on the original side walls and the erection of a new roof. The height of the building was increased to permit the installation of a 50-ton Morgan crane, which now serves the entire engine-room floor. Originally the boiler-house stack, which was built of brick, was 150 ft. high. This stack is 10 ft. in diameter. The top half of the stack fell at the time of the earthquake and a new cap has been put on at a height of 78 ft. It is said that the short stack is of ample height to afford good draft for the boiler plant now that oil is burned for fuel.

The equipment of the boiler plant includes 14 B. & W. boilers, the waste gases from which are passed through Green fuel economizers into a single large concrete breeching. There are eight 500-hp boilers with 4-in. tubes, 21 wide and 12 high, and six 600-hp boilers with 4-in. tubes, 21 wide and 14 high. California crude petroleum is used as fuel. This is held in a 30,000-bbl. storage tank and two 20,000-gal. auxiliary tanks, which are fed from either of two oil supply companies' underground piping systems.

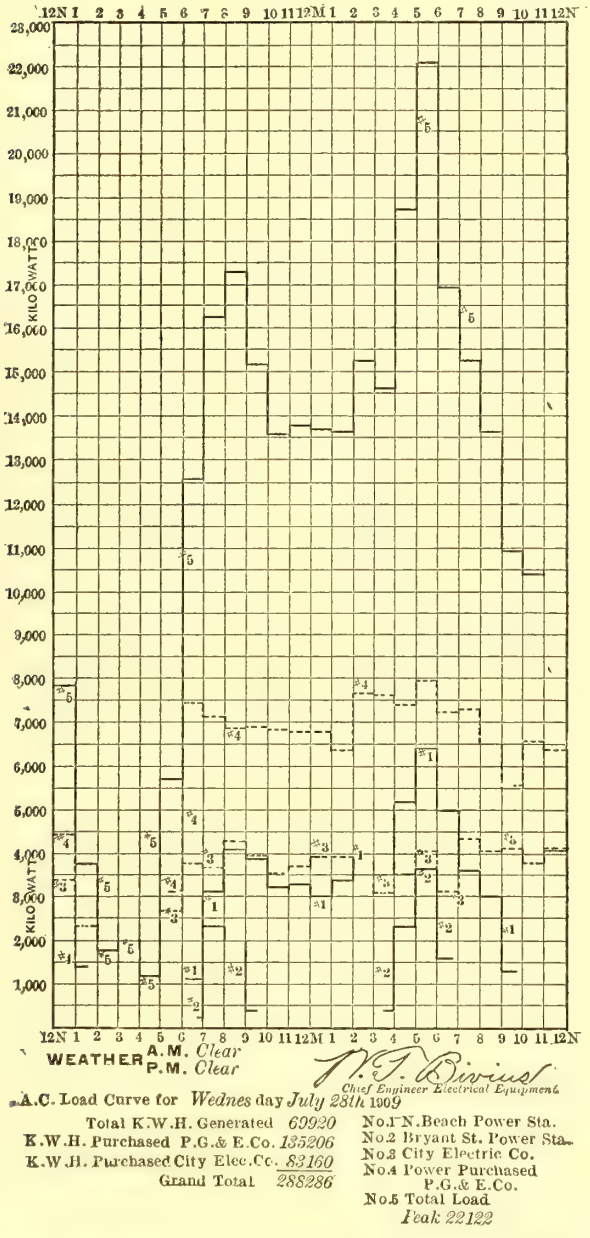
The engine-room equipment includes two three-cylinder Union Iron Works marine type engines, each driving two General Electric 1200-kw, 13,200-volt, three-phase alternators at 136 r.p.m. and a five-stage Curtis turbine of 5,000-kw capacity, which operates at 750 r.p.m., generating 13,200-volt, 25-cycle current.

Vacuum for the turbine is maintained by a Wheeler condenser with motor-driven, wet-vacuum pumps and circulating pumps handling sea water. The motor which drives the circulating pump is a three-phase General Electric induction unit of 200-hp capacity. The condensers for the reciprocating units are supplied with circulating water by engine-driven pumps, which are piped, however, so that they can be used as auxiliaries for the turbine equipment. The supply of circulating water is drawn from San Francisco Bay through two large cast-iron suction lines. An emergency supply tank provides sufficient water to prime these pipes three times in case the vacuum is lost, and a small air pump also serves to pick up the water if needed. Make-up water for the boilers is drawn from the city system, and the exhaust from the turbine condenser is passed through a Warren-Webster heater for boiler feeding. The boiler feed pumps are located in the basement and include three steam-driven and two motor-driven units. The fire-pump supply lines are fed with salt water.

An interesting part of the electrical equipment of this plant

is a 4000-kw phase-changing machine, which handles current from a long-distance transmission system operated at 60 cycles and delivers it to the railway company's substation transmission system. This phase-changing unit also operates in parallel with the 5000-kw Curtis turbine generator. The unit, which was built by the General Electric Company, is a four-bearing machine receiving 11,000-volt, 60-cycle current and delivering 13,200-volt, 25-cycle current to the railway company's a.c. substation feeders.

A daily load chart is presented showing the normal load



United Railroads of San Francisco—Typical Daily A.C. Load Curves

curve and the sources of the proportionate amounts of power which go to make up the total curve.

Views are presented on Plate XXXIV, showing the interesting method of handling the heavy machinery recently installed in this plant. Use was made of a steam railroad wrecking crane for handling a heavy armature, and the heavy parts of the largs Curtis turbine were delivered on a lighter at the beach directly in front of the plant and moved into the building on rollers.

The United Railroads of San Francisco now operate about 270 miles of standard-gage track, including 14.7 miles of cable track. An interesting part of the track reconstruction work in San Francisco, which has been steadily progressing since the spring of 1906, was the relaying of the double-track line on Market Street, the main business artery of the city which leads from the ferries through the retail district. A description of a portion of this work was published in the ELECTRIC RAILWAY JOURNAL for Jan. 18, 1908, page 68. The article described the general methods of track construction in San Francisco following the earthquake, and illustrated, among other things, some of the features of the reconstruction and track elevation work at the lower end of Market Street, near the ferry.

In March and April of this year the track in that part of Market Street which carries the heaviest traffic was entirely rebuilt for a single-track distance of 9420 ft. with 141-lb. rails in the short period of six weeks. This work was done by contract at a cost of $6 per running foot, exclusive of the asphalt paving. On account of the heavy traffic the asphalt surface which was put in by the city was laid 2 in. thick on 1 in. of binder. The accompanying views, taken during the process of this track construction, presented on Plate XXXIII, illustrate the several stages of this work. One view shows an electric crane raising the old cable yokes imbedded in the concrete of the existing track. When these yokes had been pulled out the concrete was broken with hammers or put through a crusher. Then it was replaced and releveled to form a foundation bed 2 ft. deep. The wooden ties were ballasted with 8 in. or 9 in. of broken stone covered with a 1:3:6 mixture of concrete to support the gage blocks and asphalt surface.

A unique piece of track work is presented in one of the illustrations on Plate XXXIII, showing a cable track with its built-up yokes and deep foundation of concrete being moved to a new location in the same street and having its elevation raised about 3 ft. without disturbing or interrupting the operation of the cars. This work was made necessary on account of a change in the street grade extending for about four blocks along Clay Street. In carrying out the work, which was done with company forces, the cable track and its massive concrete foundation, tied together with structural iron conduit yokes, was lifted in lengths sufficient to give the 3-ft. rise in about 100 ft. of length and temporarily supported on blocking. Short screw jacks were used for lifting, and as soon as the body of concrete and steel had been blocked to its final surface the space beneath was refilled, thoroughly tamped and flushed. This work was completed more than a year ago, and there has been no perceptible settlement.

EMPLOYMENT METHODS

Immediately after the strike of 1907 it was necessary to hire as many as 100 new men each day, including Sunday, but as soon as the schedules had all been filled the requirements for admission to service were raised and the regulations for hiring, training and disciplining employees were placed on a high basis. A bureau has been established for obtaining and keeping complete employees' records for the use of the transportation department. A part of the work of this bureau is the investigation of all local references given by new men. The bureau is under the direct charge of the superintendent of employment who has sufficient clerical assistance to carry on the work of investigating the characteristics of applicants and keeping up the photographic and record files of all men in the service.

Applicants for work are received by the superintendent of employment only on Tuesday of each week. The superintendent talks with each man and takes the references offered by

the most acceptable looking candidates. New men must be between 5 ft. 6 in. and 6 ft. 2 in. tall and be more that 21 and less than 40 years of age.

As the men stand in line awaiting their turn to meet the superintendent of employment each one is asked to fill out a skeleton reference card, which is handed to the superintendent as the man is admitted to the office. These cards are printed on heavy manila paper cut 7 in. long by 4 in. wide and punched at one end for insertion in a loose-leaf binder. The following information is required to make the card complete:

Name.....	Former employer.....
Address.....	Former rate of pay.....
Position wanted.....	Why did you leave.....
Past occupation.....	Age.....

If the superintendent should employ a man with whose qualifications he is acquainted and thus forego the customary

M 374—11-16-08-1M

Application No. *Rule Book No.*

United Railroads of San Francisco

Signature of Applicant

Superintendent will please verify this signature before placing applicant on car

190

Mr. *Supt*

Place bearer *Badge*

whose signature is above on your lines to learn the duties of Motorman.

General Superintendent.

Instructed by

(Motormen instructing students will sign below)

DAYS

Badge

Badge

Badge

Badge

Badge

This is to certify that I have received the necessary instructions from the above named employees and thoroughly understand the duties of the position of Motorman as required by the rules of the Company.

Name,

Date,

I believe the above named applicant to be competent to perform the duties of Motorman, have examined and found him familiar with instructions and book of rules.

Division Superintendent.

Date,

To be returned to office of General Superintendent, in envelope, with order for Buttons.

United Railroads of San Francisco—Instruction Record Card (Original 3 3/4 in. x 8 3/4 in.)

inspection of references, he advises the chief clerk of the employment bureau of his action by sending him a small announcement slip, 3 in. x 4 in. in size, bearing the date, name of the new man, time appointed, car house to which he should be assigned, by whom recommended and any pertinent remarks necessary. This information is followed by the signature of the superintendent of employment before filing.

REFERENCES

After an applicant has been approved by the superintendent he is handed a four-page application blank which must be filled out in ink in his own handwriting in the presence of the clerk of the employment bureau. The completeness of this blank is an index of the thoroughness of the methods used in examining new employees. The general wording of the blank is reproduced in the opposite column.

After the application blank is filled the applicant is given an order requiring him to present himself at the hospital department for physical examination by the company's surgeon. If his physical condition is satisfactory the applicant is sent to the company's photographer with a blank requesting that four photographs be taken and sent to the employment de-

APPLICATION FOR EMPLOYMENT

To be answered in applicant's own handwriting
Use Ink

1. Applicant's name in full (no initials) .....
2. For what position.....
3. Where born, City (or Town) of.....
   State (or Kingdom) of .....
4. Date of Birth.....Month.....Day.....Year
5. Trade or occupation.....
6. Married, Single or widower.....
7. No. in family.....
8. General Appearance.....
9. Color of eyes.....
10. Color of hair.....
11. Weight .....lb.
12. Height .....feet.....inches
13. Complexion .....
14. Special Remarks: .....
15. Present address, No.....City of.....
16. Are any persons depending on you for support? If so, who? .....
17. With whom are you living?.....
18. How long have you resided at your present address?.....
19. Where did you move from to that place?.....
    No. .....City of .....
20. How long did you reside there?.....
21. How long have you resided in San Francisco?.....
22. By whom were you last employed?.....
23. Employer's address, No.....City of.....
24. Employer's business .....
25. How long in their employ? From.....to.....
    At what wages? .....
26. By whom were you previously employed?.....
27. Employer's address, No.....City of.....
28. Employer's business .....
29. How long in their employ, From.....to.....
    At what wages? .....
30. How long have you been out of employment? .....
31. Where does your parent or nearest relative now reside?
    Name .....
    No. .....Street or Avenue, City of.....
32. How is this person related to you?.....
33. To what extent do you use liquors (either wines, spirits or malt) as a beverage? .....
34. Were you ever injured? If so, state, when, where and nature of injury? .....
35. Have you ever been employed on any steam railroad or any electric, cable or horse railroad in any capacity? If so, state where, on what roads and in what position, length of service, and cause of leaving service, in each case.....

The persons whose names and addresses are given below are offered as references as to character, etc., by the applicant. Applicants will please bear in mind that the willing endorsements of persons well known in the community are the best possible references, but the endorsement of persons acquainted with applicant are more valuable in this connection than the unwilling endorsement of some one more prominent, who is acquainted with him.

(The original blank contains space for four references with lines for the Name, Business, Street No., City and State of each.)

N. B.—The applicant is cautioned that inasmuch as the references on this paper will be called upon for such detailed (written) information as to ability, industry, character, habits, etc., as they can give, he should be careful to secure those who know him well, especially in his occupation, and who will be willing to furnish such information in greater detail when asked. A failure to so furnish it promptly will be deemed a refusal, and will be necessarily a disadvantage to the applicant, and no statement in lieu of it will be accepted under any circumstances.

In consideration of my receiving employment from the United Railroads of San Francisco, I hereby agree that I will faithfully perform all of the duties and fully comply with all of the Rules and Regulations now existing, or which may hereafter from time to time be prescribed by the United Railroads of San Francisco for the government of its employees.

I further agree that my employment with the said Company may be terminated by it on any day or at any hour, by either written or verbal notice from the Company, its General Manager, General Superintendent, or other officer of said Company under whom I may be working.

I decline to accept the benefit of the provisions of the Act of February 27, 1893, California Statutes, of 1893, page 54, providing for a day of rest from labor, and I request permission to work my full time each month; being satisfied with such relief from work as said Company may allow. And I expressly understand and agree that the amount paid me for each month's or week's service shall be in full for all my services during such month or week, as the case may be.

IMPORTANT—I hereby guarantee the truth of the above answers made by me to the foregoing questions, which constitute the basis of my employment. And it is expressly understood that the United Railroads of San Francisco may summarily dismiss me from its service if at any time it be ascertained that I have concealed the truth or made false statements in any of the above answers.

I hereby declare that I have carefully read all of the foregoing application.

Witness my hand this.....day of 190

Signature of Applicant.....

Letters of recommendation must be handed in with this application, to remain on file with the Company. Applicants with such recommendation are given preference.

partment. A note at the bottom of the order for photographs says: "This company is in no wise to be responsible for or charged with the cost of the above-mentioned photographs." The applicant pays the photographer 50 cents for this work and he pays the doctor $1 for the physical examination. The photographs include two copies each of full face and profile portraits of the head.

If the bureau of employment finds that the references of the applicant are satisfactory and if the man is approved by the surgeon, he is next given an instruction record card and sent to the general superintendent's office for approval and assignment to instruction service on a particular division. These instruction cards are 3 3-4 in. x 8 3-4 in. in size, printed on heavy manila stock and bearing the information as reproduced herewith. When the new man is assigned to a division for instructions, if a motorman he deposits $2.50 for a badge and buttons and if a conductor $5 for his badge, buttons and punch.

INSTRUCTION SERVICE

When a conductor has successfully proceeded thus far he is taken in hand by an instructor who delivers to him a course of lectures and oversees his breaking-in service of seven days on the car platform. Next the student is carefully examined by an inspector or the car dispatcher as to his ability and knowledge, not only of operating his car, but of making out reports, punching transfers and other necessary duties. Then he is questioned by the superintendent and after approval he is instructed to report to the car dispatcher for work.

NAME: OCCUPATION: DIVISION:

BADGE No. Date of Birth: Place of Birth:

APPLICATION No. Married, Widower, Single: Previous Occupation:

DATE ENTERING SERVICE: Weight: Height: ft. in.

" LEAVING " Complexion: Hair: Eyes:

DATE RE-EMPLOYED: DATE LEAVING SERVICE:

DATE	DISCIPLINE RECORD	ACTION TAKEN	
			A
			B
			C

United Railroads of San Francisco—Service Record Card
(Original 9 in. x 6 in.)

When a motorman receives his assignment for preliminary instruction he is given a card filled out by the instructor of motormen, authorizing him to report at a certain car house for preliminary instruction and to return later for a final examination. The preliminary instruction period covers seven days in a school equipped for training men in the handling of their cars and in emergency work. The schoolroom equipment includes a skeleton car with complete running gear so that the wheels may be operated and the brakes used. After instruction in this school the student motorman must pass a written examination before he is assigned to an instructing motorman with whom he gets his first experience on the road. When he has successfully passed his written examination the student is assigned to a car house and there the division superintendent puts him on a car to break in with an experienced motorman for seven days. As soon as the motorman declares the student to be competent he returns to the school instructor for his final examination, which includes the answering of 82 questions on car operation. If this examination is satisfactory and if he can also satisfy the division superintendent who questions him that he is competent to operate his car, he is then assigned to the extra list. Particular care is taken to keep the extra list within such limits that all men get on a car once each day. The rate of pay for new men is 25 cents an hour, increasing by one cent a year to 33 cents per hour.

Several of the blank forms used by the employment bureau are of interest on account of their completeness. One of these blanks, an identification card, is the brief statement of the employee's distinguishing characteristics. On each of these cards a photograph is pasted and before a new man is approved for work each division superintendent must have noted on the card whether or not he recognizes the portrait of the new man. After this card has been filled out it is filed with the discipline record.

REFERENCE BLANKS

The reference blank sent out to previous employers is an imitation typewritten letter asking for the usual information. A more extensive reference blank is sent to those given as character references. This blank contains a list of 16 questions regarding the applicant's characteristics.

The discipline records of all employees are kept in a card index at the office of the general superintendent. These record cards are 9 in. x 6 in. in size and ruled on white cardboard as shown. Each new employee is required to sign a copy of the following agreement:

THIS AGREEMNET, WITNESSETH:

That ....., party of the first part, has made application to the UNITED RAILROADS OF SAN FRANCISCO, party of the second part, to be employed as .....upon its cars, and in consideration of his employment agrees, as follows:

1. To honestly and faithfully perform the duties of said position so long as he shall be continued in that employment, and to obey and fully comply with all the rules and regulations now existing, as well as those which may from time to time be prescribed by the company for said position on its cars.

2. If for any reason he shall be suspended from the employment of said company, he shall not be entitled to any compensation during such suspension.

3. When his employment with said company ceases, he will at once return to said company any badge, buttons or other property of said company, in his possession; and that any wages due him from said company, when his employment under this agreement shall terminate, shall be retained by said company until all of said property is returned by him to said company.

4. That the term of his employment shall be during the pleasure of the company and no longer.

As a part of the consideration of this agreement, it is further agreed that the party of the first part is not now a member of any division of the Amalgamated Association of Street and Electric Railway Employees of America, or any other similar organization, society or association, and will not during his employment with said company join any of said divisions, or any other similar organization, society or association, wthout first notifying said company of his intention so to do.

First party further declines to accept the benefits of the provisions of the ACT of 1893 of the Legislature of the State of California providing for a day of rest from labor, and requests permission to work his full time each month, being satisfied with such relief from work as the company may allow.

This agreement is freely and voluntarily entered into by first party, and he is not acting under coercion or compulsion of said company, or any of its agents, officers or other persons on behalf of said company.

IN WITNESS WHEREOF, first party has hereunto subscribed his name and the said UNITED RAILROADS OF SAN FRANCISCO have caused these presents to be subscribed by their General Manager this.....day of ....., One Thousand, Nine Hundred and .....

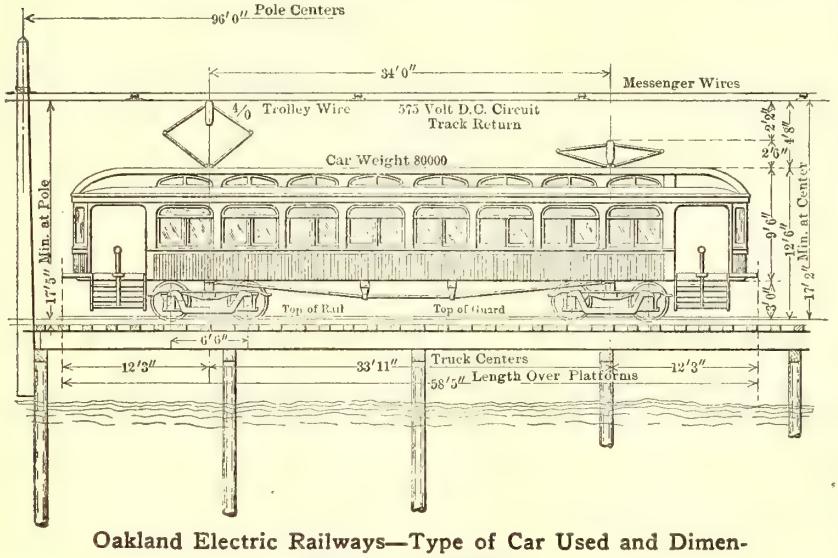
.....

UNITED RAILROADS OF SAN FRANCISCO,
By CHAS. N. BLACK,
General Manager.

Employment of men for car service, according to the methods here outlined, has materially assisted in improving the electric railway service in San Francisco. The thorough training given the new men serves greatly to lessen the probability of accidents. Also, discipline is maintained much more satisfactorily with the assistance of a complete set of records which shows all the essential information required in selecting men, together with their records while in service.

OPERATING AND CAR-BUILDING METHODS AT OAKLAND, CAL.

THE Oakland Traction Company and the San Francisco, Oakland & San Jose Consolidated Railway are two entirely independent organizations, but the two railways serve the same population—one with a fast interurban and frequent ferry service leading to San Francisco, and the other with local and suburban street railway service. While these two properties are separately owned, their railways are operated by the one staff. The San Francisco, Oakland & San Jose, commonly known as the "Key Route," has 32 miles of track extending from a pier terminus 3 miles from shore in San Francisco Bay to five population centers in Oakland and Berkeley. The important parts of the road are double tracked and laid with 70-lb. rails on a private right-of-way. The Oakland Traction Company has 199.49 miles of track and also serves the cities of Oakland, Berkeley and Alameda, all of which are located on the east shore of San Francisco Bay. The total population served by the two roads is about 350,000. An extension of the "Key Route" to comprise about 4 miles of track in the fast developing suburban territory north of Berkeley, is now under way.



Oakland Electric Railways—Type of Car Used and Dimensions of Pier Structure

The Oakland Traction Company operates 230 cars in its street railway service and the "Key Route" has 62 large interurban-type cars and is now constructing 16 70-ft. coaches for operation in connection with its train service to and from the San Francisco ferries. The tracks of the Oakland Traction Company have lately been reconstructed from narrow-gage to standard gage, so that the roadbed throughout is in excellent condition. Power for the operation of the Oakland Traction Company's cars is purchased from the Pacific Gas & Electric Company, which took over the old power plants of the traction company and supplies current through substations fed by a high-tension transmission system.

The pier terminal of the "Key Route," 3 miles from shore, includes a four-track passenger station, terminals for two ferry boats and a four-track storage and switching yard, all supported on piling. An interlocking tower near the end of the pier controls the switches for the terminal yards. The company owns five large ferry steamers which run on 20-minute headway between the Key Route ferry terminal and the Market Street terminal in San Francisco. These steamers were built in Oakland. As the boats arrive at the ferry terminal each is met by four trains of from four to eight cars. The passengers step from the ferryboat directly into the train shed and quickly load into their respective trains, which pull out one after the other and traverse the 3-mile pier to shore, where their routes divide, one each going to Berkeley, Claremont, Piedmont and Broadway. The service to the boats is operated in the same manner, and every 20 minutes a train from each of the four main divisions passes onto the pier and out to the terminal to meet a ferryboat leaving for San Francisco. The pier terminal is 2.7 miles from San Francisco and the fare between any station on the "Key Route" and San Francisco is 10 cents. The fare between stations on any branch of the "Key Route" is 5 cents. The company has a number of attractive terminals and way stations where tickets are sold. Ohmer fare registers are used in the collection of all fares.

ROLLING STOCK

The present standard type of motor car operated in the "Key Route" train service has either two or four motors. The four-motor cars weigh 80,200 lb. and the two-motor cars weigh 72,000 lb. Both car bodies are the same and seat 68 passengers. The motors are GE-66, with type M control, and trains are so made up of motor cars and trailers that there is a capacity of at least one motor per car. The four-car trains operate at speeds up to 35 m.p.h.

The motor equipment used in this service has had a clear record for five years. It is stated that although all of the "Key

CAR EQUIPMENT

Car No. 334	Type Motors GE 70-A-4	Trolley #6
Motor Truck M.C.B-20	No. " 4	Size 6"
Builder O.T. Co.	Control K-6	
Wheel Base 6'-0"	Cir. Breaker M.R.5	
Wheels 34" M.D. TIRE + C.I. CTR.	Fuse	
Axles 5"×9'-0"	Resistance C.G.	
Trail Truck "	Main Switch "	
Builder "	Brakes AIR + HAND WHEEL	
Wheel Base "	Compressor NATIONAL-A4	
Wheels "	Governor " TYPE N	
Axles "	Engineer's Valve " SLIDE	
Brake Shoes S.B	Brake Cyl. 8"	
Ref. Drawings No. 4522	Air Signa.	
	Whistle	In Service 4-3-09.

Oakland Electric Railways—Blank Presenting Record of Car Equipment

CAR BODY RECORD

Car No. 334	Wt. Car Body 22560	Width over Steps 9'-0"
Original No. "	" with Trucks 27440	" " Roof 9'-0"
Type CLOSED-2 SEC.	" Complete Eqd., 50,000	" " Deck 5'-10"
Class J1	Length Body 34'-6"	" " Sash Rail 9'-0"
Builder O.T. Co.	" Open Sec.	" at Sills 8'-10"
Year Built 1909	" Platforms 5'-2"	Number Steps 1
How Acquired	" over Couplers 48'-2"	Length " 4'-4"
Date "	Height of Body 9'-8"	Brake NATIONAL AIR & HAND
Rebuilt	" Roof from Rail 12'	Couplings
Date	" Floor " "	Fenders STANDARD
Drawing No. 4922	" Coupler from Rail 2'-2½"	Headlight MOSHER ARC
Disposition	Truck Centers 22'	Signs STANDARD
	Wheel Base 28'	Trolley #6

Oakland Electric Railways—Blank Presenting Record of Car Body Details

Route" motor cars are equipped with GE-66 motors, neither a field nor an armature has burned out since operation started. Some of the brushes have been in service for more than two years. The commutators of these motors are slotted and the type of brush used is a high-grade quality manufactured either by the Speer Carbon Company or the General Electric Company.

Current for the operation of trains is collected from an overhead wire by means of the Brown pantograph roller trol-

OAKLAND TRACTION CONSOLIDATED.

EMPLOYEE'S ACCIDENT REPORT.

(This Report must be filled out in full on the day of the accident and sent immediately to Claim Department, General Office.)

REPORT OF ACCIDENT.

Time of Accident: Month_____ Day_____ Year_____ at_____ M.

What Department?_____
(State whether Track, Line, Power-House, Car-House or Shops.)

Location:_____

Party injured: Name_____

Residence_____ Occupation_____

What was the accident or occurrence, and the cause of it?_____

Having answered the foregoing questions correctly, give a statement of the whole matter in the following space, with any other information which may seem to be valuable:

State Names of Witnesses and Residences:

Name_____ Residence_____
Name_____ Residence_____
Name_____ Residence_____
Name_____ Residence_____
Name_____ Residence_____

Superintendent, or Foreman in charge sign here:

Name_____

Date_____

Do not cut or paste these blanks. Write on this side only.

Oakland Electric Railways—Form of Accident Report Used with Wrecking Car

ley. The roller for this trolley, which is held against the wire by a spring-actuated pantograph, is a brass cylinder 5 in. in outside diameter and 1-8 in. thick. The pantograph has a vertical movement suitable to accommodate the rise and fall of the trolley wire between the limits of 14 ft. and 22 ft. above the rails. This type of trolley requires little attention, and the brass cylinders show an average life of about nine months on cars making 250 miles a day.

POWER STATION

The power station which furnishes current for the operation of all of the "Key Route" trains is located close to the right-of-way near the shore of San Francisco Bay. This station lately has been enlarged. It is an attractive brick structure, and its interior presents a unique arrangement in that there is no dividing wall between the boiler and the engine room. The generators are all General Electric d.c. railway-type machines direct driven by Corliss engines. These units include one 850-kw generator and Pennsylvania Iron Works engine; one 600-kw generator and St. Louis Corliss engine, and two 1600-kw generators with Hamilton Corliss engines. The battery of Babcock & Wilcox boilers which furnishes steam for the engines is fired with fuel oil drawn from either of two 35,000-gal. steel tanks located in the power station yard. An important part of the power station equipment is a 1500-amp hour Electric Storage Battery Company's chloride accumulator, which serves a very useful purpose in furnishing "peak" current when several long trains are operating close together on their way to the ferry terminal.

A system of identification colors for all pipe lines in the power station, shops, steamers and plants of the "Key Route" and Oakland Traction Company is consistently followed out, and when familiar with this scheme it is easily possible to tell the part of the piping system to which any section of pipe is connected by means of its identifying color. The accompanying table shows the colors for piping and pipe fitting used for the various pipe-line services.

CAR-BUILDING AND REPAIR SHOPS

All of the car-building and repair work for both the Oakland Traction Company and the "Key Route" is done at the Emeryville shops of the Oakland Traction Company. These shops are located on the main line of the "Key Route," close to one of the principal city lines of the Oakland Traction Company. The shop buildings are constructed of structural steel frames covered with corrugated iron. The group of buildings includes a machine shop, carpenter shop, erecting shop, foundry, blacksmith shop, storehouse, paint shop, and car house. Cars may be handled in and out of the buildings either on a transfer table or by switch tracks.

In connection with the extensive foundry work necessary in making all car parts, a Schwartz 60-in. melting furnace recently has been installed in the iron foundry. This furnace is charged by means of a special carriage designed and built in the company's shops. The carriage is supported on two pairs of wheels, so that it may be moved along a track extending from the pig-iron storage space outside of the foundry to the mouth of the furnace within the building. The charging car is built of structural steel and has a charging hopper which ordinarily rests in a horizontal position while being loaded, or

PIPE LINE IDENTIFICATION COLORS

Pipe Lines	Colors of Pipe	Colors of Bands, Couplings, Flanges, Valves or Fittings
Steam, 100 lb. and over	White	White.
Steam, 100 lb. and less	White	Black.
Steam, atmosphere for heating, etc	White	Aurora red.
Exhaust to condensers	Buff	Buff.
Exhaust to atmosphere	Buff	Aurora red.
Vacuum	Buff	Blue.
Drips and drains, steam line	Black	White.
Drips and drains, air pipes and tanks	Black	Light blue.
Blow-off from heaters, boilers, etc	Black	Orange.
Overflows from heater, hotwell, etc	Black	Aurora red.
Drains from crank pits	Black	Black.
House and roof drains	Black	Black.
Water, Cold, city supply or other external source	Dark green	Dark green.
Well, cistern or tank	Light green	Light green.
Hydraulic supply under pressure for lifts, etc	Light green	Yellow.
Discharge from lifts, etc	Light green	Aurora red.
Cooling to engine bearings and jackets	Light green	Light green.
Drinking	Dark green	Dark green.
Lavatories, basin, sinks, etc	Light green	Aurora red.
Fire lines and tanks	Vermilion	Vermilion.
Salt supply and intake	Slate	Slate.
Salt discharge	Slate	Aurora red.
Water, Hot, from hot wells, heaters to pumps, economizers, etc	Orange	White.
Returns from bearings and jackets	Orange	Black
From condenser to air pump	Orange	Orange.
Air pump to hotwell	Orange	Aurora red.
Hot to lavatories, basins, etc	Orange	Light green.
Cylinder oil to high pressure cylinder	Aurora red	Aurora red.
Cylinder oil to low pressure cylinder	Aurora red	Aurora red.
Cylinder oil to auxiliary pressure cylinder	Aurora red	Aurora red.
Engine oil to bearings	Aurora red	Aurora red.
Engine oil from bearings	Aurora red	Black.
Fuel oil	Dark brown	Dark brown.
Air, Compressed for tools, etc	Light blue	Light blue.
Low pressure	Dark blue	Dark blue.
Ventilator, fresh cold	Azure blue	Azure blue.
Ventilator, vitiated	Azure blue	Black.
Gas	Light brown	Black.
Gasoline	Light brown	Light brown
Electric ducts	Light yellow	Vermilion.
Kerosene	Light brown	Vermilion.

Note.—Stencil an arrow on pipe at suitable places showing direction of flow in the pipe. Arrow to be black or white.

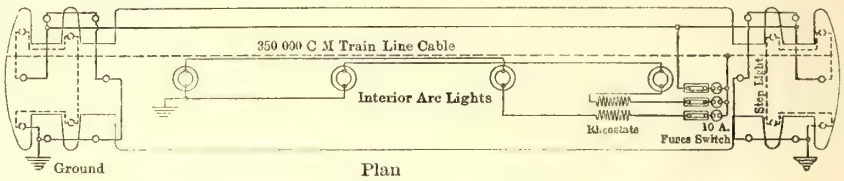
while transporting the charge of iron. When the car is placed in front of the furnace the charging hopper is dumped by power through the medium of a 12-in. air cylinder. The use of this car saves a considerable amount of labor in charging the furnace.

CAR CONSTRUCTION

All of the regular car equipments of the Oakland Traction Company and the "Key Route" are designed and built in the company's shops. During the past year these shops have constructed 20 34-ft. 6-in. closed-body city passenger cars for the Oakland Traction Company, and 16 96-ft. 3 1-2-in. steam-coach type trailers for the "Key Route."

Each of the 20 Oakland street cars built during the past year is 48 ft. 2 in. long with 5-ft. 7-in. platforms. The body is 9 ft. 8 in. high, 12 ft. high from the rail to trolley board and 9 ft. wide. A view of one of these cars on the shop transfer table is presented in Plate XXXVII. These cars are mounted on M. C. B. type trucks built in the company's shops. This truck carries two GE-70 A-4 motors on 5-in. axles with 34-in. wheels. The seating arrangement of the cars includes a smoking section 11 ft. 3 1-16 in. long with longitudinal seats and a general section 22 ft. 5 9-16 in. long with 18 Hale & Kilburn seats. The main stresses in the underframe of the car are carried by steel sections, and the platforms are supported by structural steel knees tied to the ends of the steel side sills, which are supported by truss rods. The extreme plaform overhang from bumper to truck center is 13 ft. 1 1-4 in. and the distance between truck centers is 22 ft. The detail features of this type of car and its equipment are presented by accompanying reproductions from car equipment record cards, which are types of similar records kept for all cars owned by the company.

The 69-ft. 3 1-2-in. trail cars for the "Key Route" service, of which an order of 16 is just being completed in the shops, follow in general design the former type of trail and motor cars operated in the company's train service and have bodies of similar design to those of steam railroad coaches, with the exception of the vestibuled platforms, which are 6 ft. 8 3-4 in. long and subdivided by a stanchion. The new cars complete weigh 60,000 lb. each, and have a seating capacity for 88 passengers. The cars, including all castings and trucks, were designed and built in the Oakland shops. Each car body is mounted on two M. C. B. type trucks with 36-in. 912-lb. Midvale rolled-steel wheels. It is stated that a saving in weight of 536 lb. per car is made by the use of this wheel over the weight for steel-tired wheels with cast-iron centers used on some of the other equipments.

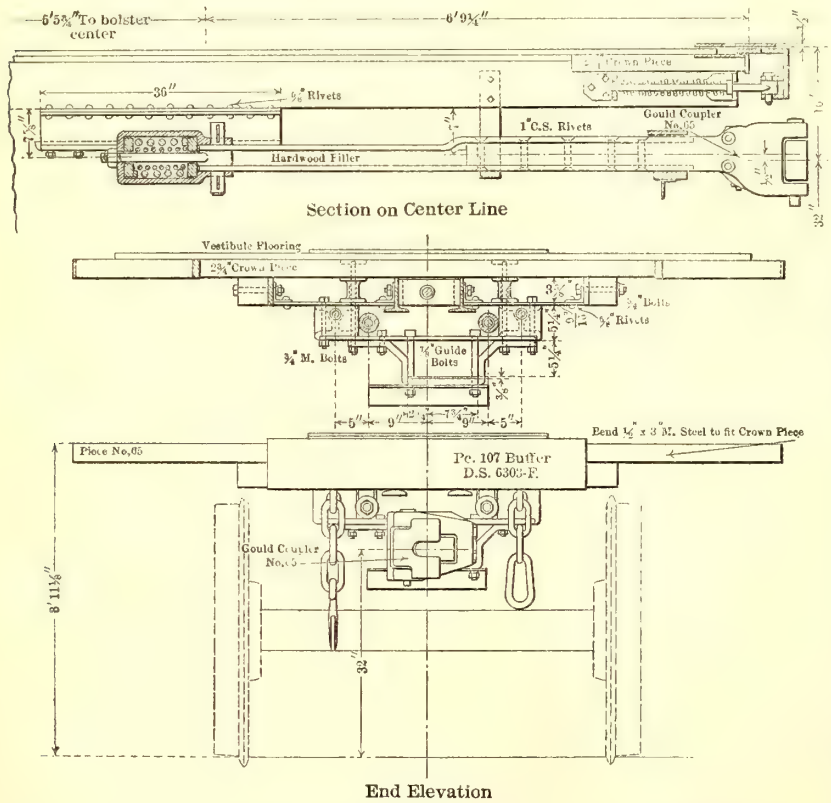


Oakland Electric Railways—Plan of Car Light Wiring

As the new cars are to be operated in trains of four or more units, they are provided with end doors and Gould standard steam railroad spring buffer platforms and couplers. The coupler anchorage is carried back to the end body sill and there riveted to the two 7-in. I-beams which form the center sills.

A view on Plate XXXVI shows the interior of the erecting shop during the construction of these cars. The bodies of the cars are 8 ft. 9 1-2 in. wide, and are subdivided into 10 window panels with fixed double sash. On account of the short run in this service it is not necessary to build the side framing construction so that the windows will raise, and this practice is desirable, not only on account of economy in construction, but also on account of the narrow clearance in some of the city streets. The interiors of the car bodies have green tinted ceilings and are finished in natural mahogany. Deck sash also are fixed, and each car is fitted with four 10-in. Globe ventilators to remove the vitiated air from the upper portion of the car. The air-brake equipment on all "Key Route" cars is the Westinghouse standard railway passenger type, with a line of piping and hose for whistle signals.

The long platforms have no side doors, and to provide against accidents gates are hung over the steps on each side. These gates are made up of heavy mesh in channel-iron frames and are supported on roller trolley carriers so that at stations the trainmen may slide them back along the sides of the cars. The interiors of the cars are illuminated by four incandescent arc lamps, operated two in series, and the platforms are illuminated by a group of six incandescent lamps in series, two placed in the hood and two under the stanchions just above the steps. A 350,000-circ. mil power cable is carried throughout the length of each car and provided with couplers.



Oakland Electric Railways—Details of Motor Car Draft Rigging

The wrecking equipment of the "Key Route" and Oakland Traction lines includes a 40-ton capacity of self-propelling steam wrecking crane weighing 140,000 lb., manufactured by the Bay City Industrial Works, and a wrecking tool car with a 30-ft. body 8 ft. wide mounted on a floor structure 46 ft. long. The electrical equipment of the tool car includes two GE-66 motors with multiple-unit control.

The emergency equipment of the tool car is very extensive,

and was listed in the ELECTRIC RAILWAY REVIEW for June 29, 1907, page 866. In general this equipment includes rope and tackle, lashings, steel hoisting cables, slings, blocks, chains, chain fittings, jacks, replacers, carpenters' tools, track tools and supplies, machinists' tools, overhead tools and supplies, miscellaneous roadway and car appliances, parts and supplies and first-air emergency packages, medicines and surgical supplies. An extra truck with an adjustable bolster is carried on the extension of the car platform and skids are provided so that this truck can quickly be lowered to the track. The two trucks on which this car is carried are of the M. C. B. type with steel-tired wheels. One motor is mounted on each truck and a pair of connecting rods distributes the torque to all four wheels of the truck. The car wheels are counterbalanced with approximately 65 lb. of lead placed between retaining plates riveted together between the spokes opposite the crank pins.

The steam wrecking crane and the electrically operated wrecking tool car are kept at the Emeryville shops in such a condition that they are always ready for service. The shop foreman has charge of the service performed by this equipment, and after the use of the equipment enters the details of the accident in a log book kept in the small office in the wrecking tool car. He also turns in a complete accident report. A steam locomotive used in freight switching is always available at night in the shop yards for hauling the wrecking equipment to the scene of a wreck, and thus this entire equipment can be used, even though the trolley may be down.

THE 1200-VOLT INTERURBAN DIVISION OF THE CENTRAL CALIFORNIA TRACTION COMPANY

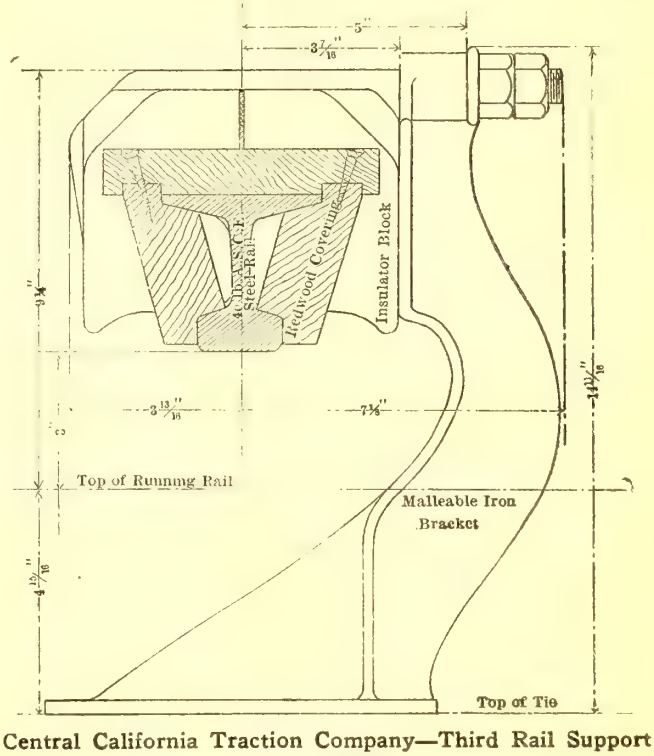
THE interurban division of the Central California Traction Company is unique in that it was the first road in this country to be operated with 1200-volt d. c. motors and generators. Current at this high voltage is generated in substations with induction motor-generator sets and is distributed to the cars by an under-running protected third-rail. The 1200-volt equipment was first operated in June, 1908, and has shown remarkably good results since that time.

In March, 1906, the Central California Traction Company began operation with a 10-mile city line in Stockton, Cal. The present interurban line between Stockton and Lodi, 15.4 miles, was built by the company and put into service in September, 1907. Between the limits of these two cities the track is practically level and is laid on a private right-of-way 100 ft. wide. There are few curves and only one bridge. The road traverses a level valley noted for its highly productive farms. The route passes through orchards and vineyards for its entire length. All of the neighboring country is under intensive cultivation and is irrigated with water supplied either from windmills, gasoline engines or electrically driven pumping plants. Stockton, the southern terminus, has a population of 25,000 and Lodi has a population of 2500. The company is now building some track in Sacramento, 50 miles north of Stockton, and the interurban line will be extended from Lodi to Sacramento during the coming year.

The present interurban division from Stockton to Lodi has a substantially built track, laid with 75-lb. rails, tie-plated, and bonded with the Ohio Brass Company No. 0000 soldered bonds. Native redwood ties, ballasted with gravel, are used. All passing sidings are stub-end and are so laid that southbound trains always head in. The turnouts are located on the side of the track opposite the third-rail, thus avoiding unnecessary breaks in the continuity of the rail and third-rail jumper complications. A line of square redwood poles, 26 ft. high, carries a pair of No. 10 copper telephone wires, connected with instruments mounted in booths, at each siding.

THIRD-RAIL CONSTRUCTION

The third-rail construction, which is illustrated on Plate XXXIX, is of special interest on account of the high voltage carried. The conductor rail is the standard 40-lb. section of ordinary track rail steel, held in an inverted position by semi-porcelain insulating blocks clamped to the tops of the malleable iron brackets with steel T-bolts. Ties 10 ft. long are spaced 12 ft. apart to carry these brackets. The third-rail joints are made with ordinary four-bolt fishplates and are bonded with Ohio Brass Company No. 0000 ribbon bonds soldered to the base of the inverted rail. The conductor rail is enclosed in a cover made of two pieces of 2-in. x 4-in. and one piece of 1-in. x 6-in. redwood, milled to fit the web and base of the rail. This protecting guard completely covers the top of the rail between the porcelain insulating blocks at the



Central California Traction Company—Third Rail Support and Protection

brackets. A chart is presented showing the voltage drop along the 1200-volt third-rail and the 1200-volt trolley in Lodi.

The continuity of the third-rail is broken at highway crossings and the electrical circuit made complete with 400,000-circ. mil rubber and lead-covered copper cable jumpers laid in 3-in. fiber conduit and anchored in concrete at the terminals.

The cost of the third-rail per mile of single track, complete and including cables, is given as follows:

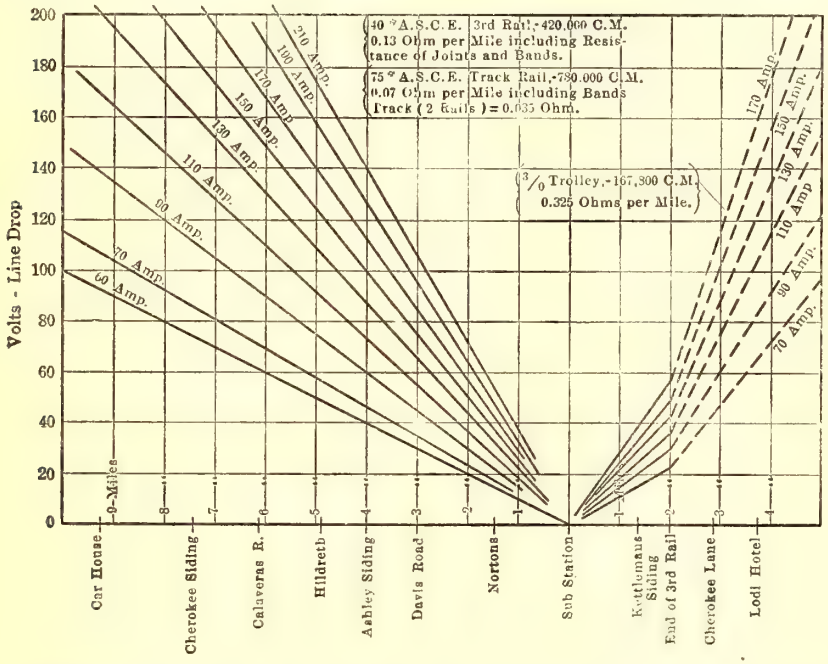
Material (total), including brackets, bonds and cables delivered	$2,748.70
Labor—	
Erection	240.00
Bonding	24.00
Cable crossings	92.60
Wooden covering	181.00
Shop work on rail ends, etc	12.40
Total cost per mile	$3,298.70

OVERHEAD TROLLEY

Within the city of Stockton and for a short distance in Lodi, where the track runs in city streets, 600-volt current is conveyed to the cars through a catenary-supported No. 000 grooved trolley. Views showing the general characteristics of this overhead work are presented on Plate XI. The messenger cable is 3/8-in. galvanized steel-supported in 120-ft. spans, either by angle-iron brackets or cross suspensions of 5/16-in. stranded cable. On straight track five trolley hangers are used in each span.

POWER SUPPLY

Power is purchased from the transmission system of the American River Electric Company, which operates a water-power plant at Placerville, about 80 miles from Stockton, and transmits current at 44,000 volts. This company also has a steam relay station located on the river front in Stockton. The equipment of this station includes three oil-burning B. & W. boilers, one 1500-kw 2200-volt Curtis turbine generator, one 600-volt 400-kw motor-generator set, and one 1200-volt 500-kw motor-generator set. Switching and transforming apparatus also is provided so that the turbo-generator may be operated in parallel with the water-power plant and assist it in handling the load on the 44,000-volt transmission system.



Central California Traction Company—Chart Showing Line Drop in 1200-Volt Third-Rail and Trolley Between Stockton and Lodi

In connection with the entire electrical equipment of this road it should be remembered that all the generating machinery and motors are satisfactorily operated with 1200 volts across the commutator and not with two 600-volt machines connected in series. The 1200-volt generator in the power house is an interpole machine driven by a 2200-volt induction motor. It is so arranged that it can be operated with half excitation to deliver 600 volts to the local railway or at full excitation to feed the interurban line over an independent feeder, which is regularly used as a part of the local 600-volt trolley network. The 600-volt motor-generator set is used to supply current to the local street cars of the company.

SUBSTATION EQUIPMENT

The entire third-rail section ordinarily is fed with 1200-volt current from one motor-generator substation, located 11.5 miles north of Stockton. This station, pending the completion of the extension from Lodi to Sacramento, feeds 9 miles in one direction and 4 miles in the other. The substation equipment is housed in two galvanized iron buildings, one containing the 2200-volt-1200-volt induction-motor-generator set with its switching apparatus, and the other enclosing three 275-kw water-cooled, oil-insulated General Electric transformers, which step down the current from the transmission pressure of 44,000 volts to 2200 volts for use by the induction motor. The switching equipment of this station is characteristic of many California plants.

An illustration on Plate XXXVIII shows the horn type air-break line switch mounted on poles in the open air. This switch serves to disconnect the entire substation equipment from the high-tension transmission system. In series with the open-air switch is a Kelman oil switch connected on the high-tension side of the transformer. The machine switches are the ordinary three-pole single-throw oil-break type used in connection with a compensator for starting the 500-kw three-phase induction motor, which drives the 1200-volt General Electric interpole generator. The output of the generator is fed to the third-rail through a line switch, a choke coil comprising 10 turns of iron rod wound around a wooden core and an I. T. E. circuit-breaker. It is found that this simple choke coil is effective in preventing the generator from arcing over on third-rail short-circuits. The generator also is fitted with fiber barriers to prevent damage to the brush-holders in event of line "shots."

The railway company operates this substation with three men, each working nine hours a day. The total operating cost, exclusive of fixed charges, is about $300 per month. Power is purchased on the 2200-volt side of the step-down transformers at a basic rate of 1 cent per kw-hour. The cars consume an average of 4.69 kw-hours per car mile on the 1200-volt division; this amount includes the losses of the motor-generator set, third-rail distribution and track return.

ROLLING STOCK

The rolling stock equipment of the interurban division includes one 32-ft. freight locomotive, two 45-ft. motor express cars and four 50-ft. passenger cars. The motor express cars have the same equipment as the passenger cars with the addition of automatic air-brake equipment. The cars were built by the American Car Company. The passenger cars seat 56, are double-ended and weigh 38.56 tons without load. The motor equipment consists of four General Electric No. 205, 1200-volt, 75-hp interpole motors with type M control. Westinghouse schedule S M E air-brakes are used on the passenger equipments. The car bodies are mounted on the American Car Company's M. C. B. type truck. The gear ratio for passenger-car motors is 23 to 51 and for express motors 16 to 58. The efficiency curves of these motors are shown in an accompanying engraving.

On account of the very high voltage at which these cars are operated all of the wiring has been laid out and installed with particular care. The auxiliary apparatus is supported from an angle-iron subframe insulated from the main car frame and all the cables and wires are carried in loricated conduit. This plan of subframe support has two advantages—it does away with the cutting and weakening of the car under-frame and it makes thorough insulation



United Railroads of San Francisco—Removing Cable Yokes with Electric Crane



United Railroads of San Francisco—Excavating Market Street Track



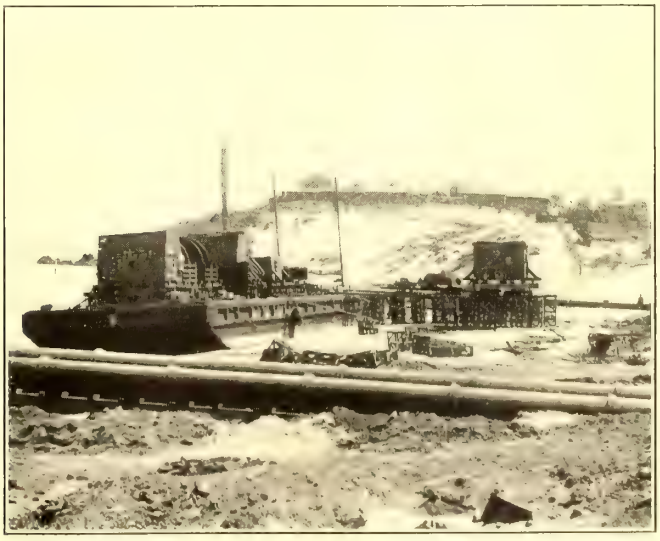
United Railroads of San Francisco—Laying Market Street Track



United Railroads of San Francisco—Paving Market Street Track



United Railroads of San Francisco—Moving and Raising Cable Track During Operation



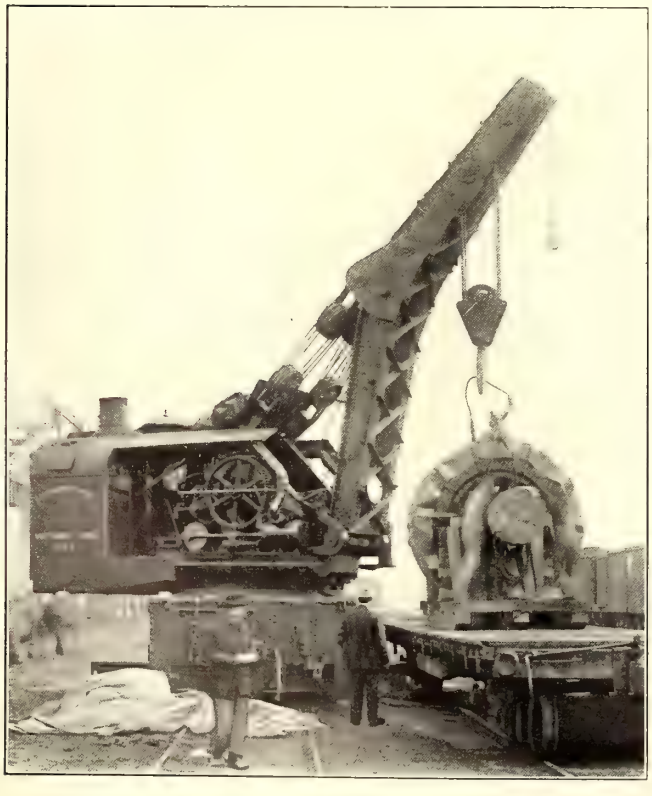
United Railroads of San Francisco—Unloading Electrical Equipment from Barge



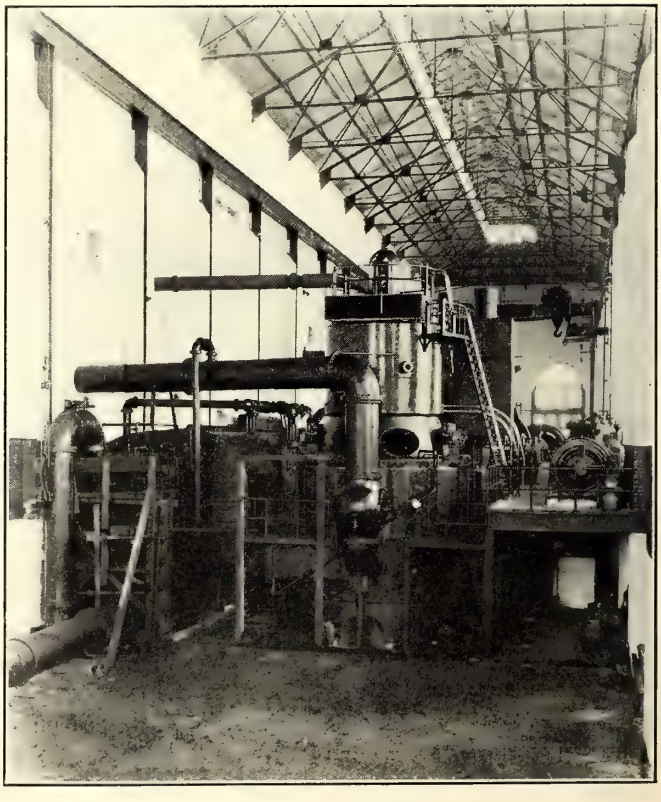
United Railroads of San Francisco—North Beach Station After Earthquake



United Railroads of San Francisco—North Beach Generating Station



United Railroads of San Francisco—Handling Electrical Machinery with Wrecking Crane



United Railroads of San Francisco—New Turbine Unit at North Beach Station



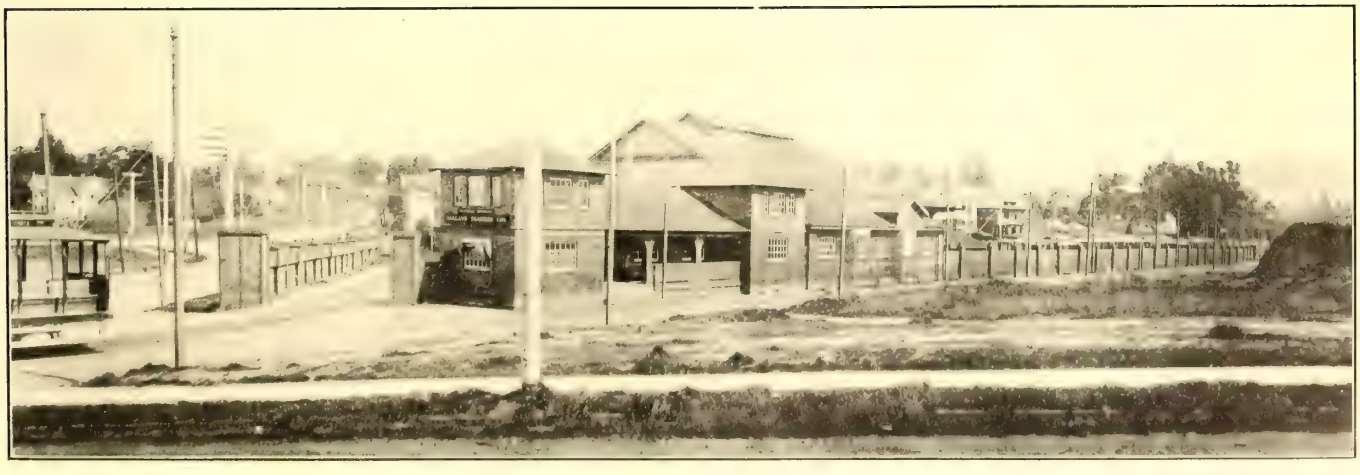
Oakland Electric Railways—Wrecking Tool Car and Crane



Oakland Electric Railways—Key Route Ferry Terminal Three Miles from Shore



Oakland Electric Railways—Shops of the Oakland Traction Company Located on the Key Route Main Line in Emeryville



Oakland Electric Railways—Central Division Car House and Yards, Including Employees' Rooms, Waiting Room and Inspection Pits



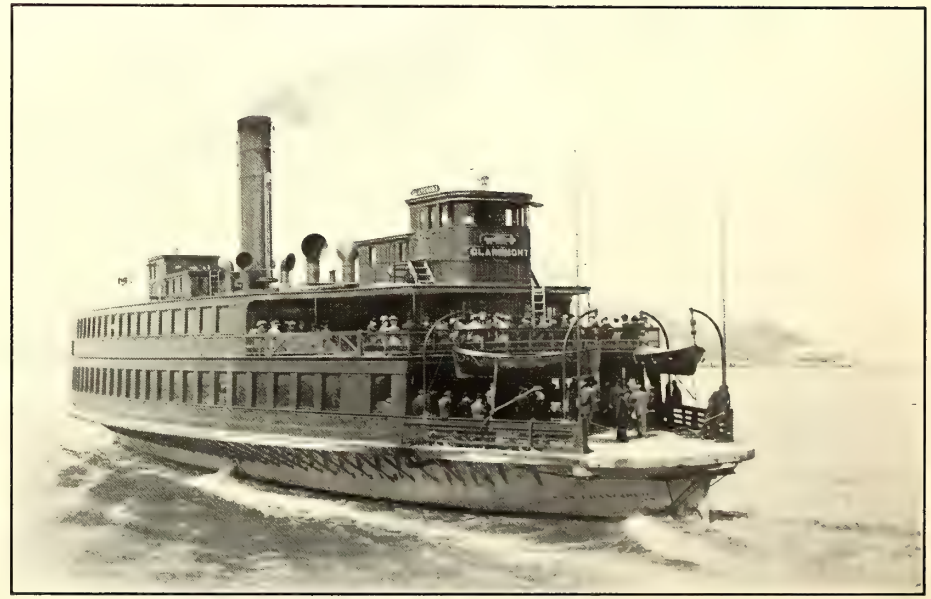
Oakland Electric Railways—Terminal Station and Hotel



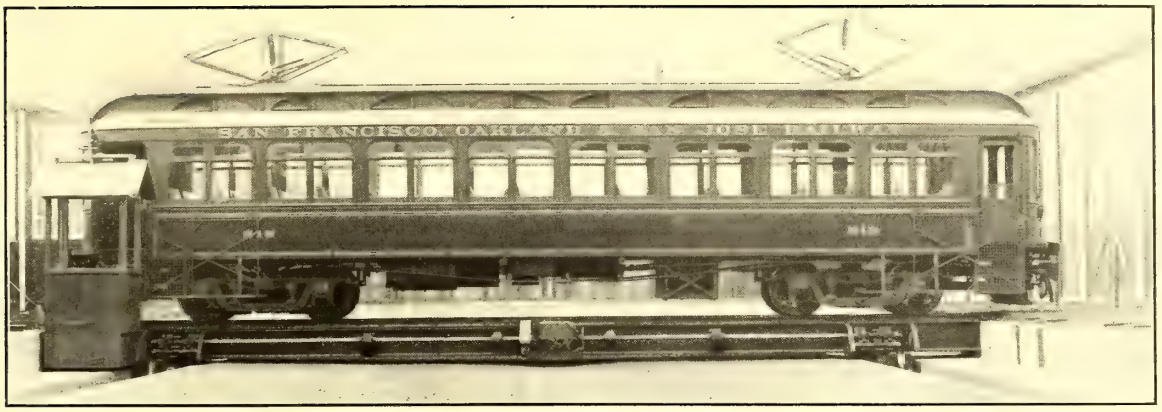
Oakland Electric Railways—Key Route Roadbed



Oakland Electric Railways—Interior of Erection Shop



Oakland Electric Railways—Key Route Ferry Steamer



Oakland Electric Railways—Key Route Motor Car



Oakland Electric Railways—Key Route Power Station



Oakland Electric Railways—Typical Suburban Station



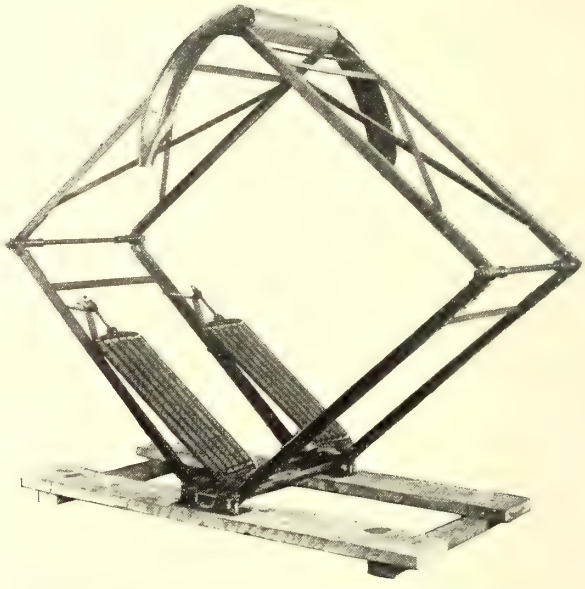
Oakland Electric Railways—Subway Under Southern Pacific Railway



Oakland Electric Railways—Loading Station at Key Route Pier Terminal



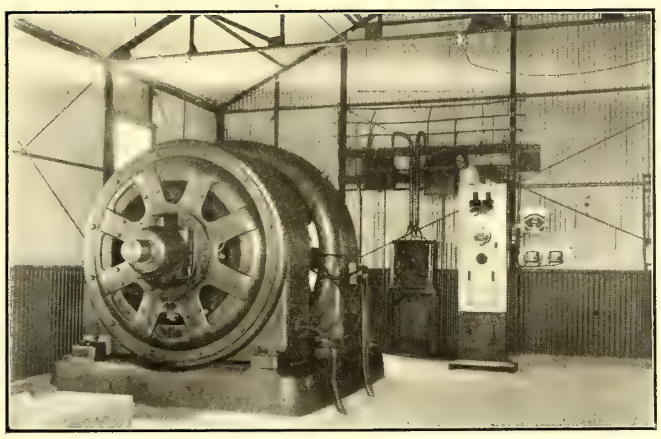
Central California Traction—Open-Air Switching Station



Oakland Electric Railways—Brown Roller Trolley



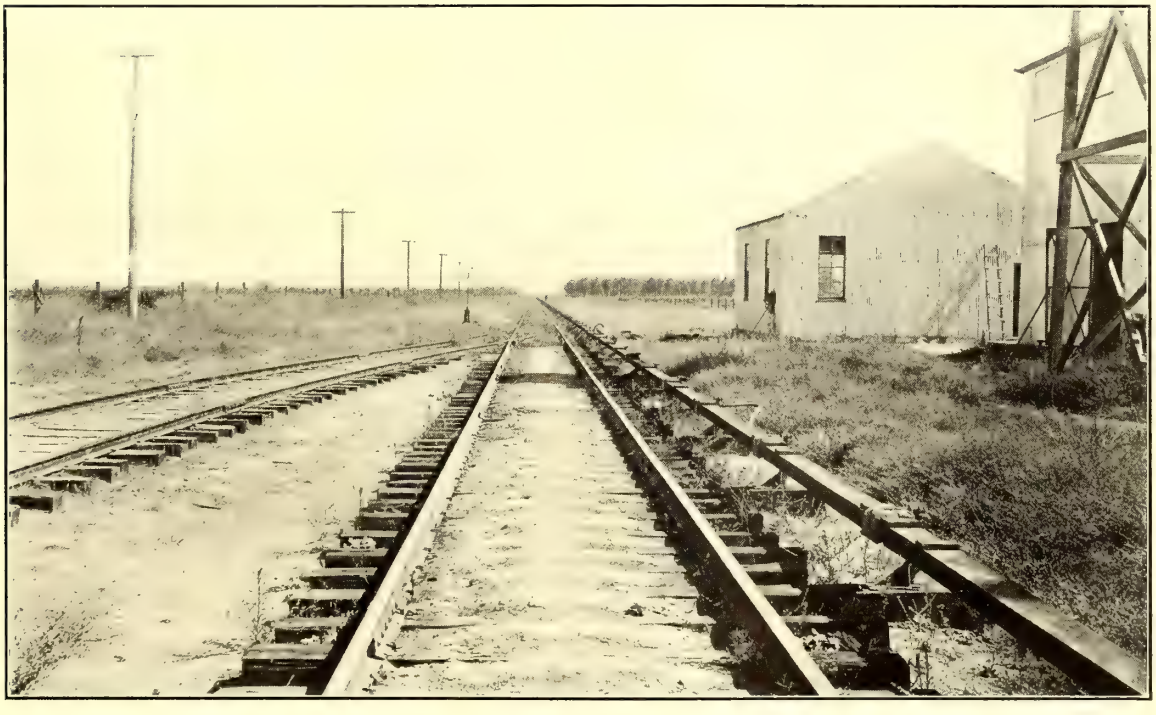
Central California Traction—Standard Interurban Car



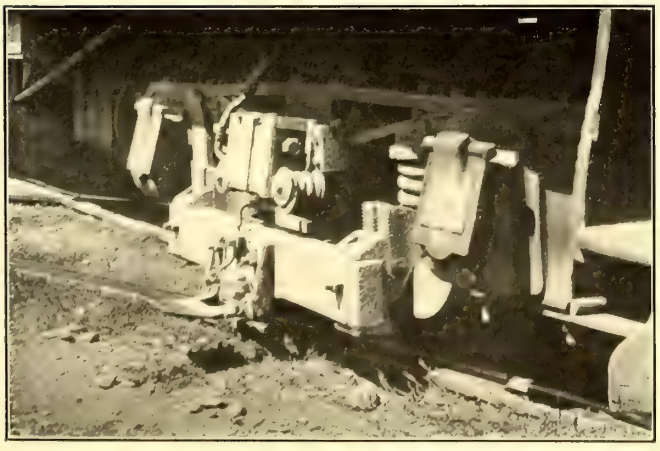
Central California Traction—1200-Volt Substation Equipment



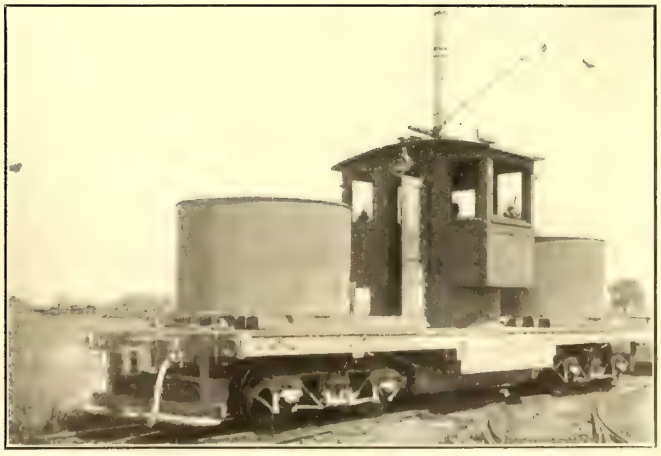
Central California Traction—Catenary Overhead at City Entrance



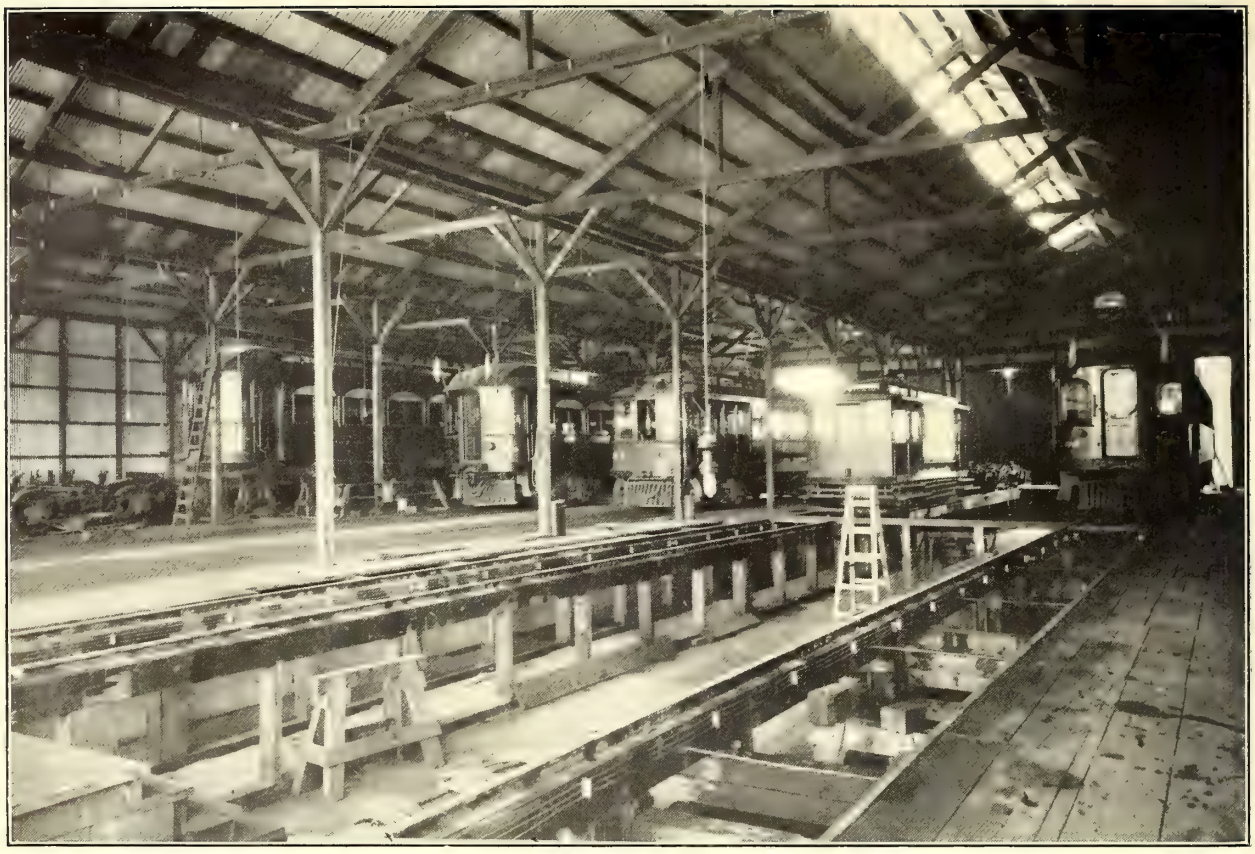
Central California Traction—Main Line Track, Showing 1200-Volt Third-Rail at Substation



Central California Traction—Third-Rail Shoe Attachment and Fuse-Box



Central California Traction—Combination Work Car and Sprinkler



Northern Electric Railway—Interior of Repair and Inspection Shops at Chico



Northern Electric Railway—Type of Shelter at Way Stations

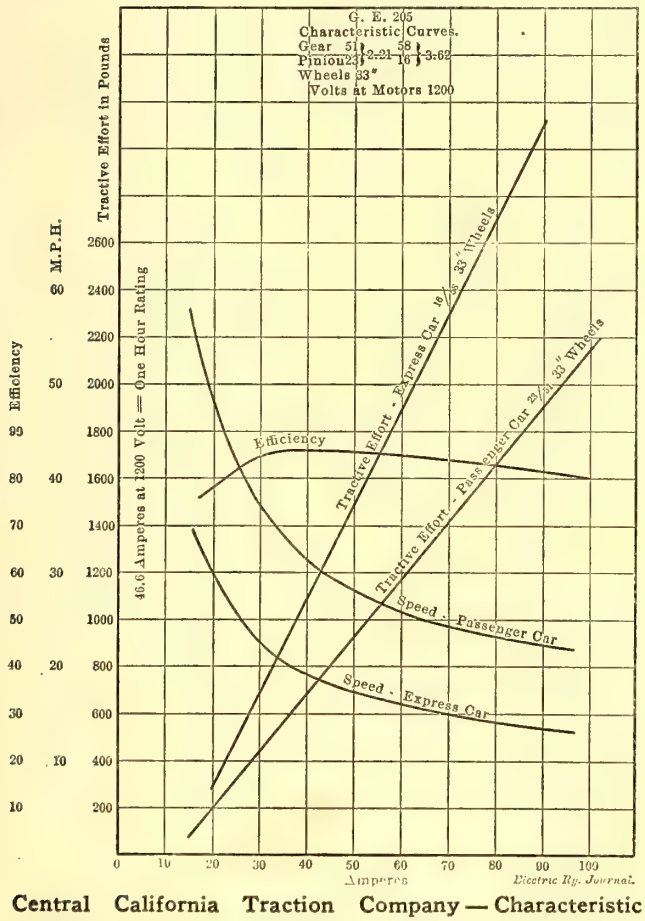


Central California Traction—1200-Volt Catenary Overhead in the City of Stockton

easily possible. The general arrangement of the third-rail current collecting shoe and its support is shown in the accompanying engraving. Steel shoes are used and those put on the cars when operation was begun are still in service. The shoes are supported and insulated by wooden beams, carried on the truck equalizer bars. Current is carried from the shoe through a nearby fuse box to the car circuits. The fuse box, which is made of horn fiber, contains a ribbon fuse and is fitted with blow-out coils to extinguish any arcs.

1200-VOLT MOTORS

The motors operate with 1200 volts across each commutator while the car is running on the 1200-volt third-rail section. In Stockton, where the motors are fed with only 600-volt current, they operate at half speed, or a maximum of 22 m.p.h. A dynamotor supplies 600-volt current for the operation of the control system while the car is running on the 1200-volt section. The dynamotor is a small motor with an armature having two commutators and two sets of



Central California Traction Company — Characteristic Curves for 1200-Volt Passenger and Express Car Motors

coils wound on the core. The coils which are connected to the 600-volt commutator are placed in the bottom of the slots, and those connected to the 1200-volt commutator are wound on top of them. The rated capacity of the dynamotor is 10 kw. It is hung from the subframe under the car body and is said to operate satisfactorily and to require very little attention. The electrical control equipment includes an electrically operated transfer switch to connect the power-supply cable with either the trolley base or third-rail shoe. Two contactors, mounted in a box next to the dynamotor under the car body, serve to change the control and dynamotor circuits for either 600-volt or 1200-volt operation as the car passes a 120-ft. dead section in the trolley line. One contactor is wound for 600 volts and the other for 1200 volts, and only one is closed at a time. The operation of changing over is entirely automatic, except that one switch must be thrown by the motorman when entering the live section beyond the dead section at either end. The change is made while the car is running at full speed.

This unique electrical equipment, including the 1200-volt motors and 1200-volt generators, has operated satisfactorily and with remarkably few pull-ins during the past 18 months. The commutators of the motors show less wear than that ordinarily found on 600-volt motors performing the same service, and some of the brushes installed at the beginning of operation are still in service.

SERVICE

The regular schedules of the interurban line of the Central California Traction Company include one car each way every hour from 6 a.m. to 11 p.m., except the hours of 8 and 10 p.m. On Saturday and Sunday the headway is shortened to 40 minutes between the hours of 1 p.m. and 7 p.m. The round-trip rate between Stockton and Lodi is 50 cents and the one-way rate 35 cents. Special commutation and other tickets are sold at reduced rates. All fares collected on the cars are registered on Ohmer fare registers.

During the year 1908 the road handled about 25,000 passengers per month, and had freight earnings averaging $1,000 per month. About half of the freight business is in carload lots. The following table shows the costs of passenger operation from January to June of the present year:

STOCKTON-LODI PASSENGER SERVICE—JANUARY TO JUNE, 1909, INCLUSIVE

Gross earnings	$24,822.00
Car miles	93,161
Earnings per car mile	$0.267
Total passengers carried	137,510
Trainmen's wages	$3,325.00
Trainmen's wages per car mile	.0357
Cost of power	4,375.00
Cost of power per car mile	.047
Maintenance (car bodies and trucks) per car mile	.0125
Maintenance (electrical equipment) per car mile	.0083
Maintenance way per car mile	.025
Substation wages per car mile	.0131
Cleaning cars per car mile	.0018
General shop expense per car mile	.0026
Maintenance (substation line, third rail) per car mile	.0041
General expense per car mile	.0114
Operating expense per car mile (total)	.1605
Operating ratio	60%

FREIGHT AND EXPRESS

A local express service is given and through freight is handled in connection with the steamers of the California Navigation & Improvement Company, running from Stockton to points on San Francisco Bay and the San Joaquin River. A through tariff is published for this service. The following tables give the monthly average costs of handling freight, both carload and express, for the year 1908:

CARLOAD FREIGHT SERVICE

Gross earnings	$455.00
Ton miles	6,726
Freight car miles	1,000
Locomotive miles	443
Earnings per ton mile	$0.0676
Earnings per locomotive mile	1.02
Trainmen's wages	59.50
Trainmen's wages per ton mile	.0088
Trainmen's wages per locomotive mile	.134
Power cost	15.80
Power cost per ton mile	.0023
Power cost per locomotive mile	.035
Other charges (maintenance, etc.) per ton mile	.0078
Other charges (maintenance, etc.) per locomotive mile	.118
Total operating expense per ton mile	.0189
Total operating expense per locomotive mile	.287
Operating ratio	27.9%

Express Car Freight Service—L.C.L. Freight

Gross earnings	$419.00
Express car miles	851
Ton miles	4,642
Earnings per express car mile	$0.492
Earnings per ton mile	.0902
Trainmen's wages	125.00
Trainmen's wages per express car mile	.1469
Trainmen's wages per ton mile	.0269
Power cost	29.60
Power cost per express car mile	.0348
Power cost per ton mile	.0064
Other charges (maintenance, etc.) per express car mile	.1733
Other charges (maintenance, etc.) per ton mile	.0318
Total operating expense per express car mile	.3551
Total operating expense per ton mile	.0651
Operating ratio	71.8%

The freight service bears its proportion of all general expenses, of maintenance charges, substation charges, track maintenance, etc.; substation charges are proportioned to the power used; track maintenance to the ton-miles operated. Practically all the carload freight handled by this road is grapes and in the three months of September, October and November, 1908, 250 cars of grapes were handled for the Eastern market and 500 cars were delivered to local wineries.

NORTHERN ELECTRIC RAILWAY

THE Northern Electric Railway Company operates the longest third-rail line in the West. This road, since 1906, has increased its mileage from a division of less than 25 miles to a system embracing 130 miles of standard-gage third-rail track. The principal city on the line and the southern terminus is Sacramento, the capital of California. From Sacramento the line extends north 41 miles to Marysville, thence about 30 miles to Oroville Junction and from there 20 miles to Chico. From Oroville a branch 5.5 miles long connects with the main line. Local service is operated in these cities.

The district which this road serves derives its support from the exceedingly fertile valley of the Sacramento River, along which the route of the railway extends. A fast service, including trains, which make the 90 miles between Oroville and Sacramento in three hours, is operated with large interurban cars run in multiple-unit trains. The company has developed a large freight traffic, the trains for handling which are hauled by 41-ton electric locomotives.

The principal constructional features of the Northern Electric Railway were described in the Electric Railway Review for June 8, 1907, page 738, and a map of the route was then presented. Since that time the construction of the company's cars was described and illustrated in the Electric Railway Journal, for Oct. 31, 1908, page 735, and the design of a new concrete substation was presented in the issue of Oct. 24, 1908, page 1249. The latter two articles were written by J. P. Edwards, electrical and mechanical engineer of the company, to whom acknowledgement is made for a part of the following information descriptive of new features.

ROADWAY

The roadway of the Northern Electric Railway passes through a level valley and therefore the track was easily constructed, so that high speeds can be made. Outside of the towns the private right-of-way varies in width from 80 ft. to 100 ft., and in Sacramento the right-of-way extends close to the center of the city. There are few curves on the main line. In the 50-mile run between Chico and Marysville, there are only three curves outside of the city limits, and none of these is sharper than 3 deg. The maximum grade on the entire road is 0.5 per cent. Standard steam railroad construction with 60-lb. rail is followed. The track rail joints are bonded with two 500,000-circ. mil Chase-Shawmut soldered bonds and the third rail, which weighs 60 lb. to the yard, is bonded at each joint with two 250,000-circ. mil Chase-Shawmut soldered bonds. At highway crossings the ends of the third-rail are connected with 500,000-circ. mil copper cables enclosed in bituminized fiber conduit and buried underground.

Current for the operation of the cars is received from the Pacific Gas & Electric Corporation's transmission lines, which are fed by numerous hydro-electric plants. Alternating current at 60,000 volts is delivered to the Northern Electric substations located approximately 10 miles apart along the line. The selling company owns the step-down transformers at the substations and sells current to the railway company at 2,200 volts pressure. When the road was first put into operation and during the construction of extensions, two portable substations, each of 400-kw capacity, the product of the railway company shops at Chico, were used. These substations receive current at 60,000 volts and feed 600-volt direct current to the third rail. The total weight of one of the substations with equipment ready for operation is 90,500 lb. Screw jacks and anchors are attached to the sills of the cars so that the weight of the body and machinery may be lifted from the springs enough to make the floor level.

The design of the Nicolaus substation, a reinforced concrete structure 53 ft. 6 in. long and 28 ft. 6 in. wide, is typical of the thoroughness with which the entire construction of this road has been carried out. This substation, as stated, was described in the issue of the Electric Railway Journal for Oct. 24, 1908. In the building are the high-tension parallel switches of three transmission lines, step-down transformers, substation equipment consisting of two 400-kw motor-generator sets and the controlling switchboard. Separated from the substation proper by an iron railing are a passenger waiting-room and ticket office.

ROLLING STOCK

The main shops for the construction and repair of rolling stock equipment are located at Chico. A general view of these shops and the material yards in their rear is presented on Plate XLI. The buildings in this group include a general car house and repair shop with six tracks, a paint shop, carpenter shop and a blacksmith shop. The rolling stock equipment includes 42 passenger cars, 5 electric locomotives, 3 steam locomotives and 400 freight and miscellaneous cars.

The latest design of construction for passenger and baggage cars operated by this road was presented in one of the articles by Mr. Edwards. These cars, of which six recently have been completed in the Chico shops, are of the double-end combination smoker, baggage and express type, which is standard on this road. They are designed for operating in trains and are fitted with M.C.B. couplers, spring-buffer platforms and multiple-unit control. The bodies, which are 55 ft. 4 in. long over vestibules and 9 ft. 2 in. wide over sheathing, are mounted on Baldwin No. 200 trucks with 36-in. Standard rolled-steel wheels and 6-in. straight-turned axles. Each truck carries two Westinghouse 121 motors with a gear ratio of 24:51. The air brakes are the Westinghouse automatic schedule AMM with quick release and recharging features and a D-3 air compressor, which also furnishes air for the Westinghouse unit-switch multiple-unit control system. These cars have a seating capacity of 30 in the smoking compartment, which occupies practically half of the car body. The other half of the body serves for baggage and express and has a small mail room partitioned off in one corner. As the cars

are designed for operation in trains the non-smoking passengers are carried in trailers at the rear. The total weight of a car is 80,500 lb.

The miscellaneous rolling stock equipment includes five electric locomotives, three of which weigh 32 tons and two 41 tons each; one 15-ton wrecking car with two cranes; 220 40-ton M.C.B. flat cars; 30 side-dump ballast cars, and 110 box cars.

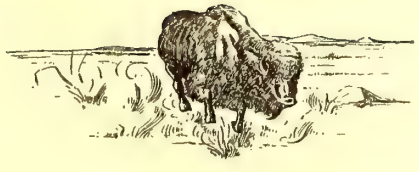
STATION BUILDINGS

The operating headquarters of the transportation department are in a large combination office and station building at Chico. A store building is used as a terminal at Sacramento and at each station along the route frame depots of attractive design have been erected. A number of shelter stations of the design illustrated on Plate XLI has been built at the principal highway crossings along the route.

Shelter stations of this type are 12 ft. 6 in. x 19 ft. outside of the walls, and have a roof projection of 2 ft. 4 in. on all sides. The walls are built of hard-burned brick to a height of 2 ft. 6 in. above the floor, and the roof is supported by 10-in. x 10-in. posts on the sides and 10-in. x 14-in. posts at the ends. The roof is shingled and is capped with a galvanized iron ridge carrying ornamental pieces at either end. Every second course of shingles is doubled with a 1-2 in. x 1-in. furring strip laid under the edge to give a rough effect to the roof. The end walls above the plate are finished with 2-in. x 8-in. panels. Within the brick enclosure a floor of concrete is made level with the outside platform, which is laid 12 in. above the tops of the running rails. The side walls extend down to the natural ground level and the inside is filled and tamped before the floor is placed. An 8-ft. 6-in. opening is left for the doorway on the side facing the track and seats extend around the full length of the interior. The woodwork is stained throughout with a brown shingle stain and station signs are hung in the angles of the gables.

At the corner of each station and in full view of the track is placed a semaphore signal which may be operated by depressing a lever, which in turn, raises the semaphore to a stop position, and also completes a circuit through a bank of green and white lamps. The semaphore blades are painted green and white and will fall to normal position when the lever is released. One of the shelter stations with a 100-ft. passenger platform, signal post, etc., complete, costs about $450.

All of the shelter stations are located on the right-of-way and are on the side of the track opposite the third rail. At road crossings cattle guards are placed in line with the wing fences and a gate is provided for the entrance of passengers.



ELECTRIC RAILWAYS AT LOS ANGELES

TRANSPORTATION FEATURES OF THE PACIFIC ELECTRIC RAILWAY

LOS ANGELES, Cal., has a population of 307,302 and is remarkable for its substantial growth. The rapid progress made may be attributed largely to the very excellent electric railway transportation service given by the street and interurban electric lines. Electric railway service is given Los Angeles and its environs by the following roads: The Los Angeles Railway Company with 218.6 miles of 3-ft. 6-in. gage track, largely within the city; the Pacific Electric Railway with nearly 600 miles of interurban track radiating to the north, south and east; the Los Angeles-Pacific Railway with 260 miles of track serving the district and ocean shore west and northwest of Los Angeles, and the Los Angeles & Redondo Railway with 84.3 miles of track between the city and the ocean shore to the southwest. All of the interurban trains operate into the heart of the city and many of them carry local passengers. The Pacific Electric Railway operates more than 1800 trains a day, practically all of which enter or pass the company's large terminal station in Los Angeles. This station occupies the entire first floor of the railway company's large office building at Sixth and Main Streets.

The general roadway construction standards of the Pacific Electric Railway were presented in the ELECTRIC RAILWAY REVIEW for Aug. 31, 1907, page 245. The maintenance of the track, roadway and building department is in charge of the assistant general manager, whose organization includes three roadmasters and 38 track section foremen. On level ballasted road the sections have as high as 20 miles of track, but on the Alpine mountain road the section is only 5 miles long. A supervisor of bridges and buildings has charge of the maintenance of all such structures.

The general designs of the track and roadway structures closely follow steam railroad standards. Almost without exception the lines are built with double track and are laid with low grades and long-radius curves.

A most important part of the track of this large system is a 14-mile four-track entrance to the city of Los Angeles, built on a private right-of-way reaching to within a very short distance of the terminal station. This four-track route affords a high-speed terminal entrance for the four double-track divisions which extend south and southeast of Los Angeles to Whittier, Santa Ana, the ocean beaches and to the port of San Pedro.

The maintenance of way department closely supervises the amount of work performed by its section and track gangs. The roadway is divided into 30 sections and there are eight extra gangs with a total of about 250 men at work continuously on extensions and improvements. By means of a large chart ruled with spaces for making entries opposite the name of each section foreman for each day of the month, it is possible to see conveniently whether the total number of hours' work by any one gang or all of the gangs exceeds the fixed amount which it is decided shall be spent during the month. In addition to this method of checking the number of hours worked daily by each gang, the section gangs are checked frequently by a traveling timekeeper, who also checks the extra gangs twice each day.

The maintenance of way department is now rebonding all of the company's tracks with electrically brazed bonds. Two bonding cars supplied by the Electric Railway Improvement Company, Cleveland, Ohio, are being used in this work. An experimental tie-treating plant recently has been installed.

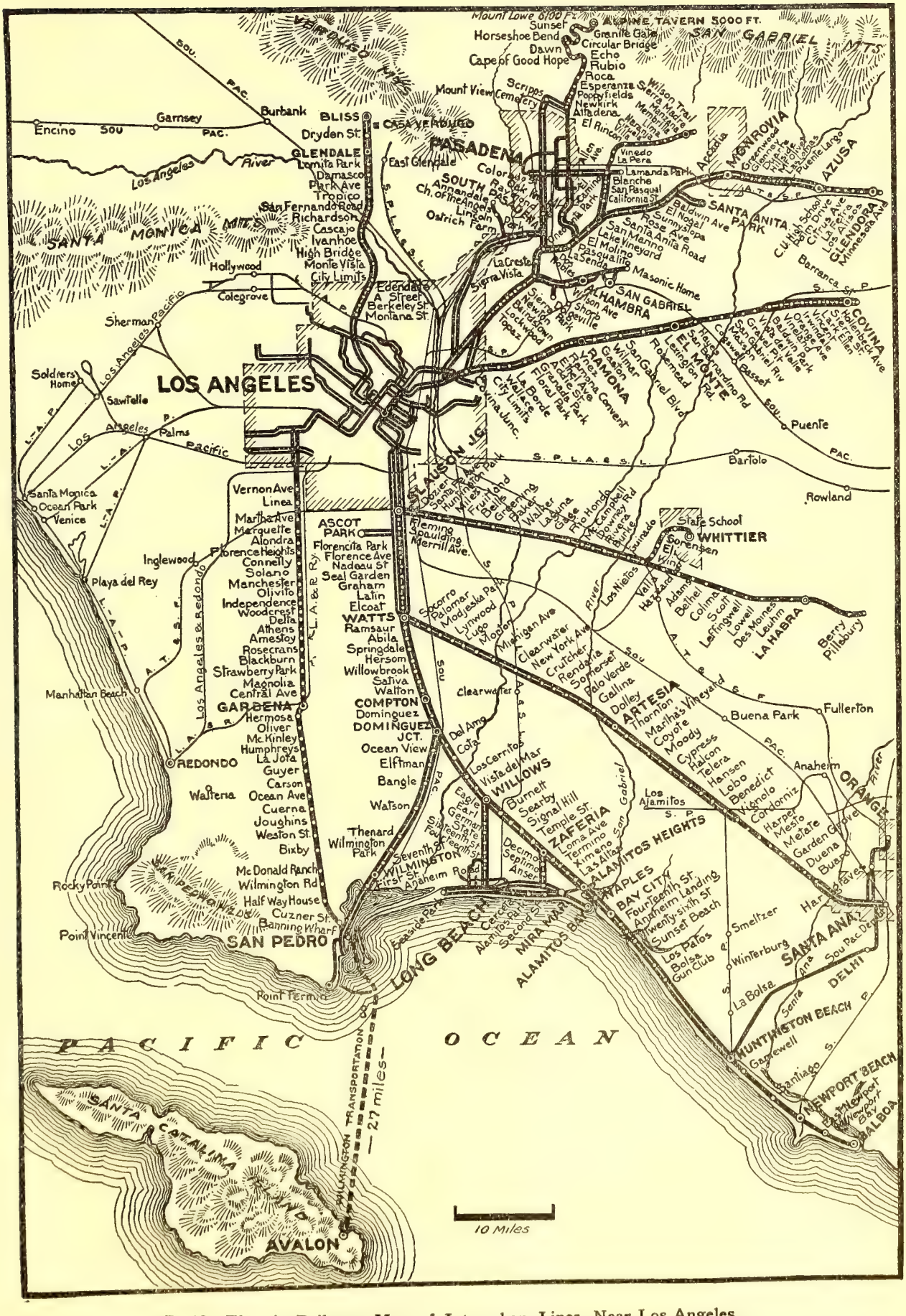
INTERLOCKING PLANTS

Wherever the tracks of the Pacific Electric cross intersecting steam lines interlocking plants have been installed. The plant at Oneonta, on the Pasadena branch of the Southern Pacific, has a 16-lever machine installed by the Union Switch & Signal Company. At Amoco, on the 4-track division, and within the city limits, where the Southern Pacific Railway's double-track line to Santa Monica crosses the four-track line of the electric railway, is an electrically operated interlocking installation built by the General Railway Signal Company. This installation has 40 levers, of which 30 are working levers. At Slauson Junction, where the Redondo line of the Santa Fe Railway crosses the four-track Pacific Electric line and also where the two-track division of the Pacific Electric to Whittier leaves the four-track line there is a 50-lever interlocking installation with 40 working levers. The design of this installation is the same as that at Amoco. In 18 hours, for regularly scheduled electric trains only, the Slauson interlocking plant averages between 1,800 and 2,000 signal movements. The plant is so well designed and maintained that it frequently operates for 90 days without a single failure. At Dominguez the operation of trains to and from Los Angeles, San Pedro and the ocean beaches is controlled by a manual interlocking 32-lever machine installed by the Union Switch & Signal Company. The crossing with the Southern Pacific system at this point is also protected by this interlocker.

The southern end of the four-track route is at Watts. From this point two tracks extend to Santa Ana and two to the ocean beaches. Until recently it was the practice for all through trains to stop at Watts for local passengers from Los Angeles. It was found, however, by reason of this practice that through cars were crowded with passengers who properly should ride on local trains. A four-blade signal was erected in front of the station and now the southbound limited trains do not stop unless signaled that there are passengers or orders waiting.

The design, erection and maintenance of interlocking towers and telephone and signal work are all under the direction of a department head known as superintendent of telephone, telegraph and signals. The dispatching of trains is done with telephones installed at depots and in booths along the lines. The Postal Telegraph Company has offices in all of the Pacific Electric Railway depots. The railway company recently purchased 300 Western Electric telephone sets for use on its dispatching wires. These instruments will replace an assortment of older types, which are not standard.

The famous Mt. Lowe railway forms a part of the Pacific Electric system. This scenic road includes a cable incline, which is 3,000 ft. long and has a difference of elevation of 1,325 ft. between its two ends. Its two cars are under the control of an operator in a driving station at the top of the incline. Motive power is supplied by a 100-hp 550-volt motor geared to a Holliday cable-grip wheel driven at 13 r.p.m. From the summit of the cable incline a narrow-gage trolley line operates for 5 miles to the Alpine Tavern, owned by the



Pacific Electric Railway—Map of Interurban Lines Near Los Angeles

railway. A roadbed for this narrow-gage line has been cut out of the side of the mountain and has an average grade of 7 per cent for its entire distance.

TRAFFIC AND TRANSPORTATION

The transportation department of the Pacific Electric Railway is in charge of a general superintendent and three division superintendents. The operation of trains is closely in accord with steam railroad methods. There are 370 passenger cars, 430 freight and express cars and 17 locomotives or construction motor cars available for service. The types of passenger and freight equipments were illustrated and described in the Electric Railway Review for July 24, 1907, page 64. All passenger cars are built with a half-open end, but the siding along the open section is brought up to the window level to stiffen the body framing. The underframing comprises four 7-in. 15-lb. I-beam sills, the center sills extending from bumper to bumper. Quadruple sets of General Electric 76 or Westinghouse 112 motors controlled by the Westinghouse electro-pneumatic multiple-unit control system are used. The air-brake equipment is the Westinghouse AMM schedule. St. Louis Car Company type 23-B trucks are used and this company also built the larger part of the car bodies. These large passenger cars have seats for 56 passengers and weigh complete about 68,800 lb. They are equipped with M. C. B. type couplers and a train control line for multiple-unit operation.

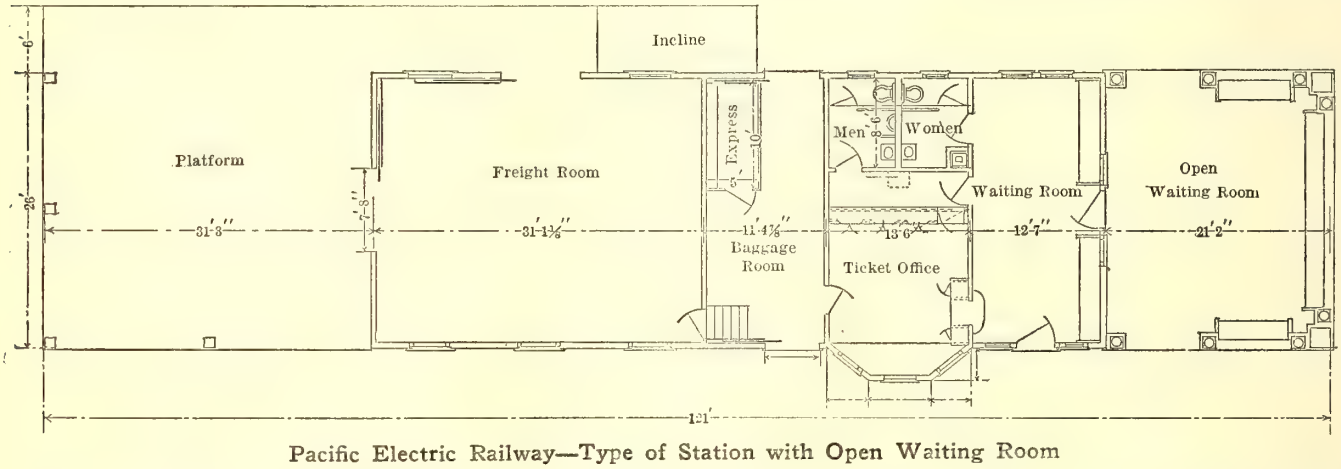
The freight equipment conforms closely to M. C. B. standards. One of the several types of freight locomtives weighs 102,800 lb. and has four Westinghouse 86-A motors of 200-hp capacity each, with General Electric multiple-unit control, Westinghouse automatic air brakes and a motor-driven compressor of sufficient capacity for handling the brakes on long freight trains. The motors have a gear ratio of 65:17. In actual service one of these locomotives has handled easily over the Pacific Electric lines from Los Angeles to Long Beach, trains of 14 standard Pullman sleeping cars. The present rolling stock equipment will soon be increased by the addition of 50 Hicks ballast cars, 50 steel flat cars and 50 passenger cars, some of which will be used for local service within the city.

PASSENGER TRAFFIC

The organization of the passenger department includes a general agent, a Los Angeles city passenger agent, three traveling passenger agents and the 38 station agents. With this department rests the responsibility for building up traffic, and therefore it maintains an aggressive campaign of general advertising and soliciting by letter and in person. The company has so many attractive rides to offer and has such excellent fast service that this department has been remarkably successful in building up an enormous special business. During the summer months there is hardly a day but some picnic is to be handled from Los Angeles to some one of the termini, favorite points being along the beaches on the Pacific ocean shore.

The passenger department has charge of the advertising and uses the daily newspapers extensively. This advertising is, of course, governed by the season and by the amount of tourist travel. There are 425 tourist apartments in Los Angeles and each is kept supplied with Pacific Electric literature. At the larger hotels the information clerks also are kept supplied with large stocks of publicity matter describing the interesting points to be reached by the Pacific Electric lines.

The passenger department keeps in touch with all special trains leaving the Eastern cities which are destined for points near Los Angeles. These trains are met at points as far east as Salt Lake City and Albuquerque by traveling passenger agents, who distribute Pacific Electric publicity matter and make definite arrangements for handling parties over the Pacific Electric lines. The agents have in hand the correspondence that has been carried on between the originating steam line and the Pacific Electric Railway and meet the persons in charge of the party or the tourist agent, and either sell tickets for the entire party to take the more important trips offered



Pacific Electric Railway—Type of Station with Open Waiting Room

by the Pacific Electric Railway, or make a personal canvass of the train. If so desired the passenger agent is prepared to make up combination trips, including Mt. Lowe, Catalina Island, San Gabriel Mission, Long Beach, etc. All such tickets are sold at the regular excursion rates. These special parties are taken over the various lines in special cars and every attention is shown by the passenger department, which sends a representative with the party to explain local features of interest.

In seeking business from such large conventions as that of the Order of Elks held in Los Angeles, this summer, the Pacific Electric Company keeps men in the important railroad centers about 24 hours east of Los Angeles. These men organize excursions and sell special party tickets to all excursion parties bound for Los Angeles. Before the Elks' convention the passenger department corresponded with the secretaries of the various lodges and endeavored to make arrangements for the special trips. Nearly 70,000 postcards illustrating attractive features to be reached on its lines were sent out by the Pacific Electric Railway Company. Thus, the work of the traveling passenger agents who greet the incoming excursionists and tourists is begun before meeting the parties. All Raymond & Whitcomb and other tourist agency parties are booked in the East for these tours, which include the Mt. Lowe trip and the combination electric and steamer trip to Catalina Island. The New York Central and the Pennsyl-

vania Railroad companies' agents in the East have coupons for these trips which can be used in building up a ticket to include these features.

One of the largest picnics organized by the traffic department during the past year was a barbecue at Arcadia, 18 miles from Los Angeles, on July 17. The capacity of the railway system for handling dense traffic was well shown at this time when the service given included 80 large interurban cars per hour with an average of 145 people per car.

The Catalina Island trip, which includes a ride of 27 miles straight south on the Pacific ocean from San Pedro to Avalon, is the source of considerable regular and tourist traffic. The electric trains which carry passengers from Los Angeles to meet the Catalina boats at San Pedro are operated separately from the regular hourly interurban service to San Pedro. Boat trains ordinarily are made up of three or four cars. On Sundays, when three boats are operated between San Pedro and Avalon, as many as 18 carloads of passengers for Catalina alone frequently are handled.

In addition to its enormous special traffic, the Pacific Electric Railway has a heavy regular riding suburban traffic made up of people who live in Pasadena and the nearby valley or at points along the 50 miles of ocean shore served by the electric line. The passenger department is now filing tariffs with the Interstate Commerce Commission for a through business from Los Angeles to San Francisco, Portland and North Coast points by way of the Pacific Electric from Los Angeles to San Pedro, and thence by steamship. Considerable joint business is done with the steamship lines operating from San Pedro to San Diego.

The large amount of special traffic initiated by the passenger department of the Pacific Electric Railway calls for the careful handling of special car business. The company, in making arrangement for special cars, reserves the right not to charter them for any Sunday, holiday and other day of heavy traffic, such as annual excursions, church picnics, etc. When arrangements are made for a special car or train the passenger department fills out a blank order specifying whether the regular type of car or a special type is desired, the number of people to be carried and the time of the run, sending this information to the general superintendent. In this connection the minimum number of passengers for a special car is 40 and the maximum is the seating capacity of the car. When he receives the advice the general superintendent issues instructions to the division superintendent regarding the handling of the special car and then the passenger department furnishes the party with special chartered-car tickets good only on the car for which arrangements have been made. The date is stamped on these tickets and the purchaser advised that his ticket is good only on the special car. Thus the regular trains are relieved from handling special parties.

The Pacific Electric Railway operates funeral cars over its entire system. Within the limits of the principal cities served —Los Angeles, Pasadena, Long Beach, San Pedro and Santa Ana—the rate for a special funeral car is $10 without casket, and the number of passengers is unlimited. If a casket is carried the rate is $15. Funeral parties traveling from one city to another on the interurban lines are handled as chartered car business and the casket is carried without charge.

The traveling passenger agents have been successful in booking several excursion parties for chartered cars for an 8 to 12-hour trip. Such parties frequently are made up at the hotels and a car will be chartered for their use during the entire day. Runs are made to the interesting points, usually including the 50-mile trip along the beaches. If desired the passenger department will send a representative with such parties to point out the features of interest and make arrangements with the operating department of the road for the routing of the car at the wish of the occupants. For such a special car service the regular one-way rates between stops are charged for each passenger, and to this are added a charge of $5 for special car service and 20 cents per mile for dead mileage.

FREIGHT HANDLING

The principal freight handling center of the Pacific Electric Railway is the large new freight station at Eighth and Hemlock Streets, Los Angeles. This station is illustrated on Plate XLIII. On account of the crowded condition of the streets in Los Angeles nearly all freight trains are handled between 12:30 and 5 a. m. As many as 120 loaded cars are taken across the city in one night. Some of the special sources of traffic are fruit, sugar beets, garden stuff and crushed rock. There are two large rock crushers on the lines which furnish material for the street paving in Los Angeles and also for use in construction work along the ocean shore. The company has several agreements with the purchasers of rock for night delivery at different points on the line. One of these agreements includes 30 cars per day. About 20 carloads of sugar beets are handled per day over the new 10-mile connecting line between Huntington Beach and Santa Ana. Huntington Beach is on the double-track line which parallels the ocean, and Santa Ana is inland about 10 miles at the terminus of a double-track branch extending to Los Angeles. The beet traffic lasts for five or six months each year. Each day 20 cars of beets, in addition to the local delivery of 20 cars, are hauled to Los Angeles for delivery to the Southern Pacific Railway for through shipment. The beet cars are loaded through traps from farmers' wagons. During four months of the year four carloads of berries per day are carried into Los Angeles. The new Huntington Beach line passes through a large celery-raising district, and thus is the source of considerable freight destined for the commission houses in Los Angeles. Twice each week the electric freight trains make connections with the steamers to and from San Diego; once each week a steamer from Seattle, and twice a day with the boats running to Catalina Island.

LOS ANGELES RAILWAY

AN abundant train service has brought about a marvelous growth in the suburbs and the district tributary to Los Angeles. The track of the Los Angeles Railway Company is all built to 3-ft. 6-in. gage and is largely laid with 7 1-4-in. high T-rails weighing 87 lb. per yard. In the paved streets the rails are supported by wooden ties 6 in. x 8 in. x 6 ft., ballasted with 12 in. of crushed rock extending nearly to the tops of the ties. Above the rock is a 4-in. bed of concrete supporting the 2-in. asphalt surface. During the past summer some concrete ties have been laid on Spring Street, one of the most heavily traveled thoroughfares of the city. About three years ago the company began welding its rail joints by the Thermit process and since that time more than 16 miles of track have been welded. The base and the web of the rail, but not the head, are joined with the weld.

The Los Angeles Railway Company operates 365 cars in regular weekday schedule and 398 cars in Saturday schedule. Typical cars were described in detail and illustrated in the ELECTRIC RAILWAY REVIEW for July 17, 1907, page 4. Their design conforms to the so-called "California" type,

with two open ends and a closed center. Each car has two pairs of trucks with 5-ft. 7-in. wheel base, each carrying one Westinghouse 101-L motor. An illustration on Plate XLV presents the exterior appearance of one of these cars. The company owns 533 motor cars. All cars are equipped with Eclipse fenders, which are said to give excellent service.

Operation of the cars within the city and suburbs is controlled by a telephone system of dispatching, which in general is like that described in this issue for the Denver City Tramway Company. The repair and car-building shops of the Los Angeles Railway are located at the southern edge of the city and comprise a group of buildings occupying two large city blocks. These shops and some of the interesting shop practices were described in the article earlier referred to.

Power for the operation of all the cars is either purchased from the Kern River Power Company to the amount of about 10,000 hp, or is generated in a steam plant operated by the railway company, which has a capacity of 5000 kw. A transmission loop about 18 miles long connects seven substations within the city. The equipment of these substations is made up largely of 50-cycle motor-generator sets of 1000-kw capacity. Storage batteries are operated in connection with several of the substations. A combined substation and office building for the power department of the railway company recently has been erected at Sixteenth and San Pedro Streets. This building is 105 ft. 7 in. long and is subdivided into three bays: a generator room 36 ft. wide, a transformer room 13 ft. wide, and a store room, shop and office section two stories high and 25 ft. wide. The building is 27 ft. high to the roof trusses and is constructed with reinforced concrete foundations and floors and brick side walls. The two-story section is subdivided on the first floor into a machine shop 32 ft. long, a store room 47 ft. long and a vault and lavatory. Above these rooms on the second floor the subdivisions provide for the accommodation of the electrical engineer, who has a private office 19 ft. x 25 ft.; a main office 40 ft. x 25 ft., and drafting and meter rooms 22 ft. and 18 ft. long, respectively, by 25 ft. wide. The offices on the second floor are reached by an outside stairway. In the Electric Railway Review for Sept. 14, 1907, page 302, the detail construction of a typical substation of the Los Angeles Railway was presented. The interior arrangement of the substation section of the new building conforms to the design of the substation earlier described.

LOS ANGELES & MT. WASHINGTON CABLE RAILWAY

THE Los Angeles & Mt. Washington Railway Company in June, 1909, began operating a novel cable road which is 3,000 ft. long and has grades in some places of 42 per cent. The road was built by real estate dealers to make available choice property located on the top of a hill between Los Angeles and Pasadena. The company operating the road is constructing a $50,000 hotel, which will be completed next month. It also proposes to develop a 12-acre natural park. At the lower end of the incline railway passengers transfer to and from the cars of the Los Angeles Railway. A view of one of the cable cars is shown on Plate XLV.



HISTORICAL INTERURBAN ELECTRIC ROADS

ALTHOUGH the first interurban lines were built prior to the application of three-phase transmission with direct current distribution to railway service, it can fairly be said that to this invention the existence of interurban lines of to-day is principally due. Previous to this invention the only way of distributing power for railway work at higher potentials than that of the trolley wire, in general use in this country, was by the booster—a cumbersome and wasteful device when used for continuous periods, or by direct current busbars of two voltages, against which the same charge can be made.

History in the construction of interurban electric railways was made earlier and more extensively in the Central Western States than in any other section of the country. The cost of construction was somewhat less in those States than in the East and the possibilities for traffic by reason of the neglect by steam railroads of the short-haul business between towns and cities appeared to be better. Successful early experiments led to other projects and somewhat the same pioneers and capitalists were interested in a number of the important lines.

In the selection of various properties for this historical treatment an interurban road has been assumed to be a new property that connected adjoining communities. Strictly suburban lines and horse roads converted for electrical operation were rejected.

In the collection of the data relating to early lines in the Central electric territory it was the intention to present to the readers of the ELECTRIC RAILWAY JOURNAL as nearly complete information as could be secured concerning various properties. Lines which might be termed "interurban" by the historian who traces in this day the efforts and troubles of those who built roads connecting adjoining communities in the early nineties, do not rank in construction or equipment with the more modern properties that began to follow six or eight years later; but the projects appeared daring at the time and some of them afforded an experience which led ultimately to greater affairs.

It was natural that the equipment for electrical operation of urban lines operated by horse power about 1890 should lead to projects for the construction of lines connecting adjacent communities, either by the extension of existing properties or by the promotion of new companies; and the various movements of this character which began to develop would undoubtedly have gone much further had it not been for the panic of 1893. It was better for the future of the properties that postponement was necessary until further advance in the application of electricity to railways should take place before extensive construction was undertaken.

With the construction of the Akron, Bedford & Cleveland Railroad, which was placed in operation late in 1895, many practices were adopted that were fundamentally correct and from which it has not been necessary to depart widely in the great development that resulted shortly afterward from widespread appreciation of the possibilities and public necessity for interurban electric railways and of the business confidence which was made certain by the election of 1896.

With the construction of two of the earliest properties described in this issue Will Christy, of Akron, was identified. His subsequent construction of the Akron, Bedford & Cleveland road, in which Henry A. Everett and E. W. Moore were interested, was the initial development of the distinctive interurban line of a type that still remains standard in many respects. In Indiana Charles L. Henry did the work of the pioneer.

Progress of a similar character was also made in Michigan. The Rapid Railway Company was organized in 1895 to build a road between Detroit and Mt. Clemens, a distance of 17 miles, and cars were operated in 1896. Two years later another line was built between Detroit and Mt. Clemens, following the lake shore. After a short period of independent operation a consolidation was effected and an important extension was built to Port Huron, making the entire system one with 122 miles of track. This was probably the largest of any interurban system at that time. Both of the older lines had used the 500-volt direct-current system of power supply with boosters, but after the decision to extend to Port Huron the question of power distribution became a very serious one and led to the adoption, by Westinghouse, Church, Kerr & Company, the engineers of the line, of a three-phase installation with five substations and transmission at 15,000 volts. The installation was unique, inasmuch as it was not connected in any way with power distribution for lighting or for other than railway purposes and soon demonstrated the great superiority of the three-phase method of transmission over the booster. For many years Michigan maintained and still possesses a very high record for the excellence and extent of its interurban lines.

The adoption of a third-rail system, with the rail outside of the track, by the Albany & Hudson Railroad, which was completed in 1900, established another important date in interurban railway history. The practicability of this construction had been shown on the Metropolitan West Side Elevated Railway in Chicago in 1895 and on the Intramural Railway at the Chicago World's Fair in 1893.

Before beginning upon the detailed description of some of the early electric lines, a short statement in regard to the use of the word "interurban" may not be out of place. Although its literary standing is now unquestioned, it is of comparatively recent origin and has been included in the dictionaries only within the last few years. The first use of the word in a publication, of which the writers of this article can find record, is that on page 529 of the STREET RAILWAY JOURNAL for August, 1893, where it was used to describe a road, about 6 miles in length, between Buffalo and Tonawanda, then recently completed. It is interesting to know that in the same issue A. H. Chadbourne, in an article on the growth and possibilities of the "suburban" electric railways, commenced his article by saying, "The word 'suburban' in the heading of this article hardly covers the conditions that I wish to speak of, since I refer to the extending of electric railways through a series of towns and villages, the beginning of which may lie beyond what may be called the suburbs of the central point to which they are connected." Charles L. Henry of Indianapolis, to whom popular tradition assigns the credit of having coined the term "interurban," says that it was suggested to him by the name of the intramural railroad at the Chicago World's Fair in 1893. Its immediate widespread adoption showed that it was a most useful addition to the English language.

NEWARK & GRANVILLE STREET RAILWAY COMPANY

(Now a Part of the Ohio Electric Railway)

THE following particulars regarding the Newark & Granville Street Railway Company have been given to the ELECTRIC RAILWAY JOURNAL by J. A. Flory, of Newark, Ohio, who was the first secretary of the company:

The company was incorporated on May 10, 1888, under the laws of Ohio with an authorized capital stock of $100,000, to build and operate an electric railway from the stations of the Baltimore & Ohio Railroad and the Pittsburg, Cincinnati, Chicago & St. Louis Railroad through the city of Newark and the country outside to the depot of the Toledo & Ohio Central Railroad in Granville.

Originally it was the intention of the company to install the underground conduit system, but as this was found to be impracticable, it was decided to use the single trolley overhead system. For want of means the enterprise was dropped until the spring of 1889, when the citizens of Newark took hold of it and proceeded to construct the part of the road located within the city of Newark. As knowledge of electric railway engineering was very limited at that time the track was laid with flat rails on stringers, such as were used on horse railways.

The portion in the city of Newark was finished and commenced operation on Dec. 23, 1889, with one 16-ft. car mounted on a Manier truck and equipped with two 20-hp double reduction Sprague motors. The car was built by the Gilbert Car Company, of Troy, N. Y. The overhead construction consisted of a No. 6 silicon bronze trolley wire, with span wire construction. The power house contained one steam boiler and a high speed Taylor engine, belted to a small Edison power dynamo.

As some of the rails weighed only 30 lb. per yd. and were much too light for the cars used, the track had to be reconstructed soon. The Sprague motors cost $3,750 per equipment and were very expensive to maintain, as those who had charge of their operation knew nothing about them. The switch boxes on the cars also were the subject of continual care. No resistance coils were used and the cars started with a jerk. Another great source of trouble was lightning, which came into the power house and through the motors, continually burning out the electrical machinery. The so-called lightning arresters of those days were flimsy affairs and failed to protect the machinery. The result was that during severe lightning and thunder storms the car, with its passengers, stopped wherever it happened to be at the time.

The electric manufacturing companies were continually experimenting with their machinery at the cost of the railroad company, sending out first one device and then another; each was claimed to be an improvement over the previous one, but none amounted to much for the purposes for which it was sold.

The cars were continually breaking down, and it took a large part of the time, both day and night, to try to keep them in running order. Experts were sent out from the factory, but the only thing they seemed to know how to do was to experiment with the machinery at the cost of the railroad company.

Another enemy in the operation of the road was snow and ice on the track and trolley. No device seemed to be known by which the track and trolley could be kept clear of ice. The result was that the company had to keep a man on the front part of the car, with a long-handled shovel, to push light snow off the track. After a heavy snowstorm men were sent out to shovel off the snow. In the course of time other methods for cleaning the track became known, such as attaching steel brushes and shovels to the bottom of the car and letting them drag on the track. Men were also employed to ride on the front of the car with a long pole and knock the ice and sleet off the trolley wires so as to crack the ice and sleet thereon.

The construction of the railroad in the city of Newark was performed under contract with Will and James Christy, Jr., under the name of the Cleveland Construction Company.

In the spring of 1890 the road was completed from Newark to the depot in the village of Granville. The track on this section, like that of the earlier portion, was constructed of 35-lb. and 30-lb. rails, which, at the time, were thought amply sufficient for an electric railway roadbed when placed on oak ties. The trolley wire was of the same material and size as that already mentioned, with a small copper feed wire running the entire length of the road. The equipment consisted of four 16-ft. cars, two open trailers and one car equipped with two double-reduction 20-hp Sprague motors, somewhat better than the former motors. This entire road commenced operation on June 10, 1890.

On Nov. 13, 1890, the company entered into a contract with the United States Express Company for carrying all express matter for that company from Newark to Granville. On Dec. 6, 1890, it made a contract with the Post Office Department of the United States for the transportation of mail from Newark to Granville, and has ever since carried this mail, and either through an express company, or directly, has also always carried express and freight matter over its line. It was always supposed to be one of the first electric roads to carry mail and express.

The rails cost from $30 to $35 per ton, and the electrical equipment, as stated, was very expensive and needed constant replacement. The road was built by means of subscriptions to shares of stock and purchases of tickets by the people in the city of Newark and the country through which it operated, and by borrowed money secured by trust deeds upon the property. The 7 1-2 miles of road, four motor cars, three trailers and one open motor car cost about $120,000, of which $100,000 was borrowed and secured by a trust deed on the road and equipment, for which a bonus of $10,000 in money and about $40,000 in stock had to be paid, as people would not loan money upon the security offered except with a large inducement of this kind.

In 1893 the Newark & Granville Street Railway Company purchased the Newark City Street Railway property, which had been operated by horse-power, but was afterward electrified, paying therefor a little over $100,000. It continued to operate until 1895, when it went into the hands of a receiver, for the reason that the cost of construction, large expense for equipment, experiments and operation were so great that the income of the road would not enable the company to meet the obligations. The trust deed was foreclosed and the road sold. Since then it has changed hands three times until it is now a part of the Ohio Electric Railway system.

Mr. Flory adds that on looking back upon the limited equipment, the experimental steps through which this early road passed and the large expense of operation, it seems almost marvelous to consider the advanced state which such lines have reached. As to the difficulties of obtaining money at that time, Mr. Flory states that Mr. Christy "can tell you about the way he waited for his money while the company was using every possible means to raise it."

CLEVELAND & BEREA STREET RAILWAY

(Now a Part of the Cleveland, Southwestern & Columbus Railway)

THE present Cleveland, Southwestern & Columbus Railway system, operating 209 miles of track, was developed from a small beginning at Berea, Ohio. In 1884, A. H. Pomeroy purchased the horse-car line running from the settlement in the town of Berea, which had a population of about 2,000 at that time, to the station, a short distance away. Mr. Pomeroy, together with C. W. D. Miller and A. W. Bishop, had previously constructed a road in Sandusky, Ohio, and later one in Mt. Clemens, Mich. The line in Berea was retained by Mr. Pomeroy and members of his family for a number of years; and finally they decided to build an electric extension to the city limits of Cleveland, believing that sufficient traffic would be secured to justify this development. Before the extension was completed, the capital available became almost exhausted and other people were invited to inspect the property and to invest therein.

At a meeting at which these people considered the opportunities offered by the project, F. T. Pomeroy, son of A. H. Pomeroy; Dr. Harlan Pomeroy, a brother of A. H. Pomeroy, and A. E. Akins, the present vice-president of the Cleveland, Southwestern & Columbus Railway, agreed to acquire an interest if Will Christy would join them. Mr. Christy then held an option for purchase of the property so far as it had been constructed and the franchises; he agreed, however, to join the other people under the arrangement suggested.

When construction of the track was finished, a single storage battery car was operated in order to preserve the franchise rights of the company. The first car between Cleveland and Berea was operated, according to O. D. Pomeroy, president of the Bank of Berea Company, Berea, Ohio, on May 10, 1894. Operation of the property under these circumstances, although the arrangement was intended to be only temporary, was not entirely satisfactory either in service to the public or in gross revenue, and it was concluded after a short period to equip the line for overhead electrical operation. Mr. Christy had charge of the electrical construction. A power plant was built at Middleburg township near Berea and equipped with two Ball engines and other machinery that had been used by one of the Cleveland local systems. This machinery was used later for a line between New Philadelphia and Uhrichsville, Ohio, constructed by Mr. Christy and his brother, James Christy, Jr.

With the equipment of the line for operation electrically, three cars were purchased and were used constantly in the Cleveland and Berea service. One car was operated in Berea for the railroad station traffic. The company secured a great deal of business because of the novelty of the trip, and traffic developed steadily from the time the line was placed in operation with the new motive power.

In 1895 the interests which controlled the Cleveland & Berea Company organized the Cleveland & Elyria Street Railroad and built an extension from Elyria to a point on the Cleveland & Berea line called Kamm's Corners. Mr. Christy had direct charge of the construction of this line, which he supervised at the time the Akron, Bedford & Cleveland road was built. A subsequent merger of the Cleveland & Elyria and the Cleveland & Berea Companies was effected under the name of the Cleveland, Berea & Elyria Street Railroad. From that time, extensions by construction and consolidation have been made rapidly, effecting the present extensive Cleveland, Southwestern & Columbus Railway system.

F. T. Pomeroy, who was among those that acquired an interest in the road in 1894, was made general manager of the properties, a position which he held until the death of his father, A. H. Pomeroy, in April, 1906. At that time F. T. Pomeroy was elected president of the system to succeed his father. He continued to occupy this position until January, 1909, when ill-health compelled him to relinquish active work for the company.

SANDUSKY, MILAN & NORWALK ELECTRIC RAILWAY

(Now a Part of the Lake Shore Electric Railway)

THE Sandusky, Milan & Norwalk Electric Railway was organized as a successor of the Sandusky, Milan & Huron Electric Railway, which was formed to build a line from Sandusky to Norwalk with a branch to Huron, Ohio. In the issue of the STREET RAILWAY JOURNAL for September, 1892, it was stated that the Sandusky, Milan & Huron Electric Railway Company had filed articles of incorporation with capital stock of $100,000. In subsequent issues, it was reported that the necessary stock had been sold to provide funds for the extension from Milan to Norwalk and that the county commissioners at Norwalk, by a unanimous vote, had granted the company a franchise in Huron County. The plans formed by the first company were changed somewhat and the line, as constructed, extended from a point at the northeast corner of the Soldiers' Home, Sandusky, directly to Norwalk with a line and terminal in the main street of the latter city. There was no steam railway connection between Sandusky and Norwalk and none exists now.

The line as finally projected was 17 miles in length. The work of construction was begun in 1892, but operation was not started until the end of September, 1893.

The road was built with capital supplied by a number of residents of the district, including W. H. Gilcher, George H. DeWitt, T. B. Taylor, A. W. Prout, of Sandusky; Valentine Fries, of Milan; J. C. Gilchrist, of Vermilion, and W. H. Price and S. E. Crawford, of Norwalk. After the promotors of the line had raised all the money they could secure from local interests, additional funds were needed to continue the project on the scale which they had mapped out originally. Loans were outstanding with several banks, including the Erie County Banking Company at Vermilion, Ohio, of which Mr. Gilchrist was president, and F. W. Coen, now the vice-president and general manager of the Lake Shore Electric Railway, an employee. As this bank was the heaviest creditor of the company when financial conditions became acute, Mr. Gilchrist was appointed receiver and Mr. Coen was sent to Sandusky as representative of the receiver. The financial difficulties which had to be met arose from the need of about $15,000, which was finally raised and the receivership terminated after about three months. When the property became solvent, Mr. Coen was made cashier and kept the few books required.

The road was laid with 55-lb. rail, which is still in use on parts of the line. The first order for equipment was for five double truck cars, 36 ft. in length, equipped with two Westinghouse motors. The car bodies were supplied by the Jewett Car Company and the trucks by the McGuire Manufacturing Company. The car house at Milan was used as a power house and equipped with two 100-kw, Westinghouse 500-volt belted generators, McIntosh-Seymour engines and two 150-hp Babcock & Wilcox boilers. The engines and generators were sold a number of years ago and the plant has not been operated for eight or nine years. The build-

ing is now used as a paint shop by the Lake Shore Electric Railway. A substation was built at this point later.

Thomas Wood, who now lives in Cleveland, was the first operating manager of the company. Mr. Coen remained with the company until Nov. 25, 1895, when he went to Detroit for a few weeks, returning to Cleveland as assistant secretary of the Lorain & Cleveland Railway. This is also a constitutent property of the Lake Shore Electric Railway, so that with the gradual consolidation into the existing larger system Mr. Coen has been with the property during substantially all of his career with electric railways.

Subsequently, the Sandusky, Milan & Norwalk was consolidated with the property of the People's Electric Railway of Sandusky, which was controlled by the same interests. The consolidated property was known as the Sandusky, Norwalk & Southern Railway. Other changes took place and the railway was combined with other properties which formed a logical opportunity for consolidation, making the Lake Shore Electric Railway in September, 1901. The present system operates 215 miles of single track.

Mr. Coen states that no great trouble was experienced in starting operation of the early system. The city lines in Sandusky had been electrified previously and experience with that property gave the projectors of the new road an advantage which resulted in operation without much difficulty. Mr. Coen said that the obstacles in the way of interesting people sufficiently to secure the needed capital were so great that a large amount of transportation was given as a bonus.

THE CANTON-MASSILLON ELECTRIC RAILWAY

(Now a Division of the Northern Ohio Traction & Light Company.)

BEFORE the actual construction of an electrically operated railway between the cities of Canton and Massillon—distant between the main street centers about 8 miles—many attempts were made by different groups of non-resident capitalists and promoters to float the enterprise. These failing, local interests finally took hold and carried the project to a successful issue. W. A. Lynch, an attorney of Canton, Ohio, formerly associated with Judge William R. Day, now associate Justice of the United States Supreme Court, purchased control of the Canton Street Railway system. Mr. Lynch was also in control at the time of the Canton Electric Light Company. About the same time a franchise had been secured in Massillon for a local system in that city, and the same interests were projecting a line to connect Massillon and Canton independent of the Canton company. A consolidation was finally effected through which the interests in the two cities were united.

After a preliminary organization in April, 1892, one was formed subsequently with the following officers: W. A. Lynch, president, Canton; C. A. Gates, first vice-president, Massillon; R. A. Miller, second vice-president, Canton; A. J. Underhill, secretary, Canton, and the additional directors, J. W. Underhill, H. C. Fogle and W. L. Alexander, of Canton, and J. W. McClymonds and C. M. Russell, of Massillon.

In the Canton system there was already in operation on the street which, when continued, formed the main street of Massillon, about 1 3/4 miles of track. Grading and track laying along the line was begun and it was completed to the head of Main Street, near the corporation limits in Massillon, a distance of about 5.6 miles, on July 1, 1892.

Invitations were issued to the officials and leading citizens of both cities to partake of the hospitality of the new corporation. The cars containing the Canton guests left according to schedule and in due time reached the halfway station. The Canton guests sat for hours awaiting the delegation from the sister city and were finally compelled to return disappointed. In the meantime the Massillon guests sat patiently until cars lined up on the main street of the city, waiting and wondering, but the wheels would not turn. There was trouble at the power house at the Massillon lighting station, with which connection had been made to furnish current to a point half way between the two cities. The result was that the "opening" had to be called off, and not until early in the morning of the next day, July 2, 1892, was the trouble corrected. Then the officials boarded a car and made the first run from Massillon to Canton, and actual operation began.

In solving the problem of equipment Mr. Lynch secured the services of a railroad master car builder and proceeded to construct in the carhouse of the company at Canton two closed cars, without toilets, 38 ft. long with 11 seats on each side. The seats were wooden, covered with carpet. The cars had vestibules and controllers at each end and two trolley poles. This is said to have been the first time this arrangement was adopted in this country. A 16-cp incandescent light was used for a headlight. Two 30-hp Westinghouse motors were used. The trucks were J. G. Brill & Co. bicycle type No. 1. Later two more cars of the same type were built, but before they could be placed in service they were burned. Two open cars, each 42 ft. long, with 11 benches, were built in the company's shops and equipped like the closed cars. One single truck baggage car, 18 ft. long, with one 20-hp Westinghouse motor, was also built in the shops. These cars were supplemented by open and closed cars made by manufacturers, without electrical equipment, and used as trailers, constituting the "smoker" generally. It was not unusual to make up a train of one motor car and two or three trailers.

The power house consisted of three 150-hp Russell automatic engines, each driving two 60-hp direct-current bi-polar Edison machines of 550 volts. Three 72x18 boilers located in Canton were used to furnish current for the Canton system and the interurban line to a point halfway between the two cities. At Massillon two 120-kw Westinghouse d.c. generators were placed in the plant of the local lighting company and, driven by the latter company's engines, furnished current for Massillon and to the halfway point. The overhead consisted of No. 0000 insulated wire reinforced by side feeders extending from each city. As the Canton railway system at the time of constructing the interurban was of 4 ft. gage it was necessary to make the connecting line the same. T-rail weighing 52 lb. to the yard was used, laid on 6-in. x 6-in. sawed oak ties, with gravel bed. Though the same rails are in service to-day the gage was changed to 4 ft. 8 1/2 in. about seven years after the beginning of construction. The greatest grade was about 6 per cent, which, with the electrical provisions then made, required all the capacity of machines and transmission, and then left something to be desired. The first schedule provided for an hourly service.

In financing the interurban and Massillon line the local capitalists subscribed and paid for about one-third of the bond issue, receiving a small bonus of stock with each $1000 6 per cent bond. With this money paid in as a basis for credit the company issued its notes secured by the company's bonds for the necessities of the road and continued this arrangement for a number of years, until the bonds were finally sold.

The foregoing information was furnished by C. A. Gates, of Massillon, originally the first vice-president of the company.

THE AKRON, BEDFORD & CLEVELAND RAILROAD

(Now a Part of the Northern Ohio Traction & Light Company)

THE construction of the Akron, Bedford & Cleveland Railroad, begun in 1894, was the most important interurban electric railway project in the Central West up to that time. The history of the road as given to the ELECTRIC RAILWAY JOURNAL by Will Christy, now the vice-president of the Northern Ohio Traction & Light Company, and C. H. Howland, an attorney of Akron, Ohio, is as follows:

The owners of the Akron Street Railway built a line between Akron and Cuyahoga Falls, the construction of which was directed by Mr. Christy. As Mr. Howland was active as an attorney for the company in protecting its franchise in court proceedings, he made a careful study of the legal aspects of the case, and as a result concluded that he could draft a charter for an electric railroad that would carry the right of eminent domain. This conclusion was ridiculed, but Mr. Howland insisted that it was feasible. However, the suggestion was not adopted in connection with the line built by the Akron street railway to Cuyahoga Falls. It occurred to Mr. Howland that if this line could be a commercial success, it would be an excellent plan to construct an electric railway from Akron to Cleveland. When he suggested the plan to Mr. Christy and his brother, they took one day to consider the project, and decided to undertake it. The formal application for a charter was made on Oct. 13, 1894, and read:

These articles of incorporation of the Akron, Bedford & Cleveland Railroad Company, witnesseth, that we, the undersigned, all of whom are citizens of the State of Ohio, desiring to form a corporation, for profit, under the general corporation laws of said State, do hereby certify:

First. The name of said corporation shall be the Akron, Bedford & Cleveland Railroad Company.

Second. Said corporation is to be located at Akron in Summit County, Ohio, and its principal business there transacted.

Third. Said corporation is formed for the purpose of constructing, operating and maintaining an electric railroad with electricity for motive power, with single or double tracks, with such side-tracks, turnouts, offices, depots, shops, telegraph lines, telephone lines, switches, poles, wires, devices and all other necessary appliances for the operation of an electric railroad. It is also formed for the purpose of transporting passengers, packages, express matter, United States mail, baggage and freight over and upon said railroad. It is also formed for the purpose of generating electricity by steam or water power, and the selling of the same for light, heat and power purposes, and the owning of all necessary real estate to carry out said object.

Fourth. The kind of an improvement to be constructed under these articles of incorporation is an electric railroad with all the devices and appliances set forth in clause third of these articles.

Fifth. The termini of said railroad are as follows: first a point within the City of Akron, in Summit County, thence in a northerly direction through the counties of Summit and Cuyahoga to a point within the City of Cleveland, with branches extending from a point in Stow township in Summit County easterly through the counties of Summit and Portage to a point within the village of Ravenna in said Portage County.

Sixth. The capital stock of said corporation shall be $300,000, divided into 3000 shares of $100 each.

In witness whereof, we have hereunto set our hands, this 13th day of October, A.D. 1894.

(Signed) Jno. F. Seiberling, F. A. Seiberling, James Christy, Jr., Charles H. Howland, Will Christy.

The members of the Seiberling family were the owners of the local system in Akron.

Various contests concerning the charter were instituted. In Summit County the charter was contested on the ground that the company was not a railroad and could not have the power of eminent domain, but the probate court decided in favor of the railroad. In a series of suits started in Cuyahoga County, the contention of the company was upheld in every case. Mr. Howland said that the exact language of the charter was adopted later by many other Ohio interurban lines.

Rights-of-ways were secured on the highways for the entire line originally, but it was decided afterward to change the plan in order to reduce the distance and avoid some grades that it was found could be eliminated by the adoption of a new route. About 10 miles of the total length of the line was built on private right-of-way. The active work of grading was started on March 10, 1895, at Cuyahoga Falls, and also at the same time at Bedford, a point midway between Cleveland and Akron. As the contracts for equipment and material had been made in advance, different parts of the line were completed as the work progressed, and on Sept. 1, 1895, the company started operation from Cuyahoga Falls to Bedford. A little later the line was so far completed that cars were operated through to White House Crossing, one mile from the city limits of Cleveland. From that point passengers were carried at first by stage to Miles Avenue, Cleveland, connecting there with the city lines. Terminal privileges in the city of Cleveland were secured in 1896.

Mr. Howland has a clipping from a newspaper of Akron, published early in November, 1895, which reported that the last spike was driven. This article stated: "The Akron, Bedford & Cleveland Electric Railroad, the finest in the country, is completed. The last spike, a silver one made of eight Dueber watchcases by Jeweler Philips, of Cuyahoga Falls, was driven at 5:09 o'clock Saturday afternoon. * * * C. H. Howland, who originally proposed the road, was to drive it. This gentleman, however, was unable to be present, so the spike was driven by officials of the road and a number of invited guests. Exactly at nine minutes after 4 o'clock, James Christy, Jr., placed the spike in position and Mrs. Charles H. Howland struck the first blow. The lady missed the mark the first time."

Among others who struck the spike were William Ellsworth Davis, electrical engineer of the Detroit Street Railway, Superintendent Frank J. J. Sloat, Manager Will Christy, Director James Christy, Jr., J. H. Weeks, pay-master; J. F. Kronk, line foreman, and J. W. Colwell, track foreman.

In discussing the difficulties of construction, Mr. Christy referred to a fill in a piece of swamp land where a pit was found into which several thousand carloads of dirt had to be thrown. The No. 0000 trolley and feeder wires were thought to be very large at the time, and these features attracted a good deal of attention from railway officials and others interested.

The same power arrangements that were adopted at the time of construction of the line are in use now, although supplemented by additional machinery. A 300-hp engine with a 350-kw generator direct connected and four boilers have been added to the Cuyahoga Falls power house. A storage battery has been added to the Bedford plant, together with a condensing system. Stirling boilers were used. Two engines were installed in each power station with 200-hp Cooper-Corliss engines. Each engine was belted to a 250-kw generator of what was then known as the "double current" type. They were built by the Westinghouse Electric

& Manufacturing Company, and were really rotary converters, designed either to give a.c. and d.c. when used as generators, or to be employed as converters if a.c. transmission from another station should be installed later. Mr. Christy says that the engines and generators as operated to-day are still giving splendid service.

The specifications for the first cars were prepared by Mr. Christy. Some of those who were consulted about the plans thought it would be a great mistake to build double truck cars, but Mr. Christy adhered to his idea that this would be the only satisfactory type for the service that was planned. Two of the cars comprising the first equipment were built by the Barney & Smith Car Company and the balance by the Jackson & Sharp Company. Traffic developed so satisfactorily that in 1896, the year following that in which operation was started, 10 additional cars of substantially the same type were purchased from The J. G. Brill Company. As general manager, Mr. Christy selected the first trainmen, who were obtained principally among the employees of the Akron Street Railway. The first crew was composed of Henry Wing, as motorman, and Metlin Hard, as conductor. These men are still employed by the company and operate the first limited train each morning from Akron to Cleveland.

In speaking of the early discouragements, Mr. Christy said that the air brakes and control proved to be so unsatisfactory that they had to be abandoned before the first year was completed. During this year and the succeeding one, experiments were made with many different kinds of air brakes, trucks and controllers. The operation of cars with three motors was tried, and finally, in 1897, it was decided to use four motors, a practice which was adopted later by all similar interurban roads. Mr. Christy believes that the demands of the companies for improved apparatus forced manufacturers to take steps to meet the needs of the properties.

"When we demanded four-motor control," Mr. Christy added, "the first thing the manufacturing company did was to offer a double control system. We wanted motors that would permit us to operate cars weighing 30 or 40 tons at a speed of 35 to 40 m.p.h. The manufacturers seemed to be unable to appreciate how successful the results would be. It is astounding now to realize how much the early experiments meant in the subsequent development of electric railways."

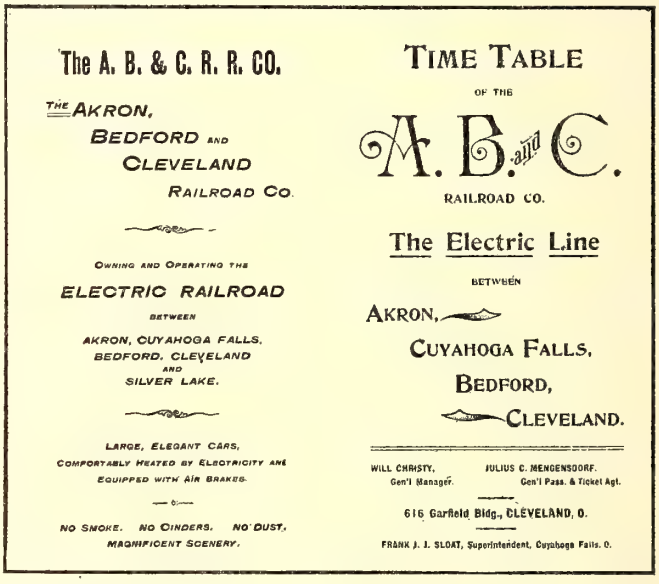
Within 60 days from the time the cars were run through from Akron to Cleveland, Mr. Howland said that the Cleveland, Akron & Columbus Railroad abandoned two local trains daily in each direction between Akron and Cleveland.

"The steam railroad officials," Mr. Howland recalls, "said we were crazy to expect much traffic. The Pennsylvania Railroad and the Wheeling & Lake Erie Railroad gave us readily the rights to cross their lines. They thought we could not amount to much of a competitor and that while we might carry a few passengers in summer, we certainly would not be able to operate in winter and that at any rate, if we could, people would not ride."

William Ellsworth Davis, now vice-president of the Cleveland Construction Company, who was afterwards a stockholder in the Akron, Bedford & Cleveland Railroad, and was employed as electrical engineer by the Edison Company when the Akron Street Railway was equipped for electrical operation, made the first circuit breaker ever used on an electric railway. This was made for use on the Akron Street Railway, for which many mechanical appliances had to be improvised. The simple contrivance was adopted also on the Newark & Granville Electric Railway and some of the other early lines. Mr. Davis recalls that after operation of the cars was started in Akron, they were sometimes followed on their trips up hill by junk dealers who collected the scrap that fell to the streets.

The financial problems connected with the construction of the Akron, Bedford & Cleveland Railroad became insistent during the early stages. Will Christy made many attempts to raise capital in other sources. Among those he saw was Charles W. Wason, who thought the project was so foolish that he rose from his chair to look for the hay-seeds on Mr. Christy. Afterward, Mr. Wason became interested in interurban lines and still retains a large interest in these properties. Finally, H. A. Everett and E. W. Moore were interested, and these men, with Mr. Christy, agreed to provide each one-third of the funds needed to complete construction.

"We estimated on a street railway line," said Mr. Christy, "and built a railroad. If I had known what the cost would be, I would never have agreed to furnish one-third of the necessary funds. It was just after the panic of 1893, prices were low and talk of prosperity was heard everywhere. We bought copper wire, delivered at Cuyahoga Falls at $10.65 per 100 lb. Ingot copper was selling at that time at $10.40, and it was made into wire and shipped from Waterbury, Conn., for the slight margin of 25 cents per 100 lb. Boil-



Akron, Bedford & Cleveland—Part of Cover of First Time Table

ers, including stacks, cost $5 per hp. Rails were purchased at $17 per ton. Motors were relatively higher. A ers, including stacks, cost $5.00 per hp. Rails were purchased at $17.00 per ton. Motors were relatively higher. A single equipment for a car cost $2,600 and the car body cost $1,400. It was only a very short while afterward that prices advanced to a much higher point. The manufacturers did not make any profit on the first cars. One salesman with whom I closed a contract said that there were 'tears in the prices.' His company wanted to keep its factory open and give work to its employees, and it could do so only by taking out contracts at prices which meant absolute loss. At the same time, we were in a position where we were straining in every way to raise the capital we needed.

The entire financing for the property was managed individually by Will Christy and Messrs. Everett and Moore until the completion of the first year of operation. The former estimated that the gross earnings during the first complete year of operation would be about $84,000. The actual figure was $86,000, although conditions of operation were necessarily unsatisfactory. The present earning capacity of this line is now nearly four times the record in the first year.

REMINISCENCES OF THE AKRON, BEDFORD & CLEVELAND ROAD

By F. J. J. SLOAT

THE Akron, Bedford & Cleveland Railroad as first operated about October, 1895, was considered the longest electric interurban road in the world; there were, however, several other interurban roads in operation at the time, among them the Cleveland & Berea Railway and the Sandusky, Milan & Norwalk Railway.

While the road connected the cities of Cleveland and Akron, the Akron, Bedford & Cleveland ownership was between Cuyahoga Falls, from which it was a distance of 4 miles to Akron over a road owned by the Akron Street Railway, and Newburg, 6 miles from Cleveland. From Newburg the line of the Cleveland Electric Railway was used. The intervening road of 26 miles, that is, between Cuyahoga Falls and Newburg, was owned by the Akron, Bedford & Cleveland Company. The through run from Akron to Cleveland was made on local cars in about 2 hours and 30 minutes. The road as constructed followed the county highway for the most part, with an occasional strip of private right-of-way. There were several severe grades; the principal one was in Akron, known as the North Hill grade, of 12.5 per cent, the distance being 1800 ft.

The road was supplied with 15 cars, seven of which were combination express and passenger and eight were straight passenger coaches, all, however, having smoking compartments, plush seats, toilet rooms, etc. The cars were about 40 ft. in length by 8 ft. 5 in. wide, with a seating capacity of about 38. The cars were constructed with motorman's vestibule on one end only, which necessitated the use of loops and Y's, which were located in Akron, Cuyahoga Falls, Newburg and Cleveland.

Late in 1896 a heavy motor car was constructed in the shops at Cuyahoga Falls which, with ballast to give it traction, weighed 24 tons. This car was to be used for hauling steam railroad excursion trains from Cuyahoga Falls to Silver Lake, a pleasure resort, and contracts for the movements were entered into with the Canton, Akron & Columbus Railroad, the Pennsylvania Railroad, the Northern Ohio Railroad and the Pittsburgh & Western Railroad, resulting in the movement of 21 trains during the season of 1897. These trains consisted of from 8 to 15 coaches loaded. The equipment on this car consisted of four 50-hp Westinghouse No. 38 motors, with slow speed gears, and operated from a rheostat controller. The car was designed and constructed in the shops at Cuyahoga Falls, with Dorner & Dutton trucks and Christensen's automatic air brake. It was of considerable interest to us after the first eight-car trains had been delivered by the Cleveland, Akron & Columbus Railroad, and handled with this motor, to find that the steam railroad people were not so skeptical as at first about this motor car.

On one occasion we received word that two sections of a certain train had 15 cars for us, but we were also asked not to attempt to pull the 15 cars as one train with our motor for fear of pulling out the draw bars on certain coaches.

CAR EQUIPMENT

The electrical equipment used comprised two Westinghouse B-38 motors and 30 hp each, or 100 hp for each car. The two motors were applied to the rear truck, the forward truck being used exclusively as a pilot truck. During the latter part of 1897 several quadruple equipments of General Electric No. 57 motors of 50 hp each, with electric brakes, were purchased.

During the year 1896 tests were made to learn the relative economy from the operation of 2-, 3- and 4-motor equipments, together with several newly designed controllers to handle the 4-motor equipments, our experience having proved that the controllers furnished with the equipment were too light and would not carry the heavy current necessary on the 12.5 per cent grade in Akron, or meet other requirements.

In the same year we tried the Lorain Steel Company's new quadruple 50-hp motor equipment and controllers. We also tried many trolley wheels and harps of various sizes and each of several kinds of metals, etc.

The air brakes supplied with the first equipments were furnished by the Hunt Air Brake Company, but owing to the severe conditions to be met, experiments were also made with the brakes of the Christensen Engineering Company and the Standard Air Brake Company. The first two companies furnished compressors having eccentrics fastened to the car axle, and the latter company furnished a compressor geared to the car axle. The great necessities of the situation and the desire on the part of the management to get the proper equipment were the incentives which inspired these experiments.

In connection with trying the axle-driven compressors the manufacturers did not install the proper relief valves at that time, with the result that we had considerable trouble on account of the air hose blowing off the compressor. This defect was remedied later by a newly patented device. We found, however, that the excessive speed of the cars, especially in coasting down grade, broke too many of the axle-driven compressors, so that this type of apparatus was abandoned, but not, however, until the various companies had placed on the market independent motor-driven compressors which were also tried on this property.

If my recollection serves me correctly, the Christensen Engineering Company was among the first in the field not only with the axle-driven compressors, but also with the independent motor-driven compressors. This improvement in the air brake equipment reached us about 1896.

The first trucks purchased for the Akron, Bedford & Cleveland cars were built by the Dorner & Dutton Company, of Cleveland, Ohio. They had 4-in. axles and 33-in. cast chilled wheels with 2 1-2-in. tread. The trucks were constructed with rigid bolsters, but after operating the trucks in this manner for about six months it became apparent that a swing bolster truck was necessary and the Dorner & Dutton Company, together with the Jackson & Sharp Company, furnished a number of sets of the M.C.B. type during the year 1896; during this same year about eight sets of No. 27 trucks were furnished by The J. G. Brill Company.

While all of the trucks having swing bolsters were satisfactory as to riding quality, the principal trouble was that they were not heavy enough for the work required of them and they were replaced later with other truck equipments.

From Cuyahoga Falls to Newburg the overhead line was constructed with 35-ft. poles set 100 ft. apart with one 2-pin cross-arm carrying two No. 0000 feeder wires, also two brackets carrying a telephone line. The trolley brackets were 7 1-2 ft. long and of the Christy type, carrying one No. 0000 trolley wire. The telephone line was installed to dispatch the cars from an office located at Cuyahoga Falls. The telephones used were furnished by the Garl Electric Company, of Akron, Ohio, which furnished also the switchboard, closed circuit type, with magneto generator operated by a belt from the engine shaft at the power house. As the telephone line paralleled the 550 trolley and feeder lines, the induction from these lines gave us the usual trouble, which took patience and work to overcome at that time.

All the cars were supplied with car telephones; telephone booths were installed at each siding also. At every 1000 ft. a connection box was installed on a pole for use with car telephones. This road was possibly the first road to be dispatched by telephones from a central office, and with the arrangements also of telephone booths at sidings and connecting boxes each 1000 ft. and telephones on the cars.

The track between Cuyahoga Falls and Newburg was laid with a 60-lb. T-rail with Heath joints. These joints Mr. Christy had specially rolled in Cleveland. The ties were 5 ft. x 7 ft. x 7 ft., but the renewals were made with standard ties. The track was ballasted with gravel.

A brick car house was located at Cuyahoga Falls, with a capacity for 16 cars, and later a machinery shop was added; all the repairs to the cars were made there. A small frame car house was also constructed at Bedford for the use of cars which were laid up at that point.

The track lay-out for the car house at Cuyahoga Falls was so arranged that cars could enter from the rear as well as from the front, facilities which seemed to me at the time to be very liberal and the benefits accruing were certainly worth the expenditure.

The bond was No. 0000 and of U-shape, riveted to the foot of the rail, the Heath joints having a receptable immediately under the joint of the rail to provide a sufficient space for the bond.

There were two power houses on the property, one at Cuyahoga Falls and another at Bedford. The machinery in each power house was alike, consisting of four Stirling boilers, two simple Allis engines and two 250-kw Westinghouse d.c.-a.c. generators.

The Cuyahoga Falls power house was of brick construction throughout, and large enough to admit of an increased capacity similar to the machinery installed at that time.

The Bedford station, while complete, was intended to be temporary for a few years, for the reason that the development of the d.c.-a.c. apparatus and the use of substations was yet in its infancy, and the intention was to move the Bedford machinery to Cuyahoga Falls and generate there all the power for the property, transmitting it by high tension lines wherever it was needed.

At this time it appears to the writer that great credit should be given to the engineers in designing this arrangement, as it seems to him to be the first installation of its kind, and the future development of the d.c.-a.c. arrangement was certainly well considered.

TRAFFIC ARRANGEMENTS

A passenger agent was in charge of the traffic on the Akron, Bedford & Cleveland road. The traffic between Akron and Cleveland was, as nearly as I can recollect, principally through travel or representing the longer hauls, about 40 per cent being local or intermediate travel. Hourly service was operated between Akron and Cleveland. Considerable special car and excursion business was handled during the summer season, and as many as 15 carloads were moved out of Akron for Cleveland, all leaving within one hour, to make connections with the boats for Detroit and Buffalo. A large excursion business was also handled daily from Cleveland to Silver Lake, located near Cuyahoga Falls, and from three to eight cars were necessary for these movements. As early as 1896 a contract was made with the American Express Company for the express privileges on the property, pro-rata with the Akron Street Railway and the Cleveland Electric Railway. Only compartment cars were used, however, by the express company, and only light express was hauled. Baggage was checked to all points on the road and in the same manner as was customary with steam roads at that time.

The property was greatly handicapped during the latter part of the year 1859; a bridge over the Gorge near Bedford gave way while a car drawing a load of coal was passing over it. This practically cut the road in two for a period of three months, and had a serious effect upon the earnings, especially during the early part of 1896. Through travel was accomplished by the transfer of passengers in wagons and buses for a distance of about a mile around the break.

As the road was conceded to be the longest interurban line at that time, necessitating two power houses, hardly a day passed without visits from persons in other parts of the country who had in mind the construction of interurban roads and were interested in investigating the property, its traffic, etc.

Considering present practices on interurban roads of to-day, the fact remains that as early as 14 years ago this property, one of the first interurban roads that was built, was completely equipped in all its departments, and, while its construction and equipment were somewhat modest, as compared with our present views regarding construction, the property notwithstanding is still in existence; although somewhat reconstructed and improved, the ear-marks of the original road are still very much in evidence.

I will enumerate as nearly as I can the principal details in connection with this road, to show how much difference there is between the practices of 14 years ago on this property and those of the present time.

The operation was in charge of a vice-president and general manager, a superintendent, two dispatchers and an inspector. The accounts were in charge of an auditor and assistants. The movement of all cars was recorded on a train sheet kept by the dispatcher.

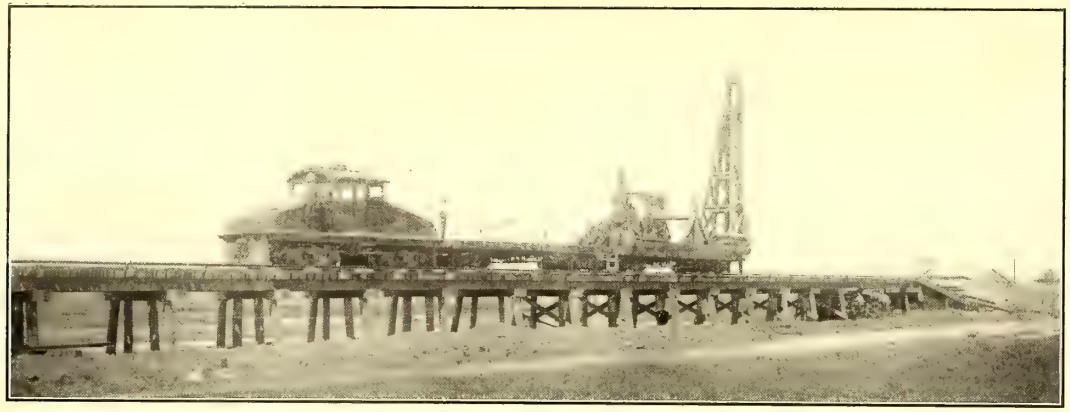
The inspector was located at the Cleveland end of the road. The shops and car barn were in charge of a master mechanic who had charge of all the equipment, with the usual foremen, both day and night. The line work was in charge of a line foreman, with the usual linemen distributed as necessary.

The power houses were in charge of a day and night engineer, the day engineers in each case being the chief engineers of the respective houses.

The traffic was in charge of a passenger agent, who also had charge of all tickets and rate-sheets, etc., and whose entire time and attention were devoted to the traffic and excursion business of this property.

The United States mail was carried on the cars under contract. The American Express Company had the express privileges on the property. Traffic arrangements existed with the Akron Street Railway for entrance into Akron, and with the Cleveland Electric Railway for entrance into Cleveland.

Important features of the construction and operation were: The early installation of the d.c.-a.c. generators in the power houses, having in mind the future use of transmission lines, substations, etc.; the installation and use of No. 0000 trolley wire and No. 0000 feeder wire; the location of the two power stations 12 miles apart and tied together, so that they could feed into the same feeder wires; the dispatching of cars by telephones from the dispatcher's office, together with installation of telephones in booths at the sidings, as well as the equipment of each car with a car telephone, and the installation also of connection boxes located on the poles every 1000 ft.; the development in air brakes, ranging from axle-driven compressors to independent motor-driven compressors for straight air application, and also automatic air application; the development in trucks from rigid bolster trucks to swing bolster trucks; the development from the use of two motors to an equipment



Northern Electric Railway—Bridge Construction Train



Northern Electric Railway—Type of Shelter Station



Northern Electric Railway—Type of Depot



Northern Electric Railway—Third-Rail Track



Northern Electric Railway—Material Yard and Shops



Northern Electric Railway—Nicolaus Concrete Substation



Pacific Electric Railway—First Floor of the Los Angeles Terminal Station



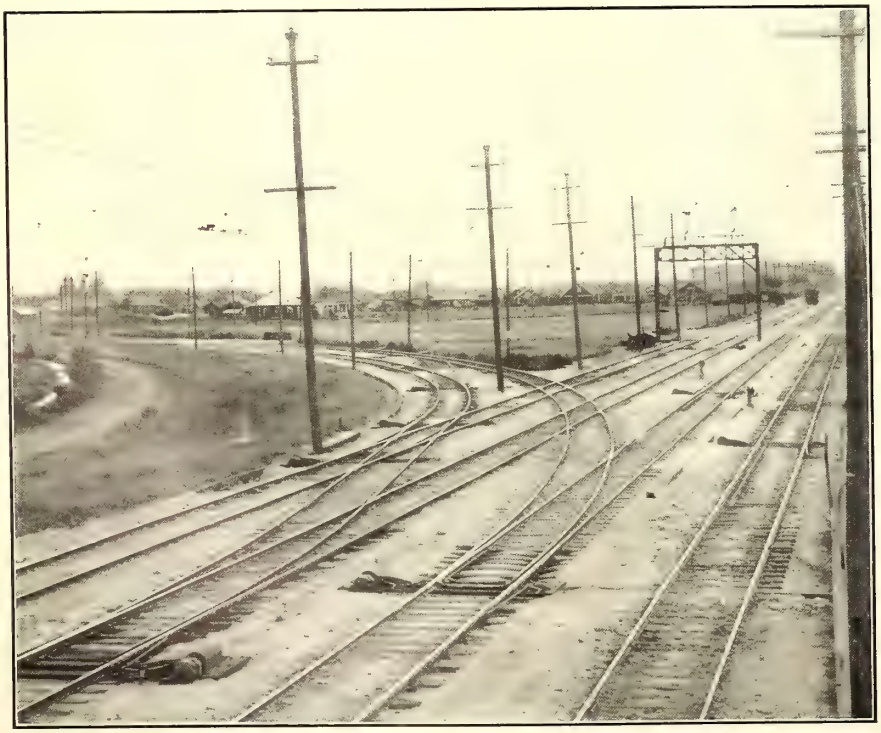
Pacific Electric Railway—Type of Station with Open Waiting Room



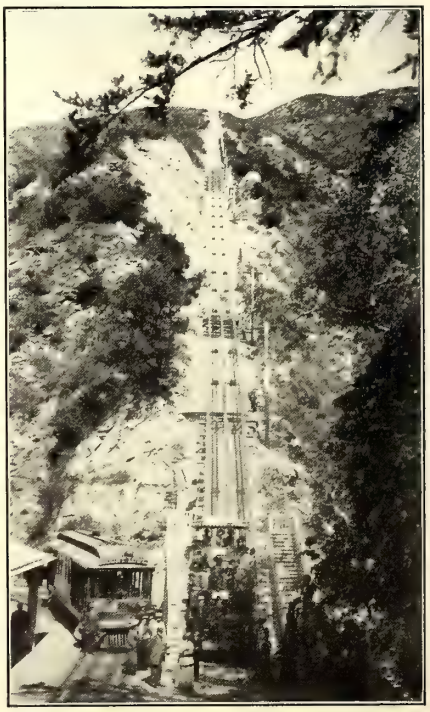
Pacific Electric Railway—Interior of Special Party Car



Pacific Electric Railway—View on Alpine Division



Pacific Electric Railway—Four-Track Entrance to Los Angeles at Branch-Off of Double-Track Line



Pacific Electric Railway—Mt. Lowe Incline Railway



Pacific Electric Railway—Exterior of Los Angeles Freight Station



Pacific Electric Railway—Interior of Los Angeles Freight Station



Pacific Electric Railway—Oneonta Junction on Double-Track Pasadena Short Line



Pacific Electric Railway—Five-Car Train as Regularly Operated



Pacific Electric Railway—Pasadena and the San Gabriel Valley from Mt. Lowe



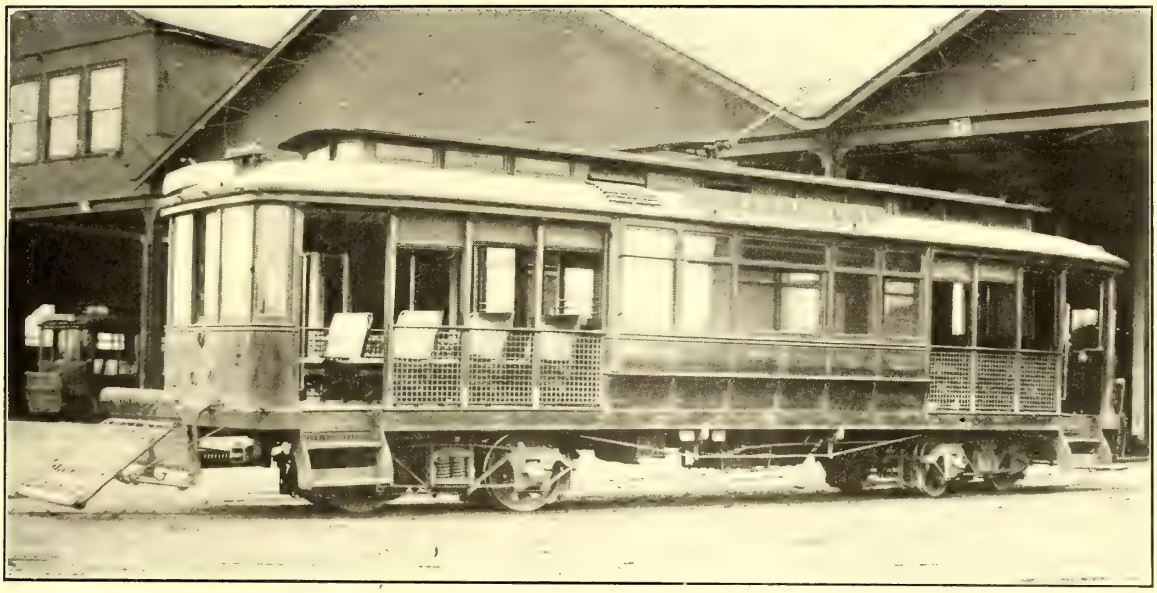
Pacific Electric Railway—Passenger and Freight Station and Substation at Watts



Los Angeles Railway—New Car House at North End of the City



Los Angeles & Mount Washington Railway—Car on Cable Railway



Los Angeles Railway—California Type Car, with Closed Center Section and Two Open Ends



Los Angeles Railway—Interior of Repair Shop



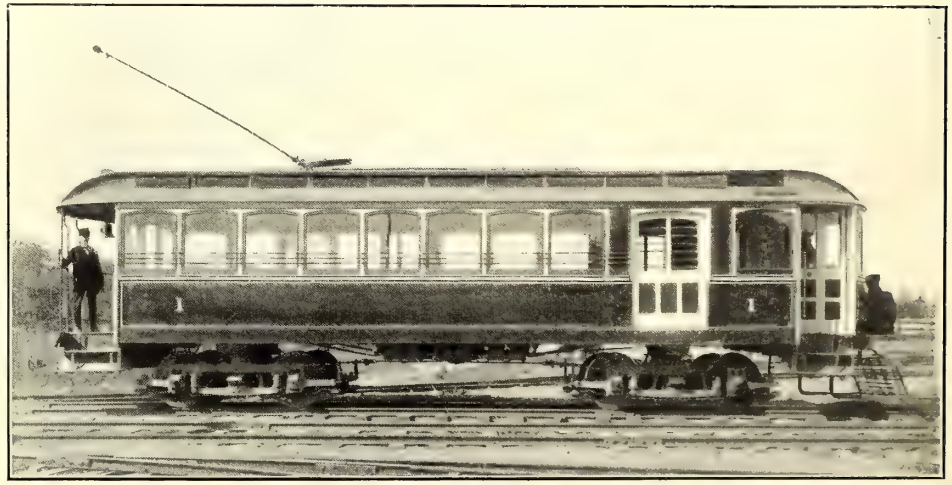
Los Angeles Railway—Interior of Car House



Akron, Bedford & Cleveland—Motor Car with Trailers Operated in 1895



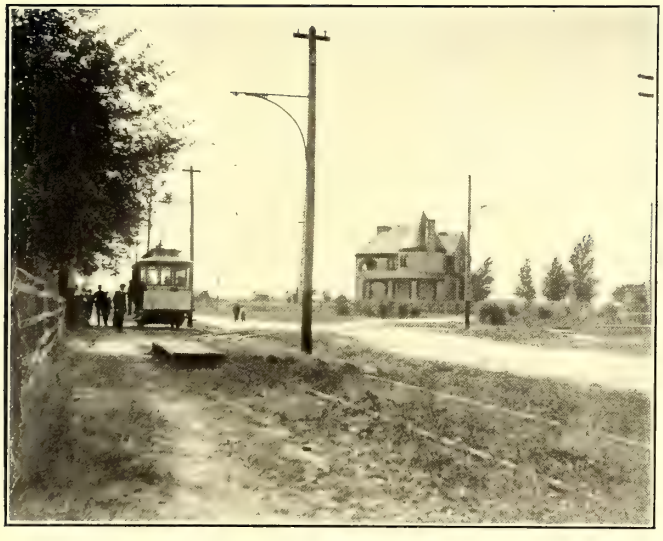
Akron, Bedford & Cleveland—Motor Car Purchased in 1896, One Year After Operation of Road Was Started



Akron, Bedford & Cleveland—Passenger Car with Baggage Compartment, Built in 1895



Akron, Bedford & Cleveland—Trail Car Built in 1895



Sandusky, Milan & Norwalk—Junction of Interurban and City Line



Sandusky, Milan & Norwalk—Old Type of Timber Trestle Constructed at Avery, Ohio



Cleveland & Berea—Early Types of Single-Truck Cars



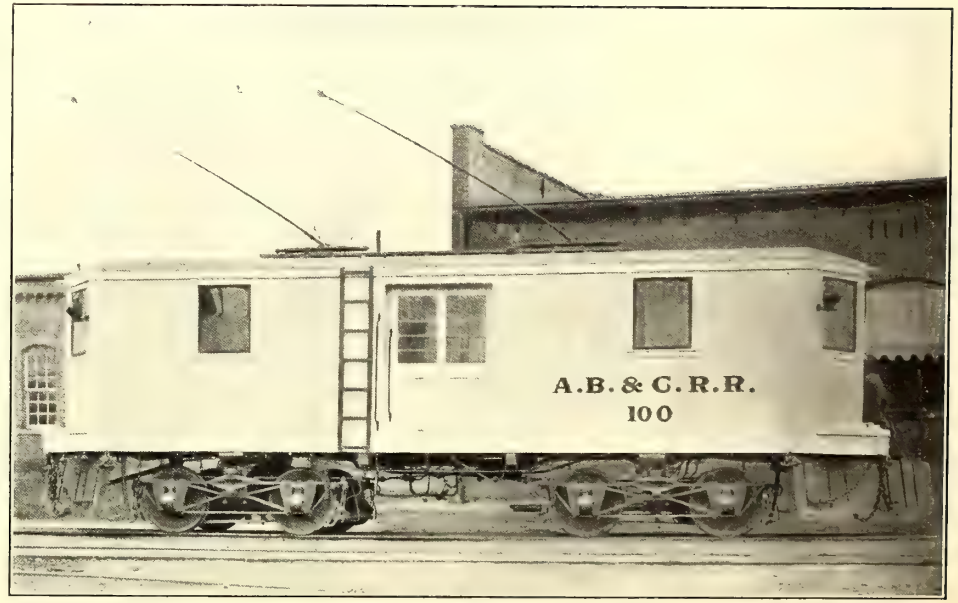
Sandusky, Milan & Norwalk—Soldiers' Home Station, Beginning of Line to Norwalk



Akron, Bedford & Cleveland—Interior View, Taken in 1899, of Cuyahoga Falls Power House



Akron, Bedford & Cleveland—Exterior View, Taken in 1899, of Car House and Power Plant at Cuyahoga Falls



Akron, Bedford & Cleveland—Snow Plow Used on Interurban Line in 1899

to quadruple equipment, and the application also of the electric brake in connection therewith; the construction of a large motor car or electric locomotive, as stated; and the development in large interurban cars provided with smoking compartments, express compartments, plush seats, toilet rooms and water coolers, all cars being equipped with iron pilots instead of fenders.

I take this opportunity, and it affords me a pleasure, to state that my connections with the officials and employees of the Akron, Bedford & Cleveland road were pleasant, especially those with Will Christy and James Christy, Jr., who built the road, and later with Will Christy, who became vice-president and general manager, for in those days, in operating a new road of that length with new and untried equipment for interurban service, we had our troubles and not a few dark days, but with Mr. Christy's co-operation and the kindness for which he is noted, many of our troubles, through his co-assistance and guidance, were worked out satisfactorily.

REMINISCENCES OF EDWARD W. MOORE

EDWARD W. MOORE, of Cleveland, who has devoted a number of years to the construction, financing and operation of electric railways with Henry A. Everett, gave some reminiscences of his early experience to the ELECTRIC RAILWAY JOURNAL. Mr. Moore's first financial interest in railways was acquired when he became associated with Henry A. Everett and his father, A. Everett, in the East Cleveland Railroad, which was operated by horse power at the time. The Everetts decided to equip the line for electrical operation and Will Christy was given the contract for the overhead work in connection with this improvement. Subsequently, when Mr. Christy had effected an organization to build the Akron, Bedford & Cleveland Railroad he interested Mr. Moore and Mr. Everett in that property. Starting with their interest in the Akron, Bedford & Cleveland line Messrs. Everett and Moore planned a great system of interurban railways independent of their extensive holdings in urban projects. Mr. Everett devoted his time largely to operation while Mr. Moore was interested chiefly in the banking and financial features of the companies.

In speaking of the Akron, Bedford & Cleveland line, Mr. Moore said:

The distance between Akron and Cleveland by the existing steam railroads was 39 and 41 miles respectively. It was 35 miles by the new electric line. We had great difficulty in selling the first mortgage bonds on this property. We tried to interest bankers and capitalists in Cleveland and throughout Ohio, as well as in New York City and other financial centers, but without success at first. In connection with my various efforts to dispose of some of the bonds in the various properties, I made a number of trips to New York and visited one large banking house when the Akron, Bedford & Cleveland road showed net earnings applicable to interest of twice the fixed charges on the entire authorized and outstanding amount of bonds. The head of this firm said that the business was derived from novelty riding and assured me that passengers would not continue to patronize the electric lines when they could use the steam railroad. Finally E. H. Gay & Company agreed to make an effort to sell the bonds on commission; they were unwilling to buy the securities outright and took them up by degrees as they found a market. We were obliged to carry these bonds a couple of years before any were sold.

In later years, as the prospects of the interurban electric railways became less speculative, and the securities more stable, we had less difficulty. We sold the Lorain & Cleveland bonds outright to E. H. Gay & Company, who organized a syndicate, in which Canadian banking houses had an interest, to take the entire block at once.

LORAIN & CLEVELAND RAILWAY

(Now a Part of the Lake Shore Electric Railway)

THE promoters of the Lorain & Cleveland Railway began in 1895 to acquire property for a private right-of-way on the south shore of Lake Erie between Cleveland and Lorain, Ohio. More time was required to purchase the necessary right-of-way than is usually the case, for the reason that the farms in that section were composed of narrow strips extending north and south and the railway wanted to acquire a right-of-way running east and west. Land was secured for a right-of-way with a minimum width of 40 ft., extending to 66 ft. at various points. Construction was started in 1896 and the line was completed on Oct. 1, 1897, and the first regular car was operated four days later.

Those who were interested principally in the promotion and the construction of the line were Henry A. Everett, E. W. Moore and B. Mahler and their associates. The company secured its charter under the general railroad act with permission to use electricity as a motive power. Mr. Mahler stated in an interview with a representative of the ELECTRIC RAILWAY JOURNAL at Cleveland that he believes this was the first line to adopt standard railroad methods of construction for electrical operation, and that the first experience with a high-speed interurban line constructed entirely on private right-of-way was that of this company. Mr. Mahler was a night telegraph operator on the Lake Shore & Michigan Southern Railway in 1868 and 1869. The trainmen who gathered in his station at night argued problems relating to railroad construction and operation, and as the Lake Shore road had only a single track at that time, many long delays for trains resulted, and the reasons therefor and possible remedies were discussed thoroughly.

During these frequent talks Mr. Mahler concluded that a railroad, in order to be more successful, should operate with higher speeds, greater power and rates that would be a material reduction from those in effect during the early years; when he became interested in interurban construction some years afterward, he remembered his early experience and conclusions. He was associated wtth the Everett-Moore interests in Toronto and in Detroit, but returned to Cleveland in 1895 to take up the project for the construction of the line between Lorain and Cleveland.

In speaking of the construction of the Lorain & Cleveland road Mr. Mahler said:

The suggestion that the line be constructed on private right-of-way was novel and did not meet with favor at the outset. Finally, it was accepted and the line was built following regular steam railroad methods of construction. We employed A. E. Arnold, a steam railroad engineer, to supervise the work of construction. The road was built with a comparatively level bed, the maximum grade not exceeding 3/4 of 1 per cent. Rails of 60 ft. length were laid, notwithstanding the criticism of those who maintained that it would be impossible to operate successfully with rail sections of this length and that the space necessary for expansion would not permit smooth operation. All the culverts were of stone and steel. We eliminated grade crossings, passing under the right-of-way of other steam railroads. No switches were installed of less than 1500 ft. in length because we concluded to forestall the possible discomfort and criticism of passengers when a car would stop on a switch.

I believe that we were the first to install four motors on our cars. Our earliest cars had four General Electric No. 57 motors of 200 hp. In using four motors we had to overcome strong objections. It was stated to us that cars operated by electricity needed a pushing power rather than a pulling

power and that therefore any power placed on the front axles would be wasted. In answer to these arguments, I pointed out the illustration furnished by a draft horse, the front legs of which carry the horse while the rear legs pull the weight. This road was the first interurban line which used standard railroad trucks in equipping the cars. Our first schedule speed was 30 m.p.h. with trains reaching 50 to 55 m.p.h. between stations. This was the highest rate of speed which had been attempted up to that time by an electric railway.

Directly after starting operation we found that the high-speed electric cars did not have sufficient weight to give them traction power. On one occasion, within a short time after operation was begun, I went over the road and the problem seemed so serious that on my return I suggested placing a bar of pig iron under each seat in the car, in order to give weight enough to afford sufficient traction. J. A. Brill, the head of the company which furnished the first cars, came to Cleveland and went over the line about that time. He said that the cars had been built for a street railway and he had not realized that they were really intended for a railroad. Mr. Brill declared that it would be necessary to add 2500 lb. to the weight of each car. This was done immediately and satisfactory performance of the cars resulted.

Mr. Mahler said that the rates of fare which were placed in effect at the time the line started operation were still maintained, and that the traffic results which were entertained by the promoters had been fully realized. In addition to the direct traffic between Lorain and Cleveland, the lake shore property in the district has been used for summer homes by residents of Cleveland. Mr. Mahler states that while the property directly on the lake front, convenient to the line, could have been purchased for $100 an acre before construction of the road, it is now selling at from $1,000 to $4,000 an acre, while land south of the nearby highway and even south of the electric line has sold as high as $300 to $400 per acre.

No great difficulty was experienced in financing the property; the bonds were purchased by E. H. Gay & Company. Discussing the financial results of operation, Mr. Mahler gave figures for the first three full years of operation as follows:

STATISTICS PER CAR MILE

Year Ended Dec. 31	Gross From all Sources	Operating Expenses	Expenditure for Maintenance	Total Car Mileage
1898	$21.06	$9.07	$2.74	346,000
1899	24.96	10.59	3.53	371,000
1900	24.88	11.08	3.77	387,000
Total 3 years	$70.90	$31.31	$10.04	1,104,000
Average per year	26.63	10.46	3.34	368,000

The maintenance expenditures shown in the foregoing table were applied principally to the equipment, as the requirements of way and structures were light during the early years of operation. The car-mileage was increased as indicated in order to develop additional business and it was found at an early date that the communities developed so rapidly that improved service was followed immediately by enhancement in the gross earnings.

F. W. Coen, vice-president and general manager of the Lake Shore Electric Railway, was the first assistant secretary of the Lorain & Cleveland Railway. Mr. Coen said that when operation was first begun the company paid for its coal 5 cents a ton at the mine, plus freight of 80 cents a ton. The present cost is 50 cents at the mine, plus $1.50 per ton for delivery.

UNION TRACTION COMPANY OF INDIANA

(Now a Part of the Indiana Union Traction Company)

A PIONEER in interurban railway construction is Charles L. Henry, receiver of the Indianapolis & Cincinnati Traction Company. Mr. Henry first became interested in railways when on June 20, 1891, he purchased the mule line in Anderson, Ind., for which he paid cash. He was interested with Philip Matter, of Marion, in a tract of land in Anderson, and in April, 1892, they constructed an electric line from the central business district to the locality in which the property was situated. During the same year the line which Mr. Henry had purchased in 1891 was converted for electrical operation.

Shortly afterward Mr. Henry began to consider the possibilities for the development of interurban electric railways.

Estimate of Daily Receipts From Passengers on an Early Interurban Line, Compiled by Charles L. Henry in 1894.

Anderson-Elwood Line			
Elwood to Anderson	150 at 25c.	$37.50	
Anderson to Elwood	150 at 25c.	37.50	
Elwood to Frankton	50 at 10c.	5.00	
Frankton to Elwood	50 at 10c.	5.00	
Frankton to Anderson	75 at 15c.	11.25	
Anderson to Frankton	75 at 15c.	11.25	
Passengers to and from Florida and other intermediate points		20.00	
Total			$127.50
Anderson-Marion Line			
Marion to Anderson	30 at 50c.	$15.00	
Anderson to Marion	30 at 50c.	15.00	
Marion to Fairmount	75 at 15c.	11.25	
Fairmount to Marion	75 at 15c.	11.25	
Fairmount to Anderson	15 at 35c.	5.25	
Anderson to Fairmount	15 at 35c.	5.25	
Summitville to Anderson	50 at 25c.	12.50	
Anderson to Summitville	50 at 25c.	12.50	
Alexandria to Anderson	150 at 15c.	22.50	
Anderson to Alexandria	150 at 15c.	22.50	
Linwood to Anderson	10 at 10c.	1.00	
Anderson to Linwood	10 at 10c.	1.00	
Travel to and from intermediate points not itemized		50.00	
Total			$185.00
Anderson-Muncie Line and Anderson-Indianapolis Line			
Muncie to Indianapolis	20 at 80c.	$16.00	
Indianapolis to Muncie	20 at 80c.	16.00	
Muncie to Anderson	75 at 25c.	18.75	
Anderson to Muncie	75 at 25c.	18.75	
Muncie to Yorktown	30 at 10c.	3.00	
Yorktown to Muncie	30 at 10c.	3.00	
Travel to and from intermediate points between Muncie and Anderson		25.00	
Anderson to Indianapolis	100 at 50c.	50.00	
Indianapolis to Anderson	100 at 50c.	50.00	
Anderson to Pendleton	75 at 15c.	11.25	
Pendleton to Anderson	75 at 15c.	11.25	
Pendleton to Indianapolis	20 at 40c.	8.00	
Indianapolis to Pendleton	20 at 40c.	8.00	
Travel to and from intermediate points not specified between Anderson and Indianapolis		75.00	
Total			$314.00
Summary of Daily Passenger Traffic			
Anderson-Elwood line		$127.50	
Anderson-Marion line		185.00	
Anderson-Muncie and Anderson-Indianapolis line		314.00	
Total			$626.50

As he was familiar with conditions in southwest Missouri, his first plan was to build an electric railway connecting the cities of Joplin, Webb City and Carthage. In order to promote this project, he visited these cities in November, 1892, and secured a contract for the purchase of the Carthage Street Railway, which was operated by horse power at the time. As he failed to secure a contract for the Webb City and Joplin properties, Mr. Henry abandoned the plan and returned to Indiana to consider the prospects for construction of an electric railway connecting what were known as the gas belt cities. The panic of 1893 followed directly and Mr. Henry postponed further action temporarily, but in the winter of 1893-94, he made the first estimates of cost and prospective earnings for an electric railway from Anderson to Marion, Anderson to Elwood and Muncie via Anderson to Indianapolis. He also made a map showing these lines, which were built afterward in accordance with this arrangement, except that the line to Elwood was actually constructed west from Alexandria instead of through Frankton,

as planned originally; and subsequently he began to secure options on land for a private right-of-way for a line from Anderson to Alexandria and from Anderson to Elwood. Although Mr. Henry was impressed more and more as time passed with the desirability of the enterprise he was unable to interest the necessary capital and did not make substantial progress before the financial depression and accompanying campaign of 1896 developed.

With the improvement of conditions which followed the election, Mr. Henry secured sufficient capital to proceed. He borrowed on his personal credit enough money from Philip Matter, of Marion, to construct an interurban line from Anderson to Alexandria. This property was owned by the original Union Traction Company of Indiana, which was organized by Mr. Henry in September, 1897. On Jan. 1, 1898, the first car was operated from Anderson to Alexandria, a distance of 11 miles. Early in the following year the road was extended to Summitville, making a total distance of 17 miles. Connection was made afterward at Summitville with the line built south from Marion, which was owned by the Marion Street Railway and was 17 miles in length. It made a continuous road of 34 miles from Anderson to Marion, owned by two different companies. The $450,000 of first mortgage bonds issued by the Union Traction Company of Indiana were purchased by the Indiana Trust Company of Indianapolis.

Estimates on Early Interurban Construction, Compiled by Charles L. Henry in 1894.

Addition to Equipment of Anderson Power House.		
One 300 horse-power Corliss engine	$4,000.00	
Foundation for and setting engine	500.00	
Two dynamos, 150 horse-power each, including switchboard instruments, foundations for and setting dynamos	6,000.00	
Line shaft, pulleys and belts	3,000.00	
One battery, two 275 horse-power water-tube boilers with steel stack, ready for steam pipe connections	10,000.00	
Steam pipe and fittings erected	500.00	
One 500 horse-power open heater and exhaust pipe, including setting	700.00	
Boiler feed pump and connections	400.00	
Steam pipe covering	75.00	
Total		$25,175.00
Car House at Anderson		
Brick building, 50 x 200 ft., iron truss roof frame and steel roof	6,000.00	
Curves and car house track and overhead work	2,000.00	
Total		$8,000.00
Repair Shop at Anderson		
Brick building, 65 x 225 ft., iron truss roof frame and steel roof; containing three tracks full length of building; machine shop, carpenter shop, paint shop, all of sufficient capacity for repairs for entire road	7,500.00	
Curves, tracks and overhead work	1,500.00	
Machinery and tools	7,500.00	
Total		$16,500.00
Total additions necessary at Anderson station		$49,675.00

As the success of this early line was demonstrated, Mr. Henry suggested to George F. McCullough, of Muncie, who owned the electric railway in that city, that they combine their interests and construct a line from Muncie by way of Anderson to Indianapolis. On Jan. 1, 1896, Hugh J. McGowan went to Indiana as a representative of the Dolan-Morgan syndicate, which had recently purchased the Indianapolis street railways. Shortly afterward Mr. Henry met Mr. McGowan and thereupon presented his project for interurban development, which was taken up later by Mr. McCullough and Mr. Henry with Randal Morgan of Philadelphia. A thorough inspection of the property was made by David Young, of Jersey City, representing Mr. Morgan and associates, who thereupon decided to join Mr. Henry and Mr. McCullough in the organization of the Union Traction Company of Indiana. This company was organized in June, 1899, and was designed to include the electric railways in Muncie, Anderson, Marion and Elwood, the interurban lines connecting these cities, and also to build the proposed line from Muncie, by way of Anderson, to Indianapolis. Directly after organization was effected the construction of the line from Indianapolis to Muncie was started. On Jan. 4, 1901, the first interurban car was operated into the city of Indianapolis on this completed line. During this period the line between Elwood and Alexandria had been completed, perfecting the system substantially as it had been planned by Mr. Henry in 1893 when the necessary capital for construction could not be attracted. The completed system as indicated reached this important point just three years and three days after the first car was operated from Anderson to Alexandria.

Mr. Henry sold his interest in the Union Traction Company of Indiana in March, 1901, and retired at that time from the position of general manager. In an address in Indianapolis on Jan. 11, 1906, at a banquet of the Indiana Electric Railway Association, Mr. Henry gave the following interesting reminiscences of his early experiences:

Looking forward to the completion of the line into Indianapolis as early as 1894 I took up the subject of a contract with the local company for running cars into this city, and in February, 1895, I secured a contract with the Citizens Street Railway Company, then controlled by what was known as the McKee & Verner syndicate of Pittsburgh. The contract was executed by Augustus L. Mason as president of the city company, and by me for the benefit of the interurban company thereafter to be organized. It provided that the city company should take charge of the cars at the city limits, collect and retain the city fares and redeliver the cars to our company again at the city limits. It also provided for the handling of mail, express matter and freight upon terms as to price to be thereafter agreed upon, and upon failure to agree, then to be fixed by arbitration.

The first corporation formed to construct an interurban electric railway was the Indianapolis, Greenwood & Franklin Railroad Company, organized Nov. 9, 1894, under the steam railroad law, and promoted by Henry L. Smith, of Indianapolis. The road from Indianapolis to Greenwood was afterward built by this same organization under the ownership of Joseph I. and Wm. G. Irwin, of Columbus, Ind., who took charge of the company in June, 1899, and it was this road that ran the first interurban car into Indianapolis on Jan. 1, 1900. This company was succeeded by the Indianapolis, Columbus & Southern Traction Company, controlled by the Messrs. Irwin.

Estimates for Early Interurban Construction, Compiled by Charles L. Henry in 1894.

Roadbed and Track		
Securing right of way	$500.00	
Grade and ditches	500.00	
Four 3-10 tons, 60 lbs. "T" rail at $23.50 delivered	2,216.05	
355 four-hole angle bar joints at 35c	124.25	
1,4207-8 bolts at 1½c	21.30	
2,113 oak ties, 30 in. centers, 6 x 8 x 8 ft., 40 cents each	845.20	
31 kegs of spikes, 9-16 x 5½ in., 6,200 lbs., at $1.65 per hundred	102.30	
355 copper rail bonds, 40 cents each	142.00	
Constructing and bonding, including delivery of material	600.00	
Gravel	300.00	
Total		$5,351.10
Overhead Construction		
90 cedar poles, 30 ft. x 7 in., top, $2.25 each	$202.50	
1,687 lbs. No. 0, H. D. copper, 11 cents	185.57	
45 insulators and hangers complete, 60 cents each	27.00	
1,600 ft. 5-16 steel strand span wire, 60 cents	9.60	
Labor, including delivery of material	150.00	
Total		$574.76
Total for roadbed, track and overhead work		$5,925.77
Estimate for Motor and Trailer Car for Interurban Electric Road.		
Motor Car		
One car body, 32 ft. inside, 36 ft. over all, with lavatory and heater	$1,500.00	
One set of double trucks with steel tired wheels	500.00	
One double motor equipment, two 50 horse-power motors	1,200.00	
One set of air brakes with electric motor and pump for operating same	750.00	
Motor car, complete		$3,950.00
Trailer Car		
One car body, 28 ft. inside, 36 ft. over all, two platforms with trucks and air brake attachments complete	$1,500.00	
		$1,500.00
Motor and trailer complete		$5,450.00

The construction and equipment of the first interurban lines presented many interesting questions. Perhaps the most serious in the beginning was the distribution of power, for at that time the idea of one central power station transmitting current at high voltage to various substations, where the voltage should be reduced, had not been tried. In the power station at Anderson, in order to enable us to have sufficient voltage on the Alexandria-Summitville section of our road, we installed a "booster," a generator developing electric current at 750 volts. This we transmitted by a separate line to the Alexandria-Summitville section and the drop of the voltage by transmission was sufficient to give us approximately 500 volts on that part of the line.

When the Union Traction Company of Indiana was formed the great central power station at Anderson was erected with substations, a system which has since been generally followed.

The wonderful growth of the electric railway business is illustrated by the fact that the first generator equipment in the Anderson station in the fall of 1891 was a 75-hp bipolar Edison machine belted to a 125-hp Corliss engine, operating two cars on a 2-mile run to North Anderson.

Our first interurban line was operated at the beginning by a block signal system, but this caused too many long delays, and, not proving satisfactory, the line was soon equipped with telephone service.

We realized that if high speed with heavy cars was to be attained it would be necessary to have a more satisfactory brake equipment than that operated by hand. For this reason, in the original estimate covering the equipment proposition, although such a thing was not then made, provision was made for an electric motor-driven air compressor, and its estimated price fixed at $750 per car. Since then this system of brakes has been brought to perfection and is now common on interurban cars. Steel tired wheels were also included in this estimate.

I invented the word "interurban" for this class of railroads, and though it is not perhaps well selected it has come into general use. One of the Anderson newspapers, becoming piqued at some act on the part of the management relating to free transportation, dignified the new name by calling it "inter-ruben," and this name in jest clung to the road quite a while.

Supplementing these remarks, Mr. Henry stated to a representative of the Electric Railway Journal that he thought the intramural road at the World's Fair in Chicago in 1893 suggested the title interurban. "The original Union Traction Company," Mr. Henry added, "secured its charter under the street railroad law, although interurban roads are now described as such in the statutes of Indiana. People laughed at me for constructing this line on private right-of-way. Our earliest rates of fare averaged about 1 1-4 cents a mile and were much too low to meet the requirements of a business that was destined to develop into high-speed service of the most remarkable degree of convenience that has ever been afforded to the public. The Christensen Air Brake Company furnished what we wanted in the way of air brake equipment."

The accompanying statements, showing the estimates compiled by Mr. Henry in 1894, are interesting as indicating the low costs fixed for this early property and the volume of traffic anticipated.

Mr. Henry said that the line as built originally from Anderson to Alexandria had no ballast and that the service was indifferent. The prospects, however, were encouraging, as the gross revenue amounted to $100 a day. The first cars used on the lines were purchased from the Barney & Smith Car Company. They had been built in April, 1896, for the Columbia & Maryland Railway, but, owing to financial difficulties in which that enterprise became involved, they remained in the shops at Dayton until purchased by Mr. Henry. These cars, Mr. Henry says, are still in use as trailers on the lines of the Indiana Union Traction Company.

EXPERIENCES OF J. R. NUTT

J. R. NUTT, now Secretary of the Citizens' Savings & Trust Company, of Cleveland, has been identified prominently with the financing of some of the early interurban lines. Mr. Nutt's first experience of this character was in the construction, in the year 1897, of the line between Cincinnati and Hamilton, for which he and Will Christy and associates furnished the major part of the capital. This line is now a part of the Ohio Electric Railway main line from Cincinnati to Dayton. Construction with unusual economy was possible because of the prevailing low prices of rails and electrical equipment in that year.

Mr. Nutt stated that some of the bonds issued under first mortgage on several of the first interurban railways are in good demand constantly, and that during the last panic these bonds fluctuated less and could be sold more readily, with less sacrifice in price, than high-grade steam railroad bonds listed on the New York Stock Exchange.



THE HISTORY OF THE PAST HALF DECADE

THE history of the street railway reaches back to 1832, when the first horse car was operated on the New York & Harlem line, and the fifty odd years which elapsed between that time and the later eighties can be considered the dark ages of the street railway industry. There was no contemporary chronicler to record the trials and achievements of the street railway manager and inventor during this period, and it is very probable that the lack of progress which characterized this half century of darkness may be ascribed to this lamentable fact. It was not until the eventful year of 1884 that a combination of three occurrences led to the promise of better things. As Macaulay would undoubtedly have said, had it been his lot to have written the history of the street railway, any school boy knows that in 1884 Vanderpoele at the Toronto Exposition operated his first electric car which was the direct predecessor of the modern electric car; Bentley and Knight put in service in Cleveland the first electric car to use direct power from a generator on a public street; and the STREET RAILWAY JOURNAL was founded. It would not do for the publishers of this paper to express an opinion as to which of these three events was the most important. Suffice it to say that each of the three, although perhaps not appreciated at its full worth at the time, was destined to exercise an important influence upon the future development of the street railway industry.

Since 1884, the art of electric railroading has grown so rapidly that neither this paper nor its readers have had much time to look backward and view the paths over which they have trod. The work which has occupied all minds has been that of constructing the future, not of philosophizing over the past. Events of great importance to the industry have followed one another so closely and so many new vistas of possible improvement have been disclosed as each step in advance has been taken, there has been little opportunity to stop simply to review previous achievements. Nevertheless, this is not the most satisfactory way, or even the most profitable way, of making a journey. In any trip or ascent, especially if it is an arduous one, a view of the paths traversed and the recollection of obstacles already overcome will often act as an inspiration for the future. It was for this reason that this paper, in 1894, published a history of the street railway industry up to that time, and a decade later, at the time of its twentieth anniversary, presented an account of the important events which had occurred between 1894 and 1904. The present issue marks the twenty-fifth anniversary of the establishment of the ELECTRIC RAILWAY JOURNAL, and again it seems fitting to devote a few pages of one issue of this paper to a sketch of the most notable events which have occurred since the role of historian was laid aside five years ago.

In many respects the past five years have been more replete with interest than any decade previous to 1904. The electric railway industry, like the JOURNAL, had reached its majority and was capable of more important things than when of more tender years. Until the beginning of the period under discussion nothing more ambitious in electric railway transportation had been attempted than the interurban railway, although the equipment of a few steam railroad branches like the Nantasket and New Britain divisions of the New Haven road indicated the possibilities of electric power for serious consideration in trunk line service. Transmission voltage, at least in the East, was still moderate and the use of Niagara power for electric railway work was confined to the immediate neighborhood of Niagara Falls and Buffalo. The relative advantages of single-phase and direct current for railway service were discussed only in a theoretical way at the meetings of the American Institute of Electrical Engineers. The old American Street Railway Association was still in existence with a constitution and organization unfitted to deal with the problems of the day. An even better idea of the immense distance traversed during the past five years can be gained from the statement that in 1904 the idea of Public Service Commissions, in the modern acceptance of that term, had not been conceived. It was not until three years later than the period we are now considering that they sprang, like Minerva, fully panoplied, from the brow of Jove.

The serial in the popular monthly magazine usually has a reference to the previous number in which the earlier chapters of the story can be found. Following this precedent, the gentle reader is informed that in the issue of the STREET RAILWAY JOURNAL for Oct. 8, 1904, he will find recorded the principal events which occurred in the electric railway industry up to the end of 1903. That year closed with an electric railway mileage of 29,830, upon which 76,186 cars were then in service, and the announcement of the award by the New York Central & Hudson River Railroad Company of contracts for the electrical equipment of its New York terminal.



MANY events occurred during the first part of this year which marked important stages of development in enterprises completed later. On the first day of the year John B. McDonald, contractor for the New York subway, escorted Mayor McClellan and a party of city officials through the subway on a trip made on hand cars. On the same date the City of Vienna took over the operation of its railway system. The same month a single-phase car was tried out in service on the Interworks Railway of the Westinghouse companies. During the same month the Indianapolis & Cincinnati Traction Company announced that it would install the single-phase system on 53 miles of road.

On March 1 the STREET RAILWAY JOURNAL reduced its subscription price from $4 to $3.

On March 31 Harrie P. Clegg issued a call for the meeting to be held at Dayton to organize the Ohio Interurban Railway Association. This meeting resulted in the organization of the association and the election of Mr. Clegg as its first president. One of the first actions taken by the association was the decision to issue a coupon book in which $12 worth of transportation would be sold for $10. Up to this time the interurban roads of the Central States had had no distinctive association, but the organization of the Ohio association was followed about one year later by the formation of the Indiana Electric Railway Association. The consolidation of these two societies into the present Central Electric Railway Association was the result.

Two months later, or on June 4, the preliminary plans of the electric railway motor, designed by the General Electric

Company for the New York Central electric locomotives were published. These plans showed a notable departure from existing electric motor design, as a bi-polar machine was employed in which the armature was not kept concentric in the fields. The boldness of the plan aroused the greatest interest, mixed with some incredulity on the part of certain engineers as to whether such a motor would operate without destructive sparking. Serious doubt was also expressed as to the capacity of the magnetic circuit, as the published diagrams showed only a single motor and not the full course of the magnetic circuit.

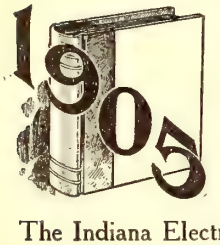
The convention of the American Street Railway Association, the last of that body, was held in 1904 in the city of St. Louis at the time of the World's Fair. The delegates met in the Transportation Hall. At this meeting the articles of organization of the American Railway Mechanical & Electrical Association were changed to admit to membership members of the way-departments of electric railway companies. At this meeting, also, the question of reorganization of the association was for the first time seriously considered in convention, and the president and executive committee were authorized to draw up a working plan. President Ely's address was devoted largely to this subject and he was re-elected president of the association.

The exhibits at the fair were elaborate and well staged, and at the close in November many manufacturers were pleased with the award of various medals, while others found themselves in the class of those who "also ran."

The International Engineering Congress was held in St. Louis just prior to the meeting of the American Street Railway Association and was attended by many prominent electrical engineers from abroad. The recent experiments on the Zossen line were made the subject of considerable discussion, and a paper on this topic was presented by Alexander Siemens.

Early in October the first section of the New York subway was opened for public traffic. This was signalized by the publication of an album by the Interborough Company giving a technical description of the line and articles on the steam plant, electrical system and rolling stock, prepared by the engineers of the company. The subway was put in operation on October 27, from the City Hall to 145th Street on the west side.

The Canadian Street Railway Association held its inaugural meeting, Dec. 20, 1904. W. G. Ross, of Montreal, was elected president.



THE year opened with important changes in the Ohio steam and interurban roads owing to the appointment of receivers for the Appleyard roads, which centered in Columbus. This system now forms an integral part of the Ohio Electric Railway.

The Indiana Electric Railway Association held its organization meeting at Indianapolis, Jan. 12, and elected as its president Charles L. Henry, of Indianapolis, who had taken a prominent part in the development of the interurban roads of that State. Mr. Henry will also be remembered for his early adoption of the single-phase system, which was put in commercial service on his line between Rushville and Morristown, just two weeks after his election as first president of the Indiana Street Railway Association.

On Jan. 20 the first of the series of annual meetings of the New York Railroad Club, devoted to the discussion of the relative merits of a. c. and d. c. traction was initiated by the club. W. B. Potter presented a paper on late developments in electric traction, and those who participated in the discussion included W. J. Wilgus, F. J. Sprague, B. G. Lamme, B. J. Arnold, George Gibbs and J. G. White. The interest manifested was so great that the May meeting of the club was devoted to the same subject, and "electric nights" have formed a feature of every yearly program of the club since that time. The later discussions on the relative merits of these two systems of electric traction have been by no means confined to meetings of the New York Railroad Club. For several years the subject continued to be as fruitful a cause for diverse opinions, and even acrimonious debates, as now promises to rage around the question whether Dr. Cook reached the North Pole.

On Feb. 3 and 4, a joint meeting of the executive committee of the American Street Railway Association with those of the affiliated associations was held at the Holland House, New York, to consider a reorganization of the association. A suggested plan, patterned after that of the American Association for the Advancement of Science, was presented by Richard McCulloch. This plan, afterward revised and elaborated by Prof. H. H. Norris, of Cornell, forms the basis of the present constitution and by-laws of the American Street & Interurban Railway Association and its affiliated bodies.

In March a short strike occurred on the Interborough Rapid Transit system, involving both the subway and elevated lines in New York. For a brief period the surface lines in the city were congested with traffic, but the officials of the company were well prepared for fighting the strike. Many of the men remained loyal, and after the first day the outcome was no longer in doubt. A feeble attempt was made by the men to maintain a semblance of the strike after the second day, but they soon discovered that it was useless, and four days after the gage of battle had been thrown down by the men, most of them were standing in line in front of the company's office applying for reinstatement.

One of the most important events of 1905 was the publication, during May, by the Government, of the census report of street railways from statistics compiled in 1902. The first official census of the street and electric railway industry of the country was made in 1890. The plan then followed was greatly elaborated for the 1902 census and was carried out by experts who were well equipped for the task. Information of the greatest value was secured and published. The important decision was also made not to postpone a similar census for ten years, but to have one every five years. It is notable that one of the two experts in charge of the street and electric railway census of 1902 was Prof. E. Dana Durand, who now has charge of the entire census work of the Government.

To those companies which have recently been considering an increase of fare it may be a surprise to learn that so long ago as April, 1905, the Railroad Commissioners of Massachusetts announced that they would allow companies in that State to charge 6 cents if the roads could not afford to carry people for 5 cents, although the original grant was for the lower fare. In defining its policy on this point, the board said: "When fares prove to be too low to make an enterprise fairly profitable, it is better for all concerned that the company revise its rates and place them upon a footing which enables it to give the accommodation which the public needs, and make a just return to stockholders upon their honest investment."

In May the International Railway Congress held an important meeting in Washington, and in June, 1905, the Montreal

Street Railway Company put its first pay-as-you-enter car in operation on St. Catherine Street.

The three most important events in the latter part of the year were the presentation by B. J. Arnold to the Chicago City Council of a preliminary report on the Chicago traction problem, the decision of the National Civic Federation to appoint a committee to investigate the existing conditions of municipal ownership of public utilities in the United States and Europe and make a comprehensive report, and the opening of the Philadelphia subway. The official inauguration of this latter line occurred Dec. 18, when surface cars were run from the City Hall, in Philadelphia, to the Schuylkill River. Prior to the opening of the road it was inspected by a party of official guests, including prominent representatives of the City of Philadelphia, and railroad managers.

Important announcements made during December, 1905, were plans for the early electrical equipment of the West Shore Railroad, between Syracuse and Utica; of the West Jersey & Sea Shore branch of the Pennsylvania Railroad, between Camden and Atlantic City, and of the Rochester branch of the Erie Railroad, between Rochester and Mount Morris. The year concluded with the publication of letters from Mr. Westinghouse to Mr. Newman, president of the New York Central & Hudson River Railroad Company, in which Mr. Westinghouse recommended that the New York Central's third-rail system be changed to the single-phase overhead system.



THIS year opened with a blaze of glory. The New York Central electrical equipment was under contract and test. The Pennsylvania Railroad, West Shore Railroad and Erie Railroad contracts had just been awarded. The New Haven policy had not been fully defined, but it was known to be expecting to install electric power. The initial electric equipment of the Long Island Railroad was practically completed, and rumors of other important changes in the motive power of trunk line railroads were rife. One was for the equipment of the Sarina tunnel of the Grand Trunk Railway with the single-phase system, the contract for which was announced during the first week in January. This was followed in a few days by the statement that the New York Central Railroad would call for bids for the electrical equipment of its proposed Detroit River tunnel, and that the Erie had appointed a commission of engineers to study the application of electricity to the company's suburban service near New York. These successive announcements raised electrical engineers to a high pitch of enthusiasm. Some of the more sanguine indulged freely in the prediction that the steam locomotive, at least for suburban service, would follow the same fate as overtook the cable in street railway operation and be consigned to the scrap heap. But it still continues to show considerable vitality.

The predictions of glorious success or dire failure to which these events led, and the discussions which followed them, distracted attention from the extensions of the interurban systems which were being made in Indiana and Ohio. But this work was carried on rapidly, and on Jan. 1, a line was opened by the Western Ohio Railway, between Findlay and Lima, which connected the extensive chain of electric railways in the northern part of Ohio and those in central parts of Ohio and Indiana. The last spike of this line was driven amidst considerable ceremony on Dec. 31, 1905, and special parties of electric railway managers traveled to Findlay to witness the event.

The construction of this physical connection between the most important groups of interurban railways in the country was followed within less than a month by the amalgamation of the Ohio Interurban Railway Association and the Indiana Electric Railway Association. This union of interests occurred at the Algonquin Hotel, Dayton, Jan. 25, when a large number of representative managers from the central State were present. The organization of the Central Electric Railway Association was followed by the establishment of a number of through routes between important cities in the Central States. The same week the announcement was made of the organization of the Interborough-Metropolitan Company. This company held large interests in the Interborough Rapid Transit Company, the Metropolitan Street Railway Company and the Metropolitan Securities Company of New York.

On March 12 the famous report on the Chicago situation by Mr. Dalrymple, of Glasgow, was made public. It will be remembered that Mr. Dalrymple, who was manager of the Glasgow municipal tramway system, was urged by Mayor Dunne to visit Chicago during the height of the debate upon the municipalization of the Chicago railways, in the hope that he would bolster up and give respectability to the movement for municipal operation in Chicago. Whether Mr. Dalrymple expected to find the principles of municipal ownership as advocated in this country and as practised abroad the same, it is impossible to say. If this was the case he was soon undeceived, in spite of strenuous efforts of Mayors Dunne and Johnson, while he was in their cities, to give every aspect of municipal operation a rosy tinge. Soon after Mr. Dalrymple returned to Glasgow he forwarded his report on the Chicago situation to Mayor Dunne, who found it so absolutely opposed to his own views that he refused to disclose its contents. At last, out of justice to Mr. Dalrymple, it was made public by the Council of Glasgow. It proved to be a severe arraignment of municipal methods in the United States, and contained, among other unpalatable truths, the statement to Mayor Dunne that in Mr. Dalrymple's opinion, "there would be great danger in your city attempting to operate without radical change in the methods usually employed in carrying on municipal work by the cities of the United States." The publication of the report attracted the greatest interest throughout the country, and brought consternation into the municipal chambers of many cities and to the politicians who had been using the plea of municipal ownership to gain lucrative positions in city governments. It is not too much to say that Mr. Dalrymple's report did more than any other one factor to establish the present system of railway operation in Chicago, in which the city has an interest in the earnings of the companies, but does not operate the lines. On April 3 a municipal vote was taken and found to be in favor of municipal ownership, but not of municipal operation. This solution of the problem proved impossible because the Mueller law, under which the city was to issue certificates to purchase the railways, was declared unconstitutional.

The entire country was shocked on the morning of April 18 when the announcement was made that San Francisco had been largely destroyed by earthquake and fire. Later reports only confirmed the original estimates of the disaster, and for many days the sympathies from the entire civilized world were centered on the situation of San Francisco, while relief funds and supplies poured into the city from all sides. The electric railway system in San Francisco suffered severely from the convulsion of nature, followed as it was by the conflagration, but its managers immediately set about the work of rehabilitation. They realized that the future of their property, as well as the comfort and prosperity of the citizens of San Francisco

depended largely upon the promptness with which the transportation lines were reopened. Temporary construction was immediately installed, and the energy displayed by the owners of the railway system in this work was a very important factor in the rebuilding of San Francisco, and the transportation of its residents and what was left of their household property to more comfortable habitations. This public duty was poorly repaid by the attitude of the city officials and many of the populace during the subsequent struggle of the company with the labor element, because, soon after the fire, San Francisco again focused the attention of all, this time by its long street railway strike. In this contest the railway company had to bear the brunt of overturning a labor situation which had long been a disgrace to the city of San Francisco, but the combination of corrupt labor leaders and city officials and of misguided employees was finally put down, and the city emerged from the struggle, bleeding and poorer, but better for the afflictions which had come upon it from within and without.

New York, San Francisco and Chicago were not the only cities with traction problems which were being solved during this period. London, whose down-town streets had been planned for the needs of the time of Richard I and had never been adequately supplied with transportation facilities, awoke, during the early part of this decade, to the direct relation of transportation facilities to municipal development. The result was the appointment by Parliament of the Royal Commission on London Traffic, and the visit of this commission to America in 1903. The results of this visit and the other investigations of the commission were made public in the report finally published in 1906. It is not necessary here to review this report, which is the most voluminous of any presented on the transportation problems of any one city, but it may be said the committee was very favorably impressed with the methods found in America, and recommended the adaption of many of them to London conditions.

During all of this year, in fact, during the entire five years which are being considered, Mayor Johnson, of Cleveland, was actively engaged in his philanthropic work of preparing to give the citizens of Cleveland a first-rate street railway service for a 3-cent fare. Early in July, 1906, he announced that the Forest City Railway Company, locally known as the "three-cent fare company," would be leased to the Municipal Traction company, which would guarantee dividends on the Forest City's $2,000,000 of capital stock, part of which was to be sold to the public. It would be tiresome and useless in this place to follow all of the devious movements of Mayor Johnson during the long Cleveland struggle, which culminated a year and a half ago in his obtaining control for a short time of the Cleveland Electric Railway system. The history is a monotonous one of lawsuits and referendums, of destruction of tracks and property, of propositions and counter-propositions, of solemn agreements and broken promises. The subject will therefore be dismissed with the statement that Mayor Johnson's rule has hung like a pall over Cleveland during the past six years or more, and that this shadow will not be removed until the primal cause has disappeared.

A monumental event of the year, which should be mentioned at this place, was the practical completion, in Milwaukee, of the Public Service Building, the largest as well as the handsomest and most complete private building in the world devoted to public utilities.

The convention in 1906 was held at Columbus, O., and the Street Railway Journal devoted its convention issue of Oct. 13, 1906, to a description and analysis of interurban railway operation in the Central States. The series of articles contained in this convention issue, and the visit of the association to Columbus, then, as now, one of the most important centers of interurban railway operation in the United States, supplied convincing testimony of the value and extent of interurban railroading. The convention was held in the State Fair Buildings, which were eminently suited for the purpose —during dry weather.

On Nov. 11 four trains operated by electricity were run out of the Grand Central Station, marking the inauguration of the electrification of the company's suburban lines out of New York.

On Dec. 8 the purchase was announced by the New York, New Haven & Hartford Railroad of the Providence street railway system, and about two weeks later, of the Connecticut Railway & Lighting Company. These purchases, made from the United Gas Improvement interests of Philadelphia, placed practically the entire mileage of the electric roads in Rhode Island and Connecticut in the hands of the New Haven Company.



1907 OPENED with a condition of general prosperity, and closed with a period of business depression from which the country is now only finally emerging. During the early part of the year many extensions to lines were projected, and new undertakings were organized only to bring disappointment to their promoters later in the year, and to be held for a more propitious time for financing or their abandonment altogether.

In Chicago, affairs began to take a more favorable turn. After many years of prostration of the local railways, during which no one but the politicians prospered, order gradually took form out of chaos. The filibustering of Mayor Dunne could not prevent the introduction into the Chicago City Council of what was known as the Chicago traction ordinances, by which the principal Chicago surface railway systems have since been rehabilitated and are now operated. On the passage of these ordinances by the Council, on Feb. 5, they were promptly vetoed by the Mayor, but were repassed by the Council over the veto on Feb. 11, by a vote of 57 to 12. The ordinances were dependent for their adoption upon a referendum vote at the coming April election. At this referendum the ordinances were accepted by the electorate at large, and Frederick A. Busse, who had favored them, was chosen mayor over Mayor Dunne, who was a candidate for re-election.

An unfortunate accident occurred, Feb. 16, from a dislodged rail on the electrified division of the New York Central Railroad, and gave rise to a very long investigation into the holding power of spikes as well as the effect of locomotive design on the stability of track.

On March 2 the Philadelphia Rapid Transit Company officially opened its elevated division, west from the Schuylkill River to its magnificent terminal station at Sixty-ninth Street, Philadelphia. On June 15 the official opening of the electrified section of the West Shore Railway, between Syracuse and Utica, occurred.

In the early part of June Governor Hughes signed the Public Service Commission bill, by which New York State was divided into two districts, and the public utilities in each district were put under the control of five commissioners. These commissioners were appointed June 28, and took office July 1. It was perhaps more than a coincidence that the appointment of these commissioners, the defeat of the municipal ownership idea in Chicago and the publication of the preliminary

reports of the committee appointed by the National Civic Federation to investigate the subject of public ownership and operation of public utilities in the United States and Great Britain should have occurred within a few months of each other. The main facts contained in the National Civic Federation examination were given to the press during the early part of July, and while it was of course too much to expect that the investigators should agree on all points, representing as they did such wide shades of opinion, yet the number of conclusions in which they were able to unite was remarkable. The general effect of the publication of these reports was to make municipal operation of street railway systems in this country, at least, a dead issue so far as serious consideration was concerned.

In the meanwhile, the Public Service Commission of New York, First District, began actively to engage in an investigation of the transit conditions in New York City. William M. Ivins, a well known attorney, was engaged to act in the capacity of what might be called prosecuting attorney, and a most rigorous investigation was conducted into the finances and operating methods of all the New York City companies. The condition of the New York City Railway Company had been going from bad to worse, and in the early part of this investigation by the Public Service Commission, application was made by several creditors of the company to Judge Lacombe in the United States Circuit Court to appoint a receiver. This was done on Sept. 24. Receiverships for the Metropolitan Street Railway Company and the Third Avenue Railroad followed not long after. These appointments, however, in no respect put a quietus on the activity of Mr. Ivins.

On July 24 the New York, New Haven & Hartford Railroad began the operation of trains over its electrified line between the Grand Central Station and New Rochelle with a service of 10 trains a day, five in each direction. This service was extended as rapidly as conditions warranted, until in the following year the entire passenger service out of New York was operated by electricity.

The last quarter of 1907 began with the Atlantic City Convention, which exceeded in attendance all previous conventions in the number of exhibits and practical results secured. The souvenir issue published by the STREET RAILWAY JOURNAL this year was devoted entirely to subjects connected with trunk line electrification. Accounts had been published in a number of the technical papers of the construction features of the New York Central, New Haven, Long Island and other electrically equipped steam railways, but in the 1907 convention issue the operating organizations and technical details of these roads were thoroughly described for the first time. An extended article also appeared on the newly equipped Rochester Division of the Erie Railroad.

The following month Tom L. Johnson was re-elected Mayor of Cleveland for the fourth, and it is hoped for the last time. The rule in baseball that a man who has been given three chances to hit the ball and has failed is declared out could well be incorporated in the charter of the City of Cleveland.

Interest in street railway circles during the latter part of the year centered about the question of a standard classification of operating expense accounts. The original classification of the Street Railway Accountants' Association of America adopted in 1898 had been outgrown, and at the meeting of the Accountants' association at Atlantic City in 1907 a revised classification, prepared by the committee on the classification of accounts, had been tentatively adopted, but shortly after the Interstate Commerce Commission indicated its intention of prescribing its own classification of electric railway accounts for use by interstate railways. This announcement gained importance from the fact that some of the State railroad commissions had decided to adopt any classification of electric railway accounts recommended by the Interstate Commerce Commission. Representatives of the electric railway companies immediately asked for a hearing, and a meeting was held in Washington, Nov. 22, at which the tentative classification of the commission was compared with that of the Accountants' Association. A second meeting, held in Washington, Dec. 17, 18 and 19, was more largely attended by electric railway representatives. The commission did not issue its tentative classification of electric railway accounts, embodied in the famous circular No. 20 until early in the following year.



THE first important event in 1908 was the operation of an electric train, Jan. 4, through the tunnel of the Hudson & Manhattan Railroad. On Feb. 25 the uptown tunnel of the Hudson & Manhattan was opened to the public with elaborate ceremonies in which the Governors of New York and New Jersey and the officials of New York and Jersey City participated.

Throughout all of the States a great deal of interest was manifested in the experiment of governing public utilities by commission being conducted in New York. Public utility bills were introduced in many Legislatures, but very few passed.

The segregation of the separate properties forming the Metropolitan Street Railway system, which began with the abrogation of the lease of the Third Avenue Railroad early in the year, was continued in later months and with it came the discontinuance of the issue of transfers at a great many points in New York City. This action gave rise to considerable complaint among those who had to pay two fares instead of the one to which they had been accustomed, and was another instance of the fact that a street railway monopoly in a city is not always a grinding one.

In the meantime, the movement for higher fares in Massachusetts continued. After careful hearings the Railroad Commissioners of the State gave permission to charge higher fares on certain lines, and there is increasing popular acceptance in Massachusetts that these 6-cent fares are justified.

While this movement for higher fares was going on in Massachusetts steps were being taken in Cleveland to inaugurate the real thing in the way of a 3-cent fare line. The negotiations in that city between the municipal authorities and the railway company had finally reached the stage where the latter was willing to lease its road to the Municipal Traction Company which was organized to operate on a 3-cent fare basis. The property was formally turned over to the Municipal Traction Company April 27. On April 28, after the manner of the old days when wine flowed through the city fountains, everybody in Cleveland was invited to ride free. Then 3-cent, 4-cent, and 6-cent fares were charged. In less than a month later the employees struck and the beginning of the end was in sight.

In their issue of May 16 the publishers of the STREET RAILWAY JOURNAL announced its purchase of the ELECTRIC RAILWAY REVIEW, its principal competitor, and that these two papers would be consolidated to form the ELECTRIC RAILWAY JOURNAL. On June 6 the first issue of the consolidated paper was published.

F. W. Whitridge, who had been appointed receiver of the Third Avenue Railroad during the year, proved to have many

original ideas and his unique methods in railroad operation and his caustic humor in dealing with the Public Service Commission soon attracted attention. One of the plans adopted by him to increase the gross receipts of the company was to place a poster in the cars with the Biblical injunction not to steal, directed to passengers who did not pay their fares and to conductors who did not turn in all the money collected. Later considerable difference of opinion developed between Mr. Whitridge and the Commission over the utility of the appraisal of the local electric railway properties decided upon by the Commission during the year and since undertaken.

During this period also there was heroic pruning of the Metropolitan Street Railway system in the hope that by lopping off some of the weak branches it would be possible to keep vitality in the main stem. The Central Park, North & East River Railroad and the Twenty-eighth & Twenty-ninth Street Crosstown line were first requested to start business on their own account. Other unprofitable branches soon suffered the same fate. The increase in the average fare, secured by this segregation of lines, produced a great deal of dissatisfaction on the part of those who were accustomed to receive free transfers from one line to another. Appeals were made to the Public Service Commission to restore the old order of things, because the Public Service law authorized the Commission to establish "joint rates and through routes," although the companies claimed that the Commission was without jurisdiction. A hearing was conducted in the Central Park case and on Oct. 30 the Commission ordered the companies to make "a joint rate of fare of 5 cents" on the Fifty-ninth Street line and on any north and south Metropolitan line between Thirty-fourth Street and 116th Street. The order was to take effect Nov. 22, but the case was carried to the courts by the companies and is now before the Appellate Division of the Supreme Court.

In the fall of 1908 the Public Service Commission, First District, conducted two very valuable series of public tests of fenders and wheel guards. One was carried out in September at the works of the General Electric Company at Schenectady, and the other during November at the works of the Westinghouse Electric & Manufacturing Company, at Pittsburgh. Manufacturers and inventors of fenders and wheel guards were invited to present their devices for practical demonstration and some valuable records were secured. The devices which stood highest in the list proved, without exception, to be those which had already been given the endorsement of adoption by railway companies, showing that there was no wonderful principle in fender construction which had not up to that time been discovered and recognized. The cost of these fender tests was $10,000, and it was money well expended.

In the meantime the Massachusetts Railroad Commission was engaged in considering the reasonableness of higher rates of fare than 5 cents on different roads. Hearings were given to decide this question and in a number of cases the increase was upheld.

Again the convention this year was held at Atlantic City, and it was the first time in the history of the association that the same place was selected for a meeting during two successive years. Again also the convention was most successful from every standpoint. The convention issue of the Electric Railway Journal this year was devoted to a comparison of electric railway practices upon operating subjects. A daily edition of the paper was also issued.

On Nov. 30 the Washington Street Subway, built by the Boston Transit Company and leased to the Boston Elevated Railway, was put in operation. The following month, William S. Murray made public at a meeting of the American Institute of Electrical Engineers the New Haven electric log. Engineers of other beliefs have taken several hacks at it, but it has proved pretty strong timber.

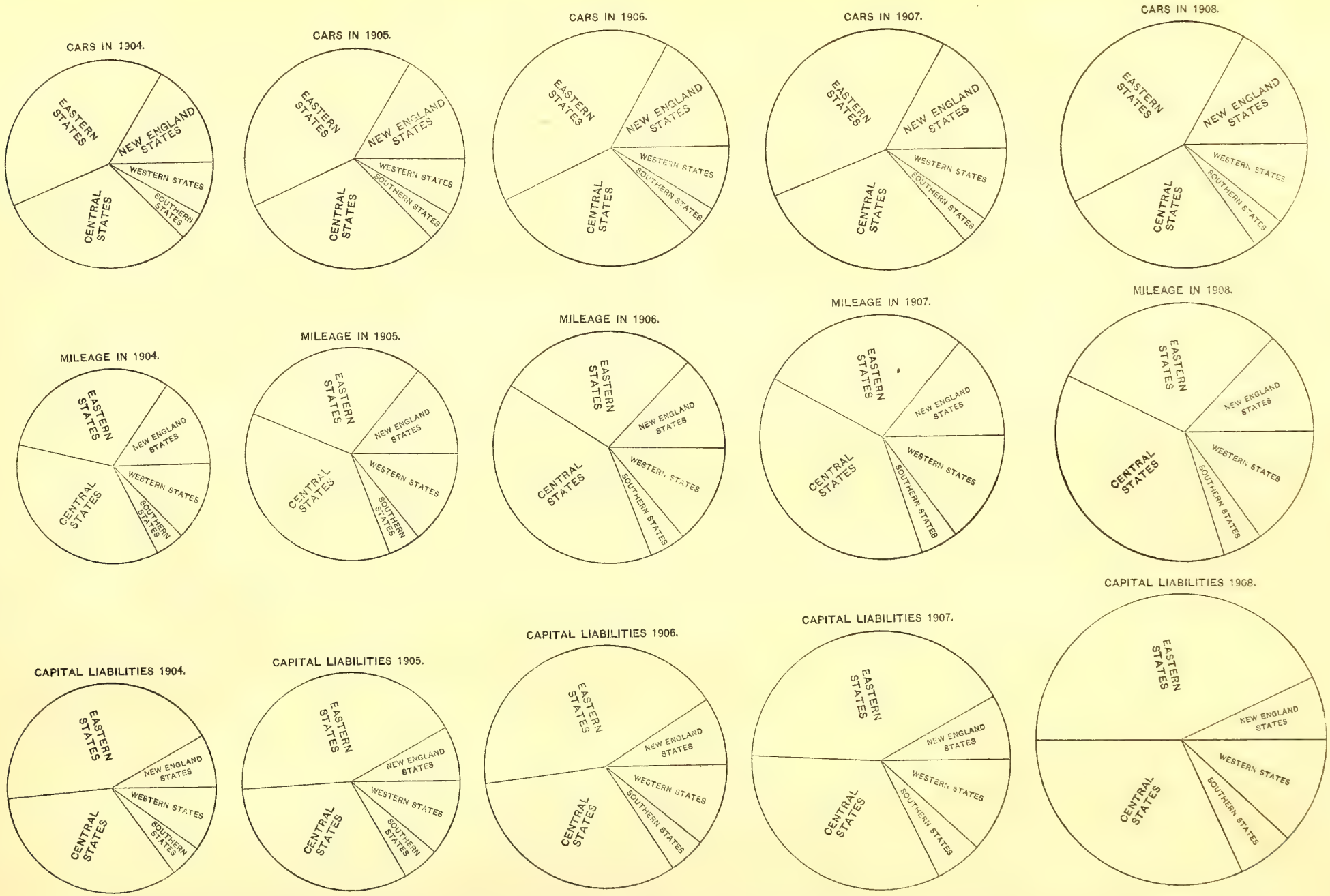


STATISTICS compiled by the Electric Railway Journal during the latter part of 1908 and published in the first issue of 1909 showed a considerable falling off in electric railway mileage built and cars purchased by electric railway companies during 1908, as compared with 1907. Nevertheless, the electric railway companies met the storm of the industrial depression much better and showed far fewer decreases of gross earnings than the steam railroads. The preliminary report of the Census Bureau for the year ended Dec. 31, 1907, published in January, 1909, proved that this comparative cessation of electric railway construction was temporary only. As compared with the statistics of June 30, 1902, the electric railway mileage had increased over 50 per cent, the earnings from operation nearly 70 per cent.

One of the events of technical interest during the year was the investigation made regarding the desirability of different designs of cars in rapid transit service in New York. The original cars in the New York subway were similar in their arrangement of platforms, doors and seats to those used on the Manhattan Elevated lines, but experience after the subway commenced operation showed that the use of side doors would prove desirable. Hence, the Interborough Rapid Transit Company provided for the subsequent introduction of side doors in cars later constructed, though the doors were not actually installed. During the investigation of Mr. Arnold into methods of increasing the traffic-carrying capacity of the subway, he recommended the introduction of double end doors, and a series of tests was conducted under the supervision of the Public Service Commission to determine the relative merits of each type of car. The center side door could not be used on trains operated on local tracks and this was advanced as an important reason by the Commission for the adoption of the double end door car, but the preference of the company for the center side door was so strong that it was adopted as standard for cars to be used in express trains.

The January meetings of the executive committee of the American Street & Interurban Railway Association were held in New York on the last days of January and were well attended. At that time it was decided to hold the 1909 convention in some city west of the Mississippi River and a subcommittee was appointed to decide upon the exact location. At this time Secretary Swenson handed his resignation to the executive committee of the association and it was received with regret.

An aphorism is to the effect that that country is happy which has no history. Assuming that this is true, it is unfortunate that the affairs in Cleveland, Detroit and Toledo during this period cannot be passed over without comment. In the Forest City, however, a turn had come in the tortuous course over which the railway affairs had had to travel. Under the wise supervision of the receivers who had been appointed to administer the affairs of the Municipal Traction Company the earnings of the Cleveland Electric Railway system had begun slowly to improve. Good service combined with a living fare constituted in this case the secret of success, and, while it would be improper to state that the company's troubles have passed, yet under the protecting arms of the Federal Court there has been at least a temporary relief.



Diagrams Showing Statistics of Cars, Mileage and Capitalization of Electric Railway Companies in the United States, 1904 to 1908, Inclusive

Detroit, although a close neighbor of Cleveland, seems not to have gained the full measure of the benefit which the experience of the latter city should have taught. Expiring franchises have brought the railway situation in that city to a serious condition and there are undoubtedly some agitators there who would like to see in Detroit a repetition of the Johnson 3-cent fare experiment in Cleveland. A Committee of Fifty has been appointed to investigate the subject and it is hoped that wiser counsels will prevail. A somewhat similar condition exists in Toledo, and there also there is a chance for a choice between the adoption of a constructive or a destructive policy. Fortunately for these two sister cities of Lake Erie, the consequences of the latter course have been amply exemplified at Cleveland.

In the meantime a history-making hearing was being conducted in Milwaukee. Two years ago the Wisconsin Railroad Commission was appointed with extremely broad powers, but up to 1909 it had given most of its attention to the other public utilities of the State. Time had been taken, however, to make a valuation of the property of the Milwaukee Electric Railway & Light Company, and this valuation was cited in a case between the city and the company, in which the former endeavored to secure a reduction to 3 cents of the passenger charge on the city lines. Experts for both the city and the company gave testimony as to the proper items to be included in operating expenses, to the amount to be charged to depreciation and reserves, the extent of the wear on equipment, and in general as to the cost of providing an adequate service on the basis of the passengers carried and car miles run in Milwaukee. The scope of the investigation of these economic questions in Milwaukee, though broader than any previously made, is characteristic of the thought and spirit of the year. In fact, these financial problems of electric railway operation are the ones which now loom largest on the horizon, being forced upon the railway companies by the undoubtedly large increase in the cost of operation, plus, in many instances, added exactions in the form of taxes and other burdens.

Among the other cities where the fare question became acute during the present year was Philadelphia, where an attempt was made by the daily papers and politicians to hold the company to the sale of six tickets for 25 cents, a rate which the company had introduced voluntarily as an experiment some time previously. Various efforts were made by the railway officials, before abandoning this rate, to restrict its use in a legitimate way by not making the tickets purchased at this low rate transferable. But it was found impossible to carry out this plan satisfactorily, and the abandonment of the tickets altogether was followed by a decision of the Supreme Court of Pennsylvania that such action was legal.

The course of the present year has only partly run. The time to come before the last day of December may contain events of far greater moment to the street railway industry than any which have been chronicled. It would seem better, therefore, having brought this history to the middle of 1909, not to attempt to sketch the events of the last few months, for has not appropriate mention of them appeared in the recent issues of this paper?—and hence is available to the latest subscriber.



BEFORE closing the chapter devoted to this history a few statistics will be given of the progress of the industry. The publication of the Red Book annually provides opportunity for the ready compilation of the statistics of the electric railway industry by years. The reports of individual properties contained in that annual are summarized as soon after its publication in June as possible and issued in tabular form in some issue of the ELECTRIC RAILWAY JOURNAL published during the latter part of the summer, this year in the issue of Sept. 4.

The accompanying diagrams show the relation between the number of cars, miles of track, and capitalization of electric railway properties, as given in the last five compilations of statistics to which reference has been made. The circumference of each circle is drawn to represent proportionately the total number of cars, mileage or capitalization in the country during each year. The lengths of the arcs of each sector correspond proportionately to the amount of this mileage, cars and capitalization, included in each of the several groups of States.

For convenience the actual figures are appended below.

Miles of Track

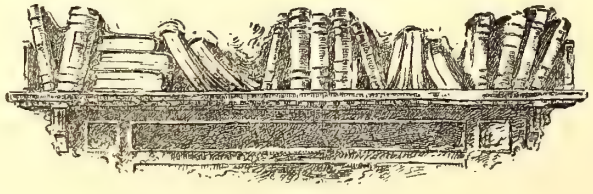
	1904	1905	1906	1907	1908
N. E. States.....	4,609	4,783	4,948	5,124	5,390
Eastern States...	9,301	9,715	10,190	10,960	12,063
Central States....	10,872	12,375	14,612	14,860	14,723
Southern States..	1,543	1,672	1,862	1,917	1,975
Western States...	3,862	4,605	5,320	5,951	6,096
Total.....	30,187	33,150	36,932	38,812	40,247

Cars

N. E. States.....	12,288	13,044	14,728	15,177	15,210
Eastern States...	30,605	32,620	33,304	34,773	35,951
Central States....	23,738	24,416	25,066	24,034	24,350
Southern States..	3,016	3,179	3,428	3,669	3,773
Western States...	6,257	6,492	8,206	9,551	9,932
Total.....	75,904	79,751	84,732	87,204	89,216

Capital Liabilities in Thousands of Dollars

N. E. States.....	$254,723	$263,148	$327,602	$330,582	$330,492
Eastern States...	1,401,344	1,443,295	1,589,081	1,694,667	1,974,257
Central States....	1,052,989	1,106,581	1,220,911	1,354,473	1,449,154
Southern States..	172,059	186,588	201,889	239,125	254,328
Western States...	335,976	369,325	425,835	504,987	548,904
Total.....	$3,217,092	$3,368,937	$3,765,318	$4,123,835	$4,557,136



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Of this issue of the ELECTRIC RAILWAY JOURNAL 12,000 *copies are printed.*

Our Twenty-Fifth Anniversary

With this issue of this paper the ELECTRIC RAILWAY JOURNAL commences the twenty-sixth year of its existence. Twenty-five years is a long period in the life of an individual or paper, but still longer when measured by events in the history of the street railway industry. Men who consider themselves young, and certainly have many useful years ahead of them, can recall without difficulty the period when there were absolutely no electric roads. At that time the text books on electricity vaguely hinted that the force which caused amber when rubbed to attract light objects and was exemplified in the lightning stroke could be utilized in some way to make the wheels of industry revolve, and perhaps be applied to the field of transportation. But the realization of this possibility was considered almost, if not quite, as remote and chimerical as the use of airships now for travel across the Atlantic.

To many a recital of bygone events possesses little interest. They claim, and with considerable reason, that the only really helpful work is that of ameliorating existing conditions and of making provision for the future. We sympathize to a large extent with this point of view, and have recognized its justice by devoting but little space in the columns of this paper during the past five years to the historical side of the street railway industry. Nevertheless, in a country which is so fond of celebrating national anniversaries as the United States, and in a year which has witnessed the Lincoln centenary, the Champlain tercentenary, the Alaska-Yukon exposition and the festivities attendant upon the Hudson-Fulton celebration, the claims of the past cannot be entirely ignored. It may be that "the time that is passed cannot be recalled." But if a knowledge of the trials and achievements of those who have laid the foundations of the present will in any way bring us nearer to a realization of the close connection between their problems and our own, and if it will stimulate us in a material degree to emulate their successes, the final result must be counted as a real gain.

During the quarter of a century which has passed since the establishment of this paper, its duty as well as its high privilege has been faithfully to record the many aspects of the changes which have occurred from the age of horse traction to that of cable; from that of cable to the electric era, and from the period of light, single-truck cars with 7½-hp motors to that of the heavy quadruple equipments of the present day. It has been in touch not only with the inventions which were finally successful, but with those which, heralded and unheralded, were honest attempts to better conditions but were finally discarded. The height of its ambition has always been to act as a faithful ally—as well as guide, counsellor and friend—to the industry which it has represented.

1884 and 1909 Compared

It is customary in historical essays, of which there has been a flood during the past few years, to draw a striking comparison between conditions as they exist at present and those obtaining at the period of which the author is writing. It is not the intention here, however, to review the development in the construction of electric generating

machinery, which finally made the electric arc lamp and then the incandescent lamp a possibility. Nor will an attempt be made to describe the early attempts to utilize the current thus made obtainable, first for stationary power purposes and then as a means of propelling a moving vehicle. All this belongs to the realm of familiar things and is well known to all, even to those who have but lately entered the industry, though only those who have lived through the entire period realize with what keen interest the farseeing railway managers of 1884 watched the developments in the application of electric power which were to have so important an effect upon their properties.

During these 25 years cars, tracks, motive power, in fact, almost all visible features of street railway systems have changed and men have changed with them. It has become almost a truism to say that nothing in the present electric railway system is left of the former horse-car era. We are often accustomed to think of the present manager of a street railway company as being as far removed from the manager of 25 years ago in thoughts and methods and in the equipment with which he has to conduct his business as if the two had lived in different planets. In a sense, but only in a sense, is this true. This view has been accepted so generally that it may not be out of place, indeed it may be most appropriate at this time, for this paper to cite the other aspect and mention some of the characteristics of similarity of the street railway industry as it existed in 1884 and now. Such a comparison will, we believe, reveal a likeness in many more particulars than a divergence, and if this fact will help us to apply lessons taught by the past, the purpose for which these remarks have been prepared will be accomplished.

In many respects the principles of street railway track and car construction employed to-day are similar to those in use 25 years ago, although the track has had to be made stronger to carry the heavier cars permissible with the more powerful motors. But it is not in these particulars that we have in mind to connect the early and later phases of railroad operations. Nor shall we endeavor to show a close resemblance between the general scheme of organization of railway companies as it exists now and as it was 25 years ago, except to say that in its general form it has been modified only so far as expansion has been necessary to direct satisfactorily the affairs of the more extensive systems. After all, these features constitute factors of comparatively minor importance in railway service. The most serious problems have always been those of operation, and here is where the likeness between the two periods which we are comparing is most marked. Indeed it could not well be otherwise, because the purposes of street railway companies at each period were identical and were to transport the public in the safest, quickest, most comfortable and most efficient way. In doing this the railway manager of to-day uses larger cars and a different motive power, but he has to deal with the same class of patrons and with largely the same class of assistants as his predecessor 25 years ago. It is generally accepted by psychologists that human nature does not vary greatly through the ages, so that it is safe to say that the Richardsons, Longstreets and Littels in 1884 had to meet practically the same problems as their successors to-day. They had to encounter the same kind of arguments and criticisms as the present managers and to a large extent by the same methods, and had to regulate the service to accord with the traffic, maintain discipline on their lines, conduct their purchases and account for and bank their receipts as if they were conducting a line at present.

Although the length of the ride has been tremendously increased and the cars are better lighted and more speedy and comfortable, passengers are carried for practically the same fare, outside of a few benighted cities where less than 5 cents is charged and a few lines in Massachusetts where the railway companies properly get more than a nickel. Again, many of the older city railway systems are operating under the same franchises as their predecessors a quarter of a century ago. The location of many of the car houses, offices and other buildings and of most of the tracks on the streets also had not been changed during this period.

We believe, also, that there is a close resemblance in the character of the officials in 1884 and at present. The knowledge of engineering required has increased, of course, in extent. Electrical graduates from the colleges have swelled the forces of the electric railway companies. Many times the number of men are now engaged in street railway work as were employed 25 years ago. But the lack of knowledge of electrical engineering and of modern systems of accounting detracts not a whit from the ability of the earlier managers. The proceedings of the associations of that time, confirmed by personal recollections, show that the railway managers in 1884 were just as keen to adopt modern improvements, as enterprising in bettering their methods, as familiar with the best practices of the day on other roads and as anxious to help their fellow-managers and ready to co-operate for the general welfare as they are at present. Moreover, many of the means for this co-operative work were in existence then as now, including the American Street Railway Association, the New York and Massachusetts State associations and last, but possibly not least, after November, 1884, the Street Railway Journal.

Our Convention Issue

Our convention issue, published this week, will reach the regular subscribers just in advance of the annual convention of the American Street & Interurban Railway Association. A limited number of copies will also be available for distribution from our booth in the Denver Auditorium. As in the past, a great deal of time has been spent upon the preparation of its text, and the number has been printed on special paper to secure a handsome typographical appearance. It is thought by the publishers that the high standard previously set by them in convention issues has been equaled, if not surpassed, in the present number of this paper.

The subject matter for the convention section of this issue has been chosen in accord with a policy, well defined for some time, to describe in a very thorough way some particular feature or features of electric railway construction and operation, typified by the electric railway properties in or near the convention city. Such a plan is particularly appropriate this year, because one of the principal reasons for holding the 1909 convention in Denver was to

encourage a closer understanding between the electric railways of the East and West, and in the portrayal of Western electric railway practice thus presented the reader will find much to interest and instruct him.

To those not acquainted with the railway system in Denver the excellence of its service will offer an index of the efficient practices of the several departments of that railway organization. Following the article on Denver is a chapter describing some of the interurban roads of Colorado. Probably the most interesting of these roads from an engineering standpoint is that of the Denver & Interurban Railroad Company, an electrified division of the Colorado & Southern steam railroad. Immediately following these two chapters are articles descriptive of the principal street and interurban systems west of the Rocky Mountains. While these roads do not differ materially from those in the East in their constructional features, novel operating practices have been developed in many cases, due to local conditions. One of these is the greater area served by the roads and the greater amount of track per unit of population. The Western roads, as a rule, carry their passengers farther than in the East, and, as a result, must be prepared to operate at faster schedules. Again, with certain exceptions, the interurban railway systems of the West receive a larger part of their passenger traffic from large centers of population, as contrasted with the interurbans of the Central States, much of whose business comes from agricultural districts and villages. Nevertheless, those Western roads which serve territory susceptible to agriculture have, almost without exception, demonstrated that a substantial growth of scattered population will follow the construction of an interurban line.

To those interested in the handling of freight and express traffic by electric railways the interurban and some of the city systems of the West—notably those of Seattle and Tacoma—present excellent examples of the possibilities of this field. Another characteristic of Far Western electric railway development is the extent to which they have utilized water-powers. West of Denver practically all of the electric lines obtain their power, or a major part of it, from hydroelectric generating stations, distant in some cases more than 100 miles. In many cases of this kind 60,000 volts are used as a transmission voltage, yet no difficulty has been experienced in carrying the high-tension wires through the streets of large cities. Power for the city systems, as in the East, is usually distributed to substations at 13,200 volts, and with the exception of San Francisco, where underground construction is employed, all transmission lines are overhead.

Taken as an entity, the electric railways of the Western States deserve much credit for the original work which they have done. All are so far from the manufacturing centers of the East, and overland transportation lines usually are so congested, that each road has had to be prepared to display considerable resourcefulness in its construction and maintenance departments. For this reason the shops of the Western roads are rather more fully equipped with heavy machinery and do more manufacturing than would be necessary were it possible to obtain manufactured supplies promptly or with the assurance of definite freight delivery.

Variety is not lacking in the methods of power distribution. Among the articles in this issue will be found descriptions of roads operated by cable, by the standard and catenary supported 600-volt trolley, by the 1200-volt third-rail, and by a 11,000-volt catenary trolley carrying alternating current.

Historical Interurban Roads

The concluding chapters of the convention section of this issue are devoted to a history of some of the early interurban electric roads, a subject which was not considered at the time of the publication of our 1904 historical number, and to a summary, with statistics, of the events of street railway interest during the past five years. Recent occurrences indicate the great difficulty of establishing priority in current achievements, and in long past events where many of the records are lost and most of the witnesses have gone, it is still more difficult for the historian to assign proper credit. In publishing the material relating to early railways that may be classified as of this interurban type the Electric Railway Journal does not undertake at the present time to settle all the questions involved about which there is some doubt; that is, it does not now seek to be the final arbiter on the problem of when, where and how the first interurban line had its origin. We prefer to chronicle facts that remain available regarding various properties which were constructed early enough to be of distinct interest to the historian of either the present or a future day.

The earliest of the roads in the Central West which appear to be entitled to be called interurban do not conform in any important respect to the modern lines of this character that now exercise so great an influence on the districts which they traverse. When these roads were first projected the application of electricity for railway purposes was in its experimental stages and apparently no one foresaw the great commercial results that would follow the adaptation of the new power for a railway service that should combine the advantages of good urban street railway service with the functions for short-haul traffic previously discharged by the steam railroads. The situation in the early nineties was such that delay was inevitable; the art had not developed to a point where extended application was practical from a financial point of view. Intervention of the panic postponed hopeful projects, but while the effects of the business depression were still widespread the movement which led to construction of the Akron, Bedford & Cleveland Railroad was started and this line, despite discouragements of every nature, was finally completed by Will Christy and his associates. This road represented permanent advancement in the use of electricity for railway power, and as Mr. Sloat shows in his article, the results attained in construction and operation appear remarkable when considered after the lapse of 14 years. Following the successful initial career of this line was the use of an entire private right-of-way for the Lorain & Cleveland Railway; and subsequent development was very rapid. The earliest interurban construction in Indiana was that for which Charles L. Henry was responsible.

The inventor of the interurban line is worthy of a place among those who have gained distinction by the accomplishment of epochal achievements.

THE ROTTERDAM - HAAG - SCHEVENINGEN RAILWAY

The Rotterdam-Haag-Scheveningen Electric Railway, a 10,000-volt, single-phase line, which was opened on Oct. 1, 1908, is the most extensive electric railway in Holland and the latest and one of the most important single-phase roads in Europe. It joins the great city of Rotterdam with the Hague, the capital, and Scheveningen, the most popular ocean resort of the country. The Hague and Scheveningen are respectively on the western and eastern branches of the main line from Rotterdam, and are located 14.5 miles and 17.67 miles from the last-named city. The history of this project casts an interesting side light on the rapid development of single-phase traction in Europe, for in 1900 a contract had been made by the original promoters for the construction of an 850-volt d.c. railway. It was proposed to generate polyphase current at 10,000 volts and transmit it to two rotary converter stations outside the power plant. Later on, however, the company was taken over by other interests, and several years were lost in settling the difficult problems which came up with regard to the actual roadway construction. In consequence of these delays it was found feasible to change the electrical plans by adopting the multiple catenary suspension and single-phase car equipment.

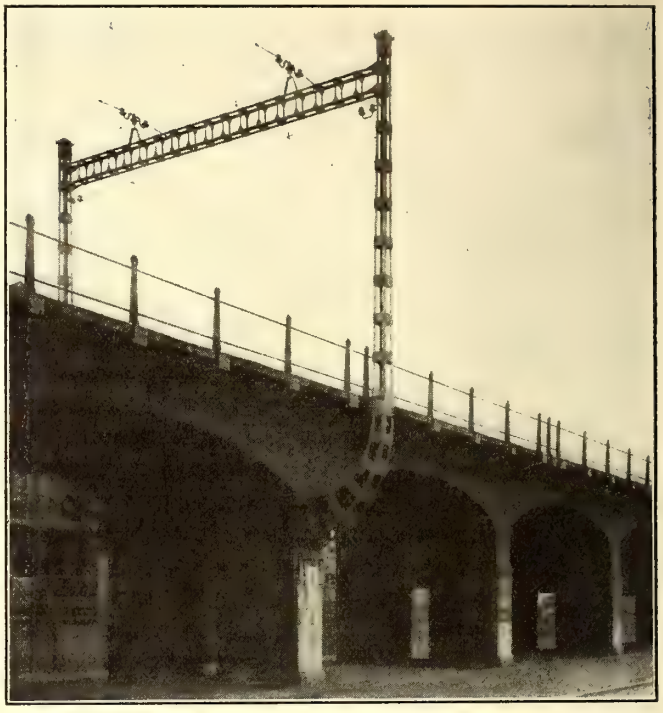
ROUTE AND ROADWAY

The line begins in the heart of Rotterdam and runs north as a double-track main line for 12.4 miles, where it divides, one double-track line going west to the Hague and the other continuing north to Scheveningen. The junction point is built up as a triangle to permit the direct operation of cars between the Hague and Scheveningen, which are 6.82 miles apart. The route length of this railway is 20.46 miles, and the total trackage in single track, 46.5 miles. Both express and local trains are operated, the former stopping only at one intermediate station, Laan von Nieuwe Ost-Indie, in the suburban territory of the Hague.

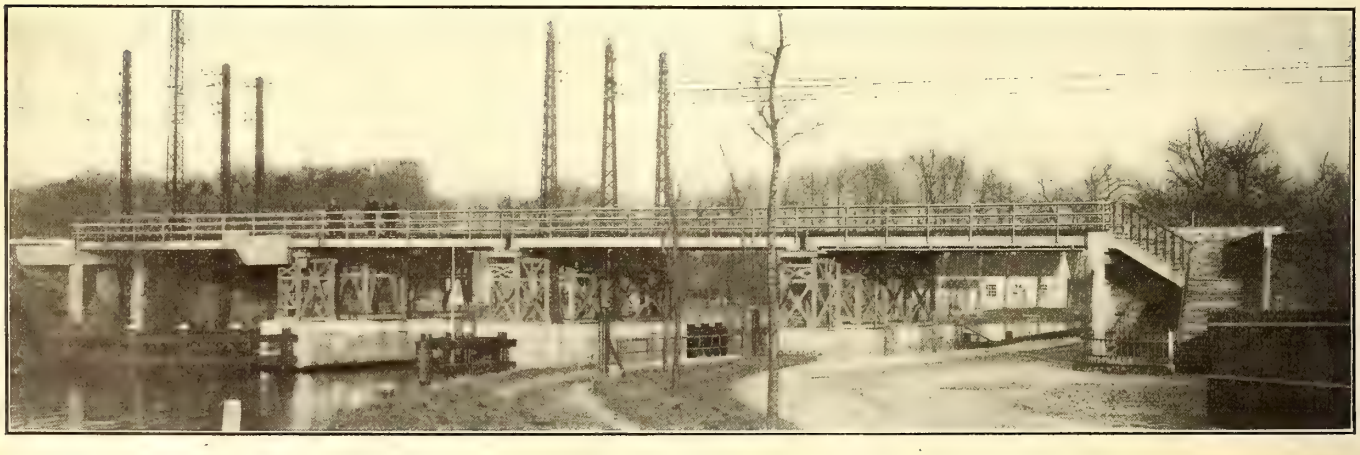
That the roadway is of massive construction may be judged from the fact that the first 1.24 miles out of Rotterdam consist of a reinforced concrete viaduct. Owing to the difficulty of setting large masses of steel in the concrete, the steel columns which carry the catenary bridges were placed outside the deck of the viaduct and curved inward to the piers, and the bottom plates of opposite pairs of columns joined by through rods. The rails weigh about 77 lb. to 78 lb. per yard throughout the system, and are laid on wooden ties in rock ballast. The uniform distance between the track centers is 14 ft. 2 in. Neither the grades nor the curves are considerable, the principal roadway trouble being the swampy character of the soil. Near one station, Schiebroek, the roadway is built on piling.

THE POWER STATION

The power house is located at Leidschendam, about 11.46 miles from Rotterdam. Fuel and other material are brought directly to this plant by the Vaart Canal. Owing to the treacherous soil, this building was erected on a foundation of armored concrete. The walls are of brick with sandstone trimmings. The foundation walls, roof, boiler tops and chimney are all of concrete. The chimney is over 194 ft. high and 8 ft. 2 in. wide at the top. The steam generating equipment consists of five boilers, each furnishing 6612 lb. of steam per hour normally and 9257 lb. of steam per hour on maximum loads at an absolute pressure of 10 atmospheres and 300 deg. C. superheat.



Scheveningen Single-Phase Railway—Novel Steel Columns on the Bridge at Rotterdam



Scheveningen Single-Phase Railway—Interruption in the Railway Circuit Over Drawbridge at Leidschendam

The original power equipment consisted of two Gorlitz horizontal jet condensing engines, each rated at 770 hp normal and 1040 hp maximum, direct-connected to Siemens-Schuckert 850-kva, 5000-volt, 25-cycle, polyphase generators. The later power apparatus consists of two Zo-

elly turbo-generators. Each turbine has a maximum output of 2600 hp at 1500 r.p.m. and is provided with a surface condenser. An automatic auxiliary valve permits the turbine output to be raised to 3000 hp. The generators are of the Siemens-Schuckert type, and are rated at 2000 kva at 5000 volts, 25 cycles. Both classes of generating units have their speed controlled from the switchboard.

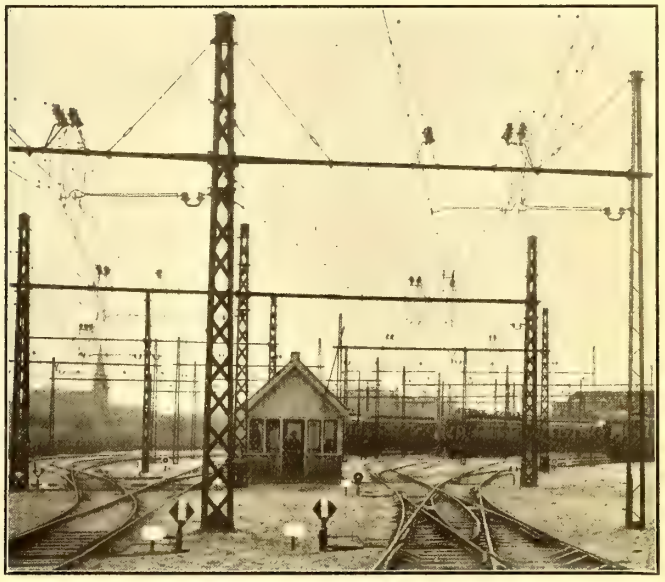
By means of the Scott system of connections, the 5000-volt, 25-cycle, three-phase current from the generators is converted to 10,000-volt, two-phase current by four 600-kva and four 1200-kva transformers. This special arrangement



Scheveningen Single-Phase Railway—Viaduct in the Outlying Portion of Rotterdam

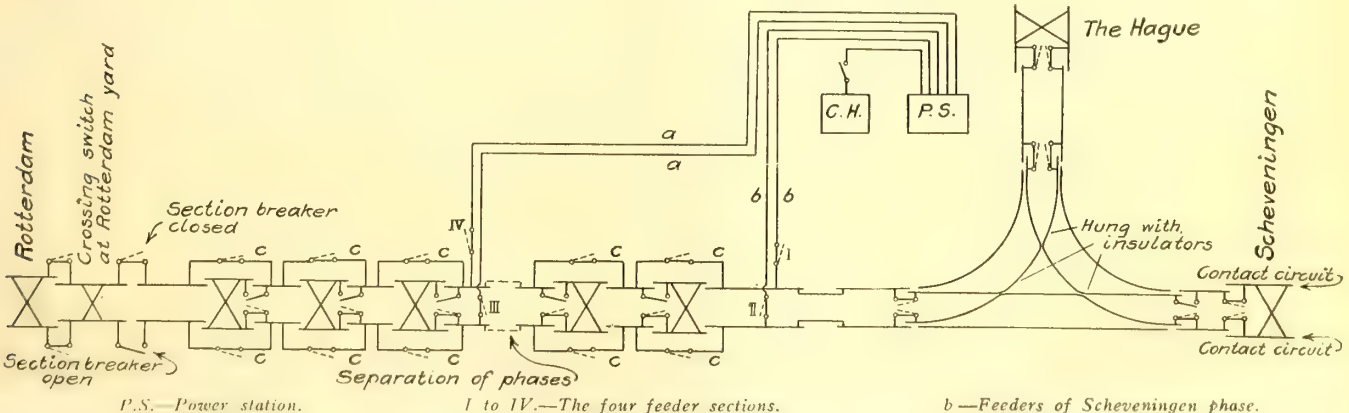
was necessitated by the condition that the first two generating sets had been nearly completed as 10,000-volt, three-phase units, when the decision was made to operate the line on two phases. The stators of the two generators, therefore, were connected in parallel to lower the potential to 5000 volts, and, furthermore, the efficiency was raised by decreasing the air gaps. The two exciter sets consist each of a 500-volt, three-phase motor and a 75-kw d.c. generator. The exciters also furnish current for lighting and for the shop motors, and are connected to a storage battery of 120 cells and 1050-amp hours capacity.

The high-tension equipment is kept entirely separate from the low-tension apparatus. The high-tension chamber is divided into concrete compartments for the oil switches of the generators, motor generator sets and the two outgoing lines, and for the measuring instrument transformers and lightning protection equipment. As shown in one of the accompanying cuts, an oil-switch cell for a main generator or outgoing line consists of a steel framework, the lower part of which contains the switch and the upper part the 220-volt d.c. operating motor and relay for automatically opening the switch on overloads. The oil-switch motor, which is hidden in the view mentioned, is operated from the main switchboard, where green and red lamps indicate the "in" and "out" positions. An alarm sounds when a high-tension switch opens under overload.



Scheveningen Single-Phase Railway—Overhead Construction in the Leidschendam Station

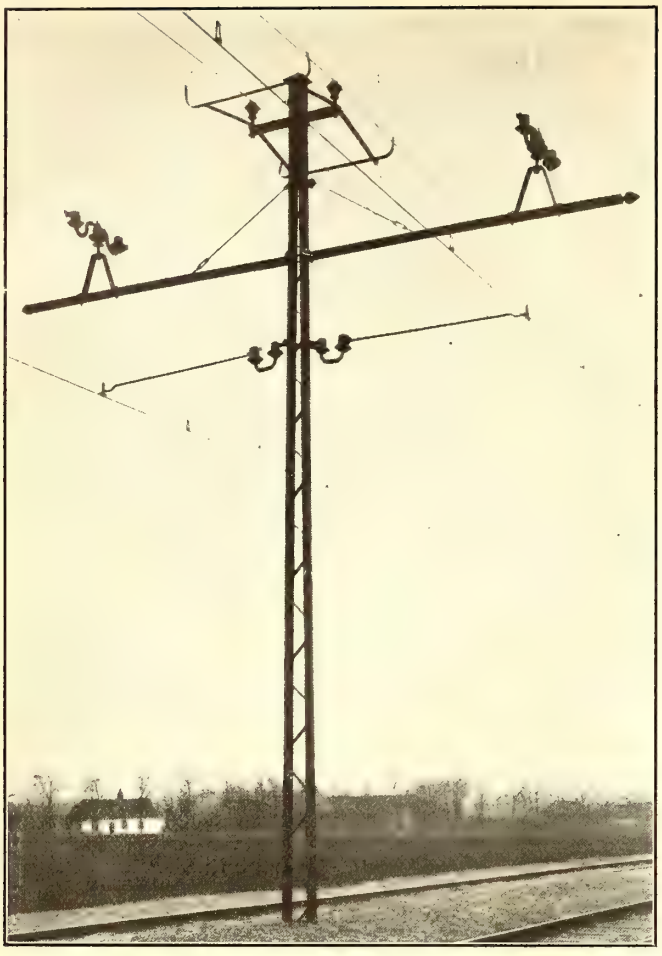
The main busbars are three in number, of which the outside ones lead to the separate phases on the trolley circuit, while the center bar is connected to the return circuit of the running rails. Each outgoing circuit is provided with two oil switches connected in parallel. Only one switch is used at a time, so that the other is available immediately if the first should fail. A small test line, also furnished with an oil switch, leads from one of the busbars to the car shops. The main switchboard, consisting of 11 marble panels with complete equipment, is mounted on an iron gallery at one end of the engine room, as shown. The panels, which were blank at the time this view was taken, are for the fourth generating set and the third motor-generator.



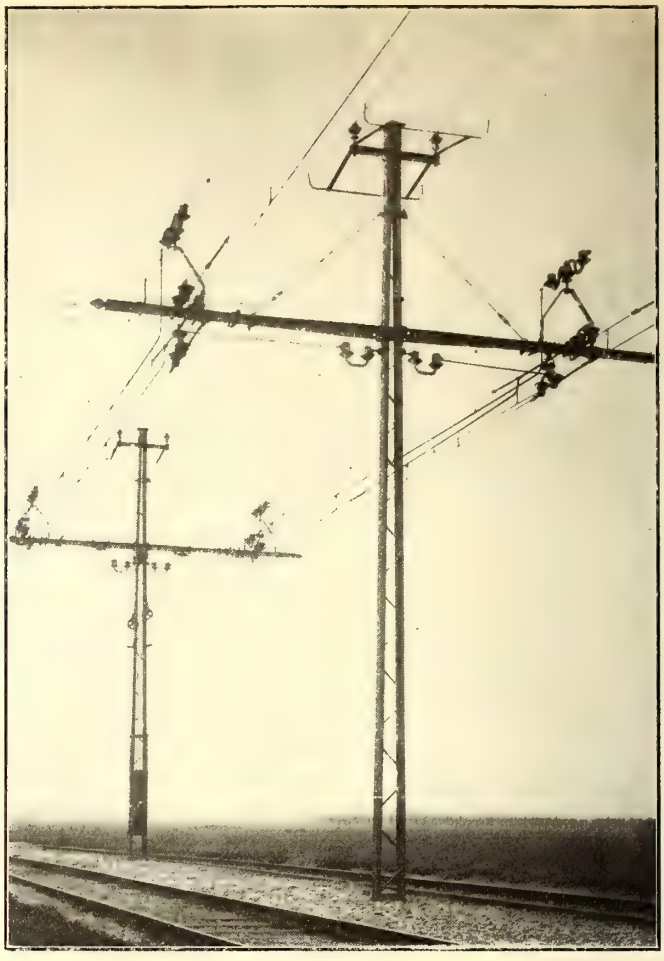
Scheveningen Single-Phase Railway—Diagram of Overhead Line System

LINE CONSTRUCTION

As has been previously intimated, the trolley circuit is divided in two parts, each of which is fed by a separate phase from the power house. This division is made near Pynacker, about 8.07 miles from Rotterdam, at a point



Scheveningen Single-Phase Railway—Double Bracket Construction in Open Country



Scheveningen Single-Phase Railway—Separation of Phases at Pynacker



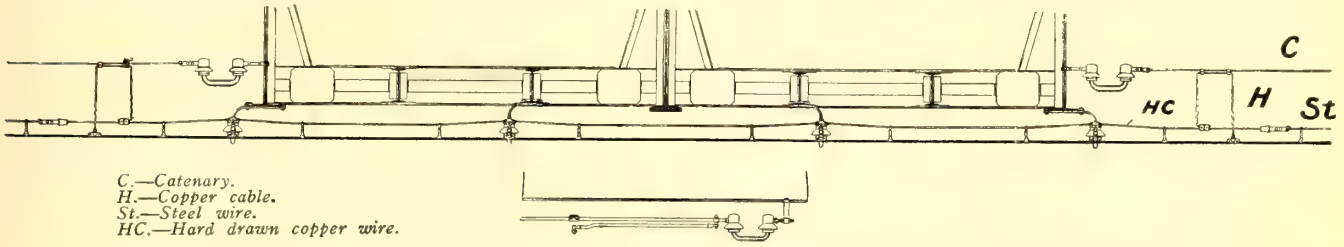
Scheveningen Single-Phase Railway—Bridge Construction at the Rotterdam Station

which allows the load on each phase to be fairly equal. The space between the opposite phases is joined by "dead" bridging pieces about 40 ft. long. The northern, or Scheveningen phase, is fed at a point 11.25 miles from Rotterdam by two bare wires, each of 80 sq. mm cross-section (158,000 circ. mil); the southern, or Rotterdam, phase, is fed by two wires of the same size seven miles from Rotterdam. Both sets of feeders are carried on the regular pole line. The return circuit from the rails to the power house is carried through two buried bare wires, each of 100 sq. mm section (197,400 circ. mil). The general arrangement of the overhead line, with section-breakers, etc., is shown in an accompanying diagram.

The overhead construction is of the Siemens-Schuckert type, which comprises a catenary, a contact wire and a third, or auxiliary, wire between the two. The spans average about 148 ft., and the height of the trolley wire over the rails is 18 ft. The contact line, which is of Fig. 8 profile and 100 sq. mm cross-section (197,400 circ. mil), is fastened to the auxiliary wire at intervals of 9 ft. 10 in. The hangers between the catenary and auxiliary wires are 19 ft. 8 in. apart. Double insulation is provided for the entire suspension. Aside from its greater safety, the use of double insulation permits each insulator to be tested in service at a higher voltage. This testing is carried out during non-operating periods with a motor-generator set and a transformer equipment for 25,000 to 30,000 volts. A storage battery locomotive, which hauls the test car, supplies the direct current from the motor-generator set.

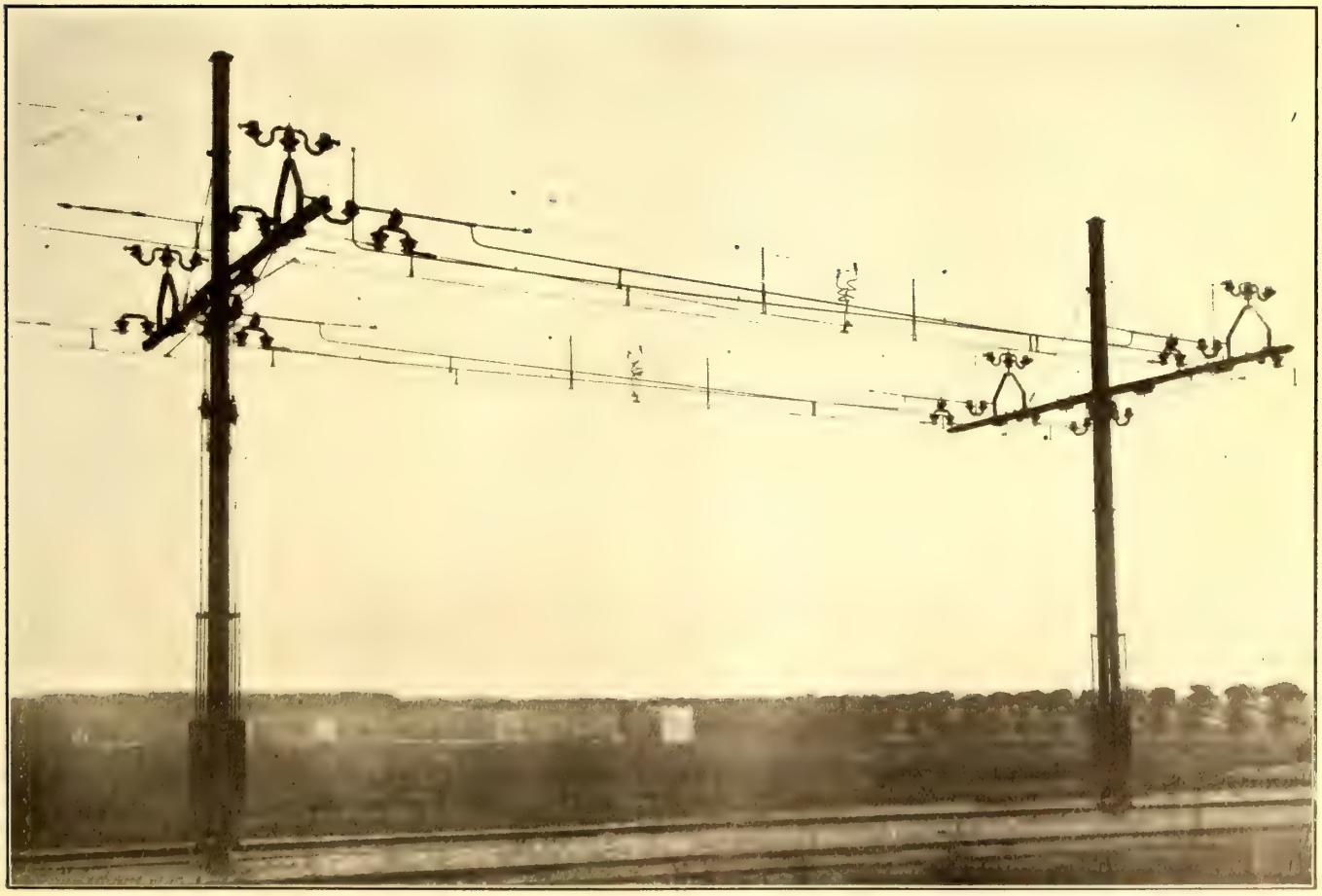
The catenary supports on each span or cross-arm are strap-iron stilts with one central insulator and two pull-offs. The catenary is attached to the irons caps of the pull-offs, and the latter, through their curved arms, are connected in turn to the iron cap of the central insulator. These stilt insulators may be moved sidewise if desired. The illustrations show that two types of line construction are used, namely, bridges in the stations and yards, and center-pole, double brackets in the open country. All poles and columns are either of channel or L-beams, and are grounded to the rails with copper connections. Many of the poles are set in concrete, which could be placed only with the aid of iron box forms; in other cases the prevalence of made land obliged the builders to extend arms of the concrete foundation even as far as the rails.

As the catenary is made up of short wires, which extend only from span to span, no special means were needed to



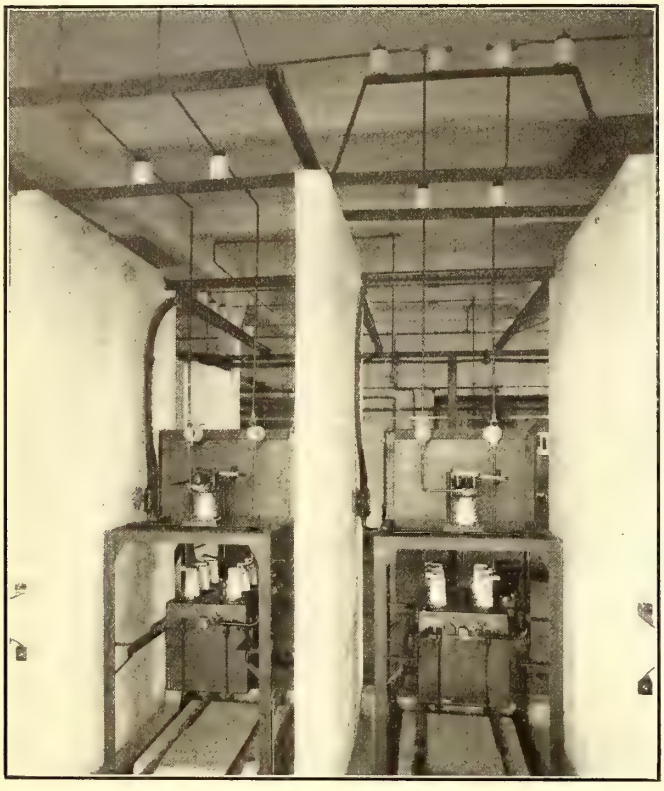
C.—Catenary.
H.—Copper cable.
St.—Steel wire.
HC.—Hard drawn copper wire.

Scheveningen Single-Phase Railway—Overhead Construction Under Iron Bridge



Scheveningen Single-Phase Railway—Automatic Device for Taking Up Variations in Tension of Trolley Wire

take up contraction and expansion. However, automatic tension devices are provided for the contact wire at intervals of 3280 ft. in the form of weights, which are proportioned to keep this wire under a constant tension of 990 lb. As the catenary, auxiliary and contact wires are broken and overlap at these tension regulating points, the latter places also serve for the installation of section breakers.



Scheveningen Single-Phase Railway—Cells of Oil Switches for the Control of High-Tension Lines or Machinery

These breakers are also placed on each side of every railroad station. Furthermore, every station has two 100-sq.-mm branch circuits, so that the current at the station can be cut off without affecting the rest of the line. The sections between the stations can also be cut out independently, as shown in the diagram previously mentioned.

Another illustration shows the overhead construction used, as at the Leidschendam drawbridge. The circuits at each end of the bridge are broken at such a height that the collectors remain in the same horizontal position, and so the cars can cross the bridge at full speed without damage. The power wires cross the stream on two very high lattice poles to avoid fouling the masts of passing ships. At another point, where the line work is carried under an iron bridge between Leidschendam and the Hague, the trolley wire is about 8.6 in. below the bridge girders, and 15 ft. 9 in., instead of 18 ft., above the rails.

The return circuit passes through rails 40 ft. 2 in. long. The bonds at the stations consist of two plugged-in copper ribbons, having a combined cross-section of 50 sq. mm (98,700 circ. mil); elsewhere the bonds are of the curved, laminated type, soldered alongside the rail head.

ROLLING STOCK

The present rolling stock, which consists of 19 motor cars and 9 trailers, was built by J. J. Beynes Waggonfabrek, of Haarlem, Holland, and electrically equipped by the Siemens-Schuckert Works. The motor cars follow American instead of Continental, practice, as will be noted from the center-aisle and cross-seat arrangement. The compartments of nine motor cars are for 24 second and 49 third-class seated passengers, while the other 10 cars are exclusively for 56 second-class passengers. In the former cars there are four compartments, which are entered through center sliding or swinging doors, while in the latter only two compartments are made, so that the smokers are separated from the other travelers. Vestibuled platforms and partitioned motormen's cabs are provided, just as on American interurban cars.

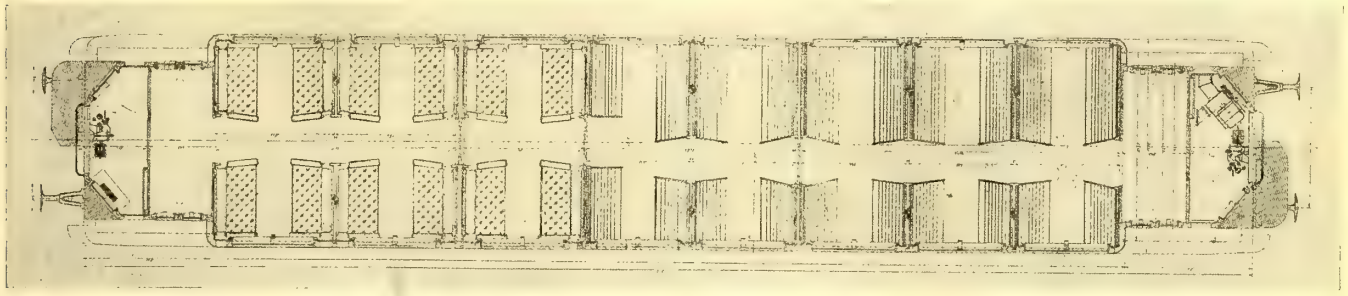
The cars are very handsomely finished outside, in green below and ivory above the windows, with the lettering and ornamental lines in gold. The interior finish is of polished mahogany. The monitor deck is of yellow-frosted glass. In summer the second-class seating is of green leather, but in cool weather the upholstery is reversed to give seats of green plush. The third-class seats are of wooden slats.

The motor cars, which weigh 112,200 lb. completely equipped, are 56 ft. 5 in. long, and 10 ft. 2 in. wide over the bodies. The car body is 9 ft. 10 in. high, and as mounted on the trucks extends nearly 14 ft. above the rails. The framing is of channel beams, and the draw-bar and buffer equipment is connected directly to the end sills. The two two-axle trucks per car have a wheel base of 8 ft. 2 in., king-pin spacing of 39 ft. 10 in. and wheels of 43 in. diameter. All trucks are furnished with semi-elliptic and spiral springs, and four pairs of brake shoes, in connection with Westinghouse air brake equipment. The two motors per car are placed on one truck; the other truck serves to carry the 5-hp, single-phase, 110-volt motor compressor for the air brakes, the current collectors, the pneumatic sander, etc.



Scheveningen Single-Phase Railway—Multiple Catenary Construction at One of the Yards

Every possible precaution has been taken to insure safety to the passengers and motormen from the electrical circuits. All wiring is carried in metal conduit laid in fireproof material. The metal sides and those parts of the roof of the car under the current collectors are grounded in addition to the accessible portions of the electrical equipment.



Scheveningen Single-Phase Railway—Plan of Combination Second and Third-Class Motor Car

The car roof is also furnished with horn lightning arresters. Of course, all the high tension switches, etc., are placed in an isolated compartment so that the motorman's cab contains no circuits of over 300 volts. Each cab contains a master controller, hand and airbrake handles, together with pneumatic pantograph, sander and whistling apparatus. The cab nearer the motor truck also contains the artificial blast for the cooling of the motors. A two-panel board in each cab carries the usual control switches and fuses for light, heat, signal lamps, master controller circuit, etc.

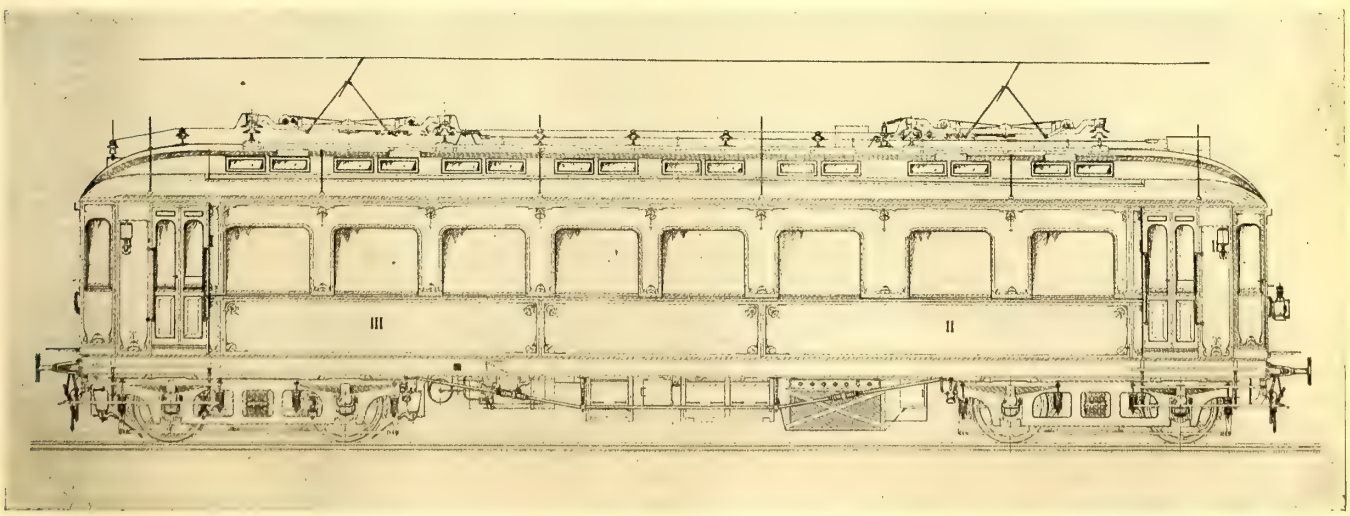
The trail cars, which weigh about 68,200 lb., are only for third-class passengers. Their seating capacity is 88 and standing capacity 20. A standard multiple unit train consists of two of these trailers (or one) between two motor cars.

ELECTRIC CAR EQUIPMENTS

Current from the line is taken through two collectors, each of which is mounted on 12 grooved insulators. The contact piece is an aluminum insert with a grease-filled gutter. The contact section proper adjusts itself to variations in height by turning on the spring-connected shaft of the supporting triangular frame. The lower ends of this frame, as shown in the drawing on page 601, are cranked to two axles. The latter are joined by a closed chain, so that when they turn, the links must move through the same angle, but in opposite directions. These axles, which thus control the raising and lowering of the collectors, may be operated either by hand or air from the motorman's cab. As the pneumatic hose circuit is continuous, all the collectors in a train can be simultaneously operated.

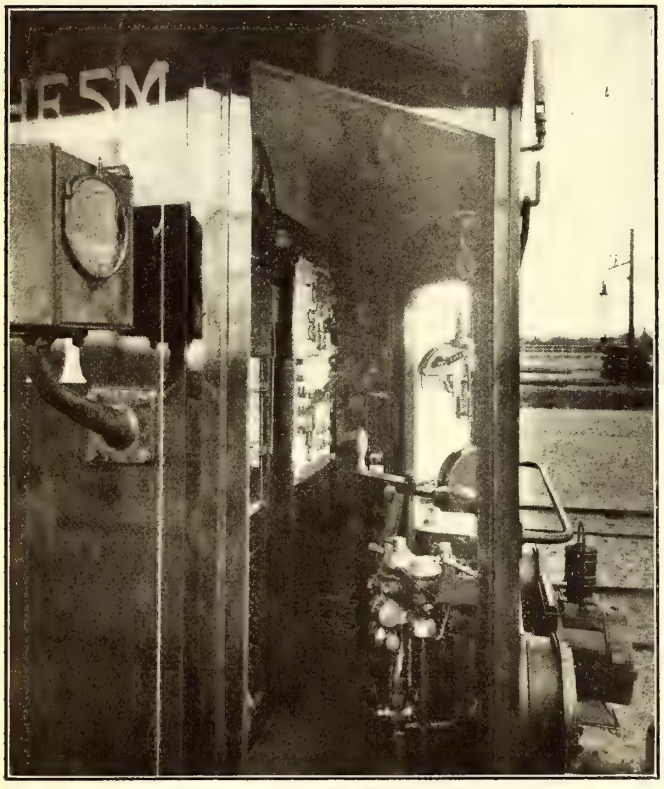
After passing through the collectors, the current is transmitted to the high-tension chamber under the car via a tube, which is insulated with micanite and closed by an insulator at each end. The high-tension compartment contains one fuse for the main transformer and another for the lighting and control circuit transformer, an electro-magnetically operated high-tension switch with release magnets, a resistance circuit which dampens the shocks of the entering current on the transformer and is short-circuited when the high-tension switch is fully closed, a relay circuit to provide current for operating on overloads, the release magnets of the high-tension switch, and a grounding switch, which must be closed before the high-tension chamber is opened. The release magneto of the main switch can also be actuated by current sent through an emergency switch in the motorman's cab, thereby making it possible to cut off immediately all high-voltage current throughout the train in case of danger.

The current from the high-tension chamber goes directly into the primary windings of the power and lighting transformers. Both transformers are oil-cooled and of the core type. They are bolted to the under side of the car body in boxes, which are lined with metal to secure better radiation The two motors per car are of the single-phase compensated series type, rated at 180 hp each on a one-hour basis and when running at 750 r.p.m. The gear ratio is practically 1 :3, which allows a speed of 55.8 m.p.h. to 62 m.p.h.



Scheveningen Single-Phase Railway—Combination Second and Third-Class Motor Car

The motors are provided with auxiliary poles and eight sets of brush-holders, with four brushes each. The motors, of course, are controlled through voltage regulation. A special arrangement of circuits was devised for the purpose, whereby seven voltages can be obtained with only four steps per motor. Two of the eight step switches are always

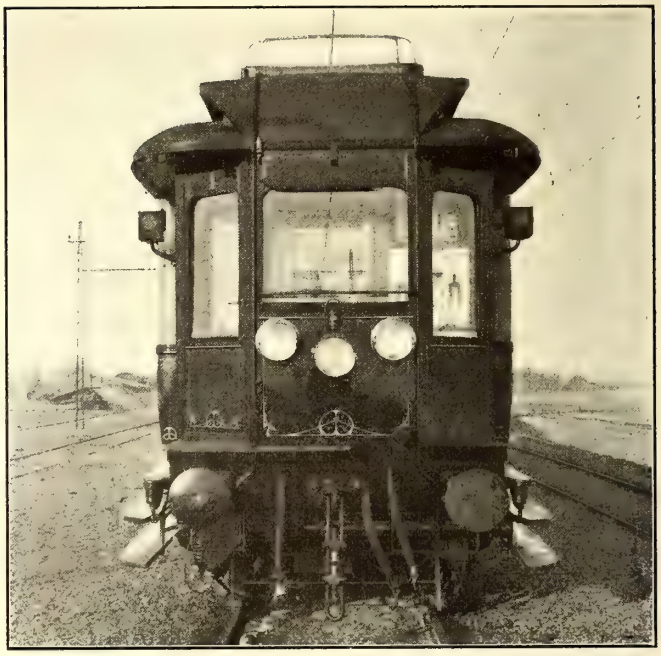


Scheveningen Single-Phase Railway—View in Motorman's Cab

closed. The secondary winding of the main transformer is made in two parts, which are so connected with the motors that a transformer winding and motor always follow one another. Both motors, therefore, conduct the same current, and divide equally between themselves the total voltage of both transformer windings. The first winding has taps for 116, 175, 244 and 314 volts, and the second winding for 151, 210, 280 and 361 volts. It will be seen from this that on the first step the voltage must be 116 plus 151 divided by 2, giving 133.5 volts per motor.

Owing to these special connections, the series arrangement does not give a higher difference of potential between any two points than would a shunt connection. Thus, 116 volts is induced in the first winding, whereas 133.5 volts is taken by the first motor, leaving a negative balance of 17.5 volts; the second winding gives 151 volts, of which the second motor takes 133.5 volts, leaving a positive balance of 17.5 volts. As these differences cancel each other, the difference of potential is again zero, as at the starting of the motor.

In connection with the foregoing there is used an "equalizing" transformer which is wound for a 1:1 ratio. The two primary terminals of this transformer are connected to



Scheveningen Single-Phase Railway—Head-on View of Motor Car

the starting points, and the two secondary ends to the end points of the motors. The purpose of this transformer is two-fold: First, to permit cutting out a motor if injured; second, to prevent the interruption of the entire circuit when the several contactors are cut out in moving from step to step. If a contactor is opened, the motor which it serves will receive current from the other winding by way of the equalizing transformer. Naturally this produces a certain choke-coil effect, which ceases immediately, however, upon the closing of the next step.

The several differences of potential are obtained by alternately raising the voltage of one or the other transformer secondary windings. If steps 1, 3, 5 and 7 be taken for

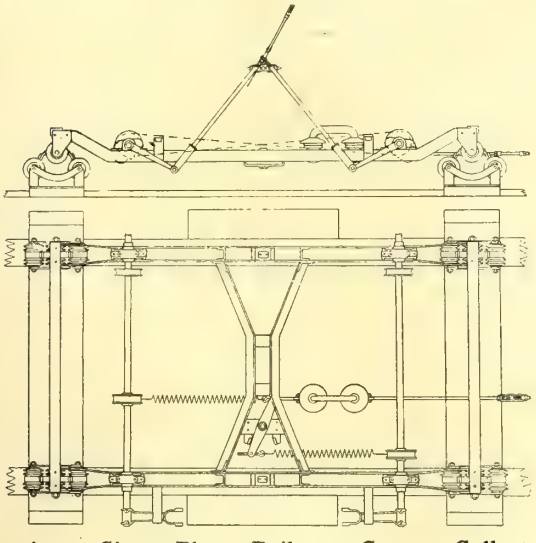


Scheveningen Single-Phase Railway—A Standard Four-Car Train, Consisting of a Motor Car at Each End and Two Trailers in the Center, Seating 305 Passengers in All

winding No. 1, and 2, 4, 6 and 8 for winding No. 2, the control would take place as follows:

Step No.	Motor Voltage	Step Switches Closed
1	133.3	1—2
2	163.0	3—2
3	192.5	3—4
4	227	5—4
5	262	5—6
6	297	7—6
7	337.5	7—8

The cars are provided with plug-in connections, to permit

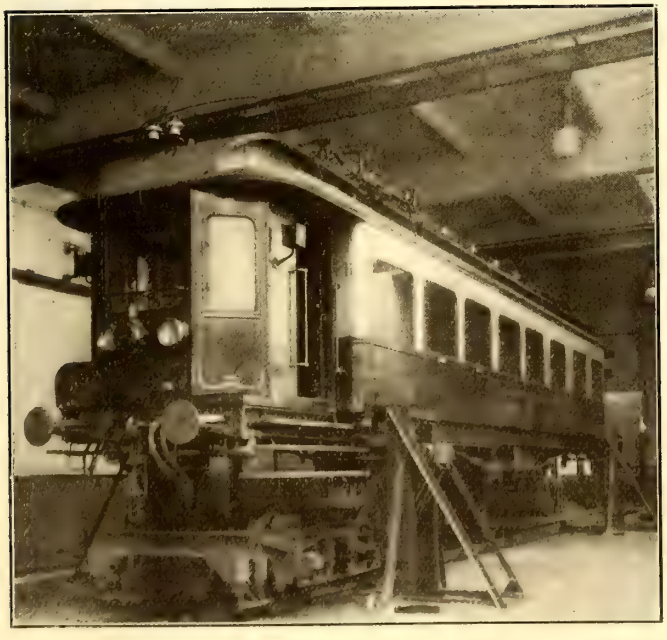


Scheveningen Single-Phase Railway—Current Collector for High Speed

shop tests of the lighting and motor compressor circuits with 300-volt or 80-volt, single-phase current.

CAR STORAGE AND SHOP

The car storage and shop are combined in one structure at Leidschendam near the power house. The building con-



Scheveningen Single-Phase Railway—Electric Car Hoist in the Shops

tains 12 tracks for 48 cars, and is divided in half by a partition. Six of the tracks are provided with pits, lighting and test circuits, etc. Both arc and incandescent lamps are used for illumination. All of the machine tools are driven by direct-current, either singly or in groups. The cars are raised by the electrically operated hoist shown in one of the illustrations.

The high-tension wires are carried into the car house or shops, but one isolated outside track is used for testing motor cars. Switching service is handled by two storage battery locomotives, each of which carries two 31-hp, 220-volt motors and 120 cells, having a capacity of 185-amp hours on one hour's discharge. One locomotive can haul a standard four-car train at 3.4 m.p.h., or the line repair car at 10.8 m.p.h.

TRAIN SERVICE

During last winter the Rottendam-Haag-Scheveningen Railway ran 52 trains every 16-hour day between The Hague and Rotterdam, averaging over 235 miles a day per motor car. The running time for the 14.5 miles was 23 minutes. The service during the Scheveningen bathing season calls for 144 trains a day, and an average of 357 miles a day. The electrical equipment for the signals and switches, together with the telephones, was supplied by the Siemens-Schuckert Works.

DECISIONS ON QUESTIONS CONCERNING INTERSTATE CLASSIFICATION OF ACCOUNTS

The Interstate Commerce Commission has issued a bulletin giving the answers to questions submitted by electric railways to the bureau of statistics and accounts in relation to the system of accounts prescribed by the commission for electric roads under its jurisdiction.

An introductory letter by Prof. Henry C. Adams, in charge of statistics and accounts, addressed "To Carriers Concerned," says:

This bulletin, entitled "Accounting Bulletin No. 2," contains the final answers to a series of questions submitted to the bureau of statistics and accounts in relation to the accounting classifications, prescribed by the commission for electric railway companies, that became effective on Jan. 1, 1909. The cases selected are regarded as important for the reason that they make clear the meaning or application of the text descriptive of the primary accounts covered by the classification of operating expenses, the classification of operating revenues and the classification of expenditures for road and equipment of electric railways.

As a matter of information it may be proper to state that the answers to questions recorded in this bulletin have received the approval of the committee on standard classification of accounts of the American Street & Interurban Railway Accountants' Association.

There are 58 questions, some of which follow:

Query. Is it permissible for electric carriers to renumber the primary accounts of the various classifications for their own convenience, provided the Interstate Commerce Commission numbers are maintained for proper reference and report?

Answer. It is permissible for electric carriers to renumber the primary accounts of the various classifications for their own convenience. For the sake of uniformity, however, it is recommended that the account numbers mentioned in the classifications be used. It is suggested that companies of Class B and Class C, in numbering their operating expense accounts, combine the numbers used in the text of the classification of operating expenses of electric railways; for example, the text for the account "maintenance of roadway and track" for companies of Class B is covered by accounts 2 to 12, inclusive, and the suggested number would be 2/12; the text for account "maintenance of way" for companies of Class C is covered by accounts 2 to 19, inclusive, and the suggested number would be 2/19, etc.

Query. Is it proper to charge assessments for construc-

tion and maintenance of paving to "taxes" under "deductions from income?"

Answer. No. Account No. 10, "paving," in the classification of expenditures for road and equipment of electric railways, provides for paving incident to original track construction, while account No. 9, "paving," in the classification of operating expenses of electric railways, covers repairs and renewals of such paving.

Query. Are carriers required to keep subaccounts for paragraphs (*a*) to (*f*) under account No. 23, "distribution system," and (*a*) to (*i*) under account No. 25, "buildings and structures," of the classification of operating expenses of electric railways; or will it be satisfactory to show the cost in total under such primary accounts?

Answer. The Interstate Commerce Commission does not require the subdivision of account No. 23, "distribution system," or account No. 25, "buildings and structures;" but any carrier desiring to do so may make subdivisions, provided a list of the subprimary accounts be first filed with the commission.

Query. Are electric carriers at liberty to open a clearing account for store expenses and apportion same on a basis of material issued? If so, should only the amount chargeable to operating expenses be charged to account No. 85, "store expenses," and so reported to the commission, or should this account also include expenses incurred in connection with material issued for construction and betterments?

Answer. Electric railway carriers are at liberty to open a clearing account for store expenses and apportion the amounts charged thereto. The total amount chargeable to operating expenses should be charged to account No. 85, "store expenses."

Account No. 85 should not include expenses incurred primarily in connection with material issued for construction and additions and betterments. Carriers are at liberty to distribute for their own purposes items covered by this account to other operating expense accounts affected, but in their reports to the Interstate Commerce Commission the entire charge for store expenses chargeable to operating expenses should be reported under account No. 85.

Query. Please explain the various accounts "other operations—Dr. and Cr.," contained in the classification of operating expenses of electric railways, particularly the paragraphs entitled "co-ordinate departments."

In connection with these accounts our understanding of account No. 56, "power purchased," is that it should show the total amount expended for this purpose, and that the amounts used for lighting shops, car houses, etc., should be charged to accounts affected and an offsetting credit made to account No. 59, "other operations—Cr." Is this correct?

Answer. The accounts "other operations—Dr., co-ordinate departments" and "other operations—Cr., co-ordinate departments," are to be used by electric railways which engage in other lines of business, such as the production of light and power for sale. In case the cost of producing power is carried in the primary accounts of the light department, the proportion of operating expenses chargeable to the railway department should be charged to the various "other operations—Dr." accounts. In case the cost of producing power is carried in the primary accounts of the railway department, the proportion of operating expenses chargeable to the light or other departments should be credited to the various "other operations—Cr." accounts.

Account No. 56, "power purchased," covers the cost of power purchased from other companies primarily for the propulsion of cars, and account No. 59, "other operations—Cr.," should not be used in connection therewith unless a portion of the power purchased is used by another co-ordinate department, such as electric light, heat, power or gas, within the same company.

Query. Account No. 63, "miscellaneous car-service expenses," provides for the cost of tickets, transfers and baggage checks. Should not the cost of all stationery, such as rate sheets, waybills, bills of lading, etc., used in connection with the operation of passenger, express or freight cars be charged to this account?

Answer. No. Charge to account No. 84, "stationery and printing." Carriers are at liberty to distribute the items covered by the undistributed accounts in the classification of operating expenses of electric railways, but all reports to the commission should agree with the accounts which are prescribed.

Query. To what account should be charged the cost of printing expense bills, balance sheets and other stationery used in the handling of express and freight busines incident to the operation of an electric railway?

Answer. The cost of expense bills, balance sheets and other stationery should be charged to account No. 84, "stationery and printing." By referring to the note under "undistributed accounts," on page 45 of the classification of operating expenses of electric railways, it will be found that carriers are at liberty to distribute items covered by accounts Nos. 82 to 88, inclusive, but that all reports to the commission must agree with the accounts which are prescribed.

Query. We have electric cars equipped and used as pile driver, steam shovel, concrete mixer and stone crusher. To what accounts should be charged the maintenance of these cars and the machinery?

Answer. The maintenance of such cars and machinery should be charged to account No. 35, "service cars," or account No. 36, "electric equipment of cars," except when the cars are used on work not chargeable to operating expenses.

Query. To what account should an electric carrier charge commissions and wages paid for the sale of school and other tickets at various stores along the line?

Answer. If the tickets are sold at stores which can be considered stations, charge commissions and wages paid to account No. 64, "station employees;" if the stores cannot be considered stations, charge to account No. 45, "superintendence and solicitation."

Query. To what account should be charged the salary and expenses of a supervising engineer in charge of the construction of a new line and buildings and the installation of machinery in power plants? It is not clear to us whether these expenses should be charged to account No. 1, "engineering and superintendence," or charged directly to the account for which incurred, in accordance with Note B.

Answer. If the engineer in question has direct supervision over all of the work in connection with the construction of a new line, it will probably not be possible to apportion his salary and expenses among the various construction accounts, and charges should, therefore, be made to account No. 1, "engineering and superintendence," in the classification of expenditures for road and equipment of electric railways.

Note B, under account No. 1, provides that, whenever it is possible, the expenses enumerated should be charged directly to the account for which incurred, as for example, power-plant buildings or shops and car houses. However, it is not the intention to insist upon any unnecessary refinement in accounting for such matters.

Query. What instructions, if any, have been issued by the Interstate Commerce Commission covering the treatment of amounts expended by electric railways for betterments and improvements?

Answer. The commission has issued no instructions to electric railways relative to additions and betterments expenditures. Until advised to the contrary, it will only be necessary for such carriers to dispose of expenditures of this nature in accordance with the classification of expenditures for road and equipment of electric railways.

Query. We note that the accounts "interest, discount and exchange" and "taxes," heretofore carried by many companies in their general expense, have been dropped from the classification of the Interstate Commerce Commission. Please advise as to the manner in which they should be handled.

Answer. Interest, discount, exchange and taxes, when arising in connection with operations, should be handled through the income account. Interest in connection with expenditures for road and equipment should be handled through primary account No. 41, "interest," in the classification of expenditures for road and equipment of electric railways.

Query. To what account or accounts should be credited charges made against operation and construction accounts for electricity furnished by an electric railway company for

the use of its shop motors, car-house lighting, running of construction cars engaged in company service, such as building new tracks, etc.?

Answer. The classification of operating expenses of electric railways does not require a segregation of the cost of power to shops, car houses, etc. The last paragraph on page 7 of the classification provides that any carrier may "keep any temporary or experimental accounts, the purpose of which is to develop the efficiency of operations: *Provided, however,* That such temporary or experimental accounts shall not impair the integrity of any general or primary account hereby prescribed; and that any such temporary or experimental accounts shall be open to inspection by the commission." It is therefore permissible for any carrier to ascertain for its own information the cost of power used at shops or car houses.

The classification of operating expenses of electric railways does not contemplate that any distribution shall be made to maintenance accounts for electricity furnished by an electric railway for the use of its shop motors, car-house lighting or running of work cars engaged in maintenance.

The actual cost of operating work cars for construction purposes, such as building new tracks, etc., is properly chargeable to construction accounts, and proper credit may be given to revenue account No. 16, "rents of equipment," and revenue account No. 18, "power."

Query. What is meant by "undistributed accounts" in the classification of operating expenses of electric railways?

Answer. Undistributed accounts are those which contain expenses properly chargeable to more than one of the five general accounts under operating expenses. For example, there are injuries which, from a strict accounting standpoint, should be charged under "way and structures," "equipment," etc. There are various difficulties in distributing these expenses among the various general accounts and the commission is willing that all expenses for injuries should be carried in account No. 82, "injuries and damages," under general account "general and miscellaneous."

Query. A carrier conducting a railway, lighting and power business carries its general accounts in the lighting and power department. A monthly charge for power is made to the street railway department and to the lighting department. Are the monthly charges for power to the lighting and street railway departments satisfactory and is a single balance sheet for the entire business permissible?

Answer. Each carrier conducting a railway, lighting and power business is at liberty to decide for itself under which department the primary operating expense accounts shall be carried, and should decide upon the basis of division of expenses among the various departments. If the expenses are carried under the lighting and power department, it will be necessary to show on the books of the railway department under accounts Nos. 27, 43, 58 and 80, "other operations—Dr.," the proportions chargeable to the railway department under "way and structures," "equipment," "conducting transportation" and "general and miscellaneous." The amounts charged to the railway department should be handled in the books of the lighting and power department through such accounts as "other operations—Cr."

The commission has not prescribed a classification of revenues and expenses for outside operations for electric railways.

One balance sheet is all that is necessary for the entire business described in this query.

Query. To what account should be charged payments made to the Government, on the basis of a specific charge per passenger, for the privilege of operating cars over its bridge?

Answer. Charge to "taxes."

Query. To what account should be charged the cost of new structures and general improvements in a free private park and the maintenance expenses of such park?

Answer. The cost of new structures and improvements of a substantial character in a free private park should be charged to account No. 33, "park and resort property," in the classification of expenditures for road and equipment of electric railways.

Maintenance expenses of such park should be charged to operating expense account No. 46, "advertising."

Query. Should the expense of sprinkling streets be charged to the same account as sanding and cleaning track?

Answer. The cost of sprinkling roadway and track, when not done directly in connection with construction or repairs of track or paving, should be charged to operating expense account No. 11, "cleaning and sanding tracks." The cost of sprinkling rendered necessary by construction or repairs of track or paving should be charged to the proper construction or maintenance account.

Query. The A & B Light & Traction Company operates gas, electric light and street railway properties. The operating expenses of the three co-ordinate departments are kept entirely separate, except the general expenses, consisting of clerical salaries, rent, taxes and office supplies. Will it be satisfactory to the commission for us to continue carrying expenses of this character in one account covering all departments, and so state the fact in our annual report?

Answer. Where a company operates both a railway department and a lighting department, the entire cost of producing power should be carried in the primary accounts either of the railway department or of the lighting department, and the amounts chargeable to the other department should be handled through the various accounts, "other operations—Dr." and "other operations—Cr." For example, if the cost of power is carried in the primary accounts of the railway department, the proportion of operating expenses chargeable to the lighting department should be credited to the various "other operations—Cr." accounts. In the case cited, the proportion of "general expenses" chargeable to the lighting department would appear as a credit under account No. 81, "other operations—Cr."

Taxes need not be subdivided between the railway and lighting departments. Taxes should be treated through the income account.

Query. This company operates a sprinkling car for the purpose of sprinkling certain streets and highways on which our track is laid. The city in which this service is performed pays us, as its proportion of the cost of this service, from 15 to 20 cents per sprinkler car-mile run. Please advise to what accounts the corresponding debits and credits should be made.

Answer. The amount received from the city should be credited to revenue account No. 9, "miscellaneous transportation revenue."

In case the service mentioned is performed primarily as a service for the benefit of the road, and the amount received from the city is only incidental, the expense of operating the sprinkling car should be charged to operating expense account No. 11, "cleaning and sanding tracks," and the cost of maintenance and repairs to account No. 35, "service cars." If, however, the service rendered is primarily for revenue purposes, the operating expenses should be charged to the appropriate operating expense accounts, as in any other revenue movements.

Query. Has the Interstate Commerce Commission prescribed any account for depreciation of way and structures or equipment?

Answer. The Interstate Commerce Commission does not require any electric railway company to keep account No. 26, "depreciation of way and structures," and account No. 42, "depreciation of equipment," unless these accounts are prescribed by the railway commission of any State in which such company operates mileage.

Query. Is it proper to charge to account No. 41, "interest," in the classification of expenditures for road and equipment of electric railways, interest paid on loans made for construction purposes by an operating electric railway company, said interest accruing on money used in building new tracks and for additional power-plant equipment and other construction purposes?

Answer. Interest which is paid or which accrues during construction should be charged to account No. 41, "interest." Interest which accrues after the completion of the work is not chargeable to this account.

Query. We are in doubt as to the proper account to be charged for trolley parts, namely, wheels, axles, washers, springs, harps, poles, bushings, etc., and carbon brushes,

carbons, headlight parts, etc. Should these items be charged to accounts 32 and 37, inclusive, or to account No. 63, "miscellaneous car-service expenses?"

Answer. All such parts as pertain to maintenance of equipment are chargeable to operating expense account No. 32, "passenger and combination cars;" account No. 33, "freight, express and mail cars;" account No. 34, "locomotives;" account No. 35, "service cars;" account No. 36, "electric equipment of cars;" or account No. 37, "electric equipment of locomotives." Account No. 63, "miscellaneous car-service expenses," includes only such items as do not pertain to maintenance of equipment. The following indicates the line of demarcation between the electric equipment of a car and a car: Electric equipment of a car includes the electric *motive* equipment and wiring; the term "car" includes the car body and trucks, electric bells and wiring, electric heaters and wiring, electric lighting and wiring and air-brake equipment and wiring. Under this segregation carbons used in electric arc headlights are chargeable to account No. 67, "miscellaneous car-service expenses," and the other items named to accounts 32 to 37, inclusive.

Query. Are Class B and Class C electric carriers required to keep the 44 accounts composing the classification of expenditures for road and equipment of electric railways, and the 19 accounts composing the classification of operating revenues of electric railways, the same as Class A carriers?

Answer. All electric carriers subject to the jurisdiction of the Interstate Commerce Commission are required to keep their road and equipment and revenue accounts in the same manner, no condensed classification of road and equipment accounts or of revenue accounts being provided for Class B or Class C carriers.

Query. What is meant by the term "car hours" as used in the mileage, traffic and miscellaneous statistics of the annual report, particularly with reference to "passenger-car hours?"

Answer. "Passenger-car hours" include not only the actual time while in revenue service, but also the time consumed in running from car houses to points where regular service is begun, time lost between trips, and time lost on account of delays caused by blockades, parades, etc. It includes the entire time during which the cars are in charge of the motormen and conductors.

FINES FOR DAMAGING STREET CARS

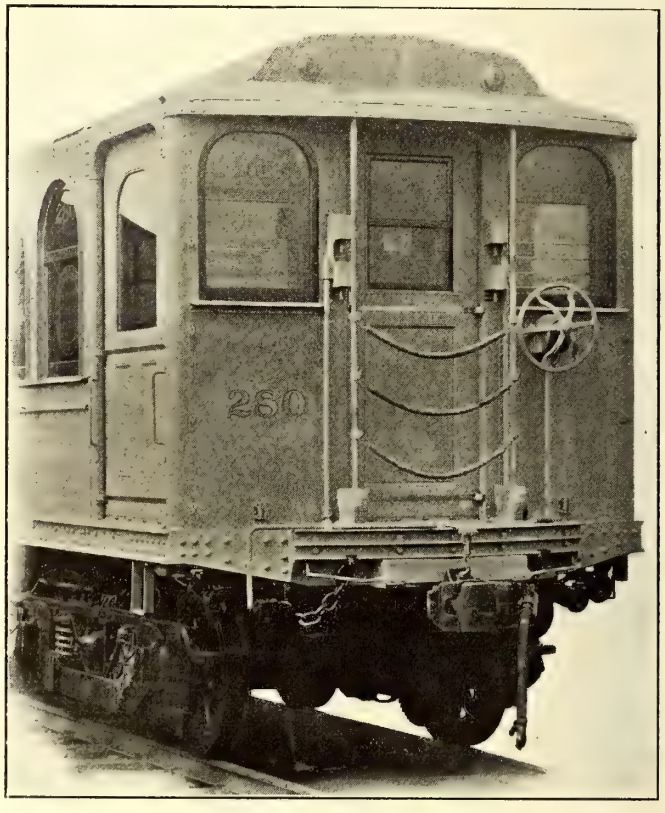
Although American street railway companies will not suffer with impunity the destruction of their car fittings, none has considered the adoption of a scale of damage charges. The latter practice, however, is in vogue on a number of European city systems. The following is a translation of a damage schedule posted in the cars of the Basel (Switzerland) municipal tramways: Breakage of mirrors, $1.93; of a large side window, $1; of an end window, 60 cents; of ventilator glass, 30 cents; of a marker lamp lens, 20 cents; of a corner lamp lens, 20 cents; of an incandescent lamp, 15 cents; for disturbing the lighting circuit, $1; for soiling seats or windows, 20 cents to 60 cents, according to the conditions. If unruly passengers fail to pay the penalties imposed for their misconduct, the conductor simply calls on the police for assistance.

AMERICAN EXPOSITION AT BERLIN IN 1910

Arrangements are being made for holding an American exposition in Berlin, Germany, from May to July, 1910, under the royal presidency of Prince Henry of Prussia. The exposition is to be confined strictly to American products, and has the indorsement of the Department of Commerce and Labor of the United States. The New York office of the American committee in charge of the exposition is at 50 Church Street.

STEEL PASSENGER CARS FOR THE HUDSON & MANHATTAN RAILROAD

On July 19, 1909, the Hudson & Manhattan Railroad opened for service the two downtown tunnels under the Hudson River connecting the new terminal building at Cortlandt and Church Streets, Manhattan, with the Pennsylvania Railroad station in Jersey City, N. J., and early in August the land tunnels under Jersey City and Hoboken were completed, thus making it possible to run through trains from the downtown terminal station to the Delaware, Lackawanna & Western station in Hoboken, where connection is made with the uptown system of tunnels. To provide ample rolling stock to handle the heavy traffic in this new extension the railroad company placed an order with the Pressed Steel Car Company, Pittsburgh, Pa., in



Hudson & Manhattan Steel Car—End View

November, 1908, for 50 all-steel cars of a design somewhat similar to the original cars purchased in 1907, but embodying many improvements which experience with the earlier cars indicated would be desirable. In January, 1909, 40 more cars of the improved design were ordered from the same builders, making a total of 90 new equipments. The completion of the entire order by the date planned for the opening of the new tunnels was specially stipulated in the orders, and through close co-operation between the railroad company and the builder most of the cars were delivered on time, notwithstanding labor troubles which subsequently arose and delayed delivery of part of the order for some weeks.

The trucks for these cars were ordered from the American Locomotive Company, the total order including 92 motor and the same number of trailer trucks.

The new cars were built to the designs and specifications of the engineers of the railroad company, with some slight modifications which were found desirable in the early stages of construction. They weigh 3000 lb. less than the original

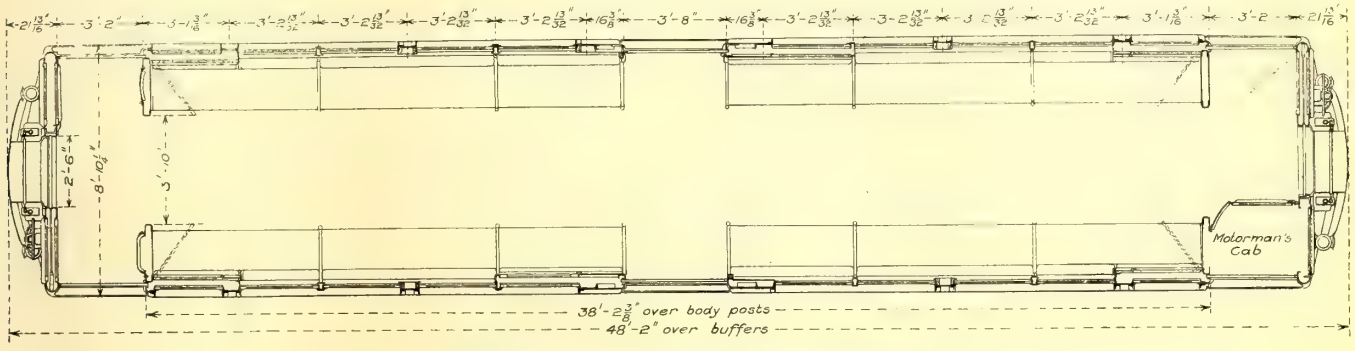
cars built for the Hudson and Manhattan Railroad, which had the same general dimensions. Particular attention was paid to the fire-proofing and sanitary features and to the prevention of telescoping of cars in the event of a collision. The general dimensions of the cars follow:

Length over buffers	48 ft. 2 in.
Length over corner posts	36 ft. 2⅞ in.
Width over side sills	8 ft. 6⅜ in.
Width over all at windows	8 ft. 11 in.
Height, top of rail to top of roof	11 ft. 8 7/16 in.
Weight, total with electrical equipment	69,600 lb.
Seating capacity	44

The underframe consists of two 6-in. channel side sills and 6-in. channel center sills. At the center and end side door openings the side sills are reinforced with lengths of 6-in. bulb angles riveted to the webs and between the bolsters and end sills the center sills are also reinforced with lengths of 6-in. channels riveted back to back through the webs. The bolsters are built up of rolled plates with cast-steel center plate fillers inserted between the center sills. The platform end sills are built up of two angles in channel section and are plated with a ⅛-in. cover plate on top. Two steel castings of special form provided with heavy vertical projecting lugs are riveted to the outside face and on top of the end sill to protect the car from telescoping in case the end sill of the adjoining car rises in a collision. Hedley grooved anti-climber plates are also bolted to the face of the end sill as an additional precaution against telescoping. The body underframe is stiffened transversely between bolsters by four trussed beams each composed of double angles and a truss rod.

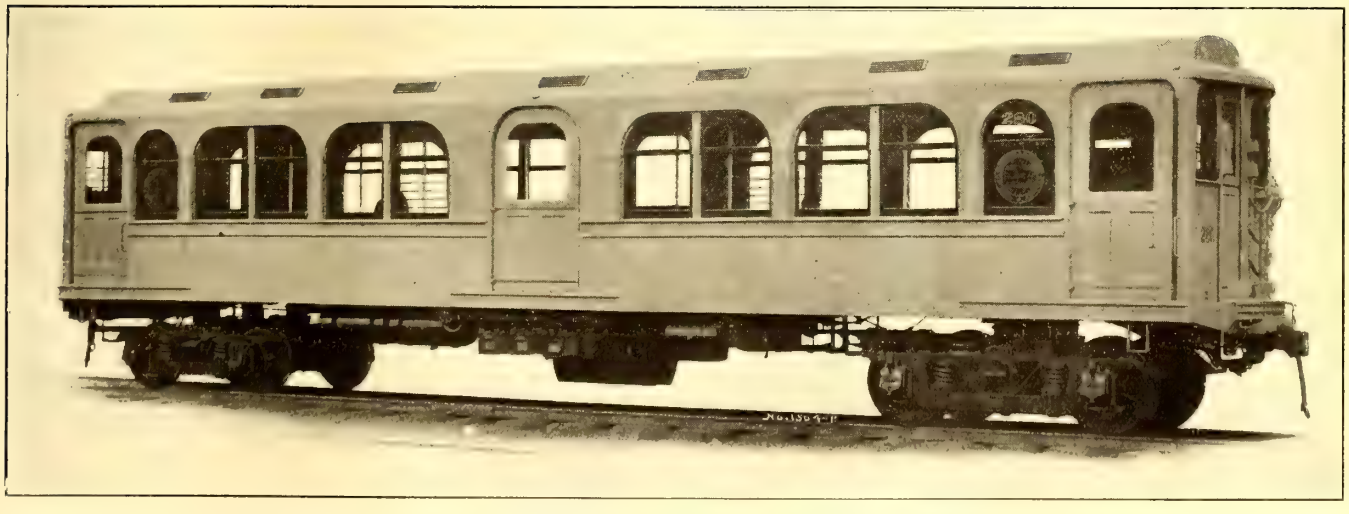
The side framing is designed as a truss 7 ft. 3¼ in. high and divided into five panels, the center side door opening forming the middle panel. The side plate, or top chord of the truss, is a 6-in. channel and the 6-in. channel side sill forms the bottom chord. The main vertical posts are 8-in. channels and between these 2-in. window posts formed of pressed steel sections are inserted. Steel plates 1/16 in. thick are used for the outside sheathing and these are panelled by pressed vertical and horizontal ribs which are blocked out to cover all rows of rivet heads in side framing. The sheathing is thus applied independently of the main frame riveting and can be quickly and easily removed. The platform door and corner posts and the body end posts also are formed of pressed plate sections.

The roof of the cars has a contour which is a combination of a plain curved roof and a monitor deck. The special object in view in designing this compromise roof con-



Hudson & Manhattan Steel Car—Floor Plan

tour was to provide for the proper distribution of ventilating devices and at the same time give the necessary headroom for the lighting fixtures without encroaching on the operating clearances to the extent required by an elliptical shaped roof. Since the cars are to be operated continuously in subways under water the roofs must be maintained absolutely water-tight and it was thought best to adopt the form shown in order to meet satisfactorily all the conditions of operation and maintenance. Seven Perry automatic ventilators are inserted in each side of the semi-monitor between carlines. The carlines are 1¾-in. x 1¼-in. x 3/16-in. angles in one piece and bent to the contour of the roof. They are riveted at their ends with angle knees to the top flanges of the channel side plates. The exterior roof covering is 1/16-in. leaded steel plates secured to the carlines by tinned rivets. All joints in the roof plates are soldered to make them water-tight. The roof construction



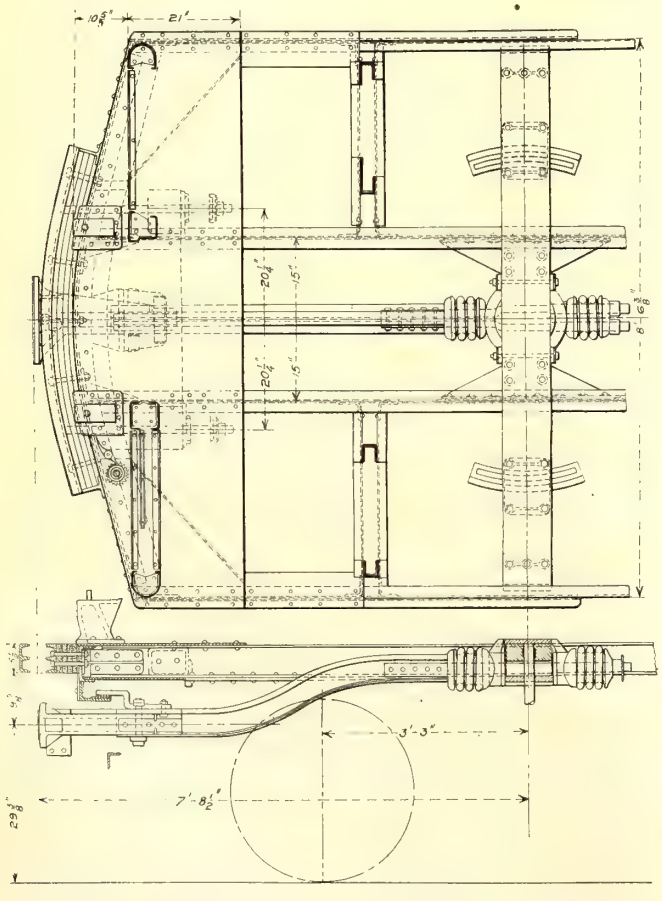
Hudson & Manhattan Steel Car—Exterior View

over the platform vestibules was designed to be collapsible, so that in the event of a collision the damage would be localized at the ends of the car and would not be transmitted to the body roofing.



Hudson & Manhattan Steel Car—Interior View

Throughout the design and construction of the body framing special care was taken to insure rigidity of the structure as a unit. The cars have proved very satisfactory in service in this respect and are capable of withstanding



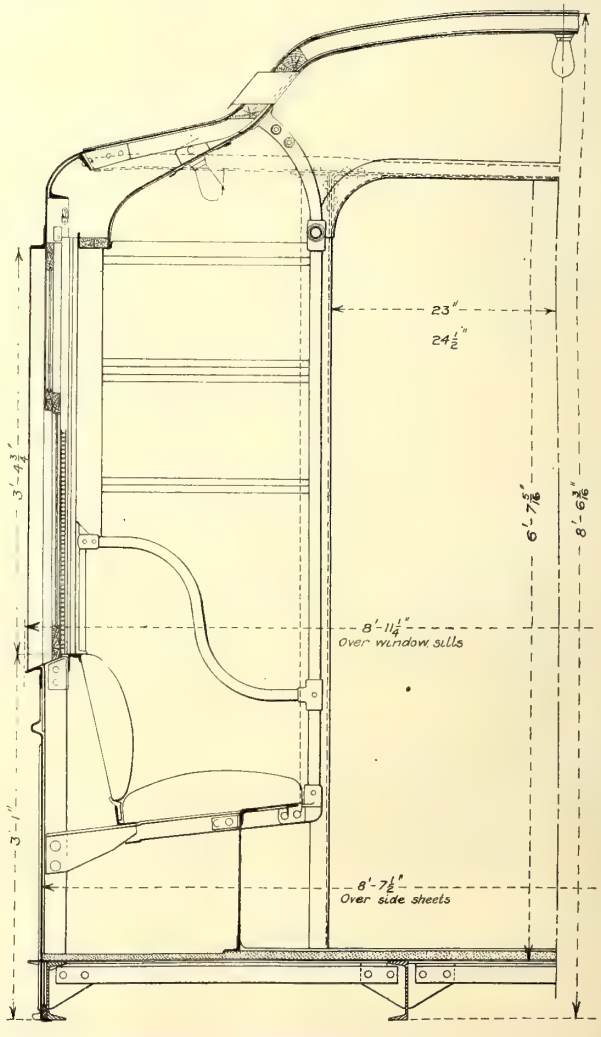
Hudson & Manhattan Steel Car—Platform Framing

without serious damage shocks which would totally destroy cars of ordinary design.

The floor plan of the new cars is similar to the first cars built for this railroad. Longitudinal seats only are built on each side of the aisle between the end bulkheads and the center side door openings. These seats are formed of steel frames with fire-proofed canvas-lined rattan backs and cushions. Each longitudinal seat is divided into three sections by pipe partitions which extend up to the roof and serve as hand holds for standing passengers. These partitions reduce surging of passengers during acceleration when the car is on a heavy grade.

The platforms are entirely enclosed and a motorman's cab is provided at the right-hand side on each end. When the cab is not in use the partition doors by which it is enclosed can be folded back, leaving the platform space and entrance passageways entirely free. Hand-operated sliding end doors are provided in each vestibule to permit of passage from one car to another in a train. The sliding end side doors have a 3-ft. 2-in. opening and the center side doors a 3-ft. 8-in. opening. All side doors are pneumatically operated and are electrically controlled from either platform. All doors are fitted with Reliance ball-bearing hangers furnished by the Pitt Car Gate Company.

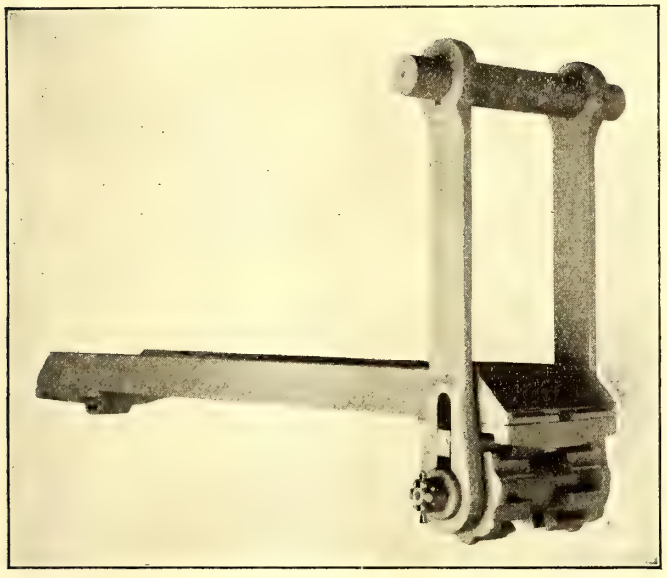
The service in which these cars will be operated is such that they will be subjected constantly to the influence of moist salt air. Special attention, therefore, has been given to the prevention of corrosion of the steel of which they are built. The usual coats of varnish on the exterior were



Hudson & Manhattan Steel Car—Half Cross-Section

purposely omitted. Two coats of Harrison Brothers' anti-oxide base paints were applied to all exterior metal surfaces and these were followed by a single coat of anti-oxide black surface paint.

The interior finish has been designed with special care to make it attractive and perfectly sanitary. Advantage was taken also of the special shape given to the headlining to improve the lighting of the car. Smooth panel surfaces without pockets or projections, in which dirt or dust could lodge, have been used throughout. All exposed surfaces were given two coats of anti-oxide base paint and three coats of enamel. The vertical and horizontal hand rods which take the place of the usual hand straps, together with the headlining, are finished in white enamel and the remainder of the interior is finished in green enamel paint decorated with gold leaf striping. Provision has been made for displaying advertising signs in double rows in the headlining, also in wide panels adjoining the center side doors over the inside sashes in the end bulkheads.



Hudson & Manhattan Steel Cars—Adjustable Spring Plank-Hanger

The flooring consists of Keystone steel floor plates filled with carbolith cement and finished with a ¼-in. layer of carborundum cement.

Incandescent lamps are mounted in the headlining under the center of the roof and immediately over the seats. Four of the lamps are connected to a storage battery carried on each car and charged from the third-rail circuit, but entirely independent of it. In case the third-rail current should fail these four lamps would continue to burn and not leave the car in total darkness.

The cars are mounted on M. C. B. type trucks, which, as before stated, were built by the American Locomotive Company. Except that they have a shorter wheel base and are of somewhat lighter construction, the trailer trucks are of the same general design as the motor trucks, both being built to carry a load on the center plate of 30,400 lb.

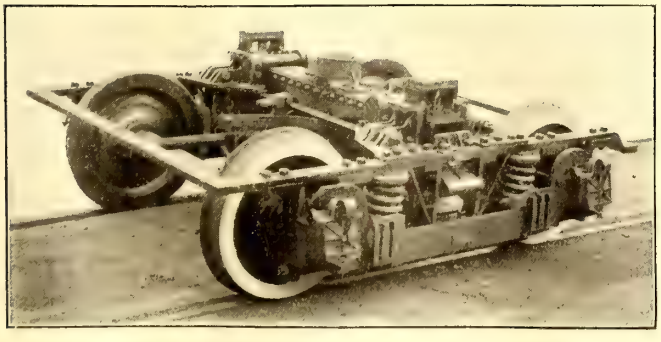
Some of the principal dimensions of these trucks follow:

	Motor truck	Trailer truck
Type	A-378	A-366-T
Gage of track	4 ft. 8½ in.	4 ft. 8½ in.
Wheel base	78 in.	66 in.
Length over all	10 ft. 3 in.	8 ft. 11 in.
Load carried at center plate	30,400 lb.	30,400 lb.
Weight complete, without motors	11,738 lb.	9,200 lb.
Weight of each motor complete with axle gear	5,500 lb.	.....
Wheels, type	Steel tired cast steel spoke centers	Solid rolled steel
Wheel diameter	34¼ in.	30 in.
Journals, diameter and length	5 in. x 9 in.	4½ in. x 8 in.
Radius of shortest curve	90 ft.	90 ft.

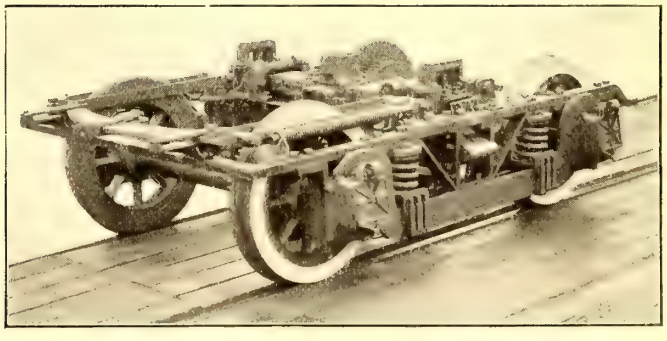
The motor truck is equipped with two GE-76 motors, each having a rated capacity of 160 hp and suspended inside of the axles with nose type of suspension. The top frame is of wrought iron, the end frames being forged solid with the sides. One end is dropped down to clear the coupler attachments. The pedestals are also of wrought iron and are slotted out for the frame fit. The transoms are 10-in. channels, weighing 25 lb. per foot, and are carried on shoulders provided on the frame center braces to take the shear off of the bolts securing them to the braces. Cast-steel transom gussets are used to tie the transoms and top frames together. These gussets also form the bearings for the swing link pins and lugs for the brake levers, thus simplifying the construction.

The swinging bolster is constructed with a bottom member of pressed steel and a steel channel top member. It has no bearing against the transoms, but, following the builder's latest practice, the driving thrust of the motors is transmitted from the truck side frames directly to the ends of the bolster and through it to the center plate by means of vertical thrust bearings cast integral with the transom gussets and raised to a level with the center plate. This construction relieves the transoms of the driving stresses. These bearings also prevent any canting or tipping of the bolster, and are provided with wear plates which may be readily replaced.

As it is very necessary to maintain the proper height of the car body platform to correspond with the height of the subway station platforms, a device has been applied by which the height of the spring plank, and consequently the height of the bolster, may be easily adjusted to provide for the wear of the wheels or other parts. This device is shown in one of the accompanying illustrations. As will be seen, it consists of an eccentric shaped swing-link rocker, which is provided with a number of pockets, in which the pin passing through the spring plank seat rests. This pin has rectangular shaped ends, having a sliding fit



Hudson & Manhattan Steel Cars—Trailer Truck



Hudson & Manhattan Steel Cars—Motor Truck

in the slots in the swing links. By jacking up the spring plank and turning the eccentric around, the spring plank may be raised a total height equal to the throw of the eccentric. In this case the swing-link rocker is so designed as to permit of a total adjustment of 1½ in. in steps of ¼ in. each.

The specifications under which these cars were built were prepared by L. B. Stillwell, consulting engineer, and Hugh Hazelton, electrical engineer, of the Hudson & Manhattan Railroad. They were represented at the works of the builder by F. M. Brinckerhoff, who supervised the construction of the cars.

ILLINOIS CENTRAL ELECTRIFICATION PROGRESS

During the past few months the engineering department of the Illinois Central Railway has been engaged actively in studying the problem of electrifying this company's tracks within the city of Chicago and the nearby suburban district. As the result of this study, L. C. Fritch, consulting engineer, Illinois Central Railroad, has just issued a preliminary report addressed to the special commission appointed by the city to look after the suppression of the so-called "smoke nuisance." The members of this commission are Dr. W. A. Evans, commissioner of health; H. H. Evans, secretary of the local transportation committee; Paul Bird, chief smoke inspector, and T. E. Donnelly, chairman of the special smoke commission.

No definite announcements regarding electrification have been made by the Illinois Central Railroad to the city commission, and it should be understood that the plans submitted this week are only tentative, because decisions on the method of generation and distribution of power and on the choice of motive power equipment have not been made. The tentative scheme, as submitted by the Illinois Central engineers, is of interest, however, because it shows that the problem is being attacked seriously and because a few figures regarding the number of trains to be operated, the daily ton mileage and the maximum hourly demand for power, so far as can be determined in a preliminary way, are presented.

The present track facilities of the Illinois Central Railroad within the city and suburban district include eight tracks from Randolph Street to Sixty-seventh Street, 8.5 route miles; six tracks from Sixty-seventh Street to Kensington, 6.5 route miles; four tracks from Kensington to Riverdale, 2 route miles, and two tracks from Riverdale to Flossmoor, 8 miles. The foregoing trackage comprises the main trunk line of the Illinois Central Railroad from its northern terminus in Chicago to the southern end of the suburban district. In addition to this trackage there are three branch lines also to be considered for electrification: A single-track line from Kensington to Blue Island, 4 miles; a double-track line from Sixty-seventh Street to South Chicago, 5 miles, and the double-track Omaha division from the Park Row station to Hawthorne, 8 miles. The completion of the electrification project as proposed would include the rearrangement of the track system and the redistribution of local and express suburban trains and through freight and passenger trains. This work would require the reconstruction of the switching yards at the downtown terminal and at Sixty-seventh Street. Suggested plans for progressively carrying on the work of electrification are as follows (plan 1-a does not contemplate the rearrangement of the tracks):

(1-a) Electrify the local suburban district from Randolph Street to Sixty-third Street without rearranging the tracks.

(1) Electrify the local suburban service from Randolph Street to Sixty-third Street.

(2) Electrify the local and express suburban service to Sixty-seventh Street and on the South Chicago branch.

(3) Electrify the local and express suburban service to Kensington, South Chicago and Blue Island.

(4) Electrify the local and express suburban service to Flossmoor, South Chicago and Blue Island, and through passenger service to Burnside.

(5) Extension of electric service to freight trains to Burnside and all service to Hawthorne and in the Chicago switch yards.

(6) Complete electrification for all service to Riverdale, South Chicago, Blue Island and Hawthorne; electrification for passenger service to Flossmoor.

At the present time the Illinois Central Railroad operates about 250 scheduled trains in and out of Chicago. With the electrification project completed it is tentatively estimated that the number of trains operated daily would be approximately as follows:

Suburban trains (proposed schedule)	396
Through passenger	82
Freight trains	190
Switching movements (estimated)	400
Total movements daily	1,068

According to present estimates the daily ton mileage of these trains would be as follows:

Suburban trains (proposed schedule)	895,440
Through passenger trains	431,610
Freight trains	1,789,776
Switching service	1,915,800
Total ton-mileage daily	5,032,626

These amounts are in excess of the present service.

The city commission was furnished with estimates for the maximum hourly demand on the power station which would be required for the six successive stages in the electrification work: The train service for the electrified local suburban tracks between Randolph and Sixty-third Streets is estimated to have a maximum hourly demand on the power station of 3500 kw, and the complete electrified terminal to have a maximum hourly demand of 20,000 kw.

Details are not available regarding the motive-power equipment proposed and the method of power distribution. A map of the territory under consideration submitted to the city commission shows a tentative plan for the use of direct current delivered to the cars by a third-rail. This power-distribution arrangement includes six substations fed with high-tension current carried for the major part of the way in conduit laid between the tracks and partly on a steel-pole aerial line. Supplementary feeders are carried similarly. The South Chicago and Blue Island branches are shown on the map to be operated with bracket-supported trolley lines.

GASOLINE MOTOR CAR FOR VIRGINIA RAILWAY

On page 468 of the Electric Railway Journal for Sept. 25 it was erroneously stated that a gasoline motor car building at the works of The J. G. Brill Company, Philadelphia, Pa., was to be put in service on the Metropolitan Street Railway Company, New York. This car, which is to be equipped with two 24-hp gasoline engines under the patents of the Gas Car Manufacturing Company, of Philadelphia, has been sold to the Elizabeth River Railroad Company, of Norfolk, Va.

COMMUNICATION

THE CORPORATION TAX LAW AND ACCOUNTING

Philadelphia, Pa., Sept. 22, 1909.

To the Editors:

When the electric railway accountants get together in Denver they will confront a situation somewhat similar to that of two years ago. Then, after having brought to a successful conclusion a long struggle for a uniform system of accounting, they were presented with an entirely different classification by the Interstate Commerce Commission. Through the good work of our most efficient classification committee that matter has been fairly and amicably settled, and we were rapidly adjusting ourselves to the inevitable changes—at least, those of us who come under the jurisdiction of the Interstate Commerce Commission. After the final encounters over the reports for the year ending June, 1909, were over and the perplexities of reconciling the old and new classifications solved, we hoped to settle down to peace and quiet on a solid basis once more.

Now comes the corporation tax law to upset all our pleasant anticipations!

It is to be observed that the struggle with the Interstate Commerce Commission was conducted between accountants on both sides who understood the fundamental principles of their subject and differed mainly on details. The coming contest with the Internal Revenue Department promises another kind of war—one in which the points of view of the two parties are so wide apart that it will be difficult for either to appreciate the stand of the other. As the opening gun, we have the written statement of the Attorney-General of the United States, which shows plainly his utter inability to appreciate the difference between income earned and income received. Moreover, he declares that the tax is not laid upon a corporation's "profits," but upon its "net income * * * received." Some of us have been laboring under the impression that these terms were practically synonymous (barring the "received"), but we live to learn. Without going further into discussion of the remarkable letter (which was written in reply to a friendly protest from a number of prominent public accountants, calling his attention to several glaring inconsistencies and absurdities in the tax clause), it is plain to see that corporation accountants generally are in for a lot of extra work and trouble when the Internal Revenue Department calls for the first reports.

A good many of us are hoping, and, in fact, feel more or less certain, that the law will be declared unconstitutional as soon as the Supreme Court gets a chance at it. Possibly. If it is a direct tax, it is clearly unconstitutional. In the Spreckels case, however, the court held that the income tax of 1894 was an *excise* tax, but became a direct tax when applied to *persons*. The obvious inference is that it will be held to be an excise tax pure and simple when applied to corporations only, and, as such, within the power of Congress to levy. Inasmuch as certain corporations are exempted and certain deductions are permitted to one corporation which another may not have, it is possible that the law might fail as not being "uniformly" laid within the meaning of the Constitution. It is to be hoped that the companies represented at Denver will find some way to have a test case carried to the Supreme Court at an early date to decide the question.

In the meantime we will undoubtedly have to make the reports. It seems to me the Accountants' Association might well take some action to have the classification committee add to its well-earned laurels by getting in touch with the Internal Revenue Department and coming to some mutual understanding as to the data required for the income tax reports. Certainly, as it stands the law is full of perplexing points, and, taken under any construction, means trouble for the unfortunate accountant who is under the jurisdiction of the Interstate Commerce Commission. At the very outset he is confronted with the penalties threatened by the Interstate Commerce Act if he keeps accounts or memoranda other than prescribed by the commission. Yet how can he comply strictly with the corporation tax law if he does not? How will he be able to tell just how much of the "income received" has been expended for operating expense when his balance sheet at the end of the year shows a large amount invested in stores? If the company has borrowed any money during the year and paid it out indiscriminately for operating and construction bills, how can he tell without a special receipt and disbursement book just how much of his total expenses has been paid from loans and how much from "income received"? Obviously, under a strict construction of the law, he cannot deduct expenses unless they have been paid out of "income received."

Many similar points will occur to those who have been studying the subject, and it is to be hoped something can be done to minimize the friction bound to arise with the Internal Revenue Department. It seems to me a subject which the classification committee is peculiarly fitted to handle, and possibly the aid of the Interstate Commerce Commission might also be enlisted to prevent much of its own good work from being hampered or destroyed.

Accountant.

HISTORY OF CARBON BRUSHES

Carbon brushes were invented by Professor Forbes, and were first manufactured on a commercial scale in 1889 by Le Carbone Company, of Paris, France. It was not until the Crystal Palace Exposition in 1893 that efforts to introduce this then radical departure in brush design met with any degree of success. At that time the publishers of the *Electrician,* of London, realizing the advantages to be gained by the use of carbon brushes, and being desirous of bringing this knowledge more closely before designers, opened the columns of their publication to a discussion of the merits of carbon as a brush material. Many prominent men contributed to this discussion, among whom were Sir David Salomons and Lord Russell, who had obtained excellent results with Le Carbone carbon brushes. This interchange of ideas gave the necessary impetus to the invention, and since that time carbon brushes have been adopted for all types of dynamo-electric machinery.

Le Carbone Company has been favored at all times with the friendly collaboration of the leading designers in Europe, and for several years past of those in the United States. In order to meet the varying conditions brought to its notice by users, a comprehensive range of qualities has been developed, embracing every type of electrical machine. Because of this wide experience, Le Carbone Company is able to supply brushes having special qualities which will satisfactorily meet almost any condition of commutation or current density. Le Carbone brushes of each grade are claimed by the manufacturers to be absolutely uniform as to their mechanical and electrical characteristics. Special types of brushes are made to overcome com-

mutation or other troubles, and when the need arises for a brush of particular construction Le Carbone Company is prepared to place its experience of 20 years in this work at the service of its customers.

SIGNALS ON THE YOUNGSTOWN & SHARON STREET RAILWAY COMPANY

The Youngstown and Sharon division of the Mahoning & Shenango Railway & Light Company maintains an interurban service between the points named, a distance of 14.5 miles, at a schedule speed of 20 m.p.h. Through cars leave each terminus every half-hour, the time of running being 53 minutes, with a 2-minute layover at Youngstown and a 10-minute layover at Sharon. The line is single-track, and cars pass regularly at the turnouts, or switches 4, 7 and 11, numbered consecutively from Youngstown. The running time between each switch is about 15 minutes. There are also other turnouts used as extra passing points when required. The track is laid with T-rails outside of the city, with spring switches which may also be thrown by hand. The trolley wire is No. 00, figure 8, with side pole and span construction and wood strain insulators.

At Hubbard Junction, switch 7, about 8 miles from Sharon, there is a branch to New Castle, between which and Hubbard Junction cars run hourly each way. The car house is located at Masury, switch 11, and the repair shop at Hazelton, outside of Youngstown. There are industrial establishments on the line of the road at Masury and between switches 10 and 11. An express freight service is maintained between Sharon, Youngstown and New Castle, on which service, as also with that for passengers, double-heading is used in times of heavy traffic, the first section carrying green marker flags and the last white.

An idea of the varied traffic may be obtained by considering the following schedule of regular daily trips one way on the single-track block, 2¼ miles long, between switches 10 and 11, where most cars pass.

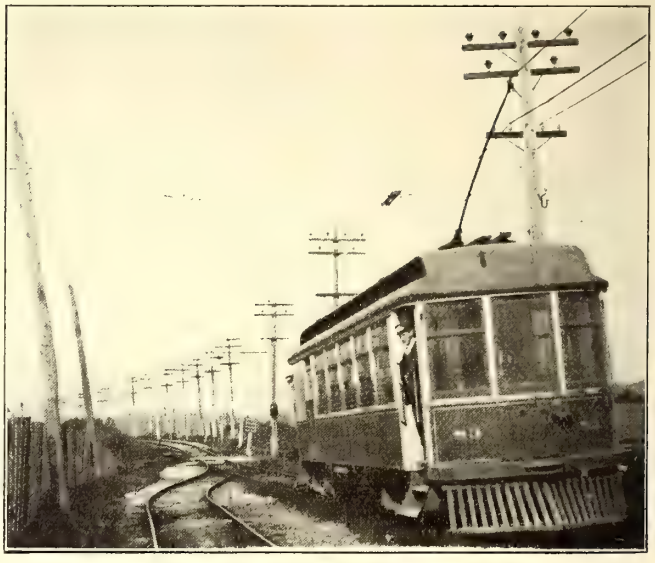


Automatic Signal at Switch in Hubbard, Ohio

Through cars, half-hourly schedule	40
Trippers	12
Freights	4
Sprinklers	2
Work trains	4
	62

Thus a total of 114 trips daily is made by the regular cars alone, not counting other trips of the work train and line car, the weekly end-for-end reversal of the Sharon local cars between the car house and the "Y" at Hubbard Junction, together with the double-heading with extra traffic. There is a dispatcher at Masury and Hubbard Junction, and telephone boxes are located at the switches, to permit crews to call up the dispatcher in an emergency, but not vice versa.

At the regular passing points there are either hand or automatic signals. The latter were designed by the company, and have been in use about two years. They permit but one car in the block at a time, so that if two or more cars follow in, the first out pulls down the trolley to hold the block for cars following. Indications are by lamps only, which under certain voltage and lighting conditions are hard to distinguish.



Automatic Signal at Switch No. 10

As the nature of the traffic between switches 10 and 11 frequently results in four or five cars following each other, a car-counting system is required. The railway company more than a year ago installed the Nachod automatic signal on this block and on that between switches 6 and 7, each block being about 1 mile long. The balance of the line is now being equipped with the same type of signal. A description of the system is given herewith.

The installation comprises at each end a signal box, fuse box and two trolley contact switches on the double-track part. The latter consists of two inclined contact strips, one connected to trolley and the other to ground through the relay, the trolley wheel bridging them and forming a temporary connection. These contact switches have no moving parts, and, not being sensitive to the direction of the cars, are placed on parts of the double track on which cars run in only one direction.

The signal indications are given simultaneously by a lamp and a semaphore disk of the same color, making them independent of conditions of light or voltage fluctuations. When there is no car on the block of single track, the signals are at no indication, or "dark." The motorman about to take the block runs under the "on" contact switch and sees the white light and white semaphore appear before he passes the signal box. This is an indication that the red signal is displayed at the other end to protect him from a car entering against him. When this car leaves the block it clears the signal when running under the "off" switch. A car at the other end, which may have been held up by the red signal, may now enter the block in the same way, setting the signals oppositely, and will clear them again on passing out.

The motorman of a second car approaching the block before the first has left it will see a white signal, which indicates that the block has at least one car on it going in the same direction. The second car will, therefore, enter the block, producing no change in the signals, except a blinking of the white light as it runs under the switch, to indicate registration, and so on for each successive car that enters that block. During all the time the block is occupied the red light and red semaphore show at the far end, so that the signal system maintains an absolute block at the red end and a permissive entrance at the white end. When these cars leave the block, one by one, the indications are unchanged until the last one leaves, when the signals are cleared. When the red signal is displayed the "on" switch at that end is cut out of operation, thereby preventing any change by a car wrongly entering. Should a car, having set the signals, not pass through the block, but back out the other track, the signals will be automatically cleared.

The signal box is a cast-iron, weatherproof case mounted on a pole and facing outward toward the double track. It contains the lamps and semaphore disks in the upper part and the oil-immersed relay in the lower. The upper portion has openings for a red and clear lens, behind which are lamps, and for a roundel of clear glass which shows a white or a red semaphore disk when the signal is set, and a void when the signal is dark. All connections are made with No. 12 weatherproof, insulated hard-drawn copper wire, and a single line wire of the same is run the length of the block, connecting the boxes.

Owing to the satisfaction these signals have given, the railway company has placed an order for the complete equipment of the division mentioned, comprising 24 additional boxes, and contemplates still further signal extensions in the future.

PLIABLE INSULATING MATERIAL FOR FLOORS

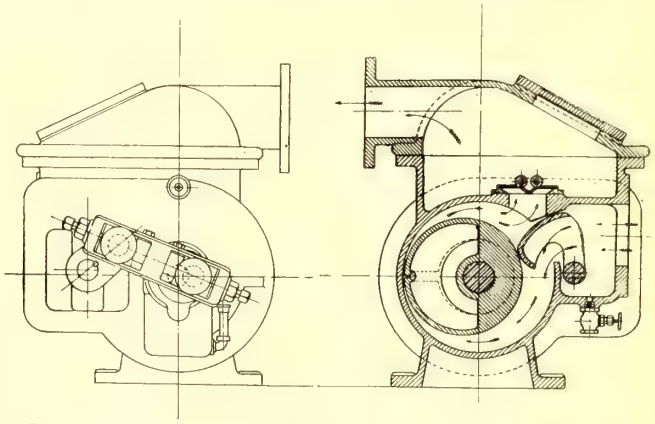
The success with which "Electrose" insulation has met for line work and other electrical purposes has led to its adoption for insulating flooring. The "Electrose" pliable insulating flooring, which was recently invented by Louis Steinberger and placed on the market by the Western Electric Company, is already being used extensively in connection with high-tension switchboards, and as a protective covering for floors and walls adjacent to high-tension apparatus. Two strong points made for this flooring are that it has both extraordinary dialectric properties and a uniform composition. Its dielectric strength may be judged from the fact that on an official test a slab 12 in. x 12 in. x 3/8 in. arced over at 89,000 volts without puncturing. The material is permanently pliable, tough, strong and waterproof. It possesses a dull surface which will not become smooth or slippery from wear, and is made in various colors for practically any size or thickness.

The material conforms to any inequalities of a floor upon which it is laid, but while the standard form is pliable, it can be made very hard and inflexible. When installing the covering the slabs are placed on the floor or secured to a wall and spaced about 1/4 in. apart. A cement made of the same material is then poured, or otherwise applied, between the slabs. When this cement "sets," within, say, 10 minutes after application, the homogeneous mass thereby formed becomes an integral part of the slabs.

This flooring may be sawed, planed or drilled and nails may be driven through it without danger of cracking or other injury. The material naturally clings to the floor or other surfaces upon which it is laid, and does not curl at the edges or corners. Hence it is not essential to secure the material to the floor, except under certain conditions, such as when the slabs are small and it is necessary to keep them from moving along the floor surface.

IMPROVED HIGH-VACUUM AIR PUMP

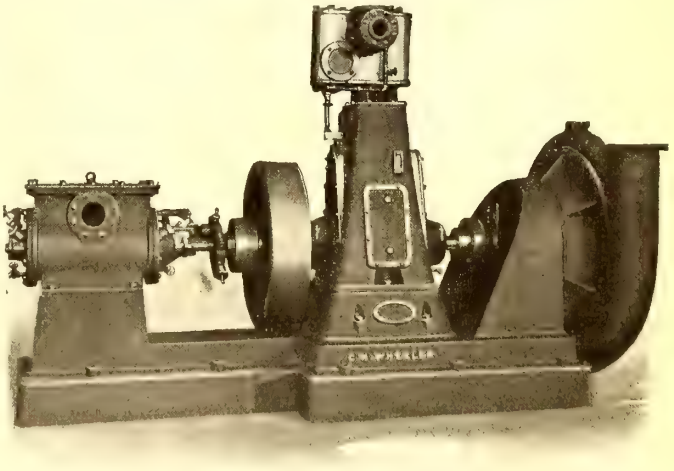
The C. H. Wheeler Manufacturing Company, Philadelphia, Pa., has recently developed a new type of rotary high-vacuum air pump for condenser purposes which occupies much less space than other types of pumps commonly used. It also has the advantage of being adapted for direct connection to one of the other auxiliaries, as shown in the



End Elevation and Cross-Section of Rotary Air Pump

accompanying engraving. This cut shows a Rotrex air pump and a centrifugal circulating pump direct connected to opposite ends of the shaft of a high-speed vertical engine.

The construction of the Rotrex air pump is very simple. It consists of a light cylindrical casing and a single rotor eccentrically mounted on a heavy steel shaft carried in ring-oiled outboard bearings which are independent of the



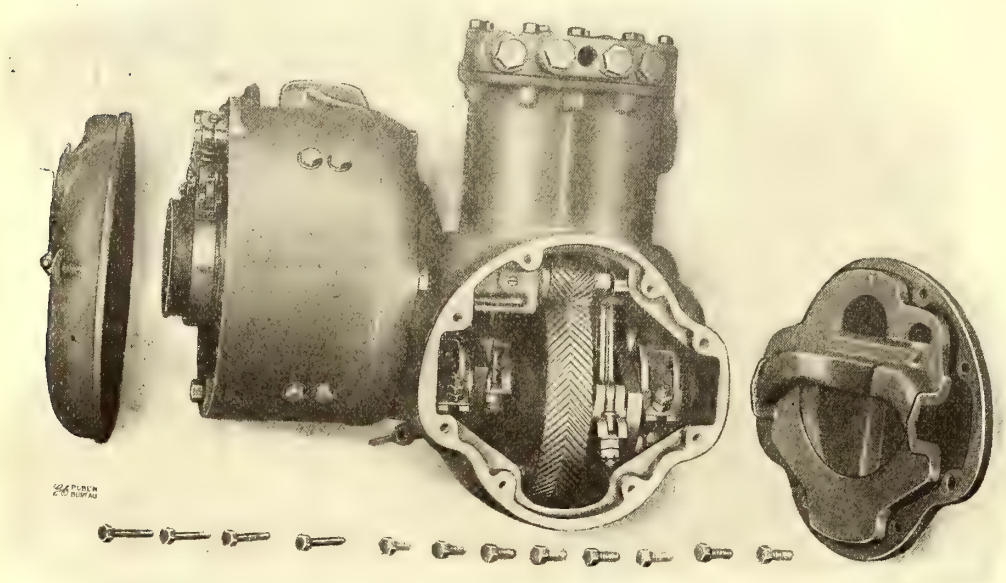
Rotary Air Pump and Circulating Pump Driven by Single Engine

stuffing boxes. Division between the suction and discharge in the pump cylinder is made by means of a radius cam which is carried in independent bearings and is operated by a connecting rod and crank arm from the rotor shaft outside of the pump. By this arrangement internal contact is entirely eliminated. The rotor operates with a close clearance between the bore of the pump and the cam maintains a close clearance with the rotor. An ingenious arrangement of ports provides for a water seal of the clearance spaces at all times. This produces a high vacuum, not

possible with surface contact or sliding fits. No suction valves are used, thus eliminating one source of expensive maintenance. Due to the high speed at which it is operated the over-all dimensions of the pump are small. The pumps are made in sizes from 50 hp to 5000 hp in single units. For larger sizes two units are mounted on opposite ends of an independent air-pump engine shaft.

NEW AIR COMPRESSORS

The General Electric Company is making a new motor-driven air compressor in three sizes for 600-volt service—the CP-27, CP-28 and CP-30, rated respectively at 15 cu. ft., 25 cu. ft. and 35 cu. ft. piston displacement. While primarily designed for use on electric cars and locomotives, these compressors are equally suited for stationary work where an intermittent supply of compressed air is desired. A substantial frame casting completely encloses all working parts and contains both the motor and crankshaft bearings. Securely bolted to this casting is the motor frame, which simply supports the pole pieces and brush holders. The gear is in the center of the crankshaft, and as the gearing is entirely enclosed in the crankcase, a separate gearcase is unnecessary. With this construction the dimensions of the motor are not limited by the distance between gear centers, and therefore it is possible to design a motor with electrical characteristics better suited for the service required. Since the motor dimensions are not limited by mechanical considerations, it is possible to use four salient poles as in railway motors. Better commutation is thus obtained than is possible with the consequent pole construction necessary in former compressors.



Motor-Driven Air Compressor with the Covers Removed

The motor frame is an independent cylindrical steel casting bolted to the compressor frame. Four laminated steel pole pieces are held to the frame by two bolts, the heads of which are outside the frame and readily accessible. The four field coils are held by spring steel flanges clamped between the pole pieces and the frame. The armature is of standard railway construction, and the commutator is exceptionally large. The brush holders are thoroughly insulated from the frame. The creepage surface between the brush holder and the frame is unusually large, thus eliminating the possibility of grounding from deposits of carbon dust on the brush holder insulation. The brush holders are adjustable for commutator wear and are interchangeable. The oil deflectors on the armature shaft divert any oil that may pass the motor bearing into a pocket, from which the oil returns to the crankcase. A light frame head bolted to the motor frame protects the interior of the motor. A cam-locked, accessible dust-proof door in the frame-head permits convenient inspection of the brushes or the commutator. The motor frame interior is free from dust-collecting pockets, and by removing the frame-head it can be thoroughly and quickly cleaned by an air blast. The armature can be quickly removed by turning the brush holders back, taking off the motor frame head and loosening the pinion nut, without having either to remove the compressor from the car or to touch the crankshaft or the gear.

The compressor frame consists of one casting, containing all motor and crankshaft bearings. A large opening is located directly over the crankshaft, provided with a removable cover to permit of convenient inspection of the gearing, connecting rods and crankcase. The two cylinders, forming an integral part of the frame casting, project horizontally, so that the maximum heat dissipation is obtained. The cylinder heads are formed by a single casting secured to the cylinder by tap bolts. There is one inlet and one outlet valve in this head for each cylinder. The valves operate in a vertical position, and are of the tubular type. The intake air passages have liberal areas and are arranged so that clean air may be taken from the inside of the car. An air strainer is provided for the receiving end of the intake pipe. The vent to the crankcase opens to atmosphere at the bottom side of the compressor, where it is impossible for dirt to collect and work into the machine. A standpipe rises from this vent hole into a large hood pocket in the frame casting, which makes the escape of oil through the pipe impossible. A drain plug at the bottom of the frame casting completely drains the crankcase.

The bearings for the crankshaft and connecting rods have hinged caps. After removing the armature and taking off the crank chamber cover the crankshaft can be removed by swinging up these caps and then lifting the crankshaft out. All bearings and working parts are automatically lubricated from a well in the compressor frame below the gear. This oil well has one oiling filler, consisting of a projecting elbow fitted with a handle plug, so designed that any dirt collected around it is lifted off when it is unscrewed, thus preventing dirt from entering the oil hole. This oil filler is accessible from the car side, and is

of such a height as to insure a proper oil level in the crankcase. The driving gear picks up oil from the well and throws it in a steady stream into an oil pan riveted to the inside of the crank chamber cover. Oil distribution to bearings is effected through large channels in the oil pan, from which the oil flows into the various bearings. No oil waste or oil rings are used, and there are no pipes or small holes to clog with oil sediment.

The gear and pinion have herringbone teeth. The pinion is secured to the armature shaft on a taper fit, allowing the pinion to be readily removed after loosening the pinion nut. The gear teeth are formed on forged rims, riveted together and bolted to a central hub made in one piece with the forged steel crankshaft, so that the gear can be readily replaced at small cost. Since gear and pinion are located centrally between the cranks, the bearing pressures are practically constant in direction, and as they do not oppose gravity are very uniform in amount. Hence wear on the bearings is largely reduced, the operation of the gears is noiseless and free from vibration, bending strains are eliminated, and the most efficient driving arrangement is obtained. The crankshaft and armature shaft bearings are in the same casting, so that a perfect mesh of the gear with the pinion is obtained at all times.

The standard compressors are intended to operate on an intermittent basis, the total running time not exceeding 30 minutes in each hour. The compressors are also made in the 25-ft. and 35-ft. sizes for 1200-volt d.c. railway systems. Such compressors can be operated for 30 minutes out of each hour on 1200 volts, and when used in service requiring both 1200-volt and 600-volt operation will operate at approximately half-speed at the lower voltage for a period of 50 minutes out of each hour.

The general dimensions, weights, speeds and capacities of these compressors are given below when working against the tank pressure of 90 lb. per square inch:

	CP-27	CP-28	CP-30
Piston displacement cu. ft. per minute	15	25	35
Voltage	600	600	600
R.P.M. of compressor	200	203	182
R.P.M. of motor	1100	1100	1025
Amperes input, approximate	4.3	7.0	8.5
Cylinder diameter	4 1/8"	4 3/4"	5 1/2"
Stroke of pistons	4 7/8"	6"	7"
Intake pipe	1"	1 1/4"	1 1/2"
Discharge pipe	3/4"	1"	1 1/4"
Length over all	29"	33 5/8"	36 1/4"
Width over all	25"	29"	35 1/16"
Height over all	18"	20 7/8"	24 1/8"
Weight, approximate in pounds	575	880	1100

SERVICE RECORDS OF ROLLED AND FORGED STEEL WHEELS

The following data on the life of rolled and forged steel wheels have been furnished this paper by the Carnegie Steel Company, Pittsburgh, Pa.:

The first solid rolled and forged steel wheel made by the Schoen Steel Wheel Company under the patents of Charles T. Schoen was rolled on Oct. 5, 1903, at McKees Rocks, Pa., in what is now known as mill No. 1 of the Schoen Steel Wheel Works of the Carnegie Steel Company. This wheel was rolled and forged from a cast-steel blank, and in spite of the defects inherent in all steel castings wheels made from cast blanks gave excellent service owing to the work which they received in the process of manufacture.

A few of these early wheels were put in use on the Intramural Railroad at the World's Fair, St. Louis, Mo., in 1904. On this road 56 cars were operated at an average speed of 12 miles per hour for 177 days, each car averaging 138 miles a day. After the close of the Fair the wheels under these cars were bought by the Metropolitan Street Railway Company, Kansas City, Mo., and put in service under St. Louis Car Company's type 47-A trucks carrying cars with an approximate total weight of 49,280 lb. The service in which these cars were run was 60 per cent city and 40 per cent interurban with an average grade of 3.25 per cent and a maximum grade of 6.3 per cent. Wheels Nos. 344 and 345 were placed in service in February, 1905, and ran together 222,727 miles. They were turned twice and taken out of service in 1908 on account of their diameter being too small to permit the motors clearing the paved streets. The total mileage of these two wheels in St. Louis and Kansas City was 247,200. The wheels under car No. 230 had made 210,000 miles, under car No. 236, 220,000 miles, and under car No. 249, 230,000 miles in Kansas City alone and were still in service on June 1, 1909. The average life of a cast-iron wheel on the same road under the same conditions was 46,000 miles.

The manufacture of Schoen steel wheels from cast-steel blanks was superseded about December, 1904, by the present process of manufacture which substitutes steel slabs for the cast-steel blanks originally used. By reason of the rolling in the slabbing mill these blanks receive a considerable amount of work before they reach the wheel plant, which fits them more perfectly for severe service. The slab is first heated, subjected to forging under a hydraulic press of 7000 tons pressure and sheared to a circular form, the hub being raised in this first forging by acorn-shaped dies. The steel is then reheated and forged under a second hydraulic press at 5000 tons pressure. This forging produces the rough contour of the flange, and before the wheel is withdrawn from the press the rim alone is subjected to an extra forging operation. From the second forging press the wheel passes to the punch, where the metal left in the center of the hub by the acorn dies is removed. It is then heated to a wash heat in a heating furnace and passes to the rolling mill, which rolls the webs and the front, back and tread of the rim. Thence it passes to the coning press, where it is dished and made truly round under 1200 tons hydraulic pressure. The wheels for freight service are rolled to a finish only, but wheels intended for street or interurban railway service are further machined on the treads, so as to insure correct contour, and on the front and back of the hub. They are then rough bored and the tape size or circumference of the wheel is stenciled on the web.

Excellent as the service of the wheels manufactured from cast-steel blanks has been, the service of a solid wheel rolled and forged from a steel slab is better. Only a few wheels have been taken out of service and replaced because of lack of endurance in the metal. On the Alabama City, Gadsden & Atalla Railway, Gadsden, Ala., a pair of Schoen wheels have run 70,000 miles with a wear of less than 1/16 in., confined entirely to the tread.

A pair of 34-in. Schoen steel wheels in service on the elevated division of the Interborough Rapid Transit Company, New York, have run 60,400 miles without turning, showing a wear of only 1/16 in. per 12,080 miles run. The service on this road, owing to the high speeds and the frequent stops, with consequent rapid acceleration and retardation, is exceedingly severe.

Schoen steel wheels Nos. 37204 and 37221 have run together on the same axle under severe conditions on another elevated railroad in the East 89,638 miles in two years' time, and are not quite ready for the first turning. The approximate number of stops for these wheels to date is 268,914, radial wear 13/32 in. on one wheel and 15/32 in.

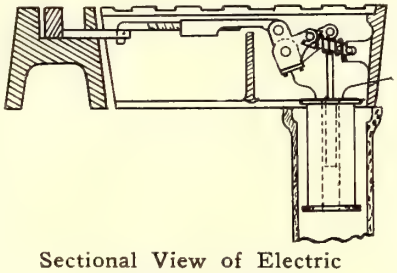
on the other, giving approximately 13,790 and 11,951 miles per 1/16 in. of wear.

The material which composes the Schoen steel wheel is homogeneous, and the extent to which the rim may be worn depends on the thickness of the rim, the diameter limit for clearance and the care taken to produce longest life. With due care, the loss of the wearing body may be greatly reduced and the ability to increase or decrease the value of the wheel in service is largely in the hands of the user. With wheels mated according to their tape sizes, finished bore smooth and true, the center line of the wheel coincident with the center line of the axle upon which it is mounted, with truck square and brake rigging kept in proper adjustment, it is reasonable to expect a large mileage and low expense in maintenance and repair.

Since the Schoen Steel Wheel Company was purchased by the Carnegie Steel Company, in July, 1908, it has been the constant endeavor to standardize so far as possible types of wheels for street railway, interurban and elevated railroad service. A number of standard street railway wheels have been designed in accordance with the recommendations of the American Street & Interuban Railway Association, with the essential purpose in view of decreasing the cost of manufacture and making these wheels economical to use under all conditions of service.

ELECTRIC SWITCHING DEVICE FOR STREET RAILWAYS

The C. W. Squires Manufacturing Company, Beverly, Mass., is placing on the market a new electric switching device for street railways, which has been given a thorough trial on a number of roads in New England during the past year, among them the Connecticut Company and the Boston & Northern Stret Railway. The mechanism has been designed with the view of obtaining simplicity and positive action. As will be seen from the accompanying sectional drawing, the switch tongue is moved by a double-acting solenoid magnet which stands in a vertical position, thus doing away with friction and wear on the magnet tube. The plunger of the solenoid is connected to one arm of a pivoted bell crank. To the other arm of this crank is attached a yoke and adjusting screw connected to the switch tongue. The operating magnet is suspended in a section of standard drain tile below the bottom of the switch box. No sewer connection is needed, as the solenoid will operate equally well if covered with water. A compartment in the switch box catches any dirt which might wash in under the cover, and it is easily removed when necessary by lifting the lid of the box.



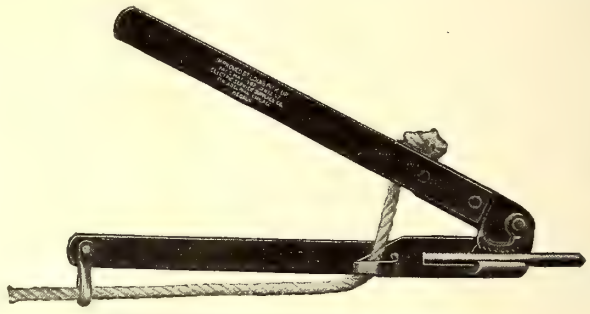
Sectional View of Electric Switching Device

The circuit-controlling mechanism consists of a magnet coil inserted in the car circuit. When this magnet is energized it lifts an armature which makes a contact from the trolley wire, through the operating solenoid to ground. About 2 amp is required in the operating circuit, and no resistance coils are needed. The trolley contactor consists of a section of angle iron about 18 in. long electrically connected to the trolley wire through the controlling magnet. A car can stand with the trolley wheel under the contactor for any length of time, it is claimed, without injury to the mechanism. Only a single wire is used between the controlling magnet and the operating magnet, as the latter is entirely automatic in its action.

With this device a switch may be passed by a car climbing a steep grade without throwing off the power and coasting. Neither does the current required for the light, heaters or air compressor on a car affect the proper working of the switch.

TROLLEY WIRE PICK-UP

A broken trolley wire is often the cause of serious delay to cars, especially if the car crews are not supplied with a device for handling a live wire or the emergency wagon is stationed a long distance from the break. The accompanying engravings show the improved St. Louis trolley pick-up device recently designed and now being sold by the Electric Service Supplies Company, Philadelphia and Chicago.



Trolley Pick-Up, Ready for Use

The two handles are made of hard fiber, hinged together at one end by malleable iron castings. One casting is made with a jaw and the other with teeth, so that when grasped between them the trolley wire is firmly held in place and in a perfectly straight position. The wire is not bent, therefore, when the strain is applied. The rope provided with each pick-up is fastened to the malleable iron casting of the upper handle and passes through an eye in the casting of the lower handle, and from this eye through a second eye at the end of the handle, so that the harder the rope is pulled the stronger the wire is gripped. All of the pulling strain comes on the malleable iron jaws, and no strain is put on the fiber handles.

In case a trolley wire breaks it is gripped in the jaws of the pick-up, the loose end of the rope thrown up over the limb of a tree or other support, the wire drawn up and the rope fastened. This allows a car to proceed without waiting for a repair wagon. Each improved pick-up is furnished with 50 ft. of either cotton or manila rope, making a bundle only 18 in. long which can be conveniently placed under the seat of a car.

Several railways are equipping their cars with a pick-up of this type and, it is said, they have found the small expense of this device is more than saved in the delays which it overcomes.

The Ganz steam motor car built by the Railway Auto Car Company and tested by the Chicago, Rock Island & Pacific Railroad about a year ago has been returned to the railroad fitted with a new Ganz engine of low steam pressure and a new Baldwin boiler and superheater. The car will shortly be placed in service on one of the company's branch lines.

HIGH TENSION PORCELAIN INSULATOR

To meet the demand for insulators suitable for high-tension transmission lines carrying current at from 70,000 to 100,000 volts the Ohio Brass Company, Mansfield, Ohio, has recently designed and put on the market the suspended type of insulator shown in the accompanying engraving. Cost, weight, size and efficiency were all considered in the design. This type of insulator was recently selected by the Hydroelectric Power Commission of Ontario, Canada, for use on its 110,000-volt transmission line after a very exhaustive investigation and series of competitive tests of a number of patterns submitted.



High-Tension Porcelain Insulator

The design of the lower surface of each porcelain shell is such as to confine the static discharges to an area immediately surrounding the forged stud until the voltage impressed has approached that of flash-over. The operation of the insulator is very quiet up to flash-over. Only the best grade of Portland cement is used in assembling the parts. The electrostatic capacity is small, as each unit consists of a single porcelain shell (in place of several shells), a malleable iron cap and a forged steel pin.

The mechanical breaking strain of this insulator is approximately 9500 lb. to 10,000 lb., which allows ample factor of safety for normal conditions. The weight of each unit complete with cap and forged stud is 10¼ lb. and when assembled the distance between the edges of adjacent porcelain shells is 6¼ in. The length of two assembled units, from center of eyes in top unit to lower edge of forged pin in lower unit, is 13 9/16 in. and each unit added increases the length by 6¼ in.

Each assembled unit when tested dry will flash over at approximately 95,000 to 100,000 volts, and under a heavy precipitation of 0.3 in. to 0.4 in. of water per minute at an angle of 45 deg. will flash over at approximately 50,000 to 55,000 volts. When tested under oil it punctures at approximately 120,000 to 150,000 volts. Each insulator is tested to 6000 lb. before packing and is given a flash-over test after the mechanical test, in addition to a severe electrical test before assembling.

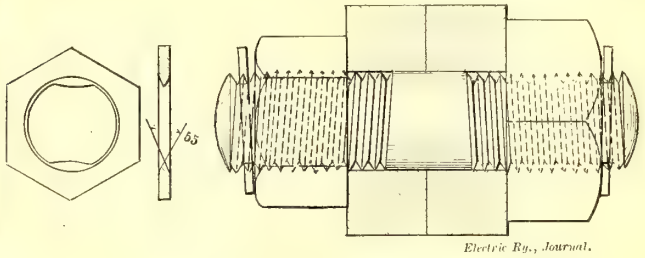
In an assembled condition of two units with a separation between the porcelain shells of 6¼ in. the flash-over dry is approximately at 175,000 volts and each unit which is added increases the flash-over approximately 75,000 volts. Two units under 0.3 in. to 0.4 in. precipitation per minute flash over at approximately 110,000 volts and each additional unit increases the precipitation flash-over by approximately 45,000 volts.

Representatives of the steam railroads and a number of Government officials have joined in a co-operative plan to conduct an inquiry into the physical properties and methods of manufacture of steel rails to ascertain what can be done to improve the rails now purchased.

A NEW LOCK WASHER

A new nut lock, or more properly a lock washer, has recently been placed upon the market by the United Lock Washer Company, Springfield, Mass. It is known as the Hugtite and is claimed to possess a number of advantages over other styles of nut lock or washer.

As illustrated in the engraving, it consists of a hexagonal disk of metal from the hole in the center of which are two opposite tongues projecting for the purpose of engaging the bolt thread. The washer is put on over the end of the bolt outside or after the nut, and not between the nut and bolt seat, as is usually the case. It is then screwed up by hand until it has reached the face of the nut, which is assumed to be first firmly screwed to place. Then a slight turn of the wrench is sufficient to fix or jam the washer to a lock. The rim of the washer is amply sufficient for wrench use, while not as thick as lock nuts now in use.



A New Lock Washer

Hence the saving in bolt length by using this washer is obvious, a not inconsiderable item for large consumers.

The Hugtite is patented and made in all sizes of suitable stock. In tests it has been found to withstand successfully jars and vibration as well as contraction and expansion. It is equally well adapted to right or left-hand thread of the same pitch and diameter.

It has been used by the Springfield Street Railway and Worcester Consolidated Street Railway in track work and other service and has also been successfully tested on steam railroads, autotrucks, drop hammers and machinery subject to considerable vibration.

The manufacturers will make an exhibit at the Denver convention.

IMPROVED RADIAL COUPLER FOR INTERURBAN CARS

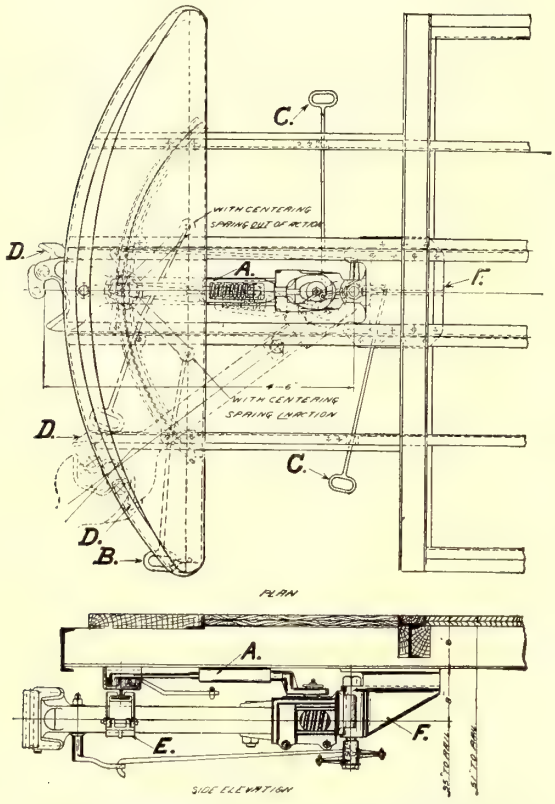
Since the Janney radial coupler was brought out by the McConway & Torley Company, two years ago, it has been applied to a large number of cars in interurban service. Experience with the first equipments put in service has suggested a number of improvements and modifications, which have been incorporated in the device as now made. The engraving on the next page illustrates the application of the coupler in its latest form to an interurban car of the ordinary type.

The coupler head is of the steam railroad M. C. B. standard type, with the addition of a lug, *D*, cast on the side back of the knuckle pin, to engage with the point of the guard arm of the connecting coupler, and thus prevents buckling when the cars are pushed around sharp curves. The couplers are interchangeable with all steam railroad couplers, and cars equipped with them may be run in steam trains without any adjustment or modification. The M. C. B. contour lines of the knuckle and head permit of the operation of 50-ft. interurban cars with the usual overhang over sudden changes of grade of from 6 to 7 per cent. If it is necessary to provide for greater vertical variations

the equipment can be furnished with a spring carrier, but the use of this is not recommended, as this carrier does not operate unless the coupler heads are bound together, and the free vertical movement of the two couplers within each other is prevented.

Two couplers of this type will couple automatically by impact on straight track, and by means of the rods *C* may be uncoupled on either straight or curved track without going between the cars. The position of the rods *C* is not affected by lateral movement of the coupler head, as they are attached to a crank pivoted under the swiveling pin by which the drawbar is fastened to the underframe. They project out to the side under the platform steps.

Under normal operating conditions the coupler is held in position under the center line of the car body by the centering spring and rod *A*. When it is desired to couple cars standing on curves the tension on spring *A* can be released by means of rod *B*. The coupler head can then be moved laterally to either side. After coupling the centering spring can again be put in tension and locked by a pull on rod *B*.

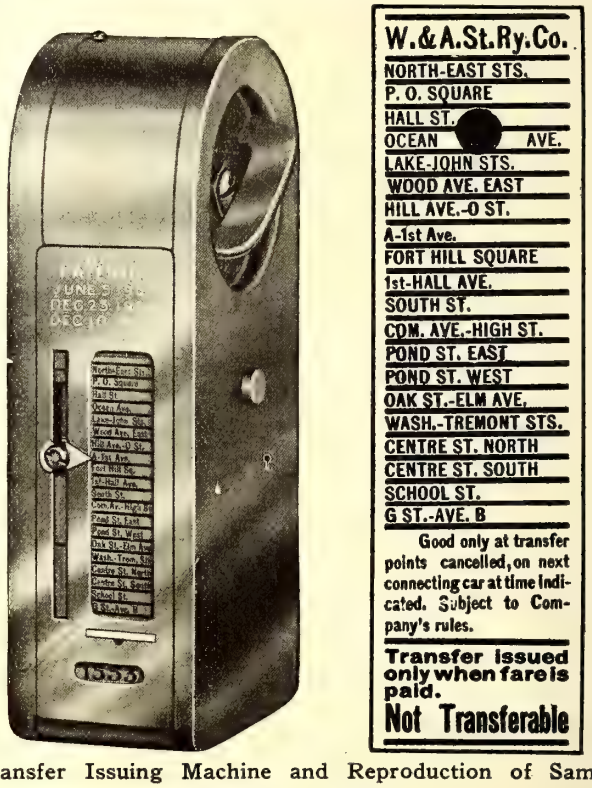


Plan and Side Elevation of Radial Coupler and Attachment

A TRANSFER ISSUING MACHINE

The auditing and checking of transfers on a large street railway system is unsatisfactory at best with the ordinary method of issuing and accounting for them. The machine shown in the accompanying engraving is intended to give the auditing department of a street railway the same control over the sale of transfers as is exercised by the auditing department of a steam railroad over tickets sold at stations by agents. The machine does automatically all that a conductor does when issuing a transfer in the ordinary manner.

The conductor on receiving a cash fare from a passenger desiring a transfer inserts the fare in the receiving slot of the machine, moves the destination hand to the proper transfer point and turns the handle of the machine once around. This pushes out a transfer, properly numbered and punched as to date, time and destination. The time is indicated by an automatic clock enclosed within the machine, which prints the exact time at which the transfer was issued. The machine registers the number of transfers issued, and the conductor at all times can tell how many transfers have been issued and how many remain in the machine. Each conductor receives a machine fully charged on starting to work, and turns it in to the receiving clerk with his cash and trip sheet at the end of the day. No one but the receiving clerk, who is supplied with a key, can open the machine to insert or remove transfers or cash. The cash inserted in the machine to issue transfers remains in it until removed at the office. The machine cannot be operated until unlocked by the insertion of a nickel in the slot, and if any other coin than a nickel or any foreign article is inserted the machine locks itself and thus furnishes proof of tampering with it.



Transfer Issuing Machine and Reproduction of Sample Transfer as Punched

Only one transfer can be taken out for each nickel inserted.

On lines issuing transfers on tickets the conductor uses one of the cash fares received from a passenger who did not ask for a transfer to insert in the machine and substitutes the ticket for the cash in making up his record of cash and tickets as shown by the fare register.

The machine is 7 in. high, 2 in. wide and 3 in. deep, or about the size of a folding camera. It weighs 2½ lb. and is carried on a strap over the shoulder of the conductor. The capacity of the machine at one charge is 250 transfers and it may be recharged in two minutes. The makers claim that transfers can be issued with one of these machines more rapidly than when punched by hand in the ordinary way.

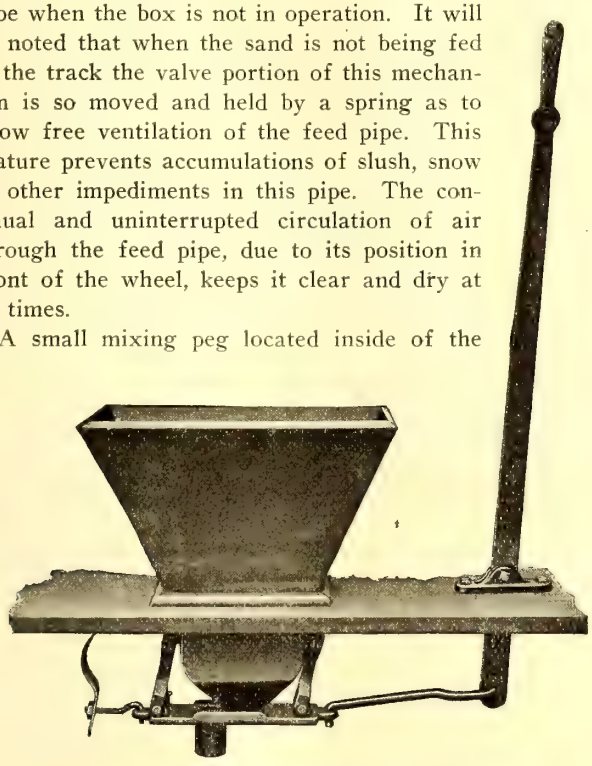
This system of issuing transfers is patented by the Transfer Issuing Machine Company, Boston, Mass., which makes and leases the machines to street railway companies.

NEW SAND BOX

The accompanying illustration shows a new sand box recently brought out by the Western Electric Company, which has been successfully used on the cars operated by the Richmond Light & Railway Company for some time.

The accompanying view shows the position of the feed tube when the box is not in operation. It will be noted that when the sand is not being fed to the track the valve portion of this mechanism is so moved and held by a spring as to allow free ventilation of the feed pipe. This feature prevents accumulations of slush, snow or other impediments in this pipe. The continual and uninterrupted circulation of air through the feed pipe, due to its position in front of the wheel, keeps it clear and dry at all times.

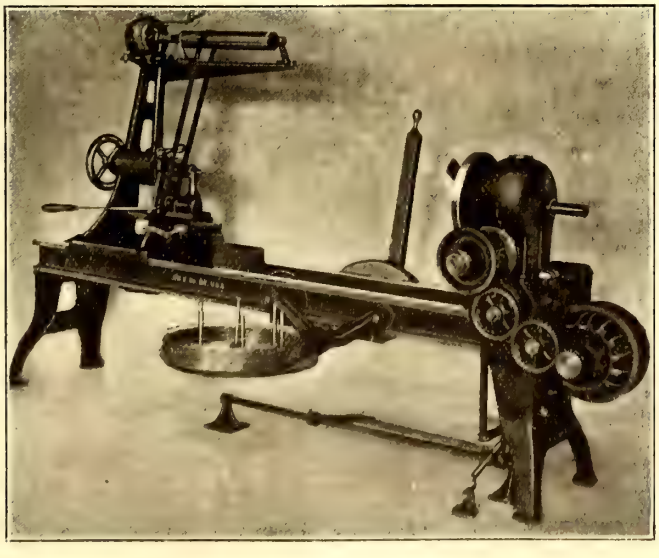
A small mixing peg located inside of the box at the valve seat prevents the sand from banking at the edges of the opening, and also breaks up any lumps in the sand, so that the moment the valve opens a stream of fine sand flows to the rail. The valve opens through levers, which may be arranged for hand or foot operation.



Hand-Operated Sand Box

COMBINATION ARMATURE REPAIR MACHINE

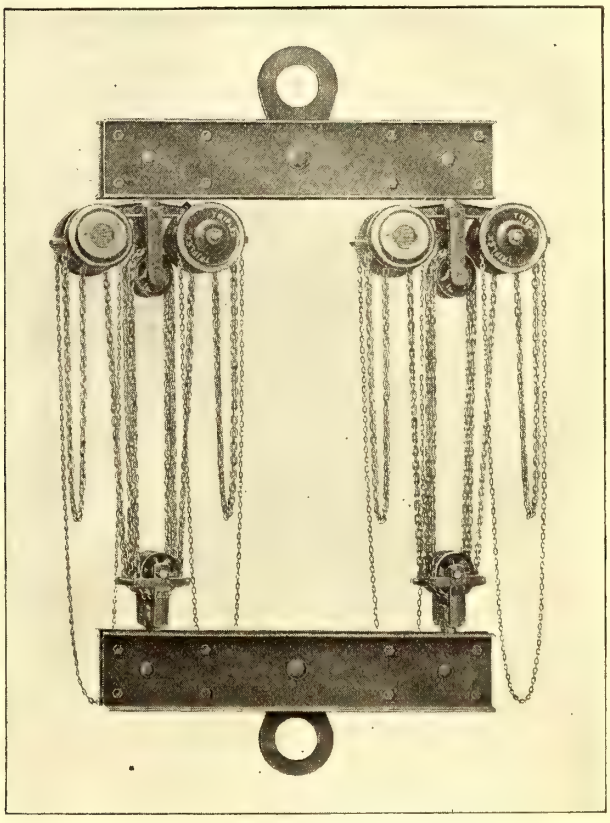
The American General Engineering Company, of New York, has just completed a motor-driven or direct-drive armature banding machine, which combines its various devices and attachments for slotting, trueing and grinding commutators. A view of the machine showing the gears and motors is presented in the accompanying illustration. A Westinghouse motor is suspended below the headstock and geared to the friction clutch pulley by the set of gears shown, but the machine can also be belt driven by disengaging the gears, which are easily removed. A rheostat is placed in an accessible position in front of the machine, so that the operator can turn the current on or off at will. The commutator slotting device is driven by an independent motor mounted on a slide rest, and is operated by a lever. By changing this slotter the slide can also be used for trueing and grinding.



Combination Armature Repair Machine

A 40-TON CHAIN BLOCK HOIST

The 40-ton triplex chain block illustrated herewith has recently been developed by the Yale & Towne Manufacturing Company, New York, to meet the demands of engineers for a hand hoist to handle very heavy loads where the installation of an electric crane or powerful steam hoist is not practicable either because of time or cost. The 40-ton triplex hoist is composed of two 20-ton blocks with equalizing bars at the top and bottom. This provides for single point suspension and for a single point for attachment of load. The equalizing bars are made of two channels placed back to back with separators between. Provision is made for the switching of each unit at the top and bottom. The clevises or points of attachment enable the hoist to be put in place easily wherever used, and also afford a convenient point for the attachment of the load. This hoist is especially useful in wrecking work, in manufacturing plants and generally for loading and unloading. It may be installed over railroad tracks on a properly guyed temporary or permanent trestle. Lateral motion may be secured by one or more trolleys running on a large I-beam.



40-Ton Triplex Chain Hoist

The hand chains are arranged to permit two, four or

eight men to work effectively. Where the load is heavier than the capacity of one hoist, it is generally of sufficient bulk to permit the attachment of two of these 40-ton units to be worked together, and thus giving a total capacity of 80 tons.

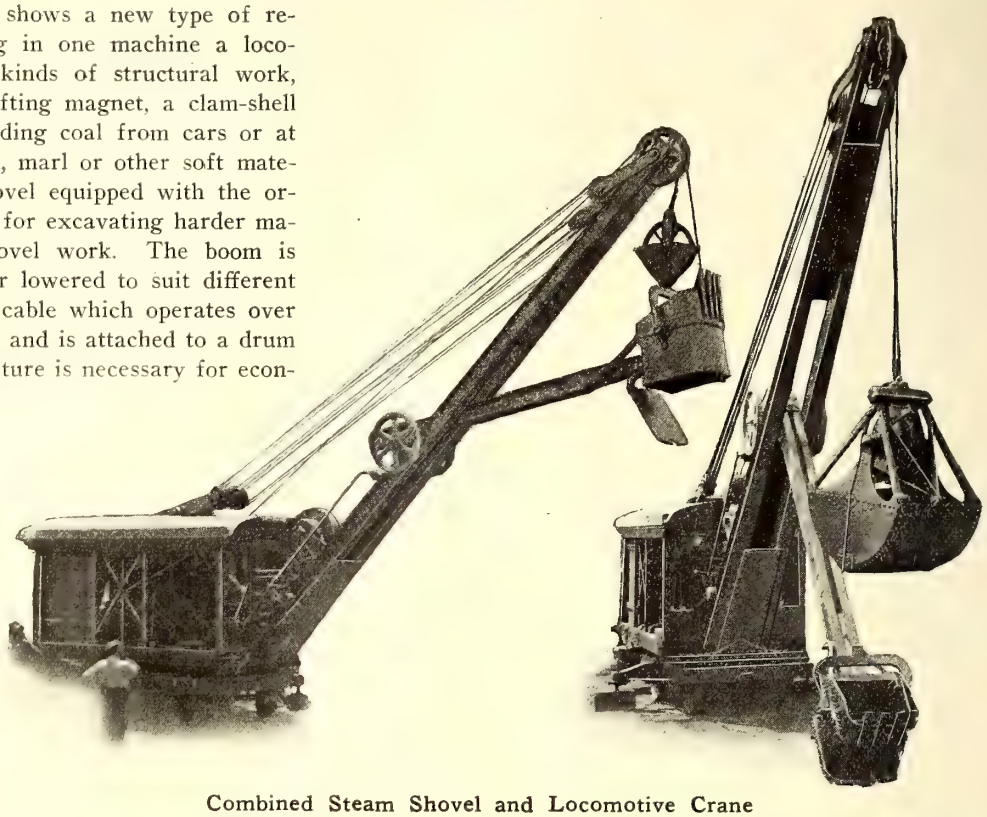
COMBINED STEAM SHOVEL AND LOCOMOTIVE CRANE

The accompanying engraving shows a new type of revolving power shovel combining in one machine a locomotive crane for handling all kinds of structural work, either with a swivel hook or lifting magnet, a clam-shell or orange-peel bucket for unloading coal from cars or at stock piles, digging sand, gravel, marl or other soft materials and a revolving power shovel equipped with the ordinary dipper and dipper handle for excavating harder material or for regular steam shovel work. The boom is 36 ft. long and can be raised or lowered to suit different classes of work by means of a cable which operates over sheaves at the point of the boom and is attached to a drum on the deck of the car. This feature is necessary for economy of operation when the machine is used as a crane or with a clam-shell or orange-peel bucket and is of assistance when the machine is being used as a steam shovel. The boom is equipped with a shipper-shaft and pinions over which the dipper handle operates and also a double drum for operating the clam-shell or orange-peel buckets and a counterweight and line for holding the clam-shell bucket in line with the boom when the bucket is being hoisted.

When used as a steam shovel with dipper and handle it is possible to bring the shipper-shaft to a point within 10 ft. of the rail by lowering the boom. This enables the dipper to dig considerably below the rail and much lower than if the boom were stationary. The dipper can also be raised sufficiently to bring the shipper-shaft 18 ft. from the rail, thus enabling the dipper to dump into cars or wagons on a high bank. This feature is especially desirable for cellar excavating and trench digging. When the boom is in its normal position, which is at an angle of about 45 deg., the shovel will make a cut 48 ft. wide in a 6-ft. bank. It has a clear height of lift of dipper with dipper door open of 14 ft. and will dump out 26 ft. in any direction from the center. Such a wide range of action would be difficult to get in any other type of shovel of this size.

The truck frame of this machine is composed of one solid steel casting practically indestructible, so designed and machine finished as to accommodate either road traction wheels or railroad trucks. The change from traction wheels to railroad trucks or vice versa can be made on the work in less than two hours. The machinery is mounted on a car body 17 ft. 4 in. long x 8 ft. 4 in. wide. The upper body revolves on a cast steel turntable 6 ft. 6 in. in diameter, which carries a machine-finished wheel-path, over which the rollers operate. The rack which swings the car body is a separate steel casting with straight-faced teeth machined to fit and securely bolted to a turntable casting. The car body is equipped with strong cast-steel swinging jack-arms with a spread of 11 ft. 8 in.

The machine is self-propelling in either direction at a speed of from 280 ft. to 500 ft. per minute on a level track. When used as a locomotive crane it has a lifting capacity of 16,000 lb. at a 22-ft. radius and 7500 lb. at a 38-ft. radius. When used as a steam shovel it has a digging capacity in ordinary material of from 400 to 600 cu. yd. per day of 10 hours. It carries a 1-cu. yd. dipper and a 1½-cu. yd. clam-shell or orange-peel bucket.



Combined Steam Shovel and Locomotive Crane

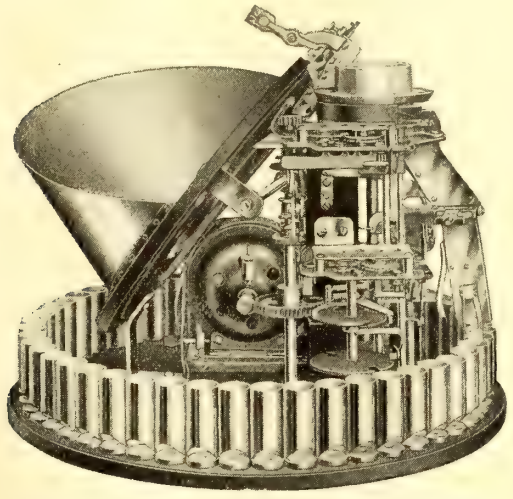
The shovel illustrated is equipped with direct-current, 550-volt motors for electric operation. The hoisting motor is 75 hp and the swinging motor is 30 hp. Both are of the railway type, series wound, with relay magnetic control, solenoid brake, resistance contactors, circuit breakers, etc. The shovel is propelled from the swinging motor and the boom is raised or lowered from the hoisting motor. When steam is used for power a 54-in. vertical boiler, a set of double 7-in. x 6-in. hoisting engines and a set of double 5-in. x 6-in. swinging engines are substituted for the motors and electrical equipment. Otherwise the machinery is practically the same.

This machine was built by the Vulcan Steam Shovel Company, Toledo, Ohio, for the Winona Interurban Railway Company, Warsaw, Ind., and will be used by the purchaser for digging gravel ballast, grading and for handling material in the yards.

AUTOMATIC COIN COUNTING AND PACKAGING MACHINE

The machine shown in the accompanying engraving is designed to automatically count and deposit into either bags or paper rolls any quantity of coins of denominations from pennies to quarters. It is small, rapid, accurate and durable, is only 20 in. in diameter and 16 in. high. A small motor, which will operate on an ordinary electric-light circuit, drives the counting mechanism through a worm gear. The coins are deposited in the hopper shown at the left and are picked up by the inclined feeding wheel which deposits them in the counting head. From the counting

head the coins drop through a chute into the ring of cups, each of which holds a paper roll for packaging. Packages can be made up to hold 50 pennies or dimes or 40 nickels or quarters. If it is desired to deposit the money in a bag after counting the bag is hung under the bottom of the delivery chute. The machine is fitted with two registers, one counting from 0 up to 10,000 and the other counting



Coin Counting and Packaging Machine

from 10,000 down to 0. These counters are so constructed that any or all digits can be set to zero instantly. With these double registers any desired method of checking accounts of cashiers, collectors or conductors can be used, the machine acting in the double capacity of bookkeeper and money packager. The machine is made and sold by the Couch & Seeley Company, Boston, Mass.

1200-VOLT DIRECT CURRENT RAILWAY INSTALLATIONS

The General Electric Company, Schenectady, N. Y., has recently closed a number of important contracts for 1200-volt, direct-current railway equipments. The rapidly increasing use of this system for interurban and suburban lines is shown by the following list of roads using 1200 volts on the trolley which are operating or under active construction:

1200-Volt Direct Current Railways in the United States

	Mileage	Car equipments	Substation units
Indianapolis & Louisville Traction Company, Louisville, Ky.	41	13 4-motor 75 hp	*No substations
Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa.	64	16 4-motor 75 hp	7 400-kw motor-generator sets
Southern Cambria Railway, Johnstown, Pa.	24	4 4-motor 75 hp	*No substations
Sapulpa Interurban Railway, Sapulpa, Okla.	9	7 4-motor 50 hp	*No substations
Aroostook Valley Railway, Presque Isle, Me.	12	2 4-motor 50 hp	2 200-kw rotaries
Central California Traction Company, Stockton, Cal.	16	6 4-motor 75 hp	2 500-kw motor-generator sets
Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.	60	30 4-motor 75 hp 3 4-motor 125 hp	15 300-kw rotaries
Southern Pacific Railroad, Oakland, Cal.	12	44 4-motor 125 hp	12 750-kw rotaries
Milwaukee Electric Railway & Light Company, Milwaukee, Wis.	90	15 4-motor 50 hp	12 300-kw rotaries
Shore Line Electric Railway, New Haven, Conn.	52	12 4-motor 50 hp	6 200-kw rotaries

*Entire line supplied direct from power stations.

The Indianapolis & Louisville Traction Company and the Indianapolis, Columbus & Southern Traction Company operate a combined through service between Indianapolis and Louisville. The 1200-volt section of this road has now been in operation for two years. The trouble due to electrical apparatus is said to have been even less than ordinarily experienced on systems equipped with 600-volt trolley.

The Central California Traction Company has been operating for a little over a year, and the absence of troubles of any character has been particularly marked. This road uses a 1200-volt third-rail of the inverted type. The power is purchased and converted in a substation from 60-cycle alternating current to 1200-volt direct current by two 500-kw motor-generator sets. The generator ends of these units are straight 1200-volt machines.

The Pittsburgh, Harmony, Butler & New Castle Railway has been in operation for about one year.

The Southern Cambria Railway, of Johnstown, Pa., will commence operation shortly with four motor cars. There are no substations on the entire 24 miles of road, power being furnished directly from the power station at 1200 volts direct current by two 300-kw, 600-volt, direct-current generators connected in series.

The Sapulpa Interurban Railway, which now operates 600-volt lines in the Sapulpa, is building a 9-mile extension which will be operated with 1200 volts on the trolley. Power is to be furnished for the entire line from the power house at 1200 volts, direct current. Two 200-kw, 600-volt generators driven by gas engines are connected in series. A further extension of some 15 miles will later be built and operated with 1200-volt d.c. trolley.

The Aroostook Valley Railway Company will operate a combined passenger and freight service, using two 4-motor, 50-hp equipments for passenger service and one 4-motor, 75-hp equipment for locomotive service. The entire line is supplied from one substation. Power is purchased at 60-cycle alternating current and converted to 1200-volt direct current by two 200-kw, 60-cycle, 600-volt rotaries connected in series.

The Washington, Baltimore & Annapolis Electric Railway recently decided to change over from the 6600-volt, single-phase system now in use to the 1200-volt, direct-current system to permit the use of smaller cars required for entrance into Washington, D. C., and the operation of a more economical service. Power is purchased as 25-cycle alternating current and distributed to four substations which supply 1200-volt direct current for the entire line and also 600-volt direct current for operation of the terminal in Annapolis. The equipment of the substations includes a varying number of units, each consisting of two 300-kw, 25-cycle, 600-volt rotary converters connected in series.

The Southern Pacific Railroad installation will include the electrification of the suburban lines around Oakland, Cal. Although the length of line equipped is short, the service is extremely heavy. The operation of trains as high as 12 cars is contemplated. Power is supplied from two substations, each containing three 1500-kw units, consisting of two 750-kw, 25-cycle, 600-volt rotary converters connected in series.

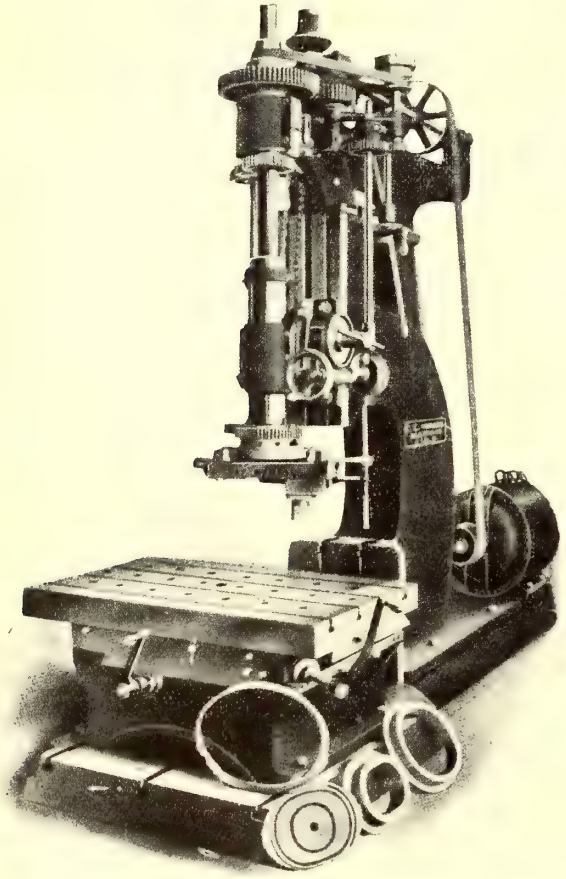
The Milwaukee Electric Railway & Light Company is changing the lines now operated with the 3300-volt, single-phase system to 1200-volt direct-current operation. The service on these lines is extremely severe owing to the necessity of hauling trains of several cars during short periods of the year. Current at 1200 volts is supplied from five substations. Three of these contain four 300-kw, 25-cycle, 600-volt rotary converters, one is equipped with three 500-kw rotary converters and the fifth is equipped with two

500-kw rotary converters. It is expected that operation with 1200-volt current will be commenced on this line at an early date.

On the Shore Line Electric Railway the entire 52 miles of road will be supplied from two substations, each containing three 200-kw, 25-cycle, 600-volt rotary converters. The power house will contain two 1500-kw, 25-cycle Curtis turbines. The arrangement of the substations is of interest in that two rotaries are operated in series, the third rotary being used as a spare. The switchboard is arranged so that any two of the three rotaries can be operated together.

ELLIPTICAL BORING MACHINE

There are frequent occasions in the machine shop when it is necessary to machine an elliptical casting such as a manhole cover or ring. The machine shown in the accompanying engraving is designed for use as an ordinary heavy boring and turning mill, but it is also supplied with a special gear-head attachment whereby true ellipses or ovals



Elliptical Boring Machine

can be cut without the use of patterns or forms. An experienced machinist can face and turn an elliptical casting as quickly and accurately as a true cylinder. By making suitable changes in the gears oval, triangular, square and other regular shapes can be turned or bored. To turn rounds an idler gear in the head is thrown out of engagement. The machine is fitted with a tapping attachment and the table can be furnished with automatic feed for milling. Other special tools and attachments are made to order for a wide variety of work.

The maker is the Covington Machine Company, Covington, Va., which also makes a complete line of punches and shears.

TANTALUM LAMPS FOR RAILWAY SERVICE

In the opinion of many illuminating engineers the invention and commercial introduction of high efficiency lamps have constituted the most important improvement in electric light effected for many years, but up to this time these lamps have not been practically available for railway service. The Buckeye Electric Company, Cleveland, Ohio, however, has just made the important announcement that it has developed its tantalum lamp in two sizes—16 cp and the 32 cp—for use on street railways. These lamps consume only 2.3 watts per candle, as compared with the ordinary 4 watts per candle lamp, so that they use approximately only about four-sevenths as much power as the latter.



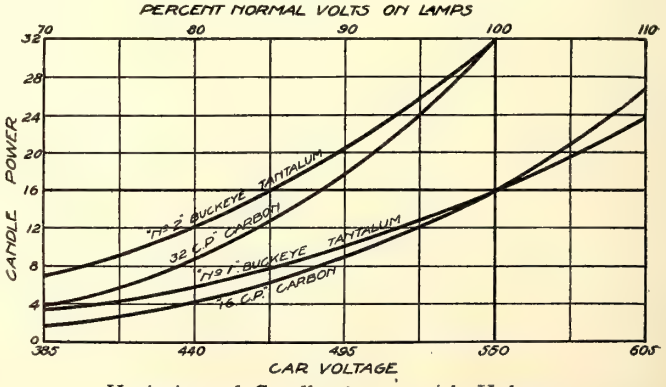
Tantalum Lamp

To those who are unacquainted with the properties of tantalum it might be said that tantlum wire, when in a state of purity, only recently made commercially possible, has a tensile strength of 57 tons per square inch, about equal to that of the best steel wire. The metal tantalum melts at about 2300 deg. C. It is unaffected by strong acids or alkalis at



Car Equipped with Tantalum Lamps

ordinary temperatures, and is no longer classed among the very rare metals. Before putting this lamp on the market the Buckeye Electric Company thoroughly tested it out under actual operating conditions on five different roads,



Variation of Candle-Power with Voltage

where it gave very good satisfaction. A view, taken at night, of a large city touring car equipped with tantalum lamps is shown in one of the engravings on this page.

The company has also prepared a list of the qualifications demanded in a lamp, and has given each qualification a

value to correspond with its relative importance. The comparative numbers of points accorded the tantalum and ordinary lamps are given in the two final columns in the table. While all electric railway engineers may not agree with the exact numbers assigned to each of these qualities, the table is at least interesting. For cases in which energy costs more than 0.4 cent per kw-hour for tantalum lamp, on this basis, is more economical than the carbon lamp.

Qualification	Points (Standard Rating)	Estimated Points Carbon	Estimated Points Tantalum
(1)—Lamps should be economical when considering cost of power plus renewals....	3.8	2.9	3.4
(2)—Candle-power of lamps should not be greatly affected by the ordinary voltage variation found on street railway systems	1.9	1.0	1.4
(3)—Light should be good in color quality....	0.4	0.3	0.35
(4)—Light should be free from glare.....	0.5	0.3	0.45*
(5)—Lamps should be inherently long-lived....	1.0	0.9	0.9
(6)—Filaments should be mechanically rugged, especially when cold.....	2.0	1.7	1.9
(7)—Lamps should be economical in current consumption, since the generator may be overloaded at times, and all the current possible needed for the motors.....	0.4	0.1	0.3
Points total.....	10.1	7.2	8.7

*When frosted. About 0.25 when clear.

Another point from which to consider lamps is their freedom from extreme candle-power variation with fluctuations in voltage. This is especially important in railway work, where, with changes of load, variations in light in the car are apt to be produced. The diagram on the opposite page gives the results of a series of tests conducted by the company to show the relation between candle-power and voltage for the two sizes of tantalum lamps and for 16-cp and 32-cp carbon lamps.

Other claims made for the lamp are that its color is more nearly white than the carbon lamp; that where the lamp is frosted, either entirely or on the bowl, a better diffusion of light is obtained; that the life of the lamp is good, and that the tensile strength of the wire is greater and offers greater resistance to mechanical breakage than a carbon filament.

The installation of these lamps requires no changes in the car or constructural wiring.

The Buckeye Electric Company expects to make an exhibit of these lamps at the Denver convention.

VACUUM VENTILATION FOR PAY-AS-YOU-ENTER CARS IN CHICAGO

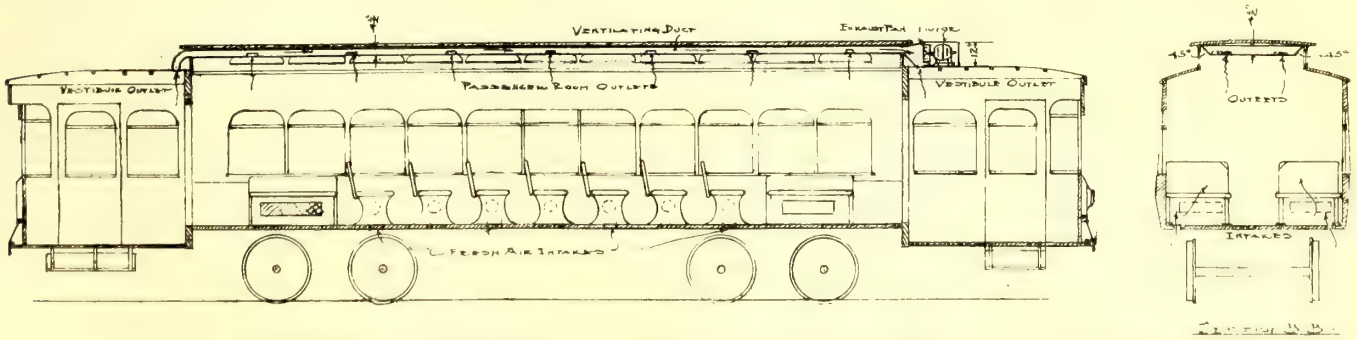
The Chicago Railways Company has just contracted for the equipment of 350 of its new pay-as-you-enter type cars with the vacuum ventilation apparatus known as the "Cooke System." It is thought that this company is the first to adopt any mechanical ventilating system for improving the sanitary conditions of its street cars. With the use of pay-as-you-enter cars equipped with doors kept normally in the closed position, the necessity for some positive method of ventilation is apparent. During the past year the electric railway companies in Chicago and the Board of Supervising Engineers of Chicago Traction have carried on a series of car ventilation experiments. The Department of Health of the city of Chicago has been highly interested in this work, and in connection with the investigation has carefully studied the principles of ventilation and observed the quality of the air maintained by the several types of ventilating systems which have been tested. The results of the earlier tests made under the direction of the Board of Health were presented in the Electric Railway Journal for May 8, 1909, page 876, in an article entitled "The results of a Study of Car Ventilation in Chicago," by W. A. Evans, Commissioner of Health. As a result of the exhaustive tests carried on by the railway and city representatives, the Board of Supervising Engineers has approved the Cooke system of ventilation, and the order for 350 equipments has been placed by the Chicago Railways Company.



Interior of Chicago Car, Showing Exhaust Ventilators in Ceiling

The Cooke system of car ventilation is designed to exhaust the vitiated air by means of a motor-driven fan connected to an exhaust chamber in the roof of the car. Fresh air is drawn in through the lower part of the car body and distributed by ducts which terminate at electric heaters under the car seats, thus affording a means for continuously tempering the air.

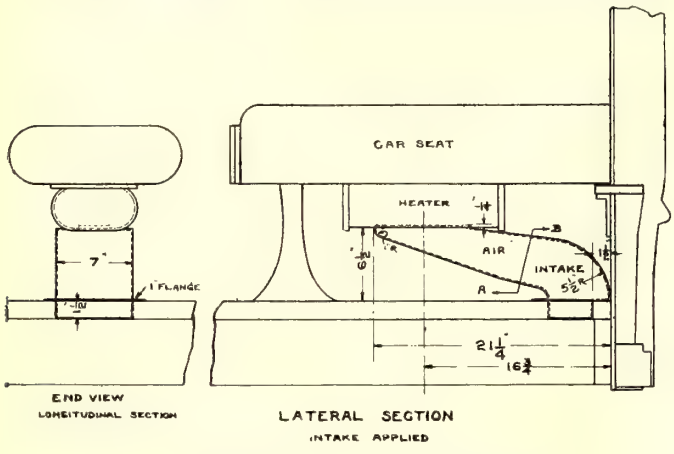
An accompanying engraving showing a cross-section of one of the Chicago Railways Company's cars exhibits the general arrangement of the air-handling devices. Four fresh-air intakes, each 4 in. x 7 in. in size and protected by wire screens, are cut through the floor of the car on each side close to the wall. With the partial vacuum mechanically maintained inside the car, fresh air is continually drawn in through these screened openings, and as it enters



Longitudinal and Cross-Sections of Chicago Car, Showing Ventilating Apparatus

passes between the coils of the electric heaters mounted under the car seats. The respective areas of the fresh-air intakes and the exhaust ports are proportioned so as to permit the passage of air at a velocity so low that its movement is imperceptible; and yet the amount of air drawn in, heated and exhausted, is sufficient to change the body of air within the car often enough to maintain a standard of purity well within sanitary limits.

Vitiated air is exhausted by a motor-driven fan permanently mounted on the top of the vestibule roof close to the monitor deck. The intake for this fan and the fan housing are made of sheet copper so designed that the exterior does not detract from the appearance of the car. Only one fan is used. A cone-shaped duct connects the fan housing with the exhaust chamber, which is formed within the full length



Fresh Air Intakes Under Seats

of the car by means of a false ceiling supported 4½ in. below the main ceiling. This exhaust chamber extends for the full width of the monitor deck and connects with exhaust outlets in each vestibule. It is continuously kept under a partial vacuum by the motor-operated fan. The vitiated air from within the car body and the vestibules enters the exhaust chamber through 14 5¾-in. register openings in the body of the car and 2-in. x 12-in. screened openings, one in each vestibule. The registers fitted into these openings are located on 4-ft. 6-in. centers, and each register is provided with a damper mechanism, so that the air velocity through each exhaust port may be equalized, irrespective of its distance from the fan.

This system of ventilation is said to provide an even and constant circulation of air throughout the car, which is in no way affected by the speed of the car, direction of motion of the car or the wind pressure. The motor which operates the exhaust fan is controlled by a snap switch located within easy reach of the motorman.

The Cooke system of ventilation is a recent development. The patents for the apparatus and the principle of operation are owned by the Vacuum Car Ventilating Company, which has sales offices in the Fisher Building, Chicago, Ill. A plant for assembling and testing the car ventilating apparatus furnished by this company has been established at 76 West Monroe Street, Chicago, Ill.

The Chicago, Wheaton & Western Railway has just opened to traffic a portion of its line, 4 miles in length, extending from Pleasant Hill to West Chicago, in Du Page County, Illinois. The road is being extended to Geneva, Ill., and will be 10 miles long. At pleasant Hill it forms a connection with the Elgin branch of the Aurora, Elgin & Chicago Railway.

PAY-AS-YOU-ENTER CARS AND SPRINKLERS FOR WESTERN CANADA

The handsome pay-as-you-enter cars shown in the accompanying illustrations have been built by the Preston Car & Coach Company, Preston, Ont., for the rapidly growing cities of Edmonton and Calgary in Western Canada. The car shown with the two trolley stands is for the Edmonton Radial Railway. It is of the double-end type, having a sliding door on the right-hand side of each vestibule and double folding doors on the left-hand side, equipped with gates for summer use. The disappearing platform

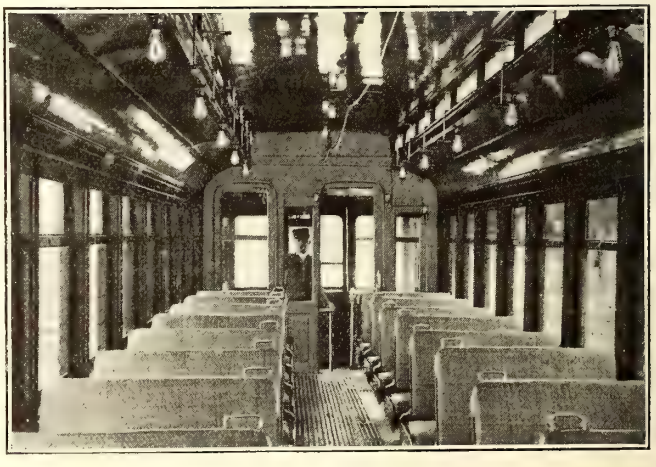


Pay-as-You-Enter Car for Edmonton, Alta.

steps are controlled through a lever and staff extending up into the vestibule and manipulated by the conductor.

The car body is 28 ft. long and the vestibules 7 ft. each. The body is mounted on Bemis No. 45 trucks, with 4 ft. 6 in. wheelbase, which carry four GE motors. The exterior is painted Newport green below the belt rail and Carmilion light above, thereby giving a very pleasing effect. The car interior is finished in birch, stained mahogany, with headlinings painted a light green with gold trimmings. The seats are of the car-builder's "Walkover" type and are upholstered in rattan. Crouse-Hinds interchangeable headlights are standard.

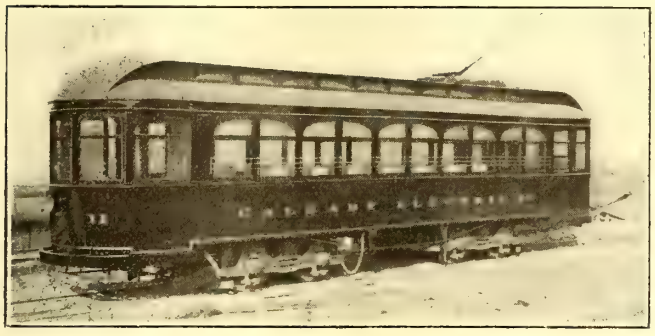
The Calgary cars, which have wide arched windows, are of the single-end pay-as-you-enter design, with the usual



Interior of Edmonton Car

exit and entrance doors at one end. The vestibule railings are similar to those used on the cars of the Montreal Street Railway Company. The car body is 28 ft. long, the rear vestibule 7 ft. and the front vestibule 5 ft. The trucks are of the same type as those used for the Edmonton cars. The roof is of the full monitor type, with the bullnose extending to the points of the vestibule. The top side and the deck sash are semi-elliptic, glazed with chipped glass and

having a ¾-in. clear margin with imitation bevel. The lower side sash drop into the wall of the car. The covers for the sash openings cannot be lifted by passengers when the sash is up, although no lock is required. The seats are also of the "Walkover" rattan type. All the trimmings are of solid, polished bronze. The car exterior is painted Newport green below the belt rail and Carmilion light above. The electrical equipment consists of four Westinghouse 101-B-2 motors and K-6 control. Other fix-



Pay-As-You-Enter Car for Calgary, Alta.

tures of the Calgary design are Jenkins fenders, Brill scrapers and an illuminated sign box in the front dash.

The Calgary and Edmonton systems have also purchased one 5000-gal. sprinkler each from the Preston company. These sprinklers are mounted on the same trucks as the cars. The electrical equipment for the Calgary sprinkler consists of four Westinghouse 101-B-2 motors and K-6 control, and that for the Edmonton sprinkler consists of four GE-80 motors. The pumps are of the Allis-Chalmers centrifugal type, and in tests have enabled the sprinklers to throw spray as far as 55 ft. on each side of the track. The sprinkler heads were supplied by the McGuire-Cummings Company, Paris, Ill. The sprinkler frame is made of structural steel throughout. An awning of striped duck extends over each platform.

COIN SEPARATING AND REGISTERING FARE BOX

The Coin Counting Machine Company, New York, manufacturer of the well-known Johnson coin counting machines, has recently perfected a fare box for use on prepayment cars. This new fare box will receive any coin up to a quarter, register one, two or five fares, as the coin passes through the mechanism, and automatically separate coins of different denominations into cups in a change drawer to which the conductor has access. The counting and separating principle of the mechanism is similar to that of the Johnson coin counting machine, which has been adopted by the United States Treasury Department, leading banks and many street railway companies. An experience of seven years in making these coin counting machines has demonstrated their accuracy, reliability and ruggedness of construction. The mechanism of the new fare box is equally accurate and reliable.

As will be seen from the illustration, the mechanism is enclosed in a metallic casing having rounded corners about 8 in. x 9 in. square and 14 in. high, including the examination box. The upper half of the casing, which can be removed to examine the interior mechanism, is sealed to the lower half, which contains the removable change drawer. It is impossible to tamper with the mechanism or the register dial, which is exposed through a small opening on one side of the casing, without breaking the seal. On top of the casing is a glass cylinder protected by four stout posts bolted into the casing. This cylinder carries a shallow cup on top, in which is a circular hole just large enough to permit a quarter to pass through. The coin in dropping through this plate enters a bent tube containing toothed guards, which prevent any attempt to withdraw coins which have once dropped on the examination plate. After passing through the tube, the coin falls on a pivoted metal examination plate, where it can be clearly seen through the surrounding glass cylinder. Any foreign, counterfeit or mutilated coins or foreign substance can be thrown into a separate compartment inside the box, to which the conductor does not have access, by pressing a small button projecting through the casing. If the coin tendered is satisfactory the conductor gives the handle on the side of the machine one turn, which tilts the examination plate and drops the coin into the mechanism by which they are picked up, registered and separated. Only a few coins can remain on the plate at one time if the conductor fails to turn the crank, as the plate is held horizontal by a light spring, which yields when a weight exceeding about eight nickels rests on the plate.

The dumping crank is geared with a worm and gear to the axis of the revolving feeding plate, and each time it is turned the plate moves through a small angle. As the coins fall from the examination plate they are picked up in the notches on the edge of the feeding plate and carried to sprockets which simultaneously count and separate them as the plate is revolved. Pennies, dimes, nickels and quarters pass through different separators and fall by gravity into the cups of the change tray below. The counters are geared to the register dial with positive bevel gears and rods in such a way that a nickel in passing



Fare Box Mounted on Car Platform

through registers one fare, a dime two fares and a quarter five fares. The first penny which passes through registers one fare, and four more pennies must pass through before another fare will be registered by a sixth penny.

The accuracy of counting and separating mechanism is not affected in any way by the jolting or movement of the car. Any number of coins of different denominations may

be inserted in the machine simultaneously and passed through without clogging. After being dropped in the cup at the top the coins cannot be removed by inverting the box or in any other manner except by passing through and registering.

The box is small and light, and can be transferred readily from one end of the car to the other at turning points. It is substantially built in every detail to withstand hard usage, and its mechanism is simple and not subject to injury or failure. Severe road tests on New York City lines have demonstrated that it is accurate, practical and equal to the requirements of heavy city traffic.

EQUALIZING AND CLEANING SYSTEM FOR AIR BRAKES

C. S. Banghart, general superintendent of the New York & Queens County Railway Company and the New York & Long Island Traction Company, has recently made some tests on the Spencer method for supplying clean, cool air to railway compressors and thereby improving their efficiency. It was noted that under ordinary conditions a new compressor is seriously affected by dust after a few days' operation. Furthermore, as the screens become clogged, the pump valves gummed and the cylinders and packing rings cut, the full volume of the pump cylinder cannot enter or be retained. Hence the compressor is underloaded and the motor speed correspondingly increased. The tests showed that with clean pump valves and a clear intake the motor operated at normal speed, but after three days' exposure to dust the speed increased over 300 r.p.m. and almost doubled in five days. In every case of a damaged armature or other electrical trouble it was found that the compressor was operating on light loads at excessive speed. When the Spencer method was applied a power saving of about 25 per cent was attained and no further trouble arose from dirt.

The principle of this equalizing and cleaning system mentioned may be understood from the following explanation of the accompanying drawing: *A* is the connection to the brake cylinder exhaust. *B* is an automatic check valve which allows the exhaust to pass to the tank *C* until the pressures are comparatively equalized and then opens the

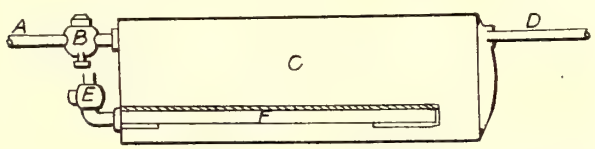


Diagram of Connections of Auxiliary Storage Tank

brake cylinder to atmosphere while retaining the volume in the tank. *D* is the connection from the tank *C* to the compressor. *E* is a commercial check valve which admits the atmosphere when the pressure in tank *C* is below that of the atmosphere. *F* is a route through the tank *C* which permits the atmospheric volume to expand against the bottom wall, where all injurious matter is deposited and remains despite the suction of the pump.

It will be seen that the device consists of means to trap under an item of pressure the greater portion of the exhaust from the brake cylinder at the time of releasing the brakes. This exhaust is not only clean, but also cold, owing to its expansion. On the other hand, air drawn from the atmosphere is cleaned without screens merely by having it expand against the bottom wall of the tank in the manner illustrated. The pressure from the trapped air rests on the pump pistons while they are out of operation, thus preventing an excessive amount of oil from entering the compressor cylinders and flooding the brake mechanism. In the trials made the ammeter showed that there was no overload on the motor, because the pressure action of the trapped volume on the filling piston assists to drive the compressing piston enough to compensate for the additional volume handled.

The following comparison of the atmospheric and equalizing systems is based on compressing 5 cu. ft. of air up to 50 lb. or 65 lb. per square inch pressure.

	Time in seconds	Watt-hours	Amp	Volts	R.p.m. of armature
Atmospheric system	29	54.66	4	500	900
Equalizing system	18	37.83	4	500	400

The foregoing figures were for clean compressors of standard 11 ft. per minute type which had been installed five years. The service requires less than 1 ft. of air per minute. The average of many trials showed that to make one supply operation or compress 5 cu. ft. of air a compressor required 38 seconds at 1120 r.p.m., 4 amp and 550 volts, whereas according to their rated capacity they should have required only 27 seconds at 610 r.p.m., 4 amp and 650 volts. Thus the compressors actually required one-third more time and almost double the speed than was indicated by their rated efficiency. The net deficiency was placed at 80 per cent, a figure large enough to have placed all the compressors out of commission had it not been for their excessive capacity.

After a 40-day experiment under adverse running conditions with a compressor equipped with the equalizing system it was found that the valves were perfectly clean and free-acting. The regular operation of compressing 5 cu. ft. of air was carried out in 27 seconds at 620 r.p.m., 4 amp and 550 volts. In general the numerous trials indicated that under these improved conditions smaller compressors may be used at a considerable saving in power and maintenance costs.

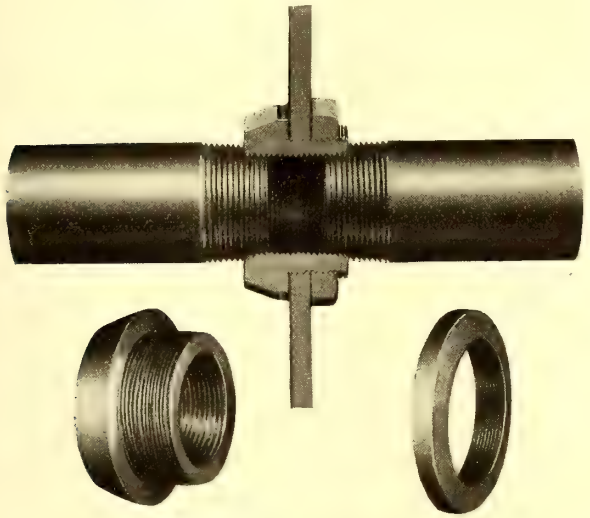
A CANADIAN RECORD FOR THE SIMMEN CAB SIGNAL

The Toronto & York Radial Railway Company's installation of the Simmen automatic railway cab signals on the Mimico division, as described in the Electric Railway Journal of June 12, 1909, continues to give the most satisfactory results. For example, an efficiency of 99.99 per cent was obtained for a total of 86,825 signal indications in August of this year. It will be recalled by readers of the article mentioned that one of the strongest features of this system is the use of cab indications instead of fixed semaphore signals along the track. One great advantage of the cab signal over the track signal is that the call of the dispatcher can be heard throughout the car by bell or buzzer indications, so that neglect of the summons is practically impossible. This, however, is not the only advantage. The strongest argument for cab signals, assuming that they have only equal merit with semaphore signals, is the question of first cost and maintenance. A single-track road equipped with automatic signals requires an average of two to the mile. Statistics show that on the American continent there is now one locomotive for every 5 miles of track. Consequently, with the cab system only one signal is required for every 5 miles, instead of 10 track signals for the same distance. Furthermore, the cost of a track signal is placed at double the cost of a cab signal, so that in the instance assumed the track installation would cost 20 times as much. The maintenance per individual track

signal is also more difficult, as it must be inspected and repaired at its fixed location, whereas the cab signals can receive attention at some central point every day.

REINFORCED SCREWED PIPE CONNECTION

The accompanying engraving illustrates the construction and application of a patented reinforced screwed pipe connection made by the Edge Moor Iron Company, Edge Moor, Del. It is intended especially for attaching a pipe to a plate of any thickness from either or both sides, and is adapted for boilers and tanks under pressure. As will be seen, it consists of an internally threaded, shouldered nipple inserted through a hole in the plate and calked at the



Reinforced Screwed Pipe Connection

shoulder. The part which projects through the plate is also threaded on the outside, and on it is screwed a collar which is turned up tight against the plate. This supplies a standard pipe threaded joint in solid metal, irrespective of the thickness of the plate to which it is attached. The connection requires no special tools to attach it in place, and has a neat appearance on both sides. It has been thoroughly tried out under a variety of conditions for more than three years with entire satisfaction.

CHANGE IN BOSTON ELEVATED POWER SYSTEM

The Boston Elevated Railway Company has begun to build a substation in the Forest Hills district of the city of Boston, for use in connection with the opening of the new elevated line from Dudley Street. It will be supplied with current from a turbo-alternator at the company's Dorchester power station and will contain the usual complement of step-down transformers and rotaries. This equipment will be the first alternating-current apparatus ever supplied from a power plant of the Boston Elevated system, the service having been exclusively direct current from scattered stations of high economy in the past, with the exception of a small amount of energy which has been purchased from central stations in times of emergency and extra heavy load. It is probable that as the Boston system expands, the use of alternating-current transmission will become more necessary, and the initial installation will be watched with interest. The turbo set will be rebuilt for alternating service at Dorchester, several years of experiment with a 200-kw, d.c. turbine having indicated little success with the latter apparatus in railway work.

CONVENTION NOTES

The complete program of entertainment for the Denver convention and other information for delegates and exhibitors has been printed in a small booklet which will be distributed at the time of registration in Denver. The following features of the entertainment program have been abstracted from an advance copy of this booklet.

The official convention badge will be honored for transportation on all cars of the following lines from Sunday, Oct. 3, to and including Sunday, Oct. 10: The Denver City Tramway Company, operating the city lines in Denver; the Denver & Northwestern Railway Company, operating the interurban line to Golden and Layden; the Denver & Inter-Mountain Railway Company, operating an interurban line to Boulder; the Denver & South Platte Railway Company, operating an interurban line from the suburb of Englewood to Littleton. The Denver & Interurban Railway Company, operating to Golden, will furnish transportation upon presentation of the official badge at its general office, 711 Cooper Building, Denver.

On Monday afternoon, Oct. 4, special sight-seeing trolley cars will leave the Brown Palace Hotel at 3 o'clock and will make stops at all of the headquarters hotels, followed by a trip through the residential section of Denver and the boulevards and parks, returning about 5 p. m. This trip is for the ladies of the convention only and is complimentary on the part of the Denver City Tramway Company and the "Seeing Denver" Company.

On Monday evening at 9 o'clock will occur the annual reception to the officers of the railway associations and their wives. The reception will be held in the parlors of the Brown Palace Hotel. Madame Sobrino, of London, and Clifford Wiley, of New York, will furnish vocal music. The reception will be followed by informal dancing.

On Tuesday afternoon the ladies will be given an automobile trip through the parks of Denver. Automobiles seating 12 and 20 persons will leave the Brown Palace Hotel at 3 o'clock, and all those who expect to take this trip are requested to be at the Brown Palace Hotel promptly at the starting time. A guide and lecturer will accompany each automobile.

The fifth annual Supply Men's amateur vaudeville and theatrical performance will be given on Tuesday night at 8:45 o'clock at the Tabor Grand Opera House, Sixteenth and Curtis Streets. The Denver City Tramway Minstrel Troupe and Band will participate. Music for informal dancing until midnight will be provided in the ballroom of the Brown Palace Hotel.

On Wednesday afternoon a trip of 51 miles in special sight-seeing trolley cars will be given the ladies. The cars will leave the Brown Palace Hotel at 2 o'clock and will run to Golden, where a stop will be made to permit the party to inspect the Colorado School of Mines. The return trip will terminate at the "White City" for the barbecue, where the evening is to be spent. This trip is also complimentary on the part of the Denver City Tramway Company and the "Seeing Denver" Company.

A wild game barbecue will be held at the "White City" at 6:30 o'clock on Wednesday evening, and the exclusive use of the "White City" and all of its attractions has been offered by the Denver City Tramway Company, which will also provide the barbecue. A number of special cars will leave the Brown Palace Hotel at 6 o'clock and regular cars on the Berkeley line will leave the central loop every five minutes. The Denver City Tramway band and orchestra will furnish music during the evening.

Thursday afternoon will be given over to a reception for the ladies at the Denver Country Club from 2:30 to 5 p. m. Golf, tennis, music and afternoon tea will be provided. A special ladies' clock golf contest with suitable prizes has been arranged. Automobiles will leave the Brown Palace Hotel at 2 o'clock for the country club, and trolley cars via the Fourth Avenue and Washington lines leave from the central loop every 15 minutes.

For Thursday evening the entertainment committee has secured the exclusive use of the Broadway Theater, opposite the Brown Palace Hotel, for the performance of Mrs. Leslie Carter. There will be informal dancing in the ballroom of the Brown Palace Hotel following the theater party.

On Friday, Oct. 8, the official excursion over the celebrated Moffat route to Corona and return will be run. Special cars will leave the station at Fifteenth and Basset Streets at 8:30 a. m. sharp, returning about 5:30 p. m. The fare for the round trip, including luncheon, will be $3. Tickets must be secured from the entertainment committee not later than noon on Thursday in order that complete arrangements may be made for extra cars and luncheon. This special rate is for Friday only with the exception that tickets secured from the committee before Thursday night will be honored on regular trains on Saturday.

On Friday night the Colorado Electric Light, Power & Railway Association, which will hold its meetings simultaneously with the American Associations, will initiate a number of candidates into the order of "The Rejuvenated Sons of Jove."

A golf tournament will be held during the convention on the links of the Denver Country Club. Delegates of railway associations and members of the Manufacturers' Association are invited and expected to play. The Denver Country Club, one of the finest in the country, has extended the privileges of its clubhouse and links to delegates free of charge during the convention period. It is hoped and expected that a large number will avail themselves of this courtesy. The club is only 15 minutes by trolley from the hotels and the service is frequent. Hence delegates may get in a round of golf before and after the meetings without interfering with the serious business of the convention. A number of prizes have been provided, and under the conditions of the contests the veriest "duffer" may win a prize.

The annual meeting of the American Street & Interurban Railway Manufacturers' Association will be held on Wednesday afternoon at 5 o'clock in the convention hall of the auditorium building. Five members of the executive committee are to be elected at this time.

The executive committee of the Manufacturers' Association will meet in its office near the entrance of the auditorium at 12 o'clock noon each day. At this time the committee will undertake to adjust any complaints received in writing or in person.

Automatic telephones will be located in convenient places throughout the auditorium buildings, where the usual local charge will be made. The Western Union Telegraph Company and the Postal Telegraph & Cable Company will maintain temporary offices in the main building of the auditorium. A station of the Denver City Post Office will be located in the main building adjoining the convention hall. Mail addressed to members and delegates in care of the associations may be called for at this station.

The official badge of the association will be required for identification and admission to all of the entertainments. It should be worn at all times in plain sight.

In addition to the list of railway officers expecting to attend the Denver convention which was printed in the Electric Railway Journal last week the following have signified their intention of going to Denver:

Chicago City Railway Company, Chicago, Ill.:
R. B. Hamilton, vice-president.
F. D. Hoffman, secretary.
A. G. Mitten, general claim agent.
J. J. Duck, auditor.
Chicago Railways Company, Chicago, Ill.:
Three representatives.
Hot Springs Water, Light & Railway Company, Hot Springs, Ark.:
E. H. Hardin, superintendent.
Indiana Union Traction Company, Anderson, Ind.:
A. W. Brady, president.
H. A. Nicholl, general manager.
W. H. Forse, Jr., secretary and treasurer.
C. A. Baldwin, superintendent of transportation.
E. C. Carpenter, claim adjuster.
R. C. Taylor, superintendent of motive power.
Iowa & Illinois Railway Company, Clinton, Iowa:
G. E. Lamb, president.
P. P. Crafts, general manager.
Michigan United Railways Company, Jackson, Mich.:
J. L. Millspaugh, general superintendent, western division.
B. F. O'Mara, general superintendent, eastern division.
Oklahoma Railway Company, Oklahoma City, Okla.:
Anton H. Classen, president.
J. J. Johnson, secretary.
Charles W. Ford, general superintendent
People's Railway Company, Dayton, Ohio:
George C. Towle, general manager.
Pittsburg & Butler Street Railway, Butler, Pa.:
Paul H. Smith, superintendent.

HINTS FROM A CONDUCTOR

CIVIL SERVICE FOR INSPECTORS AND STARTERS

While many arguments can be presented against civil service for political positions there is no doubt that inspectors, dispatchers and starters should be made answer certain questions relative to the operation of the road before being appointed. As I pointed out in a former article, if one man is promoted on an electric railway system 99 will get jealous. Again, I have seen cars leave on their runs out of order and a new inspector did not know what to do to remedy the trouble. Before his promotion to inspector a man should be prepared to answer a list of questions somewhat like the following:

If your route (or post) lay along Blank Street and a car going north should be reported to you as being out of order what would be the first thing you would do? What, if the car was going south?

If a motorman or conductor reported to you for work and you suspected that he was under the influence of liquor, what would you do?

If a conductor at Blank Street and Second Street informed you that his register was out of order, what would you do?

If you could not fix the register what would you do?

What do you consider the nature of daily reports that you should turn in every day?

If a conductor informed you that a certain passenger refused to pay his fare, what would you do?

If, after your regular work was over, and you were going home, something serious happened, would you take hold of it?

If a former friend of yours in the depot committed some offense, would you report him as quickly as a stranger?

What course would you pursue in case a trolley wire broke and lay across the street?

What would be the first thing to do if a fire took place at the Blank Street barn and you were the only superior officer near by?

The series could be continued indefinitely, but enough has been said to indicate the advisability of making the questions concrete and also of anticipating possible conditions.

The Cincinnati Traction Company expects to build a pavilion and theater at the Zoological Garden, Cincinnati, Ohio.

ELECTRIC RAILWAY LEGAL DECISIONS

LIABILITY FOR NEGLIGENCE

Kentucky.—New Trial—Grounds—Misconduct of Jury—Master and Servant—Injuries to Servant—Negligence—Question for Jury—Care Required—Contributory Negligence.

In an action for injuries to a motorman, plaintiff alleged that, by reason of defendant's failure to equip the car with a proper controller, he was unable to reduce the electric current, which caused the car to collide with another car, to plaintiff's injury. On defendant's motion the jury was sent to view the car, during which one of defendant's servants, in the presence of the jury, started and checked the car several times to show the facility with which it could be started and stopped with the controller which plaintiff claimed was out of order. Held, that such act was improper and constituted ground for a new trial.

In an action for injuries to a street car motorman by an alleged defective controller, whether defendant company by the exercise of ordinary care could have discovered in advance that the controller was out of repair, and could have prevented the injury, held for the jury.

In an action for injuries to a motorman, resulting from a defective controller, whether plaintiff was negligent in failing to take his tool box with him when he took charge of the car so as to enable him to reach a cut-off switch by standing on the box which he could not otherwise do and as was his custom, he being too short to otherwise reach the switch, was for the jury.

Where a street railway motorman in operating a car found that his controller was out of repair and failed to work, it was his duty to stop the car by operating the cut-off switch before it collided with a car in advance, if he could reasonably do so.

Where plaintiff, a street car motorman, was injured in a collision caused by a defect in his controller, and defendant claimed that it was plaintiff's duty to have stopped the car before collision by the use of a cut-off switch when he found that his controller could not be used, defendant was entitled to a specific instruction that it was plaintiff's duty to use all the instrumentalities furnished by defendant, including the cut-off switch, which were necessary under the circumstances to stop the car, and if he negligently failed to do so, or if his inability to do so was caused by his own negligence, he could not recover. (Louisville Ry. Co. vs. Hallahan, 119 S. W. Rep., 200.)

Massachusetts.—Street Railroads—Actions for Injuries—Evidence—Negligence—Contributory Negligence—Imputed Negligence—Injuries to Persons on Track—Actions—Sufficiency of Evidence.

Evidence in an action against a street railroad company for injuries received while attempting to cross the track in a vehicle driven by another person considered, and held sufficient to warrant the jury in finding that plaintiff was in the exercise of proper care.

If a father is driving with his young child, or if a child is driving with his parent while under the general control or special supervision of the parent, the negligence of the one who is driving, in driving upon a street railroad track, would be imputed to the other; but, unless there is a voluntary, unconstrained surrender of all care to the caution of the driver, the question of the liability of the parent for the negligent acts of the child in driving across a railroad track is one of fact.

Evidence in an action against a street railway company for injuries received while attempting to cross defendant's track considered, and held to justify a finding that the collision was due to the negligence of defendant's motorman. (Peabody vs. Haverhill, G. & D. St. Ry. Co. (two cases). 85 N. E. Rep., 1051.)

Michigan.—Statutes—Title—Sufficiency—Regulations—Non-compliance—Negligence—Carriers—Passengers—Injuries—Evidence—Instructions—Damages—Personal Injuries—Permanent Injuries—Evidence—Instructions.

The title of Loc. Act 1901, p. 485, No. 439, entitled "An act to regulate the operation of electric cars within" a designated county, is sufficiently broad to cover the provision that one neglecting to comply with the act, requiring operators of electric cars to equip them with electric air brakes, shall be liable for the damages sustained by any person by reason thereof, and hence does not violate Const., art. 4, § 20, providing that no law shall embrace more than one subject, which shall be expressed in the title.

Where a statute regulating the operation of electric cars is obviously for the benefit of the public in general, a failure to comply with the mandatory requirements thereof is at least evidence of negligence in any action by an individual for injuries occasioned by such failure.

Where, in an action for injury to a street car passenger, there was evidence that if there had been braking power, as required by Loc. Acts 1901, p. 485, No. 439, requiring cars to be equipped with electric air brakes, there would have been no difficulty in stopping the car and preventing the injury, an instruction that the fact that the car did not have electric brakes would make no difference unless the accident was caused or contributed to by lack of braking power was sufficiently favorable to defendant.

Where, in an action for personal injury, there was evidence of injury to plaintiff's ankle, and a physician testified that some impairment would always remain, a requested charge that there was no testimony that plaintiff's injuries were permanent was properly refused.—(Fortin v. Bay City Traction & Electric Co., 117 N. W. Rep., 741.)

Missouri.—Street Railroads—Collisions—Contributory Negligence—Question for Jury—Damages—Loss of Property—Instructions.

Whether a person struck by a street car at a crossing was guilty of contributory negligence precluding a recovery, held, under the facts, for the jury.

A person struck by a street car negligently operated, who was in no manner responsible for the collision, may recover for the loss of money and jewelry, caused by the collision.

An instruction in an action for injuries in a collision with a street car at a crossing, authorizing a recovery on finding that the operators of the car were negligent, and that such negligence "directly contributed to cause said collision," and that plaintiff exercised ordinary care, etc., is erroneous, for failing to require a finding that the negligence of the operators caused the injury, and for failing to limit the jury to a consideration of the acts of negligence alleged in the petition.

A street railway company trying an action against it for injuries from a collision with a street car, on the theory that a city had the power to create by ordinance a civil liability in favor of citizens, and introducing in evidence an ordinance authorizing the running of cars at a maximum rate of speed, and asking an instruction recognizing the authority to pass the ordinance, cannot on appeal urge that the court erred in admitting the ordinance in evidence. (Hof vs. St. Louis Transit Co., 111 S. W. Rep., 1166.)

New Jersey.—Master and Servant—Injuries to Servant—Actions—Evidence—Sufficiency—Negligence—Reports by Motorman—Admissibility.

A motorman had charge of a trolley car on which the sand box was out of order through his neglect. He had run the car twice over the same route, on which there was a steep grade, at the bottom of which a railroad crossed the street. On the third trip the car ran on the railroad and collided with an engine thereon, injuring the motorman. It appeared that on the previous trips the brake and controller were in working order; that in descending the grade on the third trip the brake and controller were applied to arrest the forward motion of the car, but failed to do so; the rails were covered with ice and snow, and the car wheels slid along the rails to the point of collision; the brake shoes were found, immediately after the accident, firmly locked against the wheels. No sand could be applied by the motorman, as was usually done in such cases to aid in stopping the car, because of a defect chargeable to his negligence. Held, that no presumption arises from these facts that the brake and controller were defective and unsafe.

An entry in a book kept by the company, in which motormen were required to enter the condition of their cars at the end of each round trip, that the car had "bad hand brakes," is admissible in evidence as showing notice to the master of an existing condition, when such notice is a material inquiry, but it is not competent proof of the fact itself. (Brady vs. North Jersey St. Ry. Co., 71 Atl. Rep., 238.)

New York.—Street Railroads—Injuries to Persons on Track—Contributory Negligence—Evidence—Presumptions—Personal Status—Infants—"Non Sui Juris"—Trial—Instructions—Duty of Request.

In an action for the death of a child 8½ years old by being run over by a street car, her intellectual capacity to appreciate the dangerous character of a car is not to be determined by a consideration of the abstract intelligence of children of that age, but by what she understood; and, if she exercised care commensurate with her intelligence, she discharged her duty to the company, and was not guilty of contributory negligence.

Children under 12 years old are presumptively non sui

juris, and the burden is on one claiming that a child under that age was as a matter of fact sui juris to show it.

"Non sui juris" means not yet arrived at the age of adult discretion.

If, in an action for the death of a child, defendant wanted it left to the jury to determine whether the parents were negligent in letting the child go to school accompanied only by her 10-year-old sister, it should have asked for such an instruction after seeing that the judge omitted to instruct on that point. (Grealish vs. Brooklyn, Q. C. & S. R. Co., 114 N. Y. Sup., 582.)

New York.—Street Railroads—Use of Highways—Frightening Animals—Negligence—Evidence.

The right of a surface railroad company to use its cars within the bounds of a highway includes the right to do such things and make such noises as are necessary, usual and incidental to such use.

A car of a surface railroad laid along a highway stopped to allow a driver of a horse to cross the track. The driver, after crossing proceeded along the side of the car and when opposite the center thereof the motorman released the air brakes, causing a hissing sound, frightening the horse and causing injury to the driver. The horse had not given any evidence of fear up to the time the accident occurred. The hissing sound was but the usual sound occasioned by releasing air brakes. Held insufficient, as a matter of law, to show actionable negligence. (Hoag vs. South Dover Marble Co., 85 N. E. Rep., 667.)

Pennsylvania.—Carriers—Injury to Passenger—Evidence—Contributory Negligence.

Where plaintiff, in an action against a street railway for personal injuries, testifies that the car had stopped and she had put her foot on the step, when the conductor suddenly started the car and she was thrown to the ground, a prima facie case is made for the jury.

The question of plaintiff's contributory negligence, when injured by alleged negligent starting of a street car while she was on the step, was one for the jury. (Rea vs. Media, M., A. & C. Electric Ry Co., 70 Atl. Rep., 554.)

Rhode Island.—Street Railroads—Injuries to Persons Near Track—Negligence—Res Ipsa Loquitur—Damages—Personal Injuries—Excessive Damages.

A trolley pole, which had come off the trolley wire and which had been banging the crosswires for some time, became disconnected from the spring and fell on a driver of a vehicle in the street, injuring him. Held that, under the doctrine of "res ipsa loquitur," the company had the burden of explaining its failure to stop the car forthwith, or to control the pole by the rope, and on its failure to sustain such burden a recovery was proper.

Where a person earning $10 a week was struck by a falling trolley pole, causing him to lose about 10 weeks from his work, to suffer severely for several days, and to incur medical expenses of from $60 to $80, a verdict for $1,300 was not excessive. (Washington vs. Rhode Island Co., 70 Atl. Rep., 913.)

Texas.—Carriers—Injury to Passengers Alighting—Instructions.

Defendant in an action against a carrier for injury to a passenger, the petition alleging that the car stopped, and then, while plaintiff, a passenger, was attempting to alight, started forward with a sudden jerk, throwing him to the ground, is entitled to an instruction that the verdict must be for defendant if the car did not stop, and then suddenly start forward, and throw plaintiff while he was attempting to alight; the only instruction given in that respect being that if, while plaintiff was a passenger on the car, it was negligently moved forward with a sudden jerk, thereby throwing him to the ground and causing the injuries, verdict should be for him. (Dallas Consolidated Electric Street Ry. Co. v. McGrew, 115 S. W. Rep., 344.)

Washington.—Carriers—Injuries to Passenger—Question for Jury—Instruction as to Motorman's Duty to Stop for Passengers.

In an action for injuries to a passenger waiting to take a street car, evidence for plaintiff held sufficient to present a question for the jury as to defendant's negligence.

In an action for injuries to a passenger waiting to take a street car, it appeared that she was within a few feet of the platform and within a foot or two of the track, and on a step as high or higher than the platform as well as at a point where the general public crossed the track, and, while standing in that position, she was struck by a car, which failed to heed her signal to stop. An instruction in her favor declared that it was the motorman's duty to keep a careful and constant lookout ahead to discover persons signaling to stop in order that they may board the car, and a person who signals in time for him to do so by exercising ordinary care has a right to assume that he is on the lookout for passengers, and will discover them if he exercises such care. Held, that the instruction was not calculated to mislead the jury into considering the motorman's duty at places other than stopping places. (Harkins et al. vs. Seattle Electric Co., 101 Pac., Rep., 836.)

CHARTERS, FRANCHISES AND ORDINANCES

Hawaii.—Street Railroads—Regulation.

The enforcement of the continuance by a Hawaiian street railway company of a 10-minute schedule on certain of its lines, upon the ground that the public convenience demands such a schedule, is not within the limits of the judicial power, and is totally inconsistent with the power to regulate the management of the street railway in this respect, which is ultimately vested by Hawaii Revised Laws, sec. 843, and Session Laws 1905, act. No. 78, in the executive authorities. (Honolulu Rapid Transit & Land Co., Appt., v. Territory of Hawaii, by Charles R. Hemenway, Attorney-General of the Territory of Hawaii, 29 Supreme Court Rep., 55.)

Illinois.—Municipal Corporations—Grant of Use of Streets—Contracts—Street Railroads—Paving—Power to Control and Improve Streets—Requirement as to Pavement of Street.

Where the privilege of the use of a public street of a municipality is granted by an ordinance, which is accepted and acted on by the grantee of the privilege in some substantial manner, the ordinance is a valid and binding contract, and is not subject to revocation by the municipality.

A village has the power, when adopting an ordinance granting a street railway company the right to occupy a portion of the streets in the operation of a street railway system, to require the company to pave the part of the streets occupied by it at such time and with such material as the officers of the village may require.

Municipalities hold their streets in trust for the public use and benefit, and they must control and improve them for such uses, and they cannot grant their exclusive use to private individuals or corporations, nor can they make any contract that will relieve them from the performance of their duties to control and improve the streets for the public use.

Under Hurd's Revised Statutes 1905, c. 131a, sec. 4, providing that every grant to a street railroad of a right to use any street shall be subject to the right of the proper authorities to control the use, improvement and repair of the street to the same extent as if no such grant had been made, etc., a municipality granting to a street railroad the right to construct and operate railroads in designated streets may require the railroad to pave the portion of the streets occupied by it, and may prescribe the material with which the pavement shall be made, or provide that the pavement shall be made at the time, in the manner, and with such materials as the village authorities may designate, and an ordinance granting a street railway company the right to construct and operate double tracks on designated streets, and requiring the company to pave with macadam the parts of the streets occupied by its tracks and a foot outside of the rails and between the double tracks, is valid, and, on the company accepting the provisions thereof and acting under it, the ordinance is a contract, and the municipality cannot subsequently require the company to pave such portion with brick. (Village of Madison v. Alton Granite & St. Louis Traction Co., 85 N. E. Rep., 596.)

Indiana.—Eminent Domain—Damages—Assessment—Speculative Damages—Condemnation Proceedings—Appeal—Harmless Error—Instructions—Province of Appellate Court.

Under Burns' Annotated Statutes, 1908, sec. 934, prescribing a rule for assessing damages in condemnation proceedings, it was error to permit an allowance for any increased danger from the operation of petitioner's railroad over the land sought to be taken, and for any other facts shown by the evidence that might be either annoying or hurtful to the defendant, necessarily caused by the permanent operation of the railroad over the land appropriated; such injuries being too remote and speculative.

Where, in condemnation proceedings, the damages allowed were double the amount awarded by the appraisers, and there was a conflict between the witnesses who testified for petitioners and defendants as to the damages sustained, an erroneous instruction permitting the recovery of remote and speculative damages was not harmless.

Where the damages in proceedings to condemn land were unliquidated and the evidence as to the amount thereof was conflicting the Supreme Court on appeal could not interpose its judgment as to the correctness of the assessment. (Indianapolis & Western Ry Co. v. Hill et al.—No. 21,160—86 N. E. Rep., 414.)

LONDON LETTER

(From Our Regular Correspondent.)

The eighth annual conference of the Municipal Tramways Association was held in London in September at the County Hall, Spring Gardens, where the delegates were received by Sir Melville Beachcroft, J.P., the chairman, and members of the London County Council. The presidential address was delivered by Mr. A. L. C. Fell, chief officer of the London County Council Tramways. Following Mr. Fell Councillor A. W. Chapman, vice-chairman of the Manchester Corporation Tramways committee, read a paper entitled "Medical Examination of Tramway Employees." Luncheon was tendered to the delegates by the chairman of the London County Council. After luncheon Mr. W. E. Ireland, of the London County Council, read a paper, "The Central Repair Depot of the London County Council Tramways." In the evening the association dinner was held at the Garden Club in the Imperial International Exhibition, Shepherd's Bush. The second morning of the conference was devoted to a paper, "Some Comparisons of Continental and British Methods of Operating Tramways," by Mr. A. R. Fearnley, general manager of the Sheffield Corporation Tramways, and a paper, "Current Consumption," by Mr. R. S. Pilcher, general manager of the Aberdeen Corporation Tramways. Luncheon was tendered to the delegates on the second day by the chairman and members of the highways committee of the London County Council. In the afternoon special cars were provided for a visit to the central repair depot and the Greenwich generating station of the London County Council Tramways, where tea was served. In the evening, a reception was tendered to the delegates and ladies by the Lord Mayor at the Mansion House. The morning of the third day was devoted to the business session of the association. In the afternoon the members and their friends and the ladies were taken to Windsor by special train, and were received in the Guildhall by the Mayor and the Corporation of Windsor.

The most important event of the year in the history of the London County Council Tramways is the formal opening of the widened portion of Blackfriars Bridge, over which the Council is operating its electric cars. This forms another and important link between north and south London, from a tramway point of view, and is the natural corollary to the opening, some time ago, of Westminster Bridge to the tramways, and to the construction of the tramways along the Victoria Embankment. Heretofore all cars operated along the Embankment have come to a dead end near Blackfriars Bridge, but now that the bridge has been opened to the cars it is possible to operate circular routes and reduce the congestion of traffic at the approaches to the bridge.

Blackfriars Bridge before being reconstructed was the widest bridge across the Thames with the exception of Westminster Bridge, and formed a most important link between the north and south. Permission to build tramways across the bridge, however, could not be obtained by the London County Council until the bridge had been widened, a work which was done by Sir Wm. Arrol & Company, Glasgow, at a cost of about £200,000. The formal opening was attended with elaborate ceremonies in which the Lord Mayor, Sir G. Wyatt Truscott, and sheriffs, assisted by a large retinue of liveried servants, participated. The Lord Mayor, assisted by Mr. Fell, operated the first car across the bridge. The work of widening the bridge was commenced in 1907, four steel caissons being lowered to the bed of the river on which the new piers were to rest. After building these up, the plan was adopted of moving the old arch ribs in a piece, 30 ft. to the westward. New ribs and flooring were then put in between the outside girder which had been removed and the structure proper, and the tramway lines and conduits were constructed close to the western curb. This part of the work was done by Dick, Kerr & Company, as sub-contractors. In connection with the widening of the bridge it is interesting to note that it was decided some time ago to provide two subways at the north end of the structure to enable passengers from Queen Victoria Street and New Bridge Street to reach the tramcars without crossing the road. These subways are 10 ft. wide by 8 ft. high, and are as close to the surface of the road as possible. They greatly reduce the danger to pedestrians at the bridge.

The London County Council has begun the work of electrifying the Highgate Hill cable line, the first cable system constructed in Europe and now more than 25 years old. The passing of the system was made the occasion of a popular demonstration, the last cars which ascended the hill being boarded by enthusiasts who set off fireworks and sang popular airs. Twenty-five years ago the Highgate Hill tramway represented the very latest in street railway construction. It was visited by tramway authorities from all over the United Kingdom, and undoubtedly was the forerunner of similar cable lines in Birmingham, Bristol, Edinburgh and other places. There has never been a serious accident on the line. In rebuilding the line for operation by electricity it will be extended to Great North Road. The Hampstead and Highgate routes were also opened during September, and electric cars are run from Holborn to King's Cross, Hampstead and Highgate.

It is said that an American syndicate will attempt to capture the produce market of London by establishing a market center in the south of London and constructing an elaborate system of light railways, linking up the metropolitan area with the outlying country districts. The plan is to establish stations in Kent, Surrey, Middlesex and Essex, and construct light railways to connect with the London County Council Tramways and the London United Tramways, and operate over these lines at night and deliver produce to the market. The plan, of course, is tentative as the obstacles to procuring the necessary rights are very great.

The District Railway continues to make marvelous progress under the capable management of Mr. A. H. Stanley. The net receipts for August, 1909, were nearly £5,000 greater than for August, 1908, despite the fact that the exhibition at Shepherd's Bush was in progress last year. Mr. Stanley, however, is not content with the progress made. Reference was made in a recent London letter in the Electric Railway Journal to the non-stop trains being run on the District Railway, a novelty on a system where traffic is so dense. These non-stop trains are to be increased in number to such places as Wimbledon and Ealing, and the system is to be extended to Richmond. Later trains are also being gradually initiated, largely increasing the facilities of theater-goers. To relieve pressure at the ticket offices, an automatic electric ticket machine has been installed at the Mansion House Station, which delivers tickets on the insertion of the proper coins and rejects coins not of the proper demonination.

The proposed removal of the tramway poles from the middle of the streets was the subject of a report recently submitted to a meeting of the Belfast Tramways committee. The alteration had been recommended by the City Commissioner of Police, and the committee considered the proposals most valuable in the interests of street traffic, while not interfering with the efficiency of the overhead equipment, and instructed the officers concerned to have the alterations carried out.

Although it is unlikely that a start will be made with the tunneling at the Euston end of the new local line of the London & North-Western Railway between London and Watford, work is actively proceeding on the section between Willesden and Harrow. Operations are also under way on the Sudbury to Harrow section, but the large amount of excavation and the bridge widenings are of a character to prolong the work for many months, and it is not likely that the line will be opened for traffic until the end of next year. With the view of creating fresh local traffic on the line, which at present has only one station, that at Sudbury, between Willesden and Harrow, four new stations will be built—at Stonebridge Park, Acton-lane, East-lane, and Kenton, and a frequent service of trains will be provided by means of a rail motor shuttle service.

The question of constructing a new bridge at a cost of nearly £2,000,000, across the Thames between Blackfriars and Southwark will again come before the Bridge House Estates committee of the City Corporation at an early date. There is, however, considerable doubt even among the supporters of the scheme as to the practicability of the proposal to provide an additional link between the tramway systems of the north and south by means of the new bridge. The tramways, however, are not in any sense an integral part of the scheme for a new bridge. They are a matter for the London County Council, and not for the City Corporation, and if an application for their construction were put forward by the London County Council no scheme could be proceeded with except by the consent of the City Council.

The report of the general manager of the Newcastle-on-Tyne Tramways for the year ended March 31, 1909, has been issued. The gross receipts were £209,540, 19s. 10d., compared with £217,080, 18s. 5d. The traffic expenses were £56,912, 18s. 2d., against £58,583, 4s. 11d.; and the general expenses £21,291, 11s. 5d., against £17,609, 2s. 7d. General repairs and maintenance cost £27,924, 2s. 3d., against £22,570, 6s. 1d., and power expenses were £14,947, 3s. 6d., against £16,615, 18s. 2d. Working costs (exclusive of public street lighting) were £121,075, 15s. 4d., against £115,378, 11s. 0d. The gross capital expenditure (inclusive of public lighting) has been £1,183,346. The traffic revenue was £203,302, compared with £211,085 in the previous year.

A. C. S.

News of Electric Railways

Modified Subway Proposal in New York

In a letter addressed to the Public Service Commission of the First District of New York on Sept. 22, T. P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., offers to build a four-track subway up Madison Avenue, to be connected with the four existing subway tracks on Park Avenue at about Thirty-eighth Street and continuing the four tracks up Madison Avenue to 149th Street, connecting two tracks with the existing subway tracks and continuing the other two tracks northerly on Jerome Avenue to 194th Street; also to construct two tracks from the present West Farms Division of the subway, commencing at about Simpson Street, running over Westchester Avenue to Pelham Bay Park. If the Pelham Bay Park route and Jerome Avenue route are constructed they will be elevated construction. This line, if constructed, will open up a new area along Jerome Avenue in the Bronx and a new area along Westchester Avenue to Pelham Bay Park in the Bronx.

The letter of the company, dated Sept. 22, refers to a communication sent to the Public Service Commission by Mr. Shonts under date of June 30, 1909, which pertained especially to the lines proposed on Lexington Avenue and Third Avenue above Forty-second Street by the Interborough Rapid Transit Company. In its reply to this letter, under date of Aug. 27, 1909, the commission suggested that a four-track line should be built up Madison Avenue and not divided between Lexington and Third Avenues. The company carefully considered the commission's suggestion, but is still of the opinion that the line suggested up Lexington Avenue and Third Avenue is more desirable.

W. O. Wood, president of the New York & Queens County Railway, Long Island City, N. Y., has submitted a proposal to the Board of Estimate of New York to run a temporary service over the Queensboro Bridge pending a final action by the board on the request by his company for a permanent permit. In his communication to the Board of Estimate Mr. Wood says:

"The New York & Queens County Railway respectfully asks permission of the Board of Estimate to run a shuttle car service across the Queensboro Bridge, in connection with its cars now passing the Bridge Plaza. Your honorable board has already tentatively approved a form of contract franchise to this company to run through cars over this bridge. Under the city charter 30 days must elapse before the time the proposed form of contract of a franchise is submitted to your honorable board and the date upon which the final grant shall be made of the proposed franchise. So that assuming that the Public Service Commission shall grant permission to this company to operate through cars over the bridge as an extension of its present system, before the date of your final hearing on the present contract, and assuming that the Mayor signs the contract on the day of its final passage by the Board of Estimate, at least five weeks must elapse before through service can be established over the bridge. Therefore, as a convenience to the people of Queens this company asks permission to run a shuttle service over the bridge, transferring passengers to and from its several lines passing the plaza for the single fare of 5 cents."

New Interurban Railway Near Chicago

The Chicago, Wheaton & Western Railway has just opened to traffic a portion of its line four miles in length extending from Pleasant Hill to West Chicago in DuPage County, Ill. The road is being extended to Geneva, Ill., on the Fox River, a distance of 6 miles, to which place it is expected the road will be in operation by Nov. 1. At Pleasant Hill the Chicago, Wheaton & Western Railway forms a connection with the Elgin branch of the Aurora, Elgin & Chicago Railroad, and at Geneva it will connect with the Fox River division of the Aurora, Elgin & Chicago Railroad. The Aurora, Elgin & Chicago Railroad is operating the Chicago, Wheaton & Western Railway, and on its completion to Geneva through cars will be run from that city direct to the center of Chicago, passing through West Chicago, Pleasant Hill, Wheaton, Lombard and Elmhurst.

The new road is operated by means of a third-rail and is substantial and well built. Over the Fox River at Geneva there will be a seven-span reinforced concrete bridge 50 ft. wide and 500 ft. long, and over the Elgin, Joliet & Eastern Railroad and Chicago & Northwestern Railroads and at West Chicago there is a steel through-truss bridge with two spans 126 ft. each. Three cars uniform with those on the Aurora, Elgin & Chicago Railroad are bing operated on the completed portion of the new road, and they meet all trains at the junction with the Aurora, Elgin & Chicago Railroad at Pleasant Hill. The officers of the Chicago, Wheaton & Western Railway are: H. C. Wood, president; Sidney Condit, secretary; W. F. McSwiney, treasurer; I. W. Troxel, chief engineer. The office of the company is at 711 Rookery, Chicago.

Cleveland Traction Situation

The time has expired for submitting a street railway franchise to the voters of Cleveland at the regular election in November and the purpose of the Cleveland Railway in opening negotiations immediately after the defeat of the 3-cent ordinance and spending so much time since in negotiations has come to naught. The officers of the company hoped that an ordinance could be prepared for a referendum vote at the November election, although they proposed some time ago to pay the expenses of an election to submit to the voters an ordinance to be drawn by Judge R. W. Tayler.

Mayor Johnson had not returned to Cleveland up to Sept. 25, but it was stated that on his return he will submit to the company an ordinance embodying the terms included in the Baker ordinance which the company refused some months ago.

Warren Bicknell, receiver of the Municipal Traction Company, has arranged a new schedule for the Euclid Avenue line. A 2½-minute service will be given between the Public Square and University Circle, with cars every 10 minutes for the Euclid Heights, Windermere and East Cleveland lines. The ordinance approved by court calls for an 8-minute service for East Cleveland. Tripper service in the evening will give a one-minute service at the Square for 42 minutes and 1½ for 12 minutes, after which the headway will be increased. The morning service will also be improved.

Contract of City and Company in Philadelphia Upheld

Judge Kinsey of Common Pleas Court No. 1 in Philadelphia handed down a decision on Sept. 27 sustaining the contract entered into recently between the Philadelphia (Pa.) Rapid Transit Company and the City of Philadelphia. Elmore E. Brode, a taxpayer, contended that the agreement between the city and the company was unconstitutional. In his opinion Judge Kinsey says:

"This is a bill in equity filed by Elmore E. Brode, complainant and a taxpayer of Philadelphia, against said city, the Mayor, John E. Reyburn; the Philadelphia Rapid Transit Company and Market Street Passenger Elevated Railway; respondant, praying that a certain contract, dated July 1, 1907, be canceled and annulled; also that the Philadelphia Rapid Transit Company, the City of Philadelphia and the Mayor be enjoined from carrying out the provisions thereof, and that the ordinance of July 1, 1907, be declared null and void.

"The principal question presented in this case is, whether the Act of April 15, 1907, is a violation of article IX, section 7 of the Constitution, authorizing cities to acquire the property of motor power companies, for the reason, it is alleged, that this is an attempt on the part of the City of Philadelphia to acquire the property of the Philadelphia Rapid Transit Company. We do not so view it under the agreement. Whether the Constitution would prevent a municipality from holding and operating a public utility for the convenience of its citizens need not now be considered, but only whether or not such an acquirement of ownership is, or has been, accomplished by the contract in this case.

"The eleventh section of the contract concludes with certain provisions as to what the city and the company may do if the city should decide, at the expiration of the said 50 years, to take the said property. All this is dependable upon the contingency that the city should do something in that direction. Until such time comes proceedings to prevent that action would be, to say the least, unnecessary. However, the insertion of such a provision as to what may be done 50 years hence in a certain particular does not, and indeed ought not, invalidate a contract as to such other portions as may be legal and valid at the present time. Neither do we see that by the said contract the city is to become a stockholder in the said company, nor is it loaning its credit thereto.

"The court also holds that the facts that the city is represented in the directorate of the company and that the company is to pay a portion of the profits to the City Treasurer, do not make the contract a partnership in violation of the constitution.

"We cannot conceive the force of the argument offered, that the establishment of a sinking fund commission for the reception and investment of the fund paid to the city by the company under the agreement for the investment of such fund as may come into their hands in the stock of the said company is in violation of article III, section 22, or article IX, section 7 of the Constitution. * * *

"The transaction is, as a whole, as may be gathered from the purport of the entire contract, a plan by which the company is made to pay the purchase price of its own property if the city should ultimately determine to take it over, and in the meantime the purchase money is to be held apart until it shall be utilized for that purpose, or paid into the city treasury.

"The adequacy of the consideration of a contract is by law vested in Councils and the Mayor, and in the absence of fraud the citizen or the court has no right to question the wisdom of the legislative will, it being within the scope of its authority."

Association Meetings

American Street & Interurban Railway Association and Affiliated Associations—Denver, Col., week commencing Oct. 4.

Association of Car Lighting Engineers—Chicago, Ill., Oct. 4, 5, 6 and 7.

Colorado Light, Power & Railway Association—Denver, Col., Oct. 7, 8 and 9.

Railway Signal Association—Louisville, Ky., Oct. 12, 13 and 14.

Empire State Gas & Electric Association—New York City, October, 1909.

Alabama Light & Traction Association—Birmingham, Ala., Nov. 15 and 16.

National Association of Railway Commissioners—Washington, D. C., Nov. 16.

Central Electric Railway Association—Indianapolis, Ind., Nov. 18.

Central Electric Accounting Conference—Dayton, Ohio, Dec. 11.

New Line Opened in Idaho.—The Panhandle Electric Railway & Power Company has opened its line at Sandpoint, Idaho.

Restaurant for Employees in Chicago.—The Chicago (Ill.) City Railway has opened a restaurant for its employees in its new building at Seventy-seventh Street and Vincennes Road. The restaurant is designed especially to provide the men with clean, wholesome food at moderate prices served as expeditiously as possible.

New Texas Road Opened.—The Wichita Falls (Tex.) Traction Company has recently opened three miles of street railway in Wichita Falls and a 5-mile line to Lake Wichita. Some time ago the interests which control the Wichita Falls Traction Company purchased the property of the Wichita Falls Water & Light Company.

Seventh Annual Meeting Rejuvenated Sons of Jove.—The seventh annual meeting of the Rejuvenated Sons of Jove will be held in Cleveland, Ohio, on Oct. 14 and 15, 1909, with headquarters at the Hollenden Hotel. J. Robert Crouse, Cleveland, Ohio, is the reigning Jupiter of the Sons of Jove, and has decreed that the business session of the convention be concentrated so far as possible into the one day, Oct. 15.

Accounting Conference Representatives at Denver.—In the report of the meeting of the Central Electric Accounting Conference held at Indianapolis on Sept. 11, 1909, which was published in the Electric Railway Journal of Sept. 18, 1909, page 436, it was announced that a motion had been adopted authorizing the president of the conference, M. W. Glover, to appoint a committee to represent the conference at the meeting of the American Street & Interurban Railway Accountants' Association in Denver, Oct. 4 to 8. In accordance with this motion the following committee has been selected: W. H. Forse, Jr., S. C. Rogers and H. E. Vordermark.

Consideration of Matters Referred to Massachusetts and Boston Commissions.—The Massachusetts Railroad Commission and the Boston Transit Commission, sitting jointly, will give a hearing at the State House, Boston, on Oct. 5, on the transportation matters referred to in the resolves of the Legislature of 1909 under chapters 94, 110 and 85. The resolves provide for investigation by the joint board of the advisability of providing certain additional subways, tunnels and elevated structures in Boston; to investigate the advisability of authorizing the Boston & Eastern Electric Railroad to construct a tunnel and subways in Boston, and to investigate certain matters relative to the proposed consolidation of the West End Street Railway and the Boston Elevated Railway. Interest centers on the prospective demand for a tunnel or subway from Park Street to the South Station, in tractional extension of the Cambridge subway now authorized and under construction, and in the proposition of the Boston & Eastern Electric Railroad, which contemplates building a tunnel under Boston Harbor to Post Office Square, to connect a proposed high-speed electric interurban railway from Salem and Lynn with the business center of Boston.

Meeting of Car Lighting Engineers.—A preliminary announcement of the meeting of the Association of Car Lighting Engineers was published in the Electric Railway Journal of Sept. 25, 1909, page 481. The meeting will be held at the new La Salle Hotel, Chicago, Ill., from Oct. 4 to Oct. 7, and the complete program for the sessions has been arranged. The committee will meet on Oct. 4 at 10:30 a. m. and continue in session until 12 m. At this session the address of the president will be presented, the report of the secretary and treasurer will be filed, and the minutes of the previous meetings will be read and unfinished business disposed of. On the afternoon of Sept. 4 the reports of standing committees will be presented, and a paper will be read on the application of electricity to railway shops. On the morning of Oct. 5 the report of the committee on standards will be presented, and on the afternoon of Oct. 5 a paper will be presented on the electrification of steam railroads. On the morning of Oct. 6 the reports of the special committees will be received. On the afternoon of Oct. 6 a paper will be presented on the application of storage battery to train lighting. The banquet will be held on the evening of Oct. 6. On Oct. 7 unfinished and miscellaneous business will receive attention, a place will be selected for the next meeting and officers will be elected. During the convention the question of changing the name of the body to the Association of Railway Electrical Engineers will be considered.

Farewell Dinner to Matthew C. Brush.—A farewell dinner was given to Matthew C. Brush, the retiring vice-president and general manager of the Boston Suburban Electric Companies, at the Algonquin Club, Boston, on Sept. 21 by about 65 personal friends in New England and New York electric railway and public administrative circles. Henry C. Page, general manager of the Worcester Consolidated Street Railway, was chairman of the committee on arrangements, the other members being C. Loomis Allen, Syracuse, and Edward L. Jones, Clarence Learned and F. W. Freeman, Boston. Samuel L. Powers, Boston, acted as toastmaster. The speakers were Sydney Harwood, Newton, Mass., who expressed the appreciation of the directors of the Boston Suburban Electric Companies at the efficient management of the properties under the direction of the guest of the evening; J. C. Calisch, retiring general manager of the Buffalo & Lake Erie Traction Company, who expressed his pleasure in the acceptance by Mr. Brush of the position of general manager of that property, taking effect Oct. 1; George Hutchinson, Mayor of Newton, and Benjamin S. Palmer, Alderman of Newton, who emphasized the era of good feeling inaugurated by Mr. Brush's administration and the removal of misunderstandings which it effected; C. Loomis Allen, vice-president of the Syracuse Rapid Transit Company, who welcomed Mr. Brush into the ranks of New York traction men, and Russell A. Sears, general solicitor of the Boston Elevated Railway, who performed a "friendship ceremony," wedding the guest of honor to those present by a solitaire ring. Mr. Brush, in response, emphasized his indebtedness to his friends, paying special tribute to J. L. Richards, president of the Newton & Boston Street Railway, and to the directors of the Boston Suburban Electric Companies, and stating that such success as he had attained was secured only through the co-operation of every man in the companies. Among those present were: Samuel L. Powers, Boston; Frank Remick, Boston; Mayor Hutchinson, Newton; Alderman Palmer, Newton; Thomas Beal, Boston; Sydney Harwood, Newton; J. C. Calisch, Buffalo; C. Loomis Allen, Syracuse; C. S. Sergeant, Boston; C. H. Hile, Boston; H. C. Page, Worcester; Russell A. Sears, Boston; C. L. Learned, Boston; F. W. Freeman, Newton; John Lindall, Boston; Paul Winsor, Boston; George Sabin Brush, Boston; C. A. Sylvester, Newtonville; C. A. Clark, Boston; E. L. Janes, Boston; James S. Barr, Boston; E. P. Shaw, Jr., South Framingham; R. S. Goff, Boston; E. W. Holst, Boston; E. S. Wilde, New Bedford; W. D. Wright, Providence; C. C. Peirce, Boston; Clarence Sprague, Boston, and J. J. Lane, Boston.

Financial and Corporate

New York Stock and Money Market

September 28, 1909.

For the last two days the stock market has been decidedly strong and fairly active. Led by United States Steel common and the Harriman issues the market advanced today from 2 to 5 points. Steel made a new high record, selling up to 89⅝, thus coming nearer and nearer to the fulfilment of the bull prophecy that it would sell at par before Christmas. Since the industrial revival in the country has been in full swing, there has apparently been heavy buying of stocks for investment. There is also much speculative buying, a fact that is clearly shown by the periodic liquidation at high levels. Traction stocks show very little activity, but have generally been firm.

Money continues to be plentiful and rates are practically unchanged. Quotations to-day: Call, 2½ to 3 per cent; 90 days, 3¾ to 4 per cent.

Other Markets

Subway stock continues to be the feature of the Chicago market. On one day during the week it sold as low as 8⅛ and closed to-day at 8⅝. Sales have been very heavy, and it is still insisted that large holders are liquidating. Other traction issues are practically out of the market.

In the Philadelphia market during the past week there has been some trading in Rapid Transit and Union Traction. There were but few sales, with prices steady.

In Boston, Massachusetts Electric preferred has been the most active among the traction issues. The price has steadily been around 79, and there is not apparent any anxiety either to sell or to buy. There has been some sale for the common stock, but it is less active than the preferred.

Both the stock and the bonds of the United Railways Company have been somewhat in evidence in the Baltimore market during the past week. The 4s have sold at 87¾, the incomes at 58½, the funding 5s at 85¼ and the stock about 14.

Quotations of various traction securities as compared with last week follow:

	Sept. 21.	Sept. 28.
American Railways Company	a46	46
Aurora, Elgin & Chicago Railroad (common)	*50	*50
Aurora, Elgin & Chicago Railroad (preferred)	*95	*95
Boston Elevated Railway	129	129
Boston & Suburban Electric Companies	*18	*17
Boston & Suburban Electric Companies (preferred)	73	*74
Boston & Worcester Electric Companies (common)	a13	a12
Boston & Worcester Electric Companies (preferred)	a54	a54
Brooklyn Rapid Transit Company	80⅛	80
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	87¾	88⅛
Capital Traction Company, Washington	a137	a140
Chicago City Railway	a180	a190
Chicago & Oak Park Elevated Railroad (common)	2	*3
Chicago & Oak Park Elevated Railroad (preferred)	7	*10
Chicago Railways, ptcptg, ctf. 1	a110	108
Chicago Railways, ptcptg, ctf. 2	a37	36½
Chicago Railways, ptcptg, ctf. 3	a25	24
Chicago Railways, ptcptg, ctf. 4s	a10	9
Cleveland Railways	*78	*78
Consolidated Traction of New Jersey	77½	76½
Consolidated Traction of N. J., 5 per cent bonds	a106½	105½
Detroit United Railway	a75	a72
General Electric Company	167	168
Georgia Railway & Electric Company (common)	94	94
Georgia Railway & Electric Company (preferred)	a90	85
Interborough-Metropolitan Company (common)	14⅞	15
Interborough-Metropolitan Company (preferred)	47¾	48⅜
Interborough-Metropolitan Company (4½s)	82¾	82⅞
Kansas City Railway & Light Company (common)	45⅞	a45
Kansas City Railway & Light Company (preferred)	82	a81
Manhattan Railway	143	142½
Massachusetts Electric Companies (common)	a17	16¼
Massachusetts Electric Companies (preferred)	79½	79½
Metropolitan West Side, Chicago (common)	17¾	15
Metropolitan West Side, Chicago (preferred)	a50	50
Metropolitan Street Railway	a24	a22
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	83	a82½
Northwestern Elevated Railroad (common)	a20	18
Northwestern Elevated Railroad (preferred)	a71	68
Philadelphia Company, Pittsburg (common)	48¼	48
Philadelphia Company, Pittsburg (preferred)	44	a44½
Philadelphia Rapid Transit Company	28	a28¼
Philadelphia Traction Company	a89	a90
Public Service Corporation, 5 per cent col. notes	a100⅞	a100¼
Public Service Corporation, ctfs.	a95½	a95½
Seattle Electric Company (common)	*114	114
Seattle Electric Company (preferred)	105	105
South Side Elevated Railroad (Chicago)	a54	a55
Toledo Railways & Light Company	a10	a10
Third Avenue Railroad, New York	22½	22
Twin City Rapid Transit, Minneapolis (common)	110	110½
Union Traction Company, Philadelphia	53½	53¼
United Railways & Electric Company, Baltimore	14	13⅞
United Railways Inv. Co., San Francisco (common)	45½	45½
United Railways Inv. Co., San Francisco (preferred)	74¼	76
Washington Railway & Electric Company (common)	a48	a47⅛
Washington Railway & Electric Company (preferred)	a94	a94¾
West End Street Railway, Boston (common)	*98	a94
West End Street Railway, Boston (preferred)	*109	107¼
Westinghouse Elec. & Manufacturing Company	86	88½
Westinghouse Elec. & Mfg. Co. (1st pref.)	130	130

aAsked.
*Last sale.

Annual Report of Philadelphia Rapid Transit Company

Gross passenger earnings of the Philadelphia Rapid Transit Company during the year ended June 30, 1909, increased $17,450 over the record of the preceding year. Owing to a decrease in operating expenses of $429,770, net earnings increased $447,220. The operations for three years compare as follows:

	1909	1908	1907
Number of passengers carried	464,264,656	512,869,023	492,137,038
Receipts from passengers	$18,317,530	$18,300,080	$18,095,503
Operating expenses	9,364,738	9,794,508	10,095,098
	$8,952,792	$8,505,572	$8,000,405
Miscellaneous receipts, interest, etc.	480,463	257,422	245,187
	$9,433,255	$8,762,994	$8,245,592
Taxes and licenses, paid and accrued	1,464,953	1,394,127	1,120,683
	$7,968,302	$7,368,867	$7,124,909
Fixed charges, paid and accrued	8,192,573	7,460,916	7,488,958
Deficit	$224,271	$92,049	$364,049

It will be observed that a large reduction took place in the total number of passengers carried. This is due to the abolition of the sale of tickets. The following analysis of passenger traffic is contained in the report:

	1909	1908
Total passengers carried	464,264,656	512,869,023
Package tickets used, per cent	41.6830	53.9197
Cash fares paid, per cent	37.3059	14.8210
Exchange tickets purchased, per cent	4.2641	7.2284
Exchange tickets used (received), per cent	4.2125	7.2270
Transfer tickets used, per cent	11.9828	16.2710
Carried free, per cent	.5517	.5329
	100.0000	100.0000
Receipts per passenger, cents	3.9432+	3.5659+

Of the total passenger earnings of $18,317,530 the sum of $10,567 was received from chartered cars. The operating expenses aggregated 51.12 per cent of the gross earnings, and were divided as follows:

	1909	1908	1907
Maintenance of way & bldgs.	$889,778	$1,060,425	$1,360,735
Maintenance of equipment	938,758	915,287	1,006,587
Transportation	4,413,417	4,822,472	4,749,107
Power	1,445,077	1,280,213	1,034,824
General expenses	1,677,708	1,716,111	1,943,845
Total	$9,364,738	$9,794,508	$10,095,098

The total expenditures for maintenance of way and buildings and maintenance of equipment were $1,828,536, or 10 per cent of gross passenger receipts. This is very slightly under the percentage expended for the same purposes during the preceding year. Another material decrease in the general expense is indicated by the figures.

The statement to stockholders, signed by John B. Parsons, president, says in part:

"The increase in fixed charge item is the increased rental to the Union Traction Company, interest on Market Street Elevated Passenger Railway bonds and interest on a portion of the Philadelphia Rapid Transit Company $5,000,000 5 per cent collateral loan.

"The accident department was operated during the year for 5.80 per cent of the receipts, as against 5.88 per cent last year; this meant a saving of $36,055.

"During the year 35 miles of track were rebuilt with the 141-lb. rail, making a total of 195 miles of your system now built with this heavy rail.

"On Nov. 29, 1908, five of your cars (semi-convertible double-truck cars) were destroyed at the fire which took place at the car works of The J. G. Brill Company; your fire insurance fund has paid for the loss of the cars.

"During the year 306 cars have been changed over to the "pay-within" type of cars, and are in operation, and other cars are being changed as rapidly as possible to the same type of car.

"The directors ordered the closing into profit and loss account all debit balances in accrued accounts at the end of the fiscal year."

A table showing the gross earnings by months indicates that the most satisfactory record was attained during October, 1908, when the total was $1.700,709.

Hearing on Boston Elevated Railway's Petition to Acquire Other Properties

A hearing was held by the Massachusetts Railroad and the Boston Transit Commissions sitting as a joint board at the State House, Boston, on Sept. 27, in regard to the question of permitting the Boston Elevated Railway to acquire the securities of other railways and on the expediency of permitting a distribution of the assets of the West End Street Railway among its stockholders, and also to change the terms and conditions under which the second

preferred stock of the West End Street Railway is to be issued for the Boston Elevated Railway in payment for the property of the West End Street Railway.

At the outset, the board postponed until Oct. 8 consideration of the question of the distribution among its stockholders of the assets of the West End Street Railway. It then took up that portion of the Legislative resolve of 1909 relating to the holdings of other street railways by the Boston Elevated Railway. Frederic E. Snow acted as counsel for the Boston Elevated Railway. Col. Charles A. Williams represented the West End Street Railway; H. H. Newton, the stockholders of the West End Street Railway, and Robert Luce, the Public Franchise League. Roscoe Walsworth was present on behalf of the Metropolitan Transit Association, and was heard first. He advocated the operation of the Boston, Revere Beach & Lynn Railroad by the Boston Elevated Railway, and said that the transportation service at the north of Boston would thereby be greatly improved. The most important remarks were contributed by Mr. Snow, who stated that he hoped the joint board would recommend legislation permitting the Boston Elevated Railway to acquire the securities and control of other street railways in the interest of improved transportation facilities. He referred particularly to the present systems which connect with the Boston Elevated Railway, namely, the Boston & Northern Street Railway, operating 512 miles of main track; the Old Colony Street Railway, 354 miles; the Boston & Worcester Street Railway, 80 miles; the Blue Hill Street Railway, 19 miles; the Lexington & Boston Street Railway, 30 miles, and the Middlesex & Boston Street Railway, about 70 miles. The Boston Elevated Railway operates about 409 miles of track, and the total trackage of the system, if the control through security purchases were allowed, would be about 1500 miles. The operating economies and service possibilities on such a centralized organization would be very attractive. Actual consolidation with the Boston Elevated Railway would be impracticable on account of the provision in the charter of the company which forbids charging more than a 5-cent fare, but if the controlling interest were lodged with the Boston Elevated Railway, the benefits of centralized operation would be noteworthy. The hearing was adjourned until Sept. 28.

Brooklyn (N. Y.) Rapid Transit Company.—The Nassau Electric Railroad, a subsidiary of the Brooklyn Rapid Transit Company, has applied to the Public Service Commission of the First District of New York for permission to issue $730,000 of bonds to retire an equal amount of first consolidated mortgage bonds of the Atlantic Avenue Railroad maturing on Oct. 1, 1909, the Atlantic Avenue Railroad having been absorbed by the Nassau Electric Railroad. The Public Service Commission has ordered a hearing on the application on Oct. 6.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—The Public Service Commission of the Second District of New York has authorized the Elmira Water, Light & Railroad Company to issue its first consolidated 5 per cent, 50-year gold bonds to the amount of $196,000 to be sold at not less than 85. Of the proceeds, $59,874.17 are to be used for the payment and discharge of indebtedness incurred in constructing additions and betterments to its property and the balance for future additions and betterments.

New York, New Haven & Hartford Railroad, New Haven, Conn.—A special meeting of the stockholders of the New York, New Haven & Hartford Railroad has been called for Oct. 27, at which the question of increasing the capital stock of the company by $40,000,000 will be submitted. The new stock is to be offered to stockholders and convertible bondholders at $125, and will be issued in blocks from time to time over the next two years to retire about $14,000,000 of maturing notes and bonds to provide funds for improvements. The annual report of C. S. Mellen, president of the company, was made public on Sept. 27. The total earnings from all sources during the fiscal year were $54,347,630, as compared with $53,050,147 in 1908. Freight earnings increased from $25,281,434 to $26,595,969; passenger earnings decreased from $23,003,115 to $22,852,741, and other revenue from transportation decreased from $3,506,133 to $3,713,867. In expenses, general transportation decreased from $23,625,503 to $22,491,376; maintenance of way and structures increased from $5,983,825 to $6,130,666, and maintenance of equipment decreased from $6,913,169 to $5,906,350. The total fixed charges increased from $14,550,387 to $16,843,079. On the other hand, income from other sources increased from $3,862,151 to $4,593,488. The final net income applicable to dividends increased from $5,266,569 in 1908 to $7,430,228 in 1909. The net earnings of the Connecticut Company show an increase from $2,745,758 to $3,644,314, while the net income of the Rhode Island Company increased from $178,420 to $469,206. The Connecticut Company earned $224,294 from its express business.

Northampton (Mass.) Street Railway.—In reply to a letter addressed to him about the reported sale of a controlling interest in the Northampton Street Railway to interests identified with the New York, New Haven & Hartford Railroad, J. C. Hammond, president of the Northampton Street Railway, replied: "I wish to say that no negotiations whatever with reference to the sale of stock of the Northampton Street Railway to the New York, New Haven & Hartford Railroad have been entered into or talked about, directly or indirectly, since the stock of the Springfield Street Railway was purchased. There have been no transfers of stock except those incident to the settling of estates, for months."

Ocean Shore Railway, San Francisco, Cal.—A circular letter sent to the bondholders of the Ocean Shore Railway says with reference to the proposed new bond issue: "The time for depositing your bonds with the Mercantile Trust Company, San Francisco, has been extended until Oct. 14; $2,650,000 worth of the bonds have been deposited, and we have assurance that about $2,000,000 more will be deposited within the next 30 days. The people who stand ready to advance $2,000,000 to complete, equip and put the railway in first-class condition are well pleased at the excellent showing which has been made through the cooperation and courtesy of our bondholders, but they cannot do anything for us, nor can we help ourselves out of our present difficulties until all of the bonds are deposited. The interest on our bonds will be due on Nov. 1, and cannot be paid unless the reorganization plan is perfected before that time."

Pittsburgh, McKeesport & Westmoreland Railway, Pittsburgh, Pa.—A meeting of the stockholders of the Pittsburgh, McKeesport & Westmoreland Street Railway has been called for Nov. 22 to vote to spend $2,000,000 on extensions and improvements next spring. George D. Cook, 25 Broad Street, New York, is offering for sale at 95 and interest $1,000,000 of 5 per cent gold bonds of the company. The Pittsburgh, McKeesport & Westmoreland Railway has a line in operation from McKeesport, on the Ohio River, to Irwin, Pa., in the heart of the coal and gas belt, 11 miles long.

Snohomish Valley Railway, Snohomish, Wash.—A statement sworn to before a notary public has been issued by the Snohomish Valley Railway saying that the company "has no railroad built, no tangible assets of any value to any bondholder, whether innocent purchaser or not; the company has abandoned its undertaking and does not intend to ever build a railroad or create any property value of any nature whatsoever to be taken by said stolen bonds." The statement is sworn to by the following: G. M. Cochran, president; E. L. Colburn, secretary; E. Wright, treasurer; Chas. A. Barron, general manager. The statement, which is addressed to whom it may concern, charges that unauthorized possession was obtained of $500,000 par value of 5 per cent bonds of the company, that the company has never received one cent on the bonds and that it has spent much money and more than 10 months trying to recover the bonds and prosecute those responsible.

Southwestern Street Railway, Philadelphia, Pa.—The sale of the property of the Southwestern Street Railway under foreclosure, which was to have taken place on Sept. 21, has been postponed until Dec. 8.

Third Avenue Railroad, New York, N. Y.—The Public Service Commission of the First District of New York has denied the application of the bondholders' committee for approval of the proposed reorganization of the Third Avenue Railroad. The opinion was written by Chairman Willcox and Commissioner Maltbie. Among the reasons given for refusing to sanction this reorganization plan are that the assets of the property are not of sufficient value to justify the proposed capitalization of $68,516,000; that the present company is overcapitalized, and the outstanding stocks and bonds are not represented by actual property; that the net earnings will probably be less than the estimate given by the receiver; that there is no evidence that the company would earn a sufficient net income to pay the interest on the adjustment bonds, amounting to $32,000,000; that there is no likelihood that there would ever be any dividend earned on the $20,000,000 of proposed common stock; that it is unwise to issue securities on probable earnings; that such overcapitalization would lead to inferior service and unwarranted exactions; that the control of the corporation would pass from the stockholders to the bond holders, and that the reorganization plan involved the capitalization of taxes, unpaid interest, repairs, renewals and other improper capital charges. The sale of the property of the company has been postponed from Oct. 27 to Nov. 30

Traffic and Transportation

Indiana Railroad Commission Lacks Power to Compel Separation of Grade Crossing

The Railroad Commission of Indiana in the case of the Pittsburgh, Cincinnati, Chicago & St. Louis Railroad versus the Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., has expressed the opinion that it cannot compel the separation of grade crossings by steam and electric railroads. The Pittsburgh, Cincinnati, Chicago & St. Louis Railroad asked the Railroad Commission to require the separation of the grades by the Pittsburgh, Cincinnati, Chicago & St. Louis Railroad and the Indianapolis, Columbus & Southern Traction Company four miles south of Indianapolis under the provisions of the Railroad Act of 1907.

The Indianapolis, Columbus & Southern Traction Company filed a special answer in which it alleged that the Pittsburgh, Cincinnati, Columbus & St. Louis Railroad had prosecuted a suit in the courts under the law of 1903, relating to the crossing of street and interurban railroads and that the Supreme Court had decided against the Pittsburgh, Cincinnati, Chicago & St. Louis Railroad on the ground that it was not practicable to separate the grades of the railroads at the crossing in question. The Pittsburgh, Cincinnati, Chicago & St. Louis Railroad moved to strike out the special answer of the Indianapolis, Columbus & Southern Traction Company, alleging former adjudication, and the commission reviewed the provisions of the law of 1903 and the provisions of the Railroad Commission Act of 1907 relating to the separation of grade crossings and held that the sections of the two laws relating to grade crossing separation must be construed together and that the commission must perform the duty as prescribed in the Act of 1903. Under the Act of 1903, however, the court or the Railroad Commission must find that it is commercially practicable to abolish the grade crossing and cannot order a grade heavier than 2 per cent on the interurban railway, nor the existing maximum grade on the steam railroad. Under the Act of 1907, it appears that proceedings for the separation of grade crossings should be tried before the Railroad Commission first and then review by the courts, and the commission realized that the issues in the case under review had been tried under the limitations of the Act of 1903 and adjudicated and settled by the courts, and that it would be useless for the commission to try the case again and then have it reviewed by the court which had already pronounced final judgment thereon. For this reason an order was entered dismissing the petition.

In a dissenting opinion Commissioner Dowling held that the former adjudication does not apply in matters of this character; that the question of commercial practicability in separating grades is purely legislative and administrative and that readjudication has no application where new matter has come into the case. A separation of grades may not have been commercially practicable three or four years ago, but the same may be commercially practicable at present and the case should have been decided on its present merits, according to Mr. Dowling.

In concluding its opinion the commission said:

"We find that as a matter of fact, respondent (electric line) was incorporated under the General Railroad Law of 1852, as a railroad corporation, and while so incorporated that its manner of operation is an electric or interurban railway, and not a steam railroad; that the petition for separation of grade crossing filed by petitioner (steam road) against respondent in the Marion Superior Court, alleged that respondent is an incorporation organized and existing under and pursuant to the laws of Indiana, and owns and operates an interurban and suburban street railway extending from Indianapolis to Columbus, Ind., using electricity for the propulsion of its cars.

"It appears that there is no escape from the conclusion that the Legislature has enacted that proceedings for the separation of grades between a steam railroad and an interurban railway shall take place by virtue of and under the provisions of Sec. 5 of the Act of 1903, which refers to the same subject matter as the grade provisions of the Railroad Commission Act of 1907, but by the very terms of the last act, the 1903 Act, is made a part of the Act of 1907, and must be read with it, as if it had been one of its sections. The commission, therefore, in the exercise of the powers of grade separation, must perform the duty as prescribed in the Act of 1903.

"Now, the powers conferred by the Act of 1903 are different, less in degree, more limited than those conferred in Sec. 19 of the Act of 1907. The latter act gave power to determine whether or not such grades shall be separated, in what manner, and by which corporation said work shall be done, and to apportion all expenses of construction and maintenance. But under the Act of 1903, the court or the Railroad Commission must find that it is commercially practicable to abolish the grade crossings. Pittsburgh, Cincinnati & St. Louis Railroad vs. Indianapolis, Columbus & Southern Traction Company (169 Ind. 634) and may not order a heavier than 2 per cent grade on the interurban railway nor the existing maximum grade on the steam railroads.

"As stated above, this issue under the limitations of the Act of 1903 has been adjudicated and settled; not only in the Circuit Court, but in the Supreme Court of the State. It would seem to be a useless waste of time and money and energy for this commission to try over again the same contention, on the same facts, subject to review in the same courts, which have given a final judgment thereon.

"It may be true, as petitioner contends, this is a legislative matter, administrative in its nature, and that the doctrine of res judicata cannot be applied to or involved in such proceedings. (140 Ind. 604). However this may be, it is certain that if this commission should come to a conclusion different from that announced by the courts in the determination of the very same case here presented, the order of the commission would be set aside.

"Apprehensive of the dangers of such crossings and while we commend the efforts of the petitioner to abolish any of its grade crossings with other railroads, nevertheless, we must decline to act where it appears to us that we are without authority and nothing would be accomplished. The commission will be glad if the petitioner will proceed to have its conclusions reviewed by the courts, and an authoritative conclusion made of its powers and duties with reference to railroad crossings. For the reasons set out above, an order will be entered dismissing the petition."

Officials of Ohio Roads Confer with Commission Regarding Operating Rules

A conference of officials of electric railways operating in Ohio was held in the office of the Railroad Commission of Ohio at Columbus on Sept. 21 for the purpose of discussing standard rules for the operation of trains in Ohio. Twenty representatives of the companies were in attendance. A committee of six railway men was appointed to draft a set of rules as a basis upon which to work and a report will be made at a meeting to be held with the Railroad Commission on Oct. 13. The members of this committee are: F. A. Davis, chairman, Scioto Valley Traction Company, Columbus; F. W. Coen, general manager, Lake Shore Electric Railway, Sandusky; Charles Currie, general manager, Northern Ohio Traction & Light Company, Akron; B. J. Jones, Ohio Electric Railway, Cincinnati; C. F. Franklin, Toledo & Western Railway, Toledo, and C. M. Paxton, Dayton & Troy Electric Railway, Dayton.

At the meeting on Oct. 13 the rules formulated by the committee will be discussed, and the members of the commission will make such suggestions as they feel should be incorporated in the new code. The code of operating rules prepared for discussion at the annual meeting of the American Street & Interurban Railway Association will be studied carefully by both the operating managers and the members of the commission with the idea of adopting those rules recommended by the national association which appear to be best adapted to conditions which govern in Ohio.

It was brought out at the meeting that some roads in Ohio are operated without train orders, the trains running on single tracks depending entirely upon the block signals for the right to proceed. The opinion was expressed that the double order system is the safest for all roads and a clause covering this subject may be incorporated in the new code. Members of the commission desire that their inspectors be allowed to ride in the motormen's vestibules when making inspections and a rule to this effect may be adopted. At present the rules of several companies state that only certain specified officers of the company shall be permitted to ride in the vestibule.

Changes Made in Transportation Department of Pittsburgh Railways

The Pittsburgh (Pa.) Railways has decided to reorganize its transportation department by sub-dividing the system into six divisions, each to be in charge of a superintendent to be appointed by the superintendent of transportation of the company, with the approval of the general superintendent. The names of the men selected for the new positions had not been announced up to Sept. 25. The announcement of the change was conveyed to the employees in a circular signed by James D. Callery, president of the company, and

P. N. Jones, general superintendent. The contents of this circular follow:

"On Oct. 1, 1909, the transportation department of the Pittsburgh Railways will be reorganized by subdividing the system into the following divisions:

First, the Allegheny Division—Including the operation of all cars and crews from the following barns: Manchester, Taggart Street, Chestnut Street and Emsworth.

"Second, the Southern Division—Including the operation of all cars and crews from the following barns: West End, Carnegie and West Park.

"Third, the Birmingham Division—Including the operation of all cars and crews from the following barns: Tunnel, Thirtieth Street and Suburban.

"Fourth, the Monongahela Division—Including the operation of all cars and crews from the following barns: Glenwood, McKeesport and Rankin.

"Fifth, the Consolidated Division—Including the operation of all cars and crews from the following barns: Oakland, Homewood, Ardmore, Highland, Herron Hill and Butler Street. The Consolidated Division will also have charge of the cars and crews of the Monongahela Division from Craig Street to the city.

"Sixth, the Interurban Division—Including the operation of all cars and crews on the Washington and Canonsburg and Charleroi routes.

"Six superintendents for these divisions will be appointed by the superintendent of transportation, with the approval of the general superintendent, such appointments being made, as far as possible, from our transportation employees. The standing of the men so appointed thereafter will depend upon the net results of the traction business in each respective district, the courtesy of employees to the public, the number of accidents, the amount of repairs necessary to the equipment and the amount of power consumed, being considered in arriving at a conclusion."

Accidents in New York During August

The Public Service Commission of the First District of New York has issued the following comparative summary of accidents for August, 1909, and August, 1908, on the street railways within its jurisdiction:

	1909.	1908.
Car collisions	137	122
Persons and vehicles struck by cars	976	896
Boarding	662	655
Alighting	1,173	1,238
Contact electricity	45	41
Other accidents	2,056	2,362
Total	5,049	5,314
INJURIES.		
Passengers	2,310	2,261
Not passengers	523	534
Employees	494	544
Total	3,327	3,339
SERIOUS. (Included in above.)		
Killed	31	44
Fractured skulls	8	15
Amputated limbs	2	4
Broken limbs	41	35
Other serious	122	138
Total	204	236

Philadelphia & West Chester Traction Company Increases Fare.—The Philadelphia & West Chester Traction Company, operating 33 miles of line out of Philadelphia, increased the fare on its line between Sixty-third Street and Market Street, Philadelphia, and West Chester on Sept. 27 from 25 cents to 30 cents.

Central Electric Accounting Conference Publication.—The Central Electric Accounting Conference has issued under date of Oct. 1, 1909, a publication of 20 pages in which are contained a list of officers and members of the conference, the constitution and by-laws of the body and the rules and recommendations adopted from the first meeting to the tenth meeting, inclusive.

Denver & Interurban Railroad to Suspend Operation For a Month.—The Denver & Interurban Railroad, operating between Denver and Boulder, a distance of 46 miles, will suspend operations for 30 days or more, owing to the necessity for replacing the viaduct out of Denver to the north with a new steel structure. Hourly train service is to be provided by the Colorado & Southern Railway, which controls the Denver & Interurban Railroad.

Accident on Elevated Railroad in Brooklyn.—The rear truck of the rear car of a train on an elevated line of the Brooklyn (N. Y.) Rapid Transit Company which was being returned to the East New York sheds of the company empty, except for the crew, after the morning rush on Sept. 24 jumped the track and fell to the street, leaving the car suspended over the side of the elevated structure. A guard who was on the car was slightly injured by being thrown against a gate of the car.

Strike in Omaha.—Scenes of wild disorder have marked the progress of the strike of the employees of the Omaha & Council Bluffs Street Railway, and on this account the company has purposely delayed operating the full complement of cars, suspending service on most of the lines at night. A conference was held on Sept. 22 between the Mayor of Omaha, officers of the company and representatives of the men, but the company is said to have refused to recognize the union, a demand which the men insisted upon. Seventy-five former employees of the company applied for reinstatement between Sept. 24 and Sept. 27.

Terre Haute Franchise Suit Being Heard.—The final argument in the injunction suit of the City of Terre Haute against the Terre Haute, Indianapolis & Eastern Traction Company will be heard in Indianapolis on Oct. 7. The evidence was taken at Rockville on change of venue during the week ended Sept. 25 by Judge J. C. Robinson. The suit was begun in February, 1908, as the result of a petition filed by Hugh J. McGowan, president of the company, for an amended contract, supplemented with a promise to build a modern interurban station and make other improvements. Mr. McGowan went to Europe, and the city decided to ask for an injunction to stop work on the streets, contending that the old franchise provided for carrying "passengers and baggage," whereas the amended franchise reads "passengers and property." The company contends that an act of the Legislature in 1901 giving electric railways permission to carry freight covers the right to do freight business in the streets of the city. The city contends that the act of 1901 extends to electric roads the right to carry freight only in the country.

Indiana Tax Commission to Inspect Electric Railways.—About Oct. 15 the members of the Indiana Tax Commission will start on a 40-day tour of the electric railways and the steam railroads in Indiana to inspect their physical condition. A trip of this kind is made by the commissioners every four or five years. The property of the following electric railways will be inspected: Indiana Union Traction Company, Indianapolis & Cincinnati Traction Company, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Columbus & Southern Traction Company, Fort Wayne & Wabash Valley Traction Company, Chicago, Lake Shore & South Bend Railway, Indianapolis & Martinsville Traction Company, Cincinnati, Lawrenceburg & Aurora Railway, Evansville & Eastern Traction Company, Evansville & Mount Vernon Railway, Fort Wayne & Springfield Railway, Chicago, South Bend & Northern Indiana Railway, Indianapolis & Louisville Traction Company, Kokomo, Marion & Western Traction Company, Lebanon-Thorntown Traction Company, Evansville & Southern Indiana Traction Company, Marion, Bluffton & Eastern Traction Company, Muncie & Portland Traction Company, Southern Michigan Railway and Winona Interurban Railway. A careful inspection will also be made of the city properties in Indianapolis, Evansville, Terre Haute, South Bend, Fort Wayne, Richmond, Anderson, Muncie and Elwood.

Changes in Surface Car Routes in Brooklyn.—The Brooklyn (N. Y.) Rapid Transit Company has announced that on Oct. 25 it will put into effect a number of changes in the routes of its surface lines, due to the redistribution of traffic as a result of the operation of trains under the East River by the Interborough Rapid Transit Company through Fulton Street to Flatbush and Atlantic Avenues, Brooklyn. A new loop for surface cars has been constructed at Fulton Street and Flatbush Avenue, and it will be used in the rush hours for short line service for cars of the Greene-Gates, Putnam-Halsey and Fluton Street lines. The company will also operate a new Fulton Ferry-Wall Street Ferry surface service, which will improve transit in the Brooklyn Heights District. Transfers will be issued at the Borough Hall between the new Fulton Ferry-Wall Street Ferry lines and all surface car lines of the company operating over Fulton street. Cars of the Wyckoff Avenue line of the company which have been operated from the discontinued ferries at the foot of Grand Street, Brooklyn, will, after Oct. 25, be run across the Williamsburg Bridge to Delancey Street, New York. A shuttle car service will be established between the plaza of the Delancey Street Bridge at Broadway and Marcy Avenue, Brooklyn, and the ferries at the foot of Broadway, Brooklyn. The subway having greatly relieved the surface cars operating across the Brooklyn Bridge in the non-rush hours, it has been decided to discontinue the operation of Seventh, Flushing and Park Avenue cars over the structure during the non-rush hours. This change will also become effective on Oct. 25.

Personal Mention

Mr. Harry Fraser has resigned as superintendent of the Toledo & Chicago Interurban Railway, Kendallville, Ind., and the position has been abolished.

Mr. A. J. Dies has been appointed auditor of disbursements of the Delaware & Hudson Company, Albany, N. Y. Mr. Dies was formerly auditor of the United Traction Company, Albany.

Mr. George W. Ogsbury has been appointed auditor of the United Traction Company, Albany, N. Y. Mr. Ogsbury was formerly auditor of disbursements of the Delaware & Hudson Company, Albany, N. Y.

Mr. Edward Herd has resigned as secretary and general manager of the Morgantown & Southern Railway, Morgantown, W. Va., to become secretary and general manager of the Herd Plumbing Company, Morgantown, which proposes to extend its business to the electrical field.

Mr. D. H. Brown has resigned as chief engineer of the Lehigh Valley Transit Company, Allentown, Pa., and is succeeded by Mr. W. W. Wysor. Mr. Brown has accepted the position of chief engineer of the Diamond Water Company, Hazleton, Pa., which is constructing a storage reservoir, dam, pipe lines and pumping stations at Hazleton at a cost of approximately $200,000.

Mr. Samuel McRoberts has been elected a vice-president of the National City Bank, New York. Mr. McRoberts is chairman of the board of directors of the Kansas City Railway & Light Company, Kansas City, Mo., and for several years was treasurer of Armour & Company. Mr. McRoberts is a lawyer by profession and has represented the Armour interests as counsel for some time.

Mr. W. E. Wickenden has been appointed assistant professor of electrical engineering at the Massachusetts Institute of Technology to assume the duties vacated by Prof. George C. Shaad, who has gone to the University of Kansas to take charge of the department at that institution. Mr. Wickenden is a graduate of Dennison University, and later took a year of graduate study in physics at the University of Wisconsin. He is now on the electrical engineering staff of the University of Wisconsin. He is author of a book on photometry and illumination, now on the press.

Mr. W. W. Wysor has been appointed chief engineer of the Lehigh Valley Transit Company, Allentown, Pa., to succeed Mr. D. H. Brown. Previous to his appointment to the Lehigh Valley Transit Company, Mr. Wysor was chief engineer for the Chattanooga (Tenn.) Railways, and previous to January, 1908, was connected with the Norfolk & Western Railway as assistant engineer in charge of location and construction work for a period of about seven years. Mr. Wysor also served for a short while as a mining engineer in the Pocahontas coal fields of West Virginia.

Mr. Walter Silvus has been appointed master mechanic of the Chicago & Milwaukee Electric Railroad, Highwood, Ill., to succeed Mr. L. L. Smith, resigned. Mr. Silvus began his railroad career with the Baltimore & Ohio Railroad in April, 1893, and remained in the employ of that company for 10 years. During seven years of his service with the Baltimore & Ohio Railroad Mr. Silvus was a foreman for the company. In 1903 he accepted a position with the Chicago, Lake Shore & Eastern Railroad at Chicago as shop foreman, but resigned from that company in January, 1904, to become general inspector of the Twin City Rapid Transit Company, Minneapolis, Minn. He resigned from the Twin City Rapid Transit Company on Sept. 15, 1909, to enter the employ of the Chicago & Milwaukee Electric Railroad.

Mr. L. L. Smith, whose resignation as master mechanic of the Chicago & Milwaukee Electric Railroad, Highwood, Ill., effective on Sept. 21, was noted on page 486 of the Electric Railway Journal of Sept. 25, has been master mechanic of the Chicago & Milwaukee Electric Railroad for the last 2½ years. Previously he held a similar position with the Schenectady (N. Y.) Railway. Before entering electric railway service Mr. Smith had extended experience in the mechanical department of steam railroads. Since he has been connected with the electric railways Mr. Smith has been actively identified with the work of the American Street & Interurban Railway Engineering Association, serving last year as chairman of the committee on maintenance and inspection of electrical equipment and being at present a member of the executive committee, chairman of the equipment committee and member of the committee on standards of the association.

Mr. E. S. Vollick has recently had assigned to him the duties of trainmaster and car house foreman of the Toledo & Chicago Interurban Railway, Kendallville, Ind. Mr. Vollick succeeds Mr. J. Hanff as car house foreman, and as trainmaster succeeds to the duties of the office of superintendent, which position was abolished following the resignation of Mr. Harry Fraser, noted elsewhere in this column. For five years Mr. Vollick was engaged as section hand on the Michigan Central Railroad at Cerusco, Mich., and for three years was connected with the construction and maintenance of way department of the Jackson & Battle Creek Traction Company. For a year he was an extra gang foreman with the Toledo & Chicago Interurban Railway and for two years and three months had charge of the maintenance of way line department of the Toledo & Chicago Interurban Railway, during which time the road was extended from Auburn to Waterloo and from Garrett to Kendallville, and placed in operation between these cities.

Mr. Robert I. Todd, whose election as general manager of the Terre Haute, Indianapolis & Eastern Traction Company, Richmond, Ind., to succeed the late C. C. Reynolds was noted in the Electric Railway Journal of Sept. 25, 1909, page 487, has been connected with street and electric railway work for 16 years. Soon after he was graduated from Johns Hopkins University Mr. Todd became connected with the Eckington & Soldiers' Home Railway and the Belt Railway, Washington, D. C., operating underground conduit roads, and was subsequently connected with the Consolidated Traction Company, Pittsburgh; the Cincinnati (Ohio) Traction Company; the United Gas Improvement Company, Philadelphia; and the Rhode Island Company, Providence, R. I. He was also at one time identified with the development of compressed air for street railway service in New York, and for a time had charge of the experimental work of the Compressed Air Company in connection with this development. As vice-president and general manager of the Indianapolis Traction & Terminal Company, Mr. Todd is responsible for the operation of 158 miles of city and suburban lines over which 650 cars are run, and as general manager of the Terre Haute, Indianapolis & Eastern Traction Company he will be responsible for the operation of 70 miles of interurban electric railway over which 20 cars are run. For some time past Mr. Todd has been active in the affairs of the American Street & Interurban Railway Association, and at this time is first vice-president of the American Street & Interurban Railway Transportation & Traffic Association.



R. I. Todd

OBITUARY

Ros Marquis, chief engineer of the power station of the Citizens' Railway, Waco, Tex., who was shot by a striking employee of the company, is dead.

H. B. Smith, president of the Evansville & Southern Indiana Traction Company, Evansville, Ind., died at Ft. Wayne, Ind., on Sept. 25. Mr. Smith was president of the Citizens' National Bank, Hartford City, Ind., and a stockholder in several interurban lines beside the Evansville & Southern Indiana Traction Company.

A ruling of the Public Service Commission, Second District, New York, refusing the Delaware & Hudson Company permission to issue $13,000,000 bonds to purchase the Hudson Valley Railway securities and coal lands in Pennsylvania, was annulled in a decision handed down on Sept. 25 by the Appellate Division of the Supreme Court of New York, Third Judicial Department. The court directs that the matter be remitted to the Public Service Commission for further consideration. The Delaware & Hudson Company some time ago applied to the commission for permission to issue a mortgage on its property to cover an issue of bonds for certain expenditures. The commission gave its authorization for the bond issue, except for that portion relating to the purchase of the coal lands and the property of the Hudson Valley Railway. From this portion of the decision the Delaware & Hudson Company appealed. The refusal of the commission to authorize that part of the bond issue which was to cover the purchase of coal lands and traction securities was based upon the commission's report that such properties were not essential to the conduct of a railroad proper, and could not therefore be included in its capitalization.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

St. Louis County Belt Railroad, St. Louis, Mo.—Incorporated to build an electric belt railway through St. Louis County from North to South, and circling St. Louis. The railway will be 30 miles long, extending from Jefferson Barracks on the south to O'Neil on the north, circling St. Louis at an average distance of 3 miles from the city limits, and passing through Webster Groves, Maplewood, University City, Wellston and Ferguson, and the unincorporated towns of Affton, Clayton, Wheaton, Carsonville and Spanish Lake. The cost will be approximately $2,000,000. Headquarters, 414 Roe Building, St. Louis. Capital stock, $200,000. Incorporators: Jas. D. Houseman, Clayton; Thos. M. Gallagher, Webster Groves; Jas. E. Hereford, Ferguson; Edw. W. Rannells, Maplewood; Geo. B. Bowles, Affton; Chas. A. Autenrieth, Clayton; Albert Wehmeyer. [E. R. J., Sept. 11, '09.]

***Bedford, Fulton & Franklin Street Railway, Bedford, Pa.**—Application has been made by this company to the Governor of Pennsylvania for a charter to build a double-track street railway from Bedford to Chambersburg. Incorporators: M. J. Murphy, H. D. Tate, George W. Rook, John F. Fay, M. H. Sheats and I. Y. Daly.

***Center County Traction Company, Bellefonte, Pa.**—Application was made to the Governor of Pennsylvania on Sept. 21 by this company for a charter to build a street railway from Bellefonte to State College. Incorporators: W. C. Hagan, Wm. H. Furey and L. T. Munson.

El Paso & Fort Hancock Railway, El Paso, Tex.—Incorporated to build an electric railway to connect El Paso, Ysleta, Socorro, San Elizario, Clint and Fabens. Headquarters, Plaza Block, El Paso. Capital stock, $100,000. Incorporators: C. E. Kelly, Richard Caples, W. B. Latta, Felix Martinez, Thomas O'Keeffe and Richard F. Burgess, El Paso. [E. R. J., Aug. 21, '09.]

Fort Worth, Mineral Wells & Western Railroad, Fort Worth, Tex.—Incorporated to build an electric railway from Fort Worth to Mineral Wells via Weatherford, a distance of 54 miles, and later to Roswell, N. Mex. Capital stock, $100,000. Incorporators: L. C. Cole, Fort Worth; N. M. James, and J. S. Hanford, Beaumont, Tex. [E. R. J., Sept. 18, '09.]

FRANCHISES

San José, Cal.—The Board of Supervisors has determined to grant the franchise for the right to build an electric railway along the county highway between Palo Alto and Mayfield, applied for by the Peninsular Railway. Bids will be opened Oct. 18, and the franchise sold to the highest bidder. The successful bidder will be required to put up two securities in the penal sum of $1,000. [E. R. J., Sept. 11, '09.]

Moline, Ill.—The Board of Supervisors has granted a 20-year franchise to the Tri-City & Northeastern Interurban Railway, Port Byron, to build an electric railway from Port Byron to Rapids City. The franchise provides that the railway must be in operation within three years. The company is to build an electric railway from Watertown to Albany. J. W. Simonson, Port Byron, president. [E. R. J., Sept. 18, '09.]

***Paoli, Ind.**—The Board of Commissioners of Orange County has granted a franchise to Charles D. Kelso and J. H. Fawcett to build an interurban electric railway over the county turnpike from Paoli to New Albany. The franchise provides that the railway must be completed by Dec. 15, 1910. An effort will be made to obtain a right-of-way from Paoli to French Lick.

Juarez, Mexico.—The State Government has granted to the El Paso (Tex.) Electric Railway the right to extend its electric railway in Juarez to the race track projected by Col. M. J. Winn, Louisville, Ky. H. S. Potter, general manager.

New York, N. Y.—W. O. Wood, president of the New York & Queens County Railway, has sent a communication to the Board of Estimate and Apportionment asking permission to operate cars over the Queensboro Bridge pending the application which is before the Board for a permanent franchise.

Chesapeake, Ohio.—The Town Board has granted a 25-year franchise to A. E. Cox and associates, Huntington, to build an electric railway through Chesapeake. The proposed railway will extend from Ironton to Gallipolis on the Ohio side of the Ohio River and from Point Pleasant to Guyandotte on the West Virginia side. [E. R. J., Aug. 14, '09.]

Mansfield, Ohio.—The City Council has extended the franchise under which the Mansfield Railway, Light & Power Company has the right to construct a single-track street railway over certain streets of Mansfield. The extension provides that the railway shall be completed before Dec. 1, 1910.

Steubenville, Ohio.—The County Commissioners of Jefferson County have granted a perpetual franchise to the Wheeling (W. Va.) Traction Company to operate its electric railway over the highway from Mingo to Brilliant.

Oregon City, Ore.—The City Council has granted a franchise to the Oregon City, Beaver Creek & Molalla Railway to operate its proposed electric railway on Main Street, instead of along the Molalla River. F. M. Swift is said to be interested. [E. R. J., Aug. 14, '09.]

Richmond, Va.—The amended franchise, recently granted by the City Council to the Richmond & Henrico Railway extending the time for the construction of its proposed railway and viaduct one year from June 30, 1909, has become void, as the company failed to start work within 90 days after the passage. [E. R. J., Sept. 18, 1909.]

TRACK AND ROADWAY

Phoenix (Ariz.) Railway.—This company has started surveys for the 6-mile extension of its street railway. Samuel H. Mitchell, general manager.

British Columbia Electric Railway, Vancouver, B. C.—This company is said to be running cars on the Chilliwack branch between New Westminster and Cloverdale, a distance of 12 miles. A regular service between these points will be begun about Oct. 1. The company's extension to Eburne, B. C., was placed in operation on Sept. 15.

Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga.—It is announced that this company has awarded the contract for 2 miles, of its electric railway, from Stonewall to Fairburn, Ga., to John Wright & Company. W. T. Roberts, Fairburn, president. [E. R. J., June 5, '09.]

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—This company expects to build a double 9 ft. x 9 ft. box culvert with reinforced concrete about 2 miles south of Milwaukee, Wis. The company will also build a 40-ft. through girder span, steel bridge with concrete abutments at Willow Street, Winnetka, Ill.

Chicago (Ill.) Railways.—This company has let the contract for the second section of the Washington Street tunnel, under the Chicago River, to George W. Jackson, Inc., Chicago, which will cost $590,000, and is to be completed in 490 days. The Van Buren Street tunnel is nearly completed, and the La Salle Street tunnel and first section of the Washington Street tunnel have been started.

Wichita Railroad & Light Company, Wichita, Kan.—W. R. Morrison, superintendent, writes that this company expects to place contracts within two months for constructing 2 miles of track in pavement.

New Orleans & Seashore Railway, New Orleans, La.—This company has awarded the contract for the construction of its electric railway from New Orleans to Grand Isle, La., a distance of 50 miles, to Black & Laird, 303 Godchaux Building, New Orleans. It is the company's intention to commence work within the next 60 days. J. W. T. Stephens, 303 Cotton Exchange Building, New Orleans, chief engineer. [E. R. J., March 27, '09.]

Boston Transit Commission, Boston, Mass.—This company has begun the work of building the Boston section of the Cambridge subway on the westerly side of Beacon Hill at Grove Street. The work is in charge of Patrick McGovern, 6 Beacon Street, Boston.

Boston & Northern Street Railway, Boston, Mass.—This company has petitioned the Railroad Commissioners of Massachusetts asking approval of two locations desired by that company. The petition requests permission to lay tracks on Ocean Street, Lynn, and to extend the company tracks on Humphrey Street, Swampscott.

Michigan Central Railroad, Detroit, Mich.—It is understood that this company has arranged to use the right-of-way of the Detroit United Railways into Flint. The plan is to use the right of way from Oxford to Flint, a distance of 30 miles.

Michigan United Railways, Lansing, Mich.—This company has opened its extension from Jackson to Leslie. The railway is equipped with the third rail system for operation.

Vicksburg (Miss.) Traction Company.—This company expects to place the contract, within the next year, for 7500 ft. of track.

Interstate Railway, Kansas City, Mo.—The construction of this electric railway from Kansas City to St. Joseph has been placed in charge of the Electric Traction Company, Commerce Building, Kansas City, Mo. Bids for building the railway will be opened immediately. It is estimated that the cost of construction will be $2,000,000. N. C. Van Natta, Corley Building, St. Joseph, has personal charge of the work. [E. R. J., July 17, '09.]

Yellowstone Valley Traction Company, Billings, Mont.—A. D. Bowen, Kansas City, Mo., representing this company, has matured his plans for the electric railway to extend from Billings to Laurel and eventually to other towns. The preliminary surveys have been completed and four routes have been located. The board of directors for the first three months are: J. B. Arnold, H. W. Rowley, Christian Yegen, P. B. Moss, I. D. O'Donnell, Joseph Zimmerman and R. E. Shepherd. [E. R. J., Oct. 31, '08.]

***Baker Construction Company, Fremont, Neb.**—This company has been organized to build an electric railway from Fremont to Omaha. Capital stock, $100,000. Directors: E. L. Whitcomb, O. C. Phillips, C. W. Baker, Peter Mangold and John G. Huglin.

Second Avenue Railroad, New York, N. Y.—This company, which has recently been granted permission by the Public Service Commission of the First District to issue $500,000 in bonds, announces that it will spend $150,000 for electrifying several horse car lines in New York.

Goldsboro (N. C.) Traction Company.—This company, which is building a 2½-mile extension, has recently placed orders with the Indianapolis Switch & Frog Company, Springfield, Ohio, for 3 standard 3-rail type crossings, steam with electric railway, also a spring switch, mate and frog, necessary for a turnout for branch line.

Cincinnati (Ohio) Traction Company.—This company expects to build about 1 mile of track in Norwood, a suburb of Cincinnati.

Cincinnati, Dayton & Fort Wayne Railway, Dayton, Ohio.—It is announced that this company will be reorganized and will resume work on its proposed electric railway. Instead of extending into Indiana, as originally planned, it is the intention of the company to build the railway to Toledo, Ohio, with a branch to Detroit. The company intends to use the tracks of the Cincinnati & Westwood Railroad between Cincinnati and Dayton.

***Fostoria, Ohio.**—F. D. Carpenter, Lima, and J. D. McDonnell and L. H. McDonnell, Fostoria, are said to be interested in the revival of the project of building an electric railway between Fremont and Fostoria. Two years ago surveys were made and rights of way secured for this railway. It is stated that the parties interested have been negotiating with the Fremont Street Railway to purchase its property.

Nipissing Central Railway, North Cobalt, Ont.—This company will lay 6 miles of track on its proposed railway between Cobalt and Haileybury, Ont., the grading having been completed. Clarence B. Henry, North Cobalt, electrical and chief engineer. [E. R. J., July 31, '09.]

Bloomsburg & Millville Street Railway, Bloomsburg, Pa.—C. W. Miller, president, writes that work on this electric railway, which is being constructed from Bloomsburg to Millville, has been suspended for some time past. It is not definitely known when work will be resumed.

Montreal & Southern Counties Railway, Montreal, Que.—According to the contractors this system will be in operation between Montreal and St. Lambert, Que., about Oct. 15. Harold A. Richardson, 112 St. James Street, Montreal, president. [E. R. J., Sept. 18, '09.]

Corpus Christi, Tex.—Daniel Hewitt, Salina, Kan., who was recently granted a franchise to construct a street railway in Corpus Christi, has placed orders for the necessary ties, rails and equipment. Surveys will be started immediately and the railway completed within nine months. [E. R. J., Aug. 14, '09.]

Gainesville, Whitesboro & Sherman Railway, Gainesville, Tex.—This company has 13 miles of railway graded, and hopes to begin construction in a short time. The company desires to correspond with a construction or engineering company which would study local conditions with a view of completing the railway. Thos. M. Bosson, secretary.

San Antonio (Tex.) Traction Company.—This company has recently placed an order with the Lorain (Ohio) Steel Company for 90-lb. rails. This is to be used to replace 60-lb. T-rails in a mile extension of the paved district. The Fernando division of this railway extending into the irrigated garden district has been completed, and opened for traffic as far as Union Stock Yards. It is stated that the remainder will be completed and opened by Oct. 1. J. J. King, superintendent.

SHOPS AND BUILDINGS

Birmingham Railway, Light & Power Company, Birmingham, Ala.—This company is said to have plans to erect a $12,000 brick building on First Avenue. The new building will be used as a new headquarters and passenger station.

Pacific Electric Railway, Los Angeles, Cal.—This company is building an elevated platform from its passenger station at Sixth Street and Main Street across Los Angeles Street, which will cost $68,000. The platform will be 420 ft. long with an elevation of 14 ft., and will be of steel built on a concrete foundation. The material has been ordered and the contracts for construction have been let. The platform will allow trains of four to six cars to enter the station over Main Street, and running through to the new tracks, can be switched and started out of the building again.

Wichita Railroad & Light Company, Wichita, Kan.—This company expects to place the contract during the next two months for the erection of a new car house.

Fargo & Moorhead Street Railway, Fargo, N. D.—This company is building a paint shop, 118 ft. x 36 ft., which will cost $6,000. The plant will be heated by steam.

Cincinnati (Ohio) Traction Company.—This company expects to construct a new club house for employees at the Brighton car house.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—M. E. McCaskey, general manager, advises that this company has awarded the contract for the construction of a new car house adjacent to Idora Park.

Lake Shore Electric Railway, Cleveland, Ohio.—This company is moving the woodworking and drying machinery from its shops at Fremont to its new shops at Sandusky. It is announced that the Fremont shops will eventually be abandoned.

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—This company is to begin work within a few days on the erection of a new headquarters and station in Willoughby, for which the company let the contract recently. Plans for the building have been completed by Franz C. Warner, Citizens' Building, Cleveland. The building will be 35 ft. x 61 ft., three stories high with a basement, and it will cost about $20,000. The ground floor will be used for the general ticket office, waiting and baggage rooms and the employees' quarters. The second and third stories of the new building will be used as headquarters for the company and by the engineering department, respectively. [E. R. J., Sept. 25, '09.]

Vicksburg (Miss.) Traction Company.—This company advises that it expects to build a new car house during the next year.

POWER HOUSES AND SUBSTATIONS

Indiana Union Traction Company, Anderson, Ind.—It is stated that this company has purchased the dam and power property of the Noblesville (Ind.) Hydraulic Company, which is being completed on White River, 2 miles north of Noblesville. The plant is being built for electrical power and light purposes.

Boston (Mass.) Elevated Railway.—This company is planning to build a substation in the Forest Hills district, at the intersection of Washington Street and Bray Street, to be used in supplying power to the Forest Hills elevated railway extension.

Detroit (Mich.) United Railway.—This company is said to have plans for the erection of a substation at Milwaukee Avenue and Dubois Street. The feed wires leading from the main station near Riopelle Street and Atwater Street to the substation will be placed under ground. The improvements will cost about $150,000.

Western Ohio Railway, Lima, Ohio.—This company is installing a 1000-kw turbine in its power house at St. Mary's in order to furnish additional power to its railway.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company has placed contracts for one 600-kw motor generator set with the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., and one 200-kw motor generator set with the General Electric Company, Schenectady, N. Y. It is stated that two additional boilers will be installed in the North Avenue power station about Nov. 1, which will mean an addition of 1000 hp.

Whatcom County Railway & Light Company, Bellingham, Wash.—This company plans to double the capacity of its York Street power station which will involve an expenditure of $140,000. The company is installing a new water wheel to displace the turbine in use at the Nooksack Falls power station, at a total cost of $35,000. The York Street station has at present a capacity of 2000 hp.

Manufactures & Supplies

ROLLING STOCK

Valdosta (Ga.) Street Railway is in the market for two closed cars with electric heaters and two 12-A Westinghouse motors.

Chicago (Ill.) City Railway has ordered the 50 pay-as-you-enter cars, mentioned in the ELECTRIC RAILWAY JOURNAL of Sept. 11, 1909, from The J. G. Brill Company.

Pittsburgh (Pa.) Railways, reported in the ELECTRIC RAILWAY JOURNAL of Aug. 7, 1909, as having ordered 50 cars from the St. Louis Car Company, is having these 50 cars built by The J. G. Brill Company.

Muskogee (Okla.) Electric Traction Company has contracted with the Cincinnati Car Company for the construction of six pay-as-you-enter cars, to be built under license from the Pay-As-You-Enter Car Corporation.

Louisville (Ky.) Railway, which has ordered 33 city cars from the St. Louis Car Company, noted in the ELECTRIC RAILWAY JOURNAL of Sept. 25, 1909, has specified Baldwin 58-20 trucks for these cars instead of St. Louis trucks, as stated in the previous record of this order.

Indianapolis, Crawfordsville & Western Traction Company, Crawfordsville, Ind., has contracted with the Westinghouse Electric & Manufacturing Company for 10 four-motor equipments, consisting of Westinghouse 304 interpole motors and K-34-B controllers.

Edmonton Radial Railway, Edmonton, Alta, Can., has recently received from the Preston Car Company a sprinkler which is about to be placed in operation. The company expects to purchase eight four-motor passenger cars of the pay-as-you-enter type, equipped with electric heaters, automatic fenders and air-brake equipments.

TRADE NOTES

Perry Ventilator Corporation, New Bedford, Mass., has been awarded the order for ventilators for cars for the Syracuse Railroad Construction Company being built by the G. C. Kuhlman Car Company at its works at Collingwood, Ohio.

Queen & Company, Inc., Philadelphia, Pa., have furnished a Landgraf-Turner alternating impact testing machine to the Bureau of Standards, Washington, D. C., and have received an order from the Royal Italian Navy for a testing machine to go to Italy by the Italian cruiser now in New York Harbor.

Stuart-Howland Company, Boston, Mass., reports a very satisfactory condition of business. It now has 17 salesmen on the road, covering nearly the whole of the United States and Canada. Its export business is also extensive. During the recent period of business depression it steadily increased its business and sales in 1909 will be at least 30 per cent greater than in 1908. The company is agent for some of the best electric railway specialties and lighting equipment.

Harold P. Brown, New York, N. Y., is the manufacturer of the Brown plastic bonds used in Denver and described elsewhere in this issue, on a section of track which has been constructed 13 yeads. Recent tests made as to the conductivity of this track proved that the joints were in very good condition. Mr. Brown states that reports of a very similar character have recently been received from Scranton, Pa.; Newark, N. J., and Hingham, Mass. Mr. Brown has recently brought out, for the purpose of installing these bonds, an electro-pneumatic hammer of a very strong and light construction, by means of which a contact surface can be prepared on the rail in excellent manner in less than 30 seconds. The filelike surface which it produces on the rail metal has been found to be very advantageous for plastic bonds.

Dodge Manufacturing Company, Mishawaka, Ind., has recently made public some interesting facts regarding the extent of its plant at Mishawaka and its products. The buildings of the company cover nearly 40 acres in a 60-acre location on the Lake Shore & Michigan Southern Railway. There are annually consumed 20,000 tons of pig iron, 7,000,000 ft. of lumber, 900 tons of steel and structural iron, 6200 tons of steel shafting and 9000 tons of coal, and there are annually produced 250,000 Independence wood split pulleys, 100,000 Dodge Standard iron split pulleys, 90,000 solid iron pulleys, 95,000 hangers, 150,000 bearings of all types, 4000 friction clutches and more than 2,000,000 lb. of bearing metal. The boilers have a capacity of 1500 hp and the steam engines 1500 hp with electric generators of 250 kw. The steel shop in which the Eureka water softener and purifier is made, has a capacity for turning out 52 fully equipped machines per annum.

ADVERTISING LITERATURE

Keasbey & Mattison Company, Ambler, Pa., has prepared an illustrated booklet on its asbestos shingles, slates and sheathings, together with numerous views of their application.

Arthur S. Partridge, St. Louis, Mo., in Schedule No. 31, dated Sept. 20, 1909, lists for sale a number of street and interurban cars, motors and power house equipment of all sizes and types.

Westinghouse Machine Company, East Pittsburgh, Pa., has issued Circular W M 503, dated September, 1909. The subject of the publication is "Westinghouse Gas Producers for Bituminous Fuels."

MacGovern, Archer & Company, New York, N. Y., have issued a list of electrical and steam machinery, power house equipment, cars, etc., which they offer for sale, dated October, 1909. The list is somewhat larger than usual.

Duplex Metals Company, New York, N. Y., is distributing a blotter on which is reproduced a testimonial letter from the Dominion Power & Transmission Company, Ltd., regarding the Duplex Metals Company's coffer-clad steel wire.

American Ventilator Company, New York, N. Y., has just published an attractive pamphlet descriptive of its ventilating system for steam and electric railway cars. Views of a number of the cars of important electric railway companies using this system of ventilation are shown.

Alexander Milburn Company, Baltimore, Md., has issued a new catalog, in which its portable acetylene lights are described and illustrated. Milburn lights are especially adapted for use in railroad and building construction work, and a long list of users of the lights is given in the publication.

Albert & J. M. Anderson Manufacturing Company, Boston, Mass., has issued Bulletin No. 23, showing its present line of switches and switchboard appliances. Particular attention is given to 600-volt d. c. railway apparatus, including standard section switches, canopy switches and cab heater switches.

Goldschmidt Thermit Company, New York, N. Y., has printed in the third quarterly issue for 1909 of its publication, *Reactions*, two articles of particular electric railway interest. These articles are on electrolysis and track bonding in Winnipeg, and on the Clark modification of the thermit rail joint.

Jos. Dixon Crucible Company, Jersey City, N. J., has issued a 12-page booklet of envelope size describing the company's facings for various kinds of work. General information is given on the proper use of facings, the values of different kinds of facings, the working conditions met in foundry practice, etc.

Rooke Automatic Register Company, Providence, R. I., has just published a "paper" on the Rooke System of Fare Collection, giving the advantages of this register for prepaying cars. The Rooke portable register is a well-known device, and the manufacturers have recently applied the same principle to a stationary registry for use on pay-as-you-enter or other prepayment cars. The details of the register are fully described and illustrated.

Bausch & Lomb Optical Company, Rochester, N. Y., is distributing a leaflet entitled "Unique Features of Bausch & Lomb Engineering Instruments," in which some valuable suggestions are given concerning the testing of objectives to determine whether or not the full aperture is utilized, and many of the especially advantageous departures in construction are explained. The line of engineering instruments made by the Bausch & Lomb Optical Company is a comparatively new one.

NEW PUBLICATIONS

Lessons in Telegraphy. By Charles Henry Sewall. New York: D. Van Nostrand Company, 1909; 90 pages with index. Cloth, $1.00 net.

This is a text-book for those desiring to become telegraph operators. It contains numerous exercises, including specimens of telegraphic train dispatching and the like.

Boys on the Railroad. New York: Harper & Brothers, 1909; 213 pages; eight full-page half-tone illustrations. Cloth, 60 cents.

Railroad life has furnished unnumbered tales of hair raising adventures, and this collection of 13 stories by as many authors are typical of the best of this kind. The stories were carefully selected by the publishers for a volume suitable for the red-blooded American boy. "True to His Name" is the only tale which proves that street railway operation also has its exciting incidents, for it gives a veracious account of a runaway cable car in the good city of Philadelphia.

TABLE OF MONTHLY EARNINGS

Notice:—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including Taxes. †Deficit.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Aug. '09	231,062	115,724	115,338	43,703	71,634
	1 " " '08	209,742	107,357	102,385	43,381	59,004
	8 " " '09	1,432,015	784,740	647,276	350,414	296,861
	8 " " '08	1,247,878	730,392	517,486	351,331	166,155
BELLINGHAM, WASH. Whatcom Co. Ry. & Lt. Co.	1m., July '09	34,485	18,363	16,121	8,061	8,060
	1 " " '08	29,123	17,196	11,927	8,166	3,761
	12 " " '09	383,394	220,297	163,096	101,815	61,281
	12 " " '08	362,017	204,685	157,333	93,611	63,722
BINGHAMTON, N.Y. Binghamton St. Ry. Co.	1m., Aug. '09	34,348	16,025	17,323	9,135	8,188
	1 " " '08	32,892	18,518	14,374	8,517	5,857
	8 " " '09	230,721	130,007	100,714	72,429	28,285
	8 " " '08	211,134	125,002	86,132	65,803	20,329
BIRMINGHAM, ALA. Birmingham Ry., Lt. & Power Co.	1m., Aug. '09	181,979	100,486	81,493	.....	.....
	1 " " '08	172,068	105,630	66,438	.....	.....
	8 " " '09	1,458,461	817,916	640,545	.....	.....
	8 " " '08	1,404,375	820,582	583,793	.....	.....
CHAMPAIGN, ILL. Illinois Tr. System.	1m., July '09	362,729	215,822	146,907	.....	.....
	1 " " '08	342,273	191,280	150,993	.....	.....
	7 " " '09	2,416,947	1,453,337	963,610	.....	.....
	7 " " '08	2,255,790	1,329,873	925,917	.....	.....
CHARLESTON, S. C. Charleston Con. Ry. Gas & Elec. Co.	1m., Aug. '09	68,484	45,573	22,911	13,917	8,995
	1 " " '08	63,803	42,943	20,860	13,642	7,218
	6 " " '09	391,418	243,292	148,126	83,500	64,626
	6 " " '08	386,972	245,702	141,269	82,725	58,544
CHICAGO, ILL. Aurora, Elgin & Chicago Railroad.	1m., July '09	167,614	77,895	89,719	28,899	60,820
	1 " " '08	148,748	72,208	76,540	27,778	48,762
CLEVELAND, O. Cleveland, Painesville & Eastern R. R.	1m., Aug. '09	36,389	*16,299	20,090	8,328	11,762
	1 " " '08	33,137	*16,359	16,779	8,108	8,671
	8 " " '09	210,845	*104,302	106,542	66,820	39,722
	8 " " '08	197,258	*107,834	89,424	64,262	25,161
Lake Shore El. Ry.	1m., July '09	121,185	55,650	65,534	33,786	31,748
	1 " " '08	110,428	55,733	54,695	33,389	21,306
DALLAS, TEX. Dallas Electric Corporation.	1m., July '09	103,340	68,107	35,233	28,404	6,830
	1 " " '08	101,397	71,130	30,268	29,830	437
	12 " " '09	1,247,675	783,120	464,555	341,392	123,163
	12 " " '08	1,144,447	769,959	374,488	352,586	21,902
DETROIT, MICH. Detroit United Railway.	1m., July '09	784,123	466,319	317,804	*162,050	155,754
	1 " " '08	685,908	*417,869	268,039	135,978	132,061
	7 " " '09	4,494,262	2,717,679	1,776,583	*1,088,384	688,199
	7 " " '08	3,999,946	*2,528,176	1,471,770	948,952	522,818
EAST ST. LOUIS, ILL. East St. Louis & Suburban Co.	1m., Aug. '09	177,210	90,954	86,256	.....	.....
	1 " " '08	174,381	91,104	83,277	.....	.....
	8 " " '09	1,304,676	730,681	573,995	.....	.....
	8 " " '08	1,317,827	694,077	623,750	.....	.....
EL PASO, TEX. El Paso Elec. Co.	1m., July '09	46,362	29,204	17,158	8,085	9,073
	1 " " '08	40,821	29,352	11,469	7,209	4,260
	12 " " '09	562,858	371,885	190,973	92,143	98,830
	12 " " '08	532,675	374,426	158,249	80,557	77,692
FAIRMONT, W. VA. Fairmont & Clarksburg Tr. Co.	1m., July '09	39,899	13,356	26,543	.....	.....
	1 " " '08	35,462	12,315	23,147	.....	.....
	7 " " '09	231,048	90,242	140,806	.....	.....
	7 " " '08	210,081	83,136	126,945	.....	.....
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., July '09	123,547	72,385	51,162	.....	.....
	1 " " '08	115,470	65,481	49,988	.....	.....
	7 " " '09	772,202	463,220	308,982	.....	.....
	7 " " '08	730,671	426,075	304,595	.....	.....
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., July '09	109,212	59,835	49,378	17,190	32,188
	1 " " '08	98,983	58,787	40,196	18,033	22,163
	12 " " '09	1,186,590	663,239	523,351	198,241	325,110
	12 " " '08	1,063,627	618,576	445,052	179,518	265,534
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., July '09	109,747	62,070	47,678	21,596	26,082
	1 " " '08	93,375	52,005	41,370	20,085	21,285
	12 " " '09	1,171,764	674,402	497,362	253,342	244,020
	12 " " '08	1,063,623	624,497	439,126	239,368	199,758
GRAND RAPIDS, MICH. Grand Rapids Railway.	1m., Aug. '09	99,838	42,456	57,382	19,035	38,437
	1 " " '08	91,289	41,549	49,740	18,819	30,921
	8 " " '09	678,396	319,762	358,634	151,812	206,822
	8 " " '08	618,670	316,368	302,302	147,490	154,812
HARRISBURG, PA. Central Penn. Trac. Co.	1m., Aug. '09	70,031	52,646	18,385	.....	.....
	1 " " '08	68,836	49,481	19,355	.....	.....
	8 " " '09	501,768	374,594	127,174	.....	.....
	8 " " '08	472,250	376,021	96,229	.....	.....
HOUGHTON, MICH. Houghton County Tr. Co.	1m., July '09	30,653	14,702	15,951	6,242	9,709
	1 " " '08	26,300	12,713	13,587	4,635	8,953
	12 " " '09	298,732	162,958	135,774	67,943	67,830
	12 " " '08	257,037	148,354	108,683	57,100	51,582
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., July '09	39,300	22,353	16,947	9,367	7,580
	1 " " '08	35,559	20,691	14,868	9,303	5,565
	12 " " '09	458,076	260,205	197,870	111,081	86,789
	12 " " '08	411,650	252,096	159,555	105,293	54,262
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Aug. '09	378,256	175,187	203,069	111,231	91,838
	1 " " '08	343,511	160,889	182,622	101,155	81,467
	8 " " '09	2,778,677	1,358,765	1,419,911	841,289	578,622
	8 " " '08	2,570,819	1,326,537	1,244,281	792,860	451,421
Milwaukee Lt., Ht. & Trac. Co.	1m., Aug. '09	152,102	37,331	114,771	70,786	43,986
	1 " " '08	149,907	35,187	114,720	65,012	49,708
	8 " " '09	967,265	254,226	713,039	511,698	201,341
	8 " " '08	928,896	245,793	683,103	475,494	207,609
MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., July '09	640,094	277,571	362,523	140,251	222,273
	1 " " '08	606,374	278,139	328,235	128,361	199,874
	7 " " '09	3,890,160	1,900,053	1,990,107	968,009	1,022,099
	7 " " '08	3,589,223	1,813,729	1,775,494	877,789	897,705
MONTREAL, CAN. Montreal St. Ry.	1m. Aug. '09	355,230	183,583	171,647	59,027	112,620
	1 " " '08	329,772	164,262	165,510	54,113	111,398
	11 " " '09	3,492,777	2,078,393	1,414,379	418,802	995,577
	11 " " '08	3,329,060	1,973,659	1,350,401	423,021	927,380
NASHVILLE, TENN. Nashville Railway & Light Co.	1m. Aug. '09	137,255	70,882	66,373	.....	.....
	1 " " '08	126,946	66,416	60,530	.....	.....
	8 " " '09	1,103,101	553,730	549,371	.....	.....
	8 " " '08	1,008,528	527,653	480,875	.....	.....
NORFOLK, VA. Norfolk & Portsmouth Trac. Co.	1m. Aug. '09	174 210	96,336	77,874	63,118	14,756
	1 " " '08	156,509	86,535	69,974	61,574	8,400
	8 " " '09	1,221,012	719,207	501,805	503,997	†2,192
	8 " " '08	1,087,423	673,996	413,428	482,170	†68,742
PADUCAH, KY. Paducah Traction & Light Co.	1m. July '09	19,152	11,592	7,560	6,624	936
	1 " " '08	18,776	11,403	7,374	6,844	530
	12 " " '09	222,910	130,749	92,162	82,161	10,000
	12 " " '08	235,493	141,615	93,878	83,209	10,668
PENSACOLA, FLA. Pensacola Electric Co.	1m. July '09	23,461	12,603	10,858	4,305	6,553
	1 " " '08	19,630	12,058	7,571	4,269	3,302
	12 " " '09	232,983	137,015	95,967	51,997	43,970
	12 " " '08	215,357	151,961	63,397	50,712	12,685
PHILADELPHIA, PA. American Rys. Co.	1m. Aug. '09	284,487	.....	.....	.....	.....
	1 " " '08	272,679	.....	.....	.....	.....
	2 " " '09	571 930	.....	.....	.....	.....
	2 " " '08	544,291	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m. July '09	18,022	9,090	8.932	1,675	7.257
	1 " " '08	15,956	9,278	6,678	2,274	4,403
	12 " " '09	128,337	86,334	42,003	23,514	18,489
	12 " " '08	120,545	91,578	28,967	27,689	1,278
PORTLAND, ORE. Portland Ry., Lt. & Pwr. Co.	1m. Aug. '09	429,276	190,225	239,051	124,981	114,070
	1 " " '08	365,849	174,040	191,809	114,191	77.618
	8 " " '09	3,126,870	1,457,791	1,669,079	982,410	686,669
	8 " " '08	2,848,823	1,423,787	1,425,036	924,228	500,808
ST. JOSEPH, MO. St. Joseph Ry., Lt., Heat & Pwr. Co.	1m. Aug. '09	90,524	44,167	46,357	21,758	24,599
	1 " " '08	83,444	39,970	43,474	20,837	22,637
	8 " " '09	634,532	333,721	300,801	170.021	130,780
	8 " " '08	577,251	302,873	274,368	164,174	110,194
ST. LOUIS, MO. United RailwaysCo. of St. Louis.	1m. Aug. '09	957,246	*599,645	357,601	232,420	125,181
	1 " " '08	911,515	*572,879	338,636	234,551	104,085
	8 " " '09	7,297,057	*4,628,348	2,668,709	1,869,499	799,210
	8 " " '08	6,973,281	*4,518,905	2,454,376	1,862,952	591,424
SAN FRANCISCO, CAL. United Railroads of San Francisco.	1m. July '09	621,753	359,224	262,529	.....	.....
	1 " " '08	568,759	.....	.....	.....	.....
	7 " " '09	4,190,657	2,441,556	1,749,101	.....	.....
	7 " " '08	3,910,212	.....	.....	.....	.....
SAVANNAH, GA. Savannah Elec. Co.	1m. July '09	55,812	38,246	17,565	17,444	121
	1 " " '08	53,455	32,764	20,690	17,507	3.183
	12 " " '09	608,333	381,517	226,817	209,314	17,503
	12 " " '08	599,160	405,481	193,680	204,711	†11,031
SEATTLE, WASH. Seattle Elec. Co.	1m. July '09	592,587	305,028	287,559	108,702	178,857
	1 " " '08	366,481	209,950	156,531	94,859	61,672
	12 " " '09	5,181,859	3,050 470	2,131,389	1,193,445	937,944
	12 " " '08	4,381,787	2,591,734	1,790,054	1,032,944	757,110
TACOMA, WASH. Puget Sound Elec. Railway.	1m. July '09	184,531	106,044	78,487	48,508	29,979
	1 " " '08	151,035	92,315	58,720	43,648	15,072
	12 " " '09	1 749,826	1,172,759	577,067	542,220	34,848
	12 " " '08	1,625,531	1,014,829	610,702	503,524	107,179
TAMPA, FLA. Tampa Elec. Co.	1m. July '09	47,172	30,403	16,769	4,700	12,069
	1 " " '08	45,192	32,463	12,729	2,426	10,302
	12 " " '09	577,101	352,859	223,243	56,406	166,837
	12 " " '08	542,454	375,808	166,647	21,080	145,567
TORONTO, ONT. Toronto Ry. Co.	1m. Aug. '09	333,223	166,057	167,166	.....	.....
	1 " " '08	299,933	149,626	150,307	.....	.....
	8 " " '09	2,477,310	1,266,065	1,211,245	.....	.....
	8 " " '08	2,275,127	1,252,520	1 022,607	.....	.....

Electric Railway Journal

DAILY EDITION

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Of this issue of the ELECTRIC RAILWAY JOURNAL, DAILY EDITION, 10,000 *copies are printed.*

Invitation to Attend Session of American Association

The opening session of the American Street & Interurban Railway Association occurs this afternoon at 2 o'clock at the auditorium hall and Pres. James F. Shaw wishes it understood that the session is open not only to delegates, but that all associate members and all representatives of the Manufacturers' Association are invited to attend. This is the only open session of the American Association. The program for the meeting is published elsewhere in this issue.

A Collection of Advertising Literature

To be successful in increasing its business an electric railway or any other institution first must give satisfactory service, and second, must let it be known that its service is good. The problem of giving good and satisfactory service has demanded the attention of the owners and operators of electric railways since the inception of this method of transportation; methods for increasing business by advertising have lately received recognition and now are being studied closely. This year the committee on passenger traffic of the Transportation & Traffic Association devoted its report to the subject of railway folders, time tables, pamphlets, post cards and similar advertising matter, all designed to induce travel. The committee was successful in procuring samples of advertising literature from 117 companies, obtaining 278 different samples. A wide variety of expression is apparent in these pieces of advertising and no doubt their average high character will surprise many who may inspect them as exhibited.

One interested in preparing the advertising matter for his company can well afford to study consistently the display of folders and may expect to receive some valuable hints for use in his work at home. The value of a large collection of such advertising matter, now proved to be of much worth in initiating traffic, is so well realized as to warrant the suggestion that the electric railway advertising matter collected by this year's committee be used as a nucleus for a permanent collection. The collection of blank forms built up by the Accountants' Association has been of much service to the members of that body and so, no doubt, would a collection of advertising literature be of increasing service to the many electric railways which of late have taken such interest in advertising the excellence of their train schedules.

Committees of the Transportation & Traffic Association

In his address before the Transportation & Traffic Association, President Allen discusses with strong approval the work of the standing committees and the future progress which can be made by perpetuation of the plan of organization of this association, which provides for the maintenance of such committees. The importance to the industry of the questions allotted to these respective committees is so well recognized that it may appear trite to refer to it; the fact is, however, that the existence and aims of the Transportation & Traffic Association permit the most careful, systematic study of these practical problems that has been undertaken by any organization of electric railway officials since the issues reached their present stage of importance. Permanent committee organization, with effective work, should make the amended reports each year reflect, as Mr. Allen states, "the best energy, thought and practice on all subjects."

The Exhibits

The exhibit of railway apparatus at a street railway convention is perhaps the most interesting and in many respects the most instructive feature of the gathering. It affords the railway men a fine opportunity of seeing and studying all of the latest improvements and of familiarizing themselves with the progress of the industry in all parts of the country. When Denver was selected as the convention city some fear existed in the minds of many that while there might be an excellent attendance of both railway men and supply men, the difficulties and uncertainties of transcontinental transportation and the high cost of freight would deter many manufacturers from sending elaborate exhibits of apparatus. The center of consumption of electric railway material is probably somewhere near Columbus, Ohio, and the center of production is about Pittsburg, Pa. Practically all of the exhibits which have been sent to Denver were shipped from Chicago or east of that point. For this reason it is most surprising and gratifying to find that the exhibits this year compare favorably both as to number and completeness with those of any previous year in the history of the associations. The arrangement of booths and aisles, the artistic decorative effects and the simple but uniform construction and color scheme could not be improved upon.

The route from the entrance on Curtis Street to the meeting rooms in the auditorium building carries the delegates

past practically every booth, either going in or coming out. The track exhibits form a continuation of the display within the building, and the fact that the tracks of the Denver City Tramway system enter the annex space made it easy to bring in the heavy pieces of machinery, cars and trucks, which have always been a nightmare to exhibitors. The Denver City Tramway Company has materially assisted in other ways, such as the furnishing a force of men and a derrick car in cases where they were needed, and generally has greatly assisted in accelerating the movement of the exhibits from the freight house to the auditorium building. The railway men are to be congratulated on the fine opportunity given them to study and see such a comprehensive collection of electric railway devices and the manufacturers are to be congratulated on the way in which they have risen to the occasion and assured the success of this feature of the convention week.

The Convention Program

The papers and committee reports to be presented at the Denver convention relate to some of the most important present day problems of the several branches of the electric railway industry. Each of the five associations will have before it for discussion a number of subjects on which the action taken will have a far-reaching effect. Fortunately the committees and the authors of papers have done their work thoroughly and promptly and this has made possible the advance publication of most of the reports and papers. Delegates have thus had an opportunity to study the recommendations at their leisure before going to the convention. The result cannot help but prove beneficial in accelerating the work of the conventions and in promoting full and intelligent discussions.

The American Association this year has among other subjects for discussion reports of the committees on welfare of employees and on education. These two reports consider different phases of the same problem, namely, raising the standard of the men who operate electric railways. Welfare work among the subordinate employees has an educational side as well as a humanitarian side. Clean, civil and contented employees are a valuable asset to any company. The committee on insurance has been studying the question of electric railway risks, and the other committees of the parent body have done notable work.

The Accountants' Association reflects in its program the tendency toward standardization of the details of operation and equipment of electric railways. Mr. Rogers' paper on "Interurban Statistics" reveals the wide diversity of methods which prevails in compiling the ordinary statistics of operation and traffic. The committee on interline accounting recommends a uniform practice in accounting for interchange business between electric railways. Other papers to be read will deal with general and special aspects of railway accounting.

This year for the first time the work of the Engineering Association will be confined to consideration of the reports of its five standing committees, appointed last fall in accordance with the revised constitution and by-laws. The activities of this association naturally divide themselves into matters pertaining to track and roadway, power generation, power distribution and car equipment. These four branches have each been assigned to a standing committee and a committee on standards completes the list. This arrangement of committee work has greatly simplified the three-days' program of the association meetings. Each session will be devoted to the consideration of only one report, and there will be no necessity of curtailing the discussion or passing over other papers or reports in order to complete the program within the time available. Without referring in detail to the subject matter of the committee reports, one striking feature of them as a whole is worthy of comment.

This is the number and variety of complete or outline specifications which have been recommended for adoption. Nine specifications in all are presented, each of which covers some material purchased in large quantities, usually by manufacturer's brand or grade only. The value of these specifications to large and small companies alike is obvious.

The Claim Agents' Association is also making a departure from the usual program this year in that it has no long papers or committee reports to be presented. Instead nine questions have been drafted for general discussion. Written communications on each question from a number of members have been printed in the form of an advance report, which will not be distributed, however, until the convention meets. These printed communications, together with the oral discussion, should bring out many new and helpful ideas.

Several important subjects will be discussed this year by the Transportation & Traffic Association. The committees on interurban and city rules have drafted revised codes of rules which they are prepared to recommend for final adoption. The rules as presented will be vigorously criticised in some quarters, no doubt, and as vigorously defended in others. For the traffic men who will be in attendance the reports of the committees on freight and passenger traffic will be of special interest. The old question, "Does freight and express business pay?" is considered by the committee on freight traffic. The statistics of traffic of a number of companies accompanying this report are most instructive.

Instruction for Accident Prevention

Accident prevention is a subject in which both the transportation and the claim departments are vitally interested, but the limits of each department's responsibility vary considerably on different railways. In some cases, the claim department does not come into contact with the trainmen at all except when they get into trouble. In others, the claim department takes a very active part in the instruction of the conductors and motormen on the safest methods of car operation. Between these two extremes, there are many intermediate policies, such as occasional lectures by representatives of the claim department to the men, discussions on subjects connected with accidents by managers, the issue of special suggestions by the claim department, etc.

There is a constant and commendable tendency on the part of railway companies to pay greater attention to the instruction of the men, not only of those entering the service but of the old men as well, in order to increase the safety of car operation. But the great variety of methods followed in this respect provokes the inquiry as to the department upon which the major part of this work should devolve.

No one will take issue with the theory that even the man with a large number of service stripes on his sleeve can be benefited by suggestive and inspiring talks on the subject of the prevention of accidents. In the last analysis, the motorman is the one upon whom the company must depend to prevent an accident for which it is responsible, and preliminary and continued instruction are the only steps by which this result can be attained. One argument in favor of its being within the province of the transportation department is that it is the one which engages the man, gives him his preliminary training, determines its duration, directs his work, promotes him for good behavior or enforces discipline for infractions of the rules, and in general is the one to which he is responsible. On the other hand, the legal department is of course most familiar with the causes of accidents, the points in the company's defense which are most apt to be attacked, and extent of the accident records required from a legal standpoint.

CONVENTION PROGRAM FOR TODAY

American Association.

(AUDITORIUM HALL.)

9:30 A. M. to 12:30 P. M.

Registration and Badges. (Association booth, entrance to Auditorium.)

2 P. M. to 5 P. M.

(Open Session.)

Annual Address of the President.
Annual Report of the Executive Committee.
Annual Report of the Secretary-Treasurer.
Announcements.
New Business.
Reports of Committees.
- (a) Subjects.
- (b) Active Membership.
- (c) Associate Membership.
- (d) Welfare of Employees.
- (e) President Goodrich's Suggestions.

Paper—"Organization, from the Standpoint of the Smaller Companies," by Ernest Gonzenbach, President and General Manager, Sheboygan Light, Power & Railway Company, Sheboygan, Wis.
Report of Committee on Education.

Accountants' Association.

2 P. M. to 5 P. M.

Registration and Badges.

Engineering Association.

9:30 A. M. to 12:30 P. M.

(ROSE PARLOR, AUDITORIUM BUILDING.)

Registration and Badges.

2 P. M. to 5 P. M.

Annual Address of President.
Annual Report of Executive Committee.
Annual Report of Secretary-Treasurer.
Appointment of Convention Committees.
Report of Committee on Way Matters.

Claim Agents' Association.

(METROPOLE HOTEL.)

9:30 A. M. to 12:30 P. M.

Discussions:
- What is the best plan of having trainmen procure and report an increased number of witnesses to accidents?
- Is it good practice, when statement of injured party is obtained of accident, to furnish him with copy of his statement?
- Is a school of instruction for trainmen essential?

2 P. M. to 5 P. M.

Discussions:
- Should information be furnished newspapers regarding the work of the claim department?
- What should be the relationship of the medical and claim departments? How can the medical best serve the claim department in the handling of accidents?
- The claim department and its relation to the operating department.

Appointment of Nominating Committee.

Transportation & Traffic Association.

(AUDITORIUM HALL.)

9:30 A. M. to 12:30 P. M.

Report of Committee on Interurban Rules.
Report of Committee on Express and Freight Traffic.
Paper—"Express and Freight Traffic on Interurban Lines," by S. L. Vaughn, Traffic Manager Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich.

Conventionalities

Well, how do you size it up? Pretty big, eh? Also fine and dandy.

Altitude and irrigation—perhaps you'll hear these two words in Colorado.

This is the twenty-eighth annual meeting of the parent association, if anybody should ask you.

Energetic, Reliable, Just—Exhibit Space No. 1. Guess the answer. A copy of the convention daily for the first correct solution.

Perhaps the weather man was presented a pass to the exhibition. At any rate he has been strictly on his good behavior so far.

J. C. McQuiston, boss installer for the Westinghouse Companies and manager of the publishing department, was one of the first on the ground.

According to one authority the Wagner cocktails served on the New York Central special train could be classified as "transformers with 100 per cent efficiency."

Among the early Sunday visitors at the convention were George L. Radcliffe and Mrs. Radcliffe. Mr. Radcliffe is general superintendent of the Schenectady Railway Company.

W. R. W. Griffin, superintendent of the Rochester Railway Company, has again distinguished himself by being among the first to "hot-foot it" among the exhibits at the convention.

All praise to the linemen of the Denver Tramway Company, who worked far into Saturday night to decorate the main streets of Denver with gay flags and bunting in honor of the convention.

Mr. and Mrs. E. L. Clark of Chicago are registered at the Kaiserhof. Mr. Clark is president of the Valentine-Clark Company of Chicago, and also president of the Northwestern Cedarmen's Association.

Missouri has no monopoly of men who want to be "shown." One of these doubters is A. H. Armstrong of the General Electric Company, who has brought an aneroid barometer along to determine whether Denver is as far up in the world as it says it is.

The entertainment committee is distributing a neat vest-pocket booklet giving general convention information and program of the entertainment. This booklet is most convenient, and the thoughtfulness of Mr. Whipple and his fellow-committeemen is greatly appreciated.

The standard classification committee of the Accountants' Association will hold a meeting at 10 o'clock this morning at the Hotel Savoy to consider, with F. W. Sweney, special examiner of the Interstate Commerce Commission, further inquiries concerning the interstate classification of accounts.

President James F. Shaw, of the American Association, arrived early Sunday morning on the special train from Boston. Mr. Shaw, who is chairman of the board of directors of the Boston & Worcester Electric Companies, is confident that the Denver convention will be a notable success in every respect.

M. B. Lathrop, superintendent of the Colorado Springs & Interurban Railway Company, led the vanguard from Colorado Springs. Mr. Lathrop says, and truthfully, that there is only one Colorado Springs. He did not say, although he might with equal truth, that the people of that city are famed for their hospitality. At any rate a warm invitation is extended to railway men attending the convention to visit this enterprising city of 40,000. Mr. Lathrop says that Colorado Springs has the best street railway system of any city of its size in the country. Visiting conventioneers who

don't believe it are asked to go and see with their own eyes. The courtesies of the system will be extended to wearers of the convention badge.

A touch of home life was given to the trip of the New York Central-Rock Island special by the presence of two delightful youngsters with their parents, Mr. and Mrs. Ernst Woltmann. These little folks endured both the long journey and the fondling of their fellow passengers with exceeding good humor.

The wonderful moralometer, justly famed as the wizardry of mechanism, is to be seen only in the exhibit of the Wagner Electric Manufacturing Company. Think of a machine that indicates character. Marvelous! Marvelous, indeed, and then some. And the best of all is, the machine has no terrors for the pure in heart.

Gen. George H. Harries of the Washington, (D. C.) Railway & Electric Company, third vice president of the American Association, arrived on Sunday. General Harries was prominent in entertaining the National Electric Light Association's convention in Washington in 1907, and he is also an officer of that association.

John H. Stedman arrived on Saturday evening from the East. Mr. Stedman is not only a writer of graceful verse and a staunch Rochesterian, but he is a loyal A. S. I. R. A., and adherent of many years' standing and one of the most popular of conventioneers. Incidentally, he is secretary of the Ohmer Fare Register Company.

On the Rock Island's "Rocky Mountain Limited" train between Chicago and Denver an innovation that received approval were concerts three times a day by means of a victrola (a greatly improved phonograph) in the observation salon. The music was excellent, the familiar phonograph twang being agreeably lacking.

Frank H. Gale, in charge of advertising for the General Electric Company, is, as usual, sauntering about, as cool as a cucumber, as though his company's arbor-like exhibit sprang into existence without any exertion on his part. But neighbor Gale has great determination and resourcefulness; it's a wonder he hasn't attempted to discover the North Pole.

Captain and Adjutant Daniel W. Smith of the First Infantry, M. N. G., Detroit, Mich., who is more commonly known as "Hot-water Heater Dan," accompanied by Mr. H. C. Ebert, president of the Cincinnati Car Company, spent Sunday as the guest of Lieutenant Bishop of the First U. S. Infantry at Fort Logan, Colo. Mr. Smith says that even among the military men at the Fort Mr. Ebert loomed conspicuous for his martial bearing.

The exhibit committee of the Manufacturers' Association issues a lemon-colored folder about exhibits which is as full of useful information about exhibits as an egg is full of meat, and includes a diagram showing the general arrangement of the convention premises and exhibit spaces. Captain Hequembourg and his cohorts of the exhibit committee are to be found at the headquarters of the Manufacturers' Association at the left of the main entrance.

To-day's entertainment features consist of the sight-seeing automobile trip for ladies in the afternoon and the widely-heralded supply men's amateur vaudeville show in the evening. Particulars of these events may be found in the general entertainment program given elsewhere. Despite the secrecy thrown about the preparations, it has leaked out that the arrangements for the evening entertainment are of a character that would put professionals to shame.

An American electric railway convention is being studied at first hand by Heinrich Duschinsky, manager of the railway supply department of the Allgemeine Elektricitäts Gesellschaft, Berlin, Germany. After the convention, Mr. Duschinsky will visit the principal American cities to study repair practice both in the shops of the railway companies and of the supply houses. Mr. Duschinsky and his wife are under the chaperonage of W. J. Clark, manager of the foreign department of the General Electric Company.

Amid the excitement and bustle incident to arrival on Sunday the fact that it was the Sabbath day was in danger of being forgotten; but A. L. Whipple silently but eloquently reminded all beholders that it was the first day of the week. However, he demonstrated that a sabbatanical appearance does not lessen a man's efficiency, and he was hard at work for the entertainment of visitors.

Col. W. E. Ludlow of Cleveland, confident and irrepressible inventor of the Ludlow track drill, shown by a working model in the exhibition, has thrown down the gauntlet as the oldest supply man at the convention. The colonel says that he is 74, but everyone who meets him must wonder if he is not stretching the figure ten or fifteen years in order to lead in the veteran class. He has a fine war record and tells thrilling experiences of '61-'65 with modesty and spirit.

Insurance men have their eye—not an unfriendly eye, let us hope—on electrical installations these days. That's why W. J. Canada and W. L. Green of the electrical department of the Rocky Mountain Fire Underwriters' Association are "among those present." These gentlemen inspect all electrical installations in Colorado, Wyoming and New Mexico, and they urge their electrical friends to visit their office in Exchange Building. "Come right in, sit down and make yourself at home," say they.

Among the many Denver men who are striving to make the visit of the street railway men pleasant, J. Keating, baggage agent at the Union Station, deserves a word of praise. Fortunately, the convention comes at a time when railroad travel is comparatively light, and Mr. Keating was enabled to pay prompt attention to incoming baggage of conventioneers. He will have men at the leading hotels during the closing days of the convention who will check baggage through to destination, avoiding delay at the railroad station.

One of the early birds was George E. Armstrong of Chicago. He brought with him a miniature but acceptable "Traveler's Railway Guide," showing time of all steam railroad trains leaving Denver and other railroad and sightseeing information. Another of Mr. Armstrong's helpful ideas was the distribution of slips about the convention premises reading "Apply for Pullman reservations and railroad schedules at Travelers' Railway Guide Booth, Number 106." At the booth there are blank forms to be filled out stating reservations required. Mr. Armstrong, that friend of man, especially traveling man, does the rest.

Those who experienced for the first time the transition from four-track railroads in the East to the single tracks on which Denver is approached naturally speculated to some extent on the future of an aspect of railroad construction which has not inspired any dreams of electrification or of electrical competition. The long stretches of prairie land where "density of traffic" is, for the present at least, a negative quantity, did not, however, "enthuse" any of the promoters so far as is known up to the time of going to press, to take immediate steps to secure private rights of way for modern, high-speed interurban lines.

Coming from the rocky, mountain passes of Easton, Pa., the brothers Hay refuse to quail before the puny hills surrounding Denver. The Hay lines are famous for fine scenery and polite conductors who make every trolley trip a veritable Cook's tour. Thomas A. H. Hay is president of the Northampton Traction Company and his brother William O. Hay is president and general manager of the Montgomery Traction Company, general manager of the Easton & Washington Traction Company and secretary of the Northampton Traction Company. The baggage of Messrs. Hay is at the Shirley, but they are circulating everywhere.

A Masonic pin has been found and handed to Secretary Swenson, to whom the owner should apply.

Maybe Secretary B. V. Swenson and Office Manager H. C. Donecker of the American Association are not onto their jobs! What?

The executive committee of the Transportation & Traffic Association held two meetings yesterday to settle the final business of the year.

The Cook Drum Corps of Denver, a famous marching musical organization, paraded the streets on Monday night in honor of the convention. Thanks!

The Westinghouse people say that they were the first to get busy in preparing an exhibit, and nobody seems to deny the claim. It's a corking big exhibit, too.

The word "popular" is somewhat overworked, but it applies truthfully to J. R. Wiley, the Chicago representative of the Standard Underground Cable Company. Mr. Wiley is at the convention and he is himself the entire delegation and exhibit of his company.

Duncan McDonald, general manager of the Montreal Street Railway Company, has just returned from Europe and so will be unable to attend this convention, although he has missed very few meetings of this kind for a number of years. The Montreal Street Railway, however, is well represented in the person of W. G. Ross, managing director of the Montreal Street Railway.

The **Electric Railway Journal** had representatives on each of the "specials," and at the first meeting of the staff it was noticeable that every man believed that the particular train which he favored with his patronage was the best-managed and the one that made the best time. The fact is that all the "specials" were in the hands of men who knew their business and "made good."

There will be a sight-seeing automobile trip through the parks and residential section of Denver this afternoon. Automobiles will leave the Brown Palace at 3:00 p. m. A guide and lecturer accompanies each automobile. W. J. Walsh of the Galena-Signal Oil Company, Chicago, is the chairman of the sub-committee of the entertainment committee in charge of arrangements.

The entertainment committee maintains a separate office at the main entrance on the left hand side on entering. Here there is a general railroad information bureau, which is more particularly intended to give particulars in relation to the official excursion on the Moffat Road Friday. Tickets are now on sale for this excursion. Those intending to go should purchase them early so that adequate arrangements may be made.

John J. Cummings, president of the McGuire-Cummings Manufacturing Company, extended the courtesy of an invitation for a trip over the Denver & Inter-Mountain Railroad to about 20 delegates yesterday afternoon. The controlling interest in the Denver & Inter-Mountain Railroad is owned by Mr. Cummings and the road extends from Denver to Golden. The party left by special car about 4 o'clock yesterday afternoon and returned about 6 o'clock.

The entertainment committee has distributed a booklet containing invitations to the members of several associations in which the privileges of their buildings and grounds are cordially extended for the convention week by the following prominent organizations of Denver: Denver Athletic Club, Colorado Traffic Club and the Colorado Golf Club. It is to be hoped that the delegates will not miss the chance to enjoy Western hospitality, which is certainly appreciated.

Distance had no terrors for the faithful henchmen from the Philadelphia Rapid Transit Company in the persons of F. chief engineer; H. B. Nichols, engineer of way; James Heywood, superintendent of lines and cables; Charles Hewitt, superintendent of motive power; and H. R. Goshorn, claim agent. The party came over the Pennsylvania Limited via the Chicago & Northwestern and Union Pacific lines, which left Philadelphia on Friday, Oct. 1 at 3:55 p. m. and arrived in Denver on Sunday, Oct. 3, at 12:45 p. m.

Apart from any welcome extended in a formal manner Denver traction men made all visitors feel glad that they had come by the hearty manner in which they met the convention people at the hotels with a "welcome to our city"; likewise by the generous display of new varnish on the cars. Moreover, they threw in a literally warm welcome which was appreciated by the visitors from the chilly East. When some unappreciative souls failed to appreciate this the Denver people thoughtfully provided a cooling shower later in the day, and everybody was happy. It is perhaps needless to add that General Manager John A. Beeler, Chief Engineer John Evans and the other officers of the Denver City Tramway Company were particularly active in making the visitors feel at home.

Fred H. Lincoln, assistant general manager of the Philadelphia Rapid Transit Company, was a passenger on the Pennsylvania special train from New York. He stood on the bridge at midnight as the train was entering Omaha and looked fondly back at the towering lights of Council Bluffs. Just 21 years ago, Mr. Lincoln, who was at that time employed by the Omaha & Council Bluffs Street Railway, assisted in the opening of the first wagon bridge across the Missouri River. This bridge carried the tracks of the Omaha & Council Bluffs Street Railway and was considered a marvel of engineering skill. The cars to be used on the bridge line were built at the works of the Pullman Company, and in order to have them delivered in Council Bluffs in time for the opening they were shipped by express from Chicago.

By the courtesy of the Denver City Tramway Company the official convention badge will be honored for free transportation on all city lines during convention week, beginning Sunday night, October 3, and including the following Sunday. The badge will likewise be good for transportation during the same period on the Denver & Northwestern Railway Company's interurban line to Golden and Leyden, the Denver & Intermountain Railway Company's interurban line to Golden, and the Denver & South Platte Railway Company's interurban line from the suburb of Englewood to Littleton. The Denver & Interurban Railroad Company, operating to Boulder, will furnish transportation over its 11,000-volt line upon presentation of the official badge at its office, 711 Cooper building, Denver.

While in Omaha, Oct. 2, many of the members of the Boston party improved the occasion to call at the offices of the Omaha & Council Bluffs Street Railway Company. Those who did so were cordially greeted by President G. W. Wattles, Vice President Frank T. Hamilton, General Manager W. A. Smith and the other officers of the company. Mr. Smith has been a very regular attendant at past street railway conventions, dating back to the time when horses were used as a motive power, but will be unable to be present this year, partly on account of business and partly because he has not been very well during the summer. He sent, however, his greetings to all his friends at the meeting this year. They will also be pleased to learn that Mr. Smith's physical condition is improving and that the strike, which has been in force on the Omaha system during the past few weeks, is petering out. So far as the visitor in Omaha could see, there was no indication of a strike. The cars were running in all parts of the city and were being well patronized.

DENVER TO NEW YORK SPECIAL TRAIN

The train committee who had charge of the Pennsylvania-New York-to-Denver special has arranged with the Santa Fe to run a special train from Denver to New York, which will leave Denver Friday at 11:30 p. m., stopping all day on Saturday at Colorado Springs, leaving there at 10:30 p. m. and running through Kansas City, St. Louis and Pittsburg, arriving in New York Tuesday at 7:40 a. m. The Pullman Company is holding the necessary equipment, but it is necessary to let the Santa Fe know just how many passengers will be on the train. Those holding tickets good returning via the Santa Fe and Chicago & Alton should notify J. P. Hall, general agent, Atchison, Topeka & Santa Fe, 901 Seventeenth Street, telephone Main 280, at once and reserve Pullman accommodations on this train.

IMPORTANT CHANGE IN ENGINEERING PROGRAM

At a meeting of the executive committee of the American Street & Interurban Railway Engineering Association, held yesterday morning at the Adams Hotel, it was decided to hold sessions of the association on Thursday instead of on Friday. The program as originally published provided for no sessions of the association on Thursday, but two sessions on Friday. To enable the delegates, however, to participate in the trip over the "Moffat Road" scheduled on Friday, the meetings for that day will be advanced to Thursday, and there will be no meetings on Friday. The place of the meetings will be announced later.

The meeting at the Adams Hotel was attended by President Paul Winsor of Boston, First Vice President F. H. Lincoln of Philadelphia, Second Vice President W. H. Evans of Buffalo, Third Vice President W. J. Harvie of Utica, Secretary and Treasurer J. W. Corning of Boston, and William Roberts of Akron, E. O. Ackerman of Columbus, and Martin Schreiber of Newark, N. J., members of the executive committee.

The details of the coming sessions were considered and it was decided to hold the sessions of the association on Thursday instead of Friday, as mentioned above. It was also decided that all meetings would be called to order promptly at the appointed hour as given in the program. The association has laid out a great deal of work for itself at this convention, and it is very important not to lose any time by starting late. Members of the association and others who expect to attend the sessions will confer a great favor on the presiding officer by being in their seats before the time for starting, so that the sessions can be begun promptly.

LAST EVENING'S RECEPTION

A brilliant and thronged reception was given in the ballroom of the Brown Palace Hotel last evening in honor of the officers of the various associations and their wives. The Denver local reception committee, headed by William G. Evans, chairman, and John A. Beeler, vice-chairman, assumed entire charge of the affair, although the manufacturers' entertainment committee co-operated.

President James F. Shaw of the American Street & Interurban Railway Association stood at the head of the long receiving line, and to him Mr. Beeler introduced the guests. After Mr. Shaw were the officers of the various associations and their wives. Excellent music was furnished by an orchestra, and the scene was animated and brilliant. Refreshments were served in an adjoining room. Musical selections were given by Madam Sobrino of London and Clifford Wiley of New York City. After the reception there was informal dancing, which was greatly enjoyed by many of the younger set, who were eager to take part in the first dance of the convention.

Before the reception the visitors were given an acceptable serenade by the Cook Drum Corp and Band of 80 pieces, drawn up in a circle in the lobby of the hotel.

PURCHASING AGENTS AND COLORADO CONVENTION DELEGATES INVITED TO THE ENGINEERING MEETINGS

It will be remembered that at one of the meetings of the executive committee of the American Street & Interurban Railway Engineering Association, held during the winter, W. J. Harvie called attention to the fact that at that time the purchasing agents of the different companies had no association with which they were directly affiliated. He pointed out that the work of the purchasing agent required him to have a good knowledge of engineering, and that it would be well to invite the purchasing agents to affiliate themselves directly with the Engineering Association. In accordance with this suggestion President Winsor issued an invitation addressed to the purchasing agents of all the member companies, explaining that they were eligible to the Engineering Association and inviting them to participate in the work and the conventions of that body. This letter was published at the time in the **Electric Railway Journal.**

The registry lists at present show a considerable number of purchasing agents in attendance at the convention this year, and it is hoped that they will accept President Winsor's invitation and attend the meetings and participate in the discussions.

President Winsor has also issued an invitation to all of the delegates of the Colorado Electric Light, Power & Railway Association to attend the meetings of the Engineering Association. The letter follows:

Denver, Colorado., Oct. 4, 1909.

Mr. J. C. Lawler, Secretary, The Colorado Elec. Light Power & Ry. Ass'n., care Colorado Springs Electric Co., Colorado Springs, Colo.

Dear Sir:—At a meeting of the executive committee of the American Street & Interurban Railway Engineering Asociation, held this morning, the secretary was instructed to extend through you to the members of your association an invitation to attend the meetings of our association.

The sessions will be held as follows:

Tuesday, Oct. 5, 2 p. m. to 5 p. m., Rose Parlor, Auditorium Building; report of committee on way matters.

Wednesday, Oct. 6, 9:30 a. m. to 12:30 p. m., report of committee on equipment.

Wednesday, Oct. 6, 2 p. m. to 5 p. m., report of committee on power generation.

Friday, Oct. 8, 9:30 a. m. to 12:30 p. m, report on standards, and report of committee on power distribution.

Friday, Oct. 8, 9:30 a. m. to 12:30 p. m., report of commitee on standards, and report of committee on power distribution.

An effort is being made to, if possible, hold the meetings that are scheduled for Friday on Thursday.

Very truly yours,
(Signed) J. W. CORNING,
Secretary-Treasurer.

Seventeenth, Curtis, Champa and Arapahoe Streets were beautifully illuminated last night by festoons of colored incandescent lamps spanning the streets. The Denver Gas & Electric Company furnished this decoration in honor of the convention.

About 200 of the ladies took advantage of the "Seeing Denver" excursion of yesterday afternoon. There were four trolley cars, and the trip extended through the residential section, boulevards and parks. F. H. Gale, R. E. Moore and B. C. Watts of the entertainment committee were in charge. The trip was given with the compliments of the Denver City Tramway Company and the "Seeing Denver" Company.

The Denver mint coined $55,455,000 in gold and $2,847,000 in silver in 1908.

THIS YEAR'S BADGES

As usual a lively touch of color is added to the convention by the tasteful badges designed for this occasion. The motif on this year's badge is furnished by the city and county seal of Denver in relief, on which an eagle and a key of welcome are especially prominent. Above the seal is a representation of a double truck car, the whole being surrounded by a ribbon of blue enamel bearing in golden letters the title, "American Street and Interurban Railway Ass'n," and the enameled flags of the United States, Canada and Mexico.

The ribbons beneath the badge proper are of the following shades for the several associations and purposes indicated: Blue, American Association; orange, Accountants' Association; green, Claim Agents' Association; red, Manufacturers' Assocation; brown, Engineering Association; gray, Transportation & Traffic Association; purple, Associate Members; white for the ladies and light blue for other guests. A feature of the badge is a button bearing the number given to the wearer on registration.

GENERAL CONVENTION ARRANGEMENTS

The 1909 conventions of the American Street & Interurban Railway Associations and its affiliated associations, with the accompanying exhibition of railway appliances, is held in the handsome auditorium at Curtis and Fourteenth Streets, Denver, to which has been added an annex more than doubling its capacity. The main entrance —indeed, the only entrance—is at the Curtis Street end of the Annex. At the right, on entering, is the headquarters of the American, Accountants, Engineering, Claim Agents and Transportation & Traffic Associations. Here is the registration office for all of the associations. At the left is the office of the Manufacturers' Association, including the executive committee, finance committee and exhibit committee of that association. The registration office for the members of that association is in this place, and here also are the postoffice facilities for the whole convention. Just beyond this space is the headquarters of the entertainment committee. A large open lobby or lounging place, with rugs, potted plants and easy chairs, separates these various offices from the first of the exhibit spaces, which fill the remainder of the Annex and the auditorium.

The administration of the executive offices is carried out with the system and detail of a large hotel. Messengers and telephones are provided to maintain communication between the administrative center and all parts of the extensive convention premises.

At the farther end of the auditorium, as one enters it from the Annex, are the meeting places. These are Auditorium Hall and Rose Parlor, immediately above. Signs point the way, so that no one need fail to attend the meetings for lack of direction. All of the meetings of the American Association and of the Transportation & Traffic Association will be held in Auditorium Hall. The Accountants will hold their Wednesday session at the Savoy hotel, and their Thursday and Friday sessions in the Rose Parlor before mentioned. The Engineers will hold their Tuesday and Wednesday sessions in the Rose Parlor, and their Friday session in Auditorium Hall. The Claim Agents will hold all of their sessions at the Metropole Hotel.

Western Union and Postal Telegraph offices are placed in the auditorium. In addition telegraph call-boxes are placed in the administrative offices. Public telephone booths are scattered through the auditorium and Annex in addition to exhibitors' private telephone facilities.

Hotel headquarters of the various associations are as follows: American Association and Manufacturers, Brown Palace; Accountants, Savoy; Engineers, Adams; Claim Agents, Metropole; Transportation & Traffic, Albany.

TO-NIGHT'S VAUDEVILLE SHOW

Great preparations have been made to make the fifth annual vaudeville and theatrical performance to be given at the Tabor Grand Opera House this evening the finest thing ever pulled off. The amateurs of the Manufacturers' Association will be assisted by the Denver City Tramway Minstrel troupe and band, and the local "boys" are said to give a really good show, so that the heavy-weights from the East will have to look to their laurels. Here is the impressive program:

Overture ..... Orchestra
Opening Chorus.....Farmer Supply Men
"Don't shoot the professor; he's doing the best he knows how"
Dutch Comedians....Mr. J. J. Kreidler and Mr. F. C. Nester
Conductor and Motorman, Denver City Tramway
Songs .....Mr. John H. Thomas
Standard Paint Company, New York, N. Y.
A Story ..... Mr. A. V. Thompson
Relating to Modern Jurisprudence
"The Attenuated Attorney who rang in the Associated Counsel"
General Electric Company, San Francisco, Cal.
Piano Prodigy ..... Mr. A. J. Price
Conductor, The Denver City Tramway Company
"L'Habitant Things and Other Things".Mr. John H Stedman
Secretary, Ohmer Fare Register Company
Rochester, New York

THE DENVER CITY TRAMWAY MINSTREL TROOP

Mr. George H. McAuley (Motorman), Interlocutor
Orchestra—
Opening Chorus—"Sousa Girl".....Ensemble
"Grand Old Lady".....Mr. E. F. Smith, Conductor
"My Dream of the U.S.A."....Mr. F. S. Nestor, Conductor
"Chicken Frying in the Pan is Music to Me" } .....
"I'm Going to the Minstrel Show" }
Mr. A. J. Price, Conductor
"Will You Love Me in December as You Do in May"..
Mr. V. A. Thorpe, Conductor
"Mother Hasn't Spoke to Father Since".....
Mr. J. J. Kreidler, Motorman
"When the Birds of Georgia Sing of Tennessee.....
Mr. E. W. Neighber, Motorman
"The Load that Father Carries".Mr. H. O. Nelson, Conductor
"Message from Home".....Mr. J. J. Andis, Motorman
"Harry Brown and Eliza Jane"..Mr. J. J. Foster, Motorman

OLIO

Selection.....The Denver City Tramway Quartette
Mr. W. L. Albin and Mr. V. A. Thorpe, Conductors
Mr. Theodore Sparks and Mr. R. De Germiny, Motormen

"A DUTCHMAN'S MISHAPS IN A HOTEL"

An Original Comedy by Mr. J. J. Kreidler, Motorman

Cast:

Christyon Ludwic Von Winklesteinhousenblousen.....
Mr. J. J. Kreidler, Motorman
Landlord.....Mr. Geo. H. McAuley, Motorman
Tommy (bellboy)..... Mr. Frank Kreidler, Employee
Celisha (The Mad Actress).....Mr. C. G. Carroll, Clerk
Edwin Booth (The Tragedian).....
Mr. M. Montgomery, Motorman
Jim Jeffries (The Pug).....Mr. P. T. Siebers, Motorman
Scene—Bedroom Time—Present
National Airs.....The Denver City Tramway Band

The highest mountain in Switzerland is the Hospice of St. Bernard, with an elevation of 8,200. Colorado's highest peak is Mount Massive, which rises 14,424 feet above sea level.

ENTERTAINMENTS OF THE WEEK

Following the sight-seeing trolley trip of yesterday and the annual reception of last evening, to which references are made elsewhere, the entertainment committee announces the following program:

Tuesday Afternoon—Automobile trip to see the parks and other interesting features of Denver, for ladies only, from 3:00 to 5:30 p. m. The automobiles will leave the Brown Palace hotel at the former hour and it is requested that ladies make the Brown Palace their rendezvous for this trip, as by doing so it will enable the committee to provide comfortable accommodations for all. However, parties of 12 to 20 ladies can arrange to have an automobile call for them at their hotels by giving sufficient notice to the entertainment committee. The official badge is required for identification. Those taking part in this and all other entertainment features are requested to wear their badges in plain sight.

Tuesday Evening—Fifth annual supply men's amateur vaudeville and theatrical performance at the Tabor Grand opera house, Sixteenth and Curtis streets, beginning at 8:45 p. m. sharp. The Denver City Tramway minstrel troupe and band will assist in this entertainment. There will be no reserved seats, except for officers of the associations, and admission will be by badge only.

Tuesday Night—From about 11 until 12 o'clock there will be informal dancing in the ballroom of the Brown Palace hotel.

Wednesday Afternoon—From 2:00 to 5:30 p. m. a trip of 51 miles, "seeing the foothills," has been arranged, for ladies only. Special trolley cars will leave the Brown Palace hotel at 2:00 p. m., and ladies are requested to meet at that hotel as on Tuesday afternoon. This affords the best short trip around Denver. A stop will be made at Golden, and the return trip will terminate at the "White City," where the barbecue will be held in the evening. This trip is complimentary by courtesy of the Denver City Tramway Company and the "Seeing Denver" Company. Badges only are required for admission.

Wednesday Evening—A wild-game barbecue will be held at "White City" at 6:30 p. m. Three elk, 25 deer and bear, and 250 sage hens and grouse will be served on the grounds. The Denver City Tramway Company is the generous host of this occasion, and a number of special cars will leave the Brown Palace at 6:00 p. m., stopping at other hotels. Regular cars on the "Berkeley Line" will leave Arapahoe and Thirteenth streets every five minutes. The Denver City Tramway band and orchestra will furnish music, and there will be dancing. Official badges should be worn in plain sight.

Thursday Afternoon—This is "ladies' afternoon" at the Denver Country Club. From 2:30 to 5:00 p. m. there will be golf, tennis and an afternoon tea with music. Prizes will be offered in a ladies' clock-golf contest. Automobiles will leave the Brown Palace at 2:00 p. m., and regular street cars (Fourth Avenue and Washington lines) leave Arapahoe and Thirteenth streets every 15 minutes.

Thursday Evening—Theater party at the Broadway theater, opposite the Brown Palace hotel. Performance begins at 8:30 p. m. The committee has secured the entire house, and the attraction is Mrs. Leslie Carter in "Vasta Herne." There will be no reserved seats, except for association officers, and admission will be by badge only.

Thursday Night—From about 11 until 12 o'clock there will be informal dancing in the ballroom at the Brown Palace hotel.

Friday—The official excursion over the "Moffat Road," which affords some of the finest scenery in the country, is arranged for this day. Special trains will leave the railroad station, at Fifteenth and Basset streets, at 8:30 a. m. road station, at Fifteen and Basset streets, at 8:30 a. m. Corona and return. All cars running from the central loop transfer to the Moffat station. The fare for the round trip including lunch, is $3.00, and it is important to remember that tickets must be secured from the entertainment committee not later than noon on Thursday, and as much earlier as possible, in order that satisfactory arrangements may be made for extra trains and lunches. The entertainment committee makes a particular request that tickets be secured early.

Saturday—There is no regular entertainment scheduled for Saturday, but it has been arranged that those desiring to take the excursion over the "Moffat Road" and who were unable to go on Friday, may use the regular trains on Saturday for the privilege at the $3.00 rate, provided that tickets are secured from the committee by Thursday night.

Golf—During the convention the Denver Country Club will issue visitors' cards to delegates and guests, permitting the use of all the ordinary privileges of the club, including the use of the golf links. This is a most acceptable courtesy, and it is hoped that the many golfers attending the convention will avail themselves of this pleasant opportunity, applying for visitors' cards to the chairman of the entertainment committee. The club is reached by the Fourth Avenue and Washington Park car lines. On Wednesday and Thursday afternoons there will be held an "Asirma" golf tournament, giving an opportunity to play over one of the finest links in the country. The tournament will be an open one, without handicaps.

Committee—All entertainments are in charge of the American Street & Interurban Railway Manufacturers' Association under the general direction of Vice President Charles C. Peirce, General Electric Company, Boston. The active preparations have devolved on the official entertainment committee, consisting of A. L. Whipple, chairman, Forsyth Brothers Company, New York; Ross F. Hayes, Curtain Supply Company New York; Charles R. Ellicott, Westinghouse Traction Brake Company, New York; W. K. Beard, Electric Railway Journal, Philadelphia; John A. Thomas, Standard Paint Company, New York; W. H. Wilkinson, Pressed Steel Car Company, New York; N. M. Garland, Ohio Brass Company, New York; L. B. Sherman, Railway Age-Gazette, Chicago; W. J. Walsh, Galena-Signal Oil Company, Chicago; F. A. Elmquist, Sherwin-Williams Company, New York; F. H. Gale, General Electric Company, New York; William Wampler, American Locomotive Company, New York; Fred L. Olds, Chicago Varnish Company, Chicago; R. E. Moore, General Electric Company, Philadelphia; Alfred Green, Galena-Signal Oil Company, New York; H. M. Frantz, H. W. Johns-Manville Company, Chicago; F. L. Gordon, American Brake Shoe & Foundry Company, Chicago; A. V. Thompson, General Electric Company, San Francisco; C. W. Laskay, Hale & Kilburn Manufacturing Company, New York; F. J. Drake, Lorain Steel Company, Philadelphia; B. C. Watts, Dayton Manufacturing Company, Denver.

A fully attended meeting of the entertainment committee was held on Sunday evening at the Brown Palace. Mr. Whipple presided and many matters of business were attended to. Chairmen of subcommittees to attend to future events of the week's program were appointed as follows: Sight-seeing automobile trip of this afternoon, Mr. Walsh; vaudeville show of this evening, Mr. Thomas; sight-seeing trip of Wednesday afternoon, Mr. Beard; ladies' afternoon at the Denver Country Club, Thursday afternoon, Charles R. Ellicott; theater party of Thursday evening, Mr. Hayes. Mr. Garland was put in charge of the arrangements for the golf tournament for men, and it was announced that Mrs. W. H. Evans of Denver would head the ladies' reception committee. The entire committee will look after the barbecue of Wednesday evening and the official excursion of Friday on the Moffat road.

MONDAY MEETING OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

The second annual meeting of the Transportation & Traffic Association was called to order in Auditorium Hall by President C. Loomis Allen of Utica, N. Y., at 2:45 p. m. on Monday. After calling the meeting to order Mr. Allen introduced John A. Beeler, vice-president and general manager, Denver City Tramway, who welcomed the members.

Mr. Beeler spoke about the development and the greatness of Colorado. It started as a silver mining State and then gold was found and now gold to the value of $25,000,000 to $30,000,000 was produced; the value of the gold produced was already outstripped several times by the production of coal and other minerals and the value of the agricultural products of the State this year was about $150,000,000.

The city had about 200 miles of street railway, the system of the Denver City Tramway Company, and there were about 75 miles of interurban road outside of the city. The city system carried every day the equal of the entire population of the city or even more.

President Allen then read his annual address, which is published elsewhere in this issue.

The report of the executive committee was then read by Secretary B. V. Swenson. The report as read was approved and ordered printed in the minutes.

Secretary Swenson read the report of the secretary-treasurer, saying that although this association was only organized in January, 1908, the 1908 convention held in Atlantic City last October was most successful and compared favorably with the meetings of the American Association and the other affiliated associations which had the advantage of a full year of preparation and the experience of preceding conventions. No change had been made in the personnel of the executive committee at the 1908 convention, as it was the general sentiment of those present that the association should show its appreciation of the work done by the officials, elected at the organization meeting, by re-electing all of them for a full year after the first convention. Shortly after the close of the 1908 convention, the president appointed various standing committees and requested the chairman of each to be prepared to report progress at the executive committee meeting.

In closing the report Secretary Swenson said it was fitting that attention should be called to the large amount of time which the various committee men had devoted to the work of the association, often at a considerable sacrifice of their own duty and to their personal inconvenience, and to the most excellent results they had obtained, as evidenced by the valuable reports which would be presented.

The expenses of the Transportation & Traffic Association, upon the presentation of proper vouchers approved by its president, were paid by the treasurer of the American Association. The expenses for the fiscal year aggregated $3,105, of which $253 was for expenses in connection with committee work done pervious to Sept. 30, 1908, for which bills were not presented at the 1908 convention. This reduced the actual expenditures for committee work for the year just closed to $1,272. The report of the secretary-treasurer was approved and ordered printed in the proceedings.

President Allen, in introducing the subject of the report of the committee on passenger traffic, asked Matthew C. Brush, Buffalo & Lake Erie Traction Company, to take the chair and present the report. Mr. Brush then read the report, which is published elsewhere in this issue. After reading the report Mr. Brush said the members of the committee were scattered all over the United States, and regardless of their best efforts it was found impossible to have a meeting. The work was done, therefore, entirely by correspondence. All of the members of the committee had done extremely efficient work in gathering together printed matter from the territory immediately surrounding their homes. They felt, whether justly or otherwise, that the policy of sending out circulars asking for information had resulted in entire disregard of these circulars by a great many of the officers of the various member companies. The circulars were referred to someone who was not particularly interested and the information secured was oftentimes incomplete and of no practical value. Since the report had been forwarded to the secretary printed matter had been received from 20 to 25 companies, including 80 to 90 additional pieces of advertising material. Mr. Woodman, Mr. Whitney and Mr. Flagg also were unable to attend the convention, and only three members of the committee were present.

E. F. Peck, Schenectady Railway, stated that all interurban roads appreciated that they must advertise. Whether time tables should be of an elaborate nature or be printed without illustrations and of a simple nature was a question. The amount of money that should be spent on advertising was a problem which he had not altogether settled for the Schenectady road. Newspaper advertising was essential. He believed it was necessary for every company to publish its time tables in the local newspapers, and to call attention to important features, such as excursions. The next type of advertising was well illustrated by the display of folders, time tables and other advertising material presented by the committee, of which the most elaborate was published by the Fonda, Johnstown & Gloversville Railroad, of Gloversville, N. Y., and advertised a residential park. Some of the folders exhibited were merely time tables, and others were devoted to scenic places. Mr. Peck's experience had been that if a large amount of money was to be spent in advertising of that nature, the very best was none too good. His company had recently issued a folder called "Trolley Trips in the Mohawk and Hudson Valleys," calling attention to the important places of scenic and historic interest. In issuing that folder no time table was printed, and all the information contained would be as interesting next year as this year, the idea being to get out an elaborate folder every two or three years.

A folder published in 1907 was called "The Gateway of the Mohawk," and when the edition was first issued copies were sent to 52 newspapers within 50 miles of Schenectady, asking them to notice it. Flattering notices were received and a demand from the entire section for copies of the folder followed.

F. W. Coen, Lake Shore Electric Railway, said that he was a firm believer in advertising. He noticed that in this territory the steam roads were carrying their advertisements in the newspapers as well as doing a great deal of pictorial advertising. In northern Ohio the steam railroads had discontinued the publication of time tables in the newspapers. One of the larger interurban roads in that territory had discontinued newspaper advertising in the smaller cities. His company had continued that kind of advertising and, he believed, was doing more than ever before. It was also issuing now a time table folder only. He believed that in a great many cases the small leaflet of certain attractions—for instance, along the lake—was very valuable. This season, if he remembered correctly, his company issued 10 of these small pamphlets of two and four pages each, and they were well received by the public, and were, he believed, of considerable benefit to the road. Two or three years ago a pictorial map was issued and 100,000 copies lasted only for 90 days.

H. C. Page, Worcester Consolidated Street Railway, said he was a thorough believer in advertising his wares. There was no reason why the roads should not advertise their business, if they had something to sell, and they had something to sell in the way of a ride. He believed that business was to be secured by advertising in a reasonable and intelligent way. In the horse railroad days, and in the early days of the electric railway, a manager who talked advertising usually lost his job. Most of the directors of the road thought

that money spent for advertising was money wasted. He felt that that idea was a poor business policy in every way. On the roads in Worcester and vicinity, and also Springfield and vicinity, a small amount of advertising was done by a time table, and also a descriptive illustrated pamphlet, with a map showing the territory served, and he felt that it was money well spent, especially for the illustrated pamphlet. Announcement was made that these pamphlets were at the different divisions and different offices along the line, and the call for them was a surprise. Letters were received continually from all over the State and outside of the State.

Chairman Brush said that perhaps some members of the association could give some information in regard to the amount of money spent for advertising literature of different character. The committee was reluctant to request this information in circular form, feeling that better results could be secured by discussion.

F. D. Hunt, traffic manager Portland (Ore.) Railway, Light & Power Company, said that he was greatly interested in handling passenger traffic this year, especially on account of the Seattle exposition, and that during the early part of the year he prepared a pictorial folder and ordered 20,000 copies, which cost $850. He found that the supply was exhausted long before the fair was really started, and 10,000 copies more were ordered. The Portland Company used several methods of advertising; one was to carry an advertisement in the newspapers giving the time tables, another was to issue a pamphlet giving information as to any particular event in the city, and display advertisements were carried in the daily papers on Thursday, Friday and Saturday, and sometimes on Sunday, giving information as to rates to a resort. That advertising had been very beneficial. Another plan of advertising that had proved good was to string banners across the intersecting streets where a great number of people passed each day, calling attention to any special excursion on the interurban line. An advertisement was carried on the front end of the cars announcing any particular attraction. The more these opportunities were put before the public, the greater were the chances of reaching those who would not ordinarily take these trips.

P. P. Crafts, general manager, Iowa & Illinois Railway, said that company had allowed an annual expenditure of approximately $4000 for advertising and conducting pleasure parks. Of that sum approximately $1000 was appropriated for making up losses on the park. He believed that fairly effective results had been obtained from the expenditure of that amount of money, but just how to spend it, through what channels to expend it, had always been a puzzle. The company started originally by issuing large card time tables, approximately 18 in. wide by 2 ft. long, which were distributed at the hotels and some business houses, railroad depots, etc., within a radius of approximately 200 miles of headquarters. In addition to this a large number of circular letters were sent to various business houses whose travelling representatives went through the territory, reaching in this way Chicago, Minneapolis, St. Paul, St. Louis, Omaha and Kansas City. These letters had done a great deal of good. Often travelling men had advised the company that their houses sent these letters direct to them on the road.

As to newspaper advertising Mr. Crafts said a slight change was made from the first method tried, when transportation was issued in exchange for the advertising. Now that could not be done, and in order to economize, special days or special attractions were advertised in the newspapers, but the advertising was confined to dash signs to a great extent, and to personal letters, particularly in advertising the park. Circular letters sent to the wives did more good than if sent to the men themselves.

J. W. Brown, superintendent of transportation, West Penn Railways, said that the company's advertising expenditure was about $10,000 a year. Time tables costing about $8 a thousand were issued. Ordinary hotel blotters in bright colors were used, containing the schedule of the particular line of cars running into the town. These cost about $3 a thousand. A wall schedule was used for the interurban lines, with the West Penn monogram and the schedule for that particular section; these cost about $3 per hundred. In the better class of hotels, in the larger towns, frames were furnished for these. This year, at a prominent point, on top of the county bridge, which was used by three steam railroads as well as by the trolley lines, a large electric sign, which had about 600 lights, had been put up. This sign cost about $550. On the rear of some large buildings, the shops for instance, signs had been painted in plain black and white 6-foot letters; those cost 6 cents a square foot. Along the main line of the Pennsylvania Railroad travellers were told that the West Penn way was the popular way, by a sign on one of the sub-stations affording this opportunity. This advertising in the past year had cost about $2,000. The electric sign, however, and the signs upon the back of the buildings could be considered an investment good for several years to come.

T. C. Cherry, superintendent, Utica & Mohawk Valley Railway, said it seemed to be the consensus of opinion that pictorial literature, time tables, etc., afforded good advertising, but he thought the roads should go further than this, and a good deal of the work was up to the passenger agent. Distribution of literature should be followed by the passenger agent.

J. H. Pardee, operating manager, J. G. White & Company, New York, said it should be born in mind that there were two reasons for advertising, or rather two classes of people to be reached by advertising. One was composed of those who knew about the road and a certain kind of advertising had to be used to induce them to ride more, and the other class was composed of those who would not ride on the road unless they were informed that there was such a road. He had adopted a plan which he thought brought good results at very slight expense. The steam railroads did not propose to advertise the electric line, so he mailed under personal cover to each one of the ticket agents of the steam railroads in the vicinity a complete time table and folder of the electric line and he was told by various ticket agents, and also by people who had asked for information concerning the electric road, that the ticket agents were able to give this information only because they had been sent a copy of the time table.

W. H. Collins, Fonda, Johnstown & Gloversville Railroad, said a large part of the traffic on that road was derived from hauling people to pleasure resorts, and a travelling passenger agent looked particularly after that business. It was his duty to go through the surrounding country, to a distance even as great as 100 miles, and book picnics; and at the park, to which Mr. Peck referred, there was a summer population of perhaps 3,000, possibly upwards of 200 cottages, several hotels, and a larger number of boarding houses. Most of the usual attractions were to be found there, such as boating, tobogganing and other "midway" attractions. In addition to that the road catered to the summer boarder. To attract the popular 1-day travel poster advertising was used. In addition display advertising was used in the newspapers. Time tables were advertised in the newspapers, and all of the important features at the park were described in display advertisements in the papers.

J. C. Calisch, Buffalo & Lake Erie Traction Company, stated that it had been found that a folder was best for the general information of the public. The company put out 50,000 folders and they cost $2,500. A fan was issued, which was very popular. The boat and steam railroad were separated from the electric railway, separate folders being issued. In addition advertisements were placed in all of the daily city papers. No trouble at all was experienced in getting the people along the line, but the traffic at the ter-

minals was different. Another help was the advertising on the cars. In the new cars, inside advertising had been prohibited. Trolley travel had reached a point now where it could be compared with steam railroad travel, and it seemed a pity to buy $12,000 or $15,000 car, mahogany finished, and litter it up with sign board advertisements.

George W. Parker, Detroit United Railway, was not in the passenger end of the road, but he took an interest in that feature. The folder the company now had was issued by outside parties on an advertising basis. In a measure this had been satisfactory, and yet in his judgment it did not meet the need.

Mr. Coen said there was another side of the advertising business of which it seemed to him sight had been lost. A pleased patron was the best advertising medium. It had been his good fortune to spend a few days in and about this city, and he had been surprised to find that in almost every line of business everybody was a "booster."

Chairman Brush suggested that there was no advertisement like a living advertisement. That had been his experience, particularly in connection with the park business. The biggest advertisement was the patron of the park who went away from it thoroughly satisfied. The instructions to the park manager were that he was to go to almost any extreme, leaving the matter largely in his judgment, to see that any patron who made any complaint or had any ill feeling at all should leave the park thoroughly satisfied.

Mr. Coen cited an experience of the last summer. A large manufacturing plant in Cleveland had arranged with one of the steam railroads to carry its employees to a park about 40 miles distant. The date fixed was a Saturday, and when it came near that date a representative of the steam railroad advised the people that they were short of cars and could not handle the picnic. Someone suggested an arrangement with the Lake Shore Electric Railway and the 1200 people were handled from Cleveland in an hour, carried the 40 miles and taken back nicely. These people were now among the best friends the road had in Cleveland.

Ernest Gonzenbach, president Sheboygan Railway, Light & Power Company, had had no idea that so much was done to attract passenger traffic. On the Sheboygan lines a summer resort was a favorite 1-day outing, and he found that certain cars during the day were heavily overcrowded, while other cars were underloaded. An advertising campaign was started this summer to instruct the public when to take cars and how to avoid the crowded cars. It was advertised deliberately that certain cars leaving the terminal station at certain times were overcrowded, and those who could do so were requested to take other cars. As good returns had not been received from any other class of advertising that had been attempted as out of that one feature. The company was enabled to handle the public with fewer cars; people naturally did not like to travel in crowded cars, and arranged their outings so as to leave and return at times when cars could be taken which gave them the greatest accommodation.

A. H. Mackay, general traffic manager Puget Sound Electric Railway, thought that conditions had a great deal to do with the amount of advertising. If there were parks or summer resorts or anything to which the public notice could be called, he believed strongly in advertising. The Puget Sound Electric Railway, a purely commercial line, issued an 8-page folder, as simple as possible, giving the time card and showing the saving which might be made in fare by travelling a part of the journey over the line. The attention of the surrounding cities was also called to these facts. It was found that the best form of advertising was keeping cars up to date and giving the public the best possible service. Trains were operated every hour from each end of the line, with parlor cars attached. When the parlor cars were first put on the general impression was that they would not pay. However, these cars had paid. He thought that advertising did not do much good unless it was borne out by the service.

J. E. Dozier, general manager Nahant & Lynn Street Railway, gave two years ago to an organization of Lynn, Mass., free transportation to a Rhode Island clam bake, which was prepared at the railway terminal. Round trip tickets to the terminal were sold for 15 cents, the regular fare, and the clam bake was free. Better results were received from that clam bake as a medium of advertising than anything else he had ever attempted. He sent personal letters to secretaries of different lodges, giving rates and information pertaining to various locations, as to what facilities there were, and found it to be a good investment.

President Allen belonged to that class of men who were doubtful about the wisdom of distributing large sums of money in advertising for the sake of increasing passenger traffic, and particularly so when that increase occurred during the summer months, in other words when it was what might be called purely pleasure business. The discussion had wandered somewhat from the question of folders, and opened up the whole subject of advertising. Probably, however, it would be impossible to discuss folders and the results obtained from them without taking the whole question into account. His statements should be prefaced by the remark that upon the roads which they concerned what was known as a pleasure or a park business was not done to any great extent. The business that was done was business which they were trying to make good 365 days in the year. The only thing that had shaken the opinion that the right course had been pursued had been the array of trolley folders which the committee had assembled and placed on exhibition. He had been made to wonder whether they were wise within their own lives, and that perhaps they did not know of the benefits to be obtained by trolley folders and time tables properly used. They had believed that the best results in creating traffic that was good 365 days in the year were secured by placing the time tables in the daily, bi-weekly and tri-weekly papers. He had put down since this discussion started, and particularly since Mr. Craft's talk, some figures about costs, which were approximate.

The gross earnings of the electric railways was approximately $3,000,000 per annum. They spent last year, Mr. Allen continued, in 28 papers scattered over a territory of 75 miles, advertising time tables giving the leaving and arriving time of electric trains, $2,800. On June 1, 1908, a limited service was inaugurated on one of the lines which was placed in direct competition as to running time with the main line of the New York Central road with the desire of getting a share of the through business. The business did not come with advertisement in the newspapers. A folder, purely a time table of 16 pages, was tried. At first 50,000 were printed, at a cost of $3,000. These were distributed in the advertising racks of the Middle States and New England Street Railway Club, which cost $300 per annum. It was found that in most of the racks the folders were entirely exhausted, and apparently if any criticism was to be made upon the advertising racks it was that they were not refilled at frequent intervals. But the efforts from which the best results were obtained were the distribution of 35,000 copies of the time table in the cities and villages and hamlets, where they were placed in houses through distribution agents. The method of distribution was not the old way of scattering circus folders, throwing them over the fence, but by the agent going to the door and rapping or ringing the bell, and handing the folder. In the last two years 70,000 of these time tables had been distributed each year in this way. The cost of that distribution had been $6,300 per annum, and such good results were obtained in that way that a little more money was spent. The Matthews-Northrup Company prepared a 40-page folder which contained no information whatever in relation to the op-

eration of the road. It contained some information about the type of equipment, but most of the space was taken up with descriptive matter and pictures of important places and points of interest in the territory. Fifty thousand of those folders were purchased at a cost of $2,500, and it was thought that the supply would last three years, making a cost of $833 per annum. The distribution had been confined to placing them in the racks of the interurban cars, he thought three days a week, and in the advertising racks of all the stations and at the hotels. There had been no general distribution of them, and they would last longer even than three years unless some efficient method of distributing them was found. In a great many of the racks folders were found containing time tables with advertisements. There were no advertisements in the time table which Mr. Allen showed. It was found that while advertising cheapened the cost to the railroad company it cheapened to a greater extent the usefulness of the time table. Combination folders were also found which included descriptive matter and time tables and advertising.

President Allen thought it would be a good plan to know how much money had been spent on folders, time tables and advertising in the daily papers, based on so many dollars per thousand dollars of gross receipts. That would be valuable information and would furnish enlightenment as to whether advertising was overdone or underdone.

R. P. Stevens, president, Lehigh Valley Transit Company, said that when he went to the property two years ago he inquired what method of advertising was used and how much was spent. He found that no advertising of any nature was done. He inquired a little further, and was informed that there was nothing to advertise. So he saw it was up to him to get busy. After some investigation he found that the line of the Philadelphia-Allentown road, about 50 miles, followed the route of the liberty bell when it was taken from Independence Hall, Philadelphia, and hidden in the church in Allentown during the time the British occupied Philadelphia, and this was decided upon as an advertising feature of the road. The road was forthwith named the "Liberty Bell Route," and the liberty bell adopted as the trademark. It was found that the liberty bell bore so much resemblance to the Bell telephone that a picture of the liberty bell was taken as it now existed in Independence Hall. The cuts were carried through all the advertising. As to results, almost all kinds of advertising were done, but in particular the line on which he had the figures was the Liberty Bell route, which catered to the Delaware Water Gap travel, from Philadelphia to the Delaware Water Gap mountain resorts. Although this business was not nearly as large in winter as in summer, it was to a certain extent all the year around business. This year $3,000 was appropriated for advertising in Philadelphia papers. To find out who wanted the time table, who was interested enough to ask for it, all the advertising stated that beautifully illustrated folders could be had on inquiry at certain department stores in Philadelphia or by application by postal card, requesting mention of the paper in which the advertisement was found. It was surprising to see the results from that newspaper advertising. Some days 300 and 400 postal cards were received.

That experience showed that the folder was not good enough. The start was made a little too cheaply, and advertising was included. The advertising paid for the folder. It had been found from this experience, but Mr. Stevens would not attempt to say that it was the experience of all other roads, as local conditions of course govern—that the better folder issued the better would be the results; he had made arrangements with the photographer of the Pennsylvania Railroad, and a Philadelphia artist to prepare a folder similar to the best class of folders seen around Denver advertising various trips. That folder issued cost somewhere about 8 cents. For this year's advertising a feature was made of a personally conducted trolley trip. A young college student was willing to work during his vacation at $1.50 a day, and being fortunate in having historically interesting places along the line, he was able to start in at Philadelphia and give through his megaphone a very interesting talk the entire length of the line, and incidentally help the passengers in handling their baggage and directing them to their hotels.

A time table which people would take into their homes and preserve for future reference was the one to be issued.

Regarding the historical talk, mentioned last year, Mr. Stevens again took advantage of that feature and wrote personal letters to 5000 school teachers in Philadelphia, enclosing the folder, and suggesting that a talk with the pupils about the historical features of this trip would be of great benefit to the students and of interest to them, and offering the school teachers complimentary transportation.

Chairman Brush called attention to one folder sent to the committee, reading "Free Trips to Evansville and Return Every Day in the Year." On the back of it was the following: "The following merchants, all members of the Evansville Rebate Association, have combined, and under their plan your fares will be refunded on your purchases. Particulars at every store." Regardless of the amount of folders issued, Mr. Brush still felt that unless service was given that could be depended upon absolutely, the money spent on folders was wasted.

President Allen then took the chair again and the meeting was adjourned until 9:30 o'clock on Tuesday morning.

The Hudson-Fulton celebration in New York City and in other cities on the Hudson River is preventing the attendance at the convention of many railway managers who would otherwise be present. The celebration in New York City ended Oct. 2, although the "Clermont" and the "Half Moon" started on their trip up the river to Albany and Troy on Sept. 29. There was a celebration at Newburgh on Oct. 1, and one at Poughkeepsie on Oct. 4. Others will be held at Kingston on Oct. 5, at Catskill on Oct. 6, at Hudson on Oct. 7, at Albany on Oct. 8, and at Troy on Oct. 9. This is the reason which prevents the attendance at the convention of R. E. Danforth of the Public Service Railway, F. W. Bacon of the New Jersey & Hudson River Railway & Ferry Company, C. Gordon Reel of Kingston, Edgar S. Fassett of Albany, and several others. Their presence will be missed. Mr. Fassett showed his great interest in the Denver convention, however, by being at the Albany station when the New York special train passed through that city. Although the time of stop was short, many of those on the train had a chance to exchange greetings with him.

Eastern New York is not the only section of the country at which celebrations are being held this week. St. Louis is also having an anniversary, in its case the centennial of its incorporation. A series of parades and displays have been arranged for the entire week, and as in New York a large amount of extra work is devolving on the railway officers. Capt. Robert McCulloch, president and general manager of the United Railways Company of St. Louis, is chairman of the centennial committee.

The Badger Fire Extinguisher Company of Boston, Mass., has a large and attractive display of various types of chemical fire extinguishers and 40-gal. chemical engines for use in trolley cars and car houses. This company has equipped all the car houses of the New York City Railway Company with 40-gal. chemical engines, having installed a total of 33 machines of this type. Its exhibit is in charge of Charles R. Edwards, general manager, Boston, Mass., and A. E. Stone, New York manager.

Denver has 29 parks, covering 1100 acres. A boulevard system connecting all the parks and encircling the city is now under construction.

ADDRESS OF PRESIDENT ALLEN OF TRANSPORTATION & TRAFFIC ASSOCIATION

It is a source of great pleasure to your president that he is present and able to greet the delegates of the Transportation & Traffic Association assembled in this fair city —Denver. Those who have traveled from the far Western country and the Pacific Coast, and those who have come from the far East and the Atlantic Coast are glad indeed to assemble in convention with the delegates from the middle and central West. Again repeating, it is a great pleasure to be here and call this meeting to order, knowing that Denver has importuned this visit and that she has welcomed us with the warmest hospitality. Denver has shown a desire to impress upon us the greatness of the city, the business ability and hustle of her people. We should be duly appreciative of the hearty welcome extended to us. We will remember for many years the Denver convention of 1909, and will cherish in our memories the new acquaintances we will have formed, as well as the fact that we came here, assembled in convention, transacted the work in a business-like manner, and departed for our homes with a knowledge of having performed our duty to the Transportation & Traffic Association to the fullest degree. Your president will not tire you with a lengthy address, but will confine these remarks to calling attention again to the work of this association.

At the close of the 1908 convention held in Atlantic City, it was the firm conviction of the officers and executive committee of this association that the work during this year should be wholly confined to the standing committees and that the sessions of the 1909 convention would be devoted to the consideration of the reports submitted by these committees.

The standing committees of our association are, the committee on passenger traffic, committee on interurban rules, committee on express and freight traffic, committee on city rules, committee on transfers and transfer information and the committee on the training of transportation employees. The reports from these standing committees will be received in the order above outlined, precedence being given to the committee on passenger traffic for the reason that at the Atlantic City convention its report was not read, owing to the shortness of time alloted to the sessions. The report submitted at Atlantic City was received, printed, and contains information compiled by the committee that is valuable to the superintendent or manager who may be desirous of stimulating passenger traffic. This report with its references and catalogued index will supply detailed information to those desiring information upon the subject that has never before been assembled.

The work of all the standing committees since the 1908 convention and during the year 1909 has been pursued with great energy. The chairman of these various committees will report the number of sessions of their respective committee, and will outline briefly the work they have undertaken to accomplish. Having kept in close touch with the chairmen of these committees, I know that a large amount of detail work has been performed by the members of these committees. The committees are entitled to great credit and the thanks of this convention for the labor they have performed.

The Transportation & Traffic Association has not as yet accomplished or produced any one definite thing. It has not recommended the adoption of, or given the stamp of its approval upon, any of the reports of its committees. At the last convention it was not deemed wise to recommend, approve or promulgate the work of its various committees, as the members of the association at that time had no opportunity of considering and voting intelligently upon the reports that had been submitted. Since that convention, however, the work of the various committees has been in the hands of the member companies and their representatives through the medium of the proceedings of this association in all cases, and in special reports which have been promulgated by the committee on interurban rules, and the committee on city rules, in a special circular sent out by the secretary, so that there does not now exist the excuse that the member companies and the delegates in attendance at this convention have not had time to carefully consider the subjects that have been presented. The mile-stones of progress in this association will be marked by the work we have performed and accomplished.

The work performed by this association for the past year has been the work of its standing committees. The things we will accomplish will be the adoption of the reports of standing committees. This convention must not adjourn until it has, after careful consideration and due deliberation, adopted by suitable resolutions the reports of the committees. The adoption of a committee's report by this association should receive the complete approval of the parent association at its final session on Thursday afternoon.

If this association, after receiving the reports of the committee on interurban rules and the committee on city rules, after the fullest discussion and making such amendments as it may deem proper and wise to make, shall adopt them and in adopting them show by that stamp of approval that these rules are the best up to the present time for the government of employees on both interurban and city railways, I shall feel that we have given not only to the members of the American Street & Interurban Railway Association, but the transportation world at large, recommendations that will be conducive to better transportation methods, both as to safety and convenience of the traveling public and that transportation conditions in general will be bettered by the adoption and general use of these bodies. We can all feel that if the adoption and general use of these two reports are accomplished at this convention that we have performed a duty well.

The adoption of the reports of our standing committees will not mean that we have accomplished the end in these matters, or that we have attained perfection in them. The reports should be referred to the incoming standing committees for further consideration, suggestions and improvements. The work during 1910 will without doubt produce amendments which should be presented at the 1910 convention and if accepted by the association will bring the reports up to date, so that at the close of each annual convention the amended reports will reflect the best energy, thought and practice on all subjects.

In some of the older steam railway associations the standing committees have been considering the work allotted to them for 25 years and amendments made at each annual convention by the committees have shown changes in railway practice, the amendments being based upon the results obtained by a careful study of the subject as changing conditions are presented. Electric railway practice in the transportation field will change as conditions change, and as these changes occur so should amendments to the reports of our standing committees be made.

In concluding this short address I cannot refrain from expressing to the officers and members of the executive committee and to the members of this association my heartfelt thanks for their assistance and co-operation during my term of office as your president. Without co-operation on your part the successful sessions of 1908 could not have been produced, and the splendid program of the 1909 convention prepared. To the chairmen and members of the standing committees I wish to express my thanks for the work that has been done. The association will more formally do this when it has considered the work which you have undertaken and so admirably performed.

I am pleased to see so many members in attendance at

this convention. Let me urge those present to-day to be prompt at the meetings and to assist in bringing others to attend the meetings and to remember that you have come here to give freely all the experience gained in the reports and papers under discussion and that the most good will be accomplished to all when there is a full and free discussion.

INSTALLATION OF EXHIBITS

The exhibit committee of the American Street & Interurban Railway Manufacturers' Association is entitled to great credit for the thoroughness and efficiency of its work in installing exhibits in the Auditorium and Annex. The entire undertaking was accomplished in the week prior to the opening of the convention, and on Sunday night, Oct. 3, all booths were completed and the aisles cleared. There are about 135 exhibitors occupying 45,000 ft. of exhibit space. The arrangement of posts, railings and signs is uniform and pleasing; white and green are the prevailing colors. The exhibition contains numerous pieces of heavy machinery, and in nearly all parts of it the weight allowed per square foot of floor is 250 lb.

A consolidation of freight shipments was effected by which consignments in less than carload lots were concentrated at New York and Chicago and sent through in one car in each case. The New York car arrived in good time, but the Chicago car was detained by an accident to the truck, although not enough to cause any appreciable trouble. This car arrived and was unloaded on Friday morning. This consolidation of frieght resulted in a considerable saving in money and made it easier to trace the shipments and handle them on arrival.

The Manufacturers' Association provides the general lighting for the entire premises until 10 o'clock each night. Arrangements have been made with the Denver Gas & Electric Company for special lighting and electric signs. The association provides exhibitors a reasonable amount of electricity for power at 110 and 220 volts a. c. and 220 and 550 volts d. c. This is done without extra charge to the exhibitors. Boxes, crates and packing material are stored in the basement of the Auditorium. The buildings are guarded at all hours of the day and night by special watchmen, as well as by the Police Department, and the Denver Fire Department has firemen in the buildings constantly.

The car exhibit is at the Champa Street end of the Annex. Here there are several complete cars on exhibition, as well as a mining locomotive in operation on a narrow-gage track.

The exhibit committee of the American Street & Interurban Railway Manufacturers' Association consists of Kenneth D. Hequembourg, Walken-Bennett Manufacturing Company, New York, chairman; L. M. Cargo, Westinghouse Companies, Denver; L. M. Cole, Sherwin-Williams Company, Denver; R. M. Babbitt, **Electric Railway Journal**, Chicago; G. W. Cox, Electric Supplies Company, Keokuk; Arthur T. Herr, American Brake Shoe & Foundry Company, Denver; H. J. Kenfield, Electric Traction Weekly, Chicago; Charles Knight, American Steel & Wire Company; Chicago; H. G. McConnaughy, Dearborn Drug & Chemical Company, New York; S. P. McGough, Lorain Steel Company, Chicago; C. J. Thompson, The J. G. Brill Company, Denver; A. L. Wilkinson, Ohio Brass Company, Mansfield.

Mr. Hequembourg has been indefatigable in his work as chairman of the exhibit committee, and he has been ably seconded by the Denver members of the committee, Messrs. Cargo and Herr looking out for the power, Mr. Cole for the freight and cartage and Mr. Thompson for the car exhibit. F. W. Darlington, an experienced railway man, electrical engineer, Denver & Interurban Railway, Denver, is the director of exhibits. A word of appreciation should also be extended to the Denver Convention League, which has co-operated with the exhibit committee to the fullest extend and done everything that it could for the success of the railway convention. President C. H. Morse and Secretary W. F. R. Mills have represented the league in connection with convention matters most acceptably.

STREET CARS TO HOTELS

While all of the principal Denver hotels are within walking distance of the Auditorium, if one does not object to a little exercise, nevertheless it will be useful to know the street railway routes between the convention hall and some of the leading hotels.

To reach the Albany, Kaiserhof, Savoy, Shirley and Brown Palace, the visitor should take a Twenty-second Avenue car, eastbound, passing the main entrance of the convention premises. Riding three blocks he should transfer either to the Park Hill or the Seventeenth Street car going up Seventeenth Street. Cars on the Twenty-second Avenue route run every seven minutes and on Seventeenth Street very three minutes during the day. To reach the Adams Hotel, take the Twenty-second Avenue car and transfer to Depot Loop car going up Eighteenth Street. The St. James Hotel is but two and a half blocks from the Auditorium, and the Twenty-second Avenue cars pass the door.

REPORT OF THE COMMITTEE ON PASSENGER TRAFFIC*

M. C. Brush, Chairman; E. F. Peck, Franklin Woodman, F. W. Coen, W. S. Whitney and C. E. Flagg

At the convention held at Atlantic City in October, 1908, the committee on passenger traffic submitted a lengthy report on the methods of procedure by various electric railroads throughout the United States for creating traffic, laying particular stress upon the methods pursued and results obtained in connection with the operation of parks or pleasure resorts.

At the time of securing that report efforts were made to cover the ground as thoroughly as possible, and it therefore seemed wise in the report of the committee for this year to endeavor to lay before the Association examples of means adopted by electric railway companies throughout the United States in calling to the attention of the public features which would result in increased traffic.

The committee was reluctant to forward a circular letter to all the member companies for this information, and therefore the greater portion of the United States was divided into arbitrary divisions, governed to a certain degree by the homes of the respective members of the committee, and each member endeavored to secure from his territory a comprehensive assortment of all kinds of printed matter, such as folders, flyers, time-tables, pamphlets, postal cards, etc., referring to the matter in hand.

The committee was successful in securing printed matter from 117 companies, varying in number from one to twelve classes of printed matter, making a total of 278 different samples submitted. These the committee has endeavored to carefully arrange and have on exhibition in the convention hall.

It will unquestionably be surprising to some members of the Association to note the tremendous amount and variety of this matter being published, particularly when it is realized that it is but a few years since any effort along these lines was inaugurated.

The committee believed that the best results from its report could be secured by requesting a discussion of the relative merits of the different classes of printed matter.

*Abstract of report read before the American Street & Interurban Railway Transportation and Traffic Association, at Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

A SOUVENIR WORTHY OF A FINE TRIP

As is well known, the special train of the Massachusetts Street Railway Association, after leaving Denver will visit Salt Lake City, Butte, Helena, Seattle, Tacoma, Portland, San Francisco, Los Angeles and many other cities before returning to Boston. As many of the cities on the route are managed by Stone & Webster of Boston, and as the idea of the trip originated largely because of an invitation from this firm to visit its properties in the Far West and Southwest, the Stone & Webster Engineering Corporation presented to each of the party a souvenir album which will prove very useful during the trip, and also as a memoir of it. It consisted of a book of 73 pages and contained particulars of the equipment and stocks and bonds of each electric railway in each city to be visited, as well as a short statement in regard to the history of the city and its leading industries. A list of references in the **Street Railway Journal** and the **Electric Railway Journal** of each of the properties described is included. The book also includes a printed list of all of the members of the party and blank pages for autographs, memoranda and photographs.

The title page of each book bears the imprint of the name of the member to which it was presented. The cover is particularly tasteful and shows a cowboy throwing a lasso. The form of the loop of the lasso is that of the route to be traversed by the party. The frontispiece is a reproduction of a large painting in the Stone & Webster offices in Boston, giving a bird's-eye view of the district extending from the foot of Mount Ranier to Seattle. The picture shows the 20,000-hp water power development at the foot of the mountain, the transmission line, and the city of Seattle in the distance.

THE BOSTON SPECIAL TRAIN

The Boston special train which arrived in Denver at 4 o'clock Sunday morning will leave Friday night at 2 a. m. for its trip to the Pacific Coast. Altogether, there were 77 passengers on the train, including 27 ladies. Most of them came through from Boston or some other city in Massachusetts but several from New York boarded the train at Utica and at other places. About three hours were spent in Chicago and about the same time at Omaha. The latter visit was particularly pleasant, as the delegates were entertained by an automobile trip around the city, supplied through the courtesy of the Commercial Club of Omaha.

When the train reached the Omaha station at 9:30 a. m. on Saturday it was met by the representatives of the club and the tourists were escorted to some 20 automobiles which were in waiting. Each member of the party was decorated with a guest's badge bearing the name and colors of Omaha. The party then separated to visit different points of interest, but most of them went to Fort Omaha, where they watched the arrival of a large body of cavalry and artillery which had just traveled from Des Moines. Another object of interest at Fort Omaha was the large aerodrome, where military dirigible balloons are housed. A visit was also made by most of the delegates to the Country Club at Omaha, where refreshments were served. Many also called at the offices of the Omaha & Council Bluffs Street Railway Company.

After leaving Omaha, the party sent the following telegram to Mr. Guild, president of the club:

"Only regret time was too short to appreciate fully such hospitality which had the true American flavor Accept our heartfelt thanks for the courtesies extended. None of us fully appreciated until now the commercial and social advantages of Omaha. We are certain that Omaha will have a great future."

Mr. Guild replied as follows:

"Thank you for your kind message. We enjoyed your visit immensely. Wish you might have remained longer and hope you will come again. Maybe you will have your convention here sometime. Best wishes for a pleasant and profitable journey."

A telegram of appreciation was also sent to E. L. Lomax, general passenger agent of the Union Pacific Railroad at Omaha, who had been largely instrumental in the arrangements for entertainment. Another message of similar tenor was sent to G. A. Cairns, general passenger agent of the Chicago & Northwestern Railway at Chicago, extending the thanks of the Massachusetts Street Railway Association to him for the service and hospitality extended to the passengers while the train was on the Northwestern system. Among the attentions of the railway company was the presentation to each of the ladies on Saturday morning of a large box of roses.

THE NEW YORK CENTRAL-ROCK ISLAND SPECIAL

The New York Central-Rock Island special, which left New York at 3:30 p. m. on Thursday, Sept. 30, and reached Denver at 6:35 p. m. on Saturday, Oct. 2, bore an assemblage which represented the last word in good fellowship. Everybody was put in a pleasant frame of mind at the outset, for not a single member was obliged to take an upper berth. Moreover, by the thoughtfulness of the committee, delightful weather had been provided, and the time of leaving New York so well calculated that the travelers were afforded a fine view of the "Half Moon" and "Clermont," as they sailed up the Hudson River. Some of the sporting spirits on the train, under the impression that they were on a ship, made up a pool as to the exact time of arrival. It is rumored that "Transfer" Stedman and Bertram Berry were the winners of the first prize. The crowning feature of the trip was an "ultra-refined" musical and literary entertainment which was held Saturday afternoon on the observation car. The following is an exact copy of the program as printed on the train:

Ultra-Refined Musicale

Selections.....Rocky Voiced Sextette
(Rocks furnished by the Rock Island Railroad)
Selection.....Bertie E. Berry
(Composer of The Vacant Chair)
Song.....“Singer” Smith
(The Boy Tenor; born in 1846)
Song.....Tom Hay
(The Man from Montana)
Pleasing Ballads.....Colonel Marshall
(The man with the double-barreled voice)

Special Feature

Marvelous mind reading Stunt.....Professor J. “Fay” Ryan
(All those with minds please step forward)
Song—“We’d Like to Be Back on Broadway”.....
(To be sung rising at the next watering station by the entire audience (if any be left)
Monologue—By “Transfer” Stedman, the famous raconteur,
“Wild Conductors I have Known”
Daring continuous performance on an untamed piano by the
Infant Prodigies, Masters Chaffee and Hopkins.

TO OUR PATRONS

Entire expense of this performance is more or less cheerfully borne by the “Angel” of the Show, F. Terence MacGovern, the noted Philanthropist who endowed the Library at Phillipsburg. Manager, D. Belasco Loomis.

Positively no encores; no missiles over 5 lb. Please omit flowers.

The passengers were so well pleased with the train service that they passed the following resolution of thanks for transmissal to the responsible parties:

Whereas, The special train operated by the New York Central Lines and the Rock Island Lines from New York to Denver for the accommodation of members of the American Street & Interurban Railway Manufacturers' Association and their guests has been conducted so successfully in every respect that the passengers desire to express their keen appreciation of the courtesy, convenience, comfort and pleasure which they have enjoyed by reason of the efforts made in their behalf; therefore be it

Resolved, That the passengers unanimously pass a vote of thanks to the New York Central Lines, the Rock Island Lines, the Pullman Company and especially to their efficient representatives, Messrs. L. F. Vosburgh, K. E. Palmer, J. V. Ryan and E. E. Spangler, for the excellent character of the service rendered.

THE PENNSYLVANIA SPECIAL FROM NEW YORK

The Denver convention special train from New York, over the Pennsylvania, Chicago & Northwestern and Union Pacific railroads, left Jersey City at 4:16 p. m., Friday, October 1. A large delegation of wives and stay-at-homes saw the party off. At North Philadelphia the Philadelphia Rapid Transit Company delegates and several supply men were taken on board. The train reached Harrisburg at 8:30 and took on a large party from Baltimore, Washington and other Southern cities, headed by Gen. George W. Harries of Washington. After a fast ride over the mountains an extra car, containing the Pittsburg delegates, was attached at Pittsburg at 1:37. Chicago was reached exactly on time, at 10:42 a. m. Saturday morning. The train was immediately switched from the Pennsylvania Railroad to the Northwestern Depot, where a stop of about an hour was made. The entire party was photographed in the station and at 12:10 p. m. the special started again on its way westward. A fast run was made across Illinois and Iowa. Omaha was reached at 12:30 a. m. Sunday and the train left at 1:07 a. m. over the Union Pacific. Two powerful engines pulled the 10 cars at a fast and steady gait across the plains, reaching Denver at 12:37 p. m. The running time from Omaha to Denver was 12 hours and 30 minutes at an average speed of 52 miles per hour. This breaks all previous records between Omaha and Denver, the fastest previous run being 13 hours and 40 minutes. The train carried 142 passengers and consisted of two standard sleeping cars, four compartment sleeping cars, a compartment observation sleeping car, a club car and two dining cars.

The train was in charge of a committee of which W. L. Conwell of the Westinghouse Electric & Manufacturing Company was chairman. Every provision was made for the entertainment and comfort of the party. On Friday evening a reception for the ladies was held in the observation car at the rear of the train and at the same time a smoker was given in the club car at the front of the train. A Pianola and a Columbia phonograph provided music in the observation car and another phonograph dispensed canned music in the club car. Saturday night a bridge whist tournament was held in one of the dining cars and handsome prizes for both ladies and gentlemen were awarded. An interesting feature of the trip was a guessing contest as to the mileage covered in each of the first three 12-hour periods. Beautiful prizes were given by the committee to those lucky enough to approximate the actual distance run. Before the train reached Denver the passengers' unanimous appreciation of the painstaking efforts of the committee in charge was expressed in the form of a resolution of thanks, which was signed by every member of the party and presented to Mr. Conwell.

THE ST. LOUIS PARTY

About 60 ladies and gentlemen formed the St. Louis party to the convention, leaving that city at 2:30 p. m. and arriving in Denver at 4:30 p. m., traveling over the Wabash and Union Pacific roads. The party filled two Pullmans and consisted of people from the Southeast, Southwest and Central West. Arthur S. Partridge of St. Louis was in charge of arrangements and the trip proved very enjoyable. Among those on the train were Messrs. Pratt, Gunsalus and McMullen of the Southwest Missouri Railroad of Webb City; Mr. Bixby of the Springfield (Mo.) Railway & Light Company; Messrs. Traddles and Barnes of the Westinghouse office in Kansas City; Mr. Markham of the Brill Company at Atlanta; Bert Slimp of Atlanta, and E. C. Brown of Kansas City, both of the Ohio Brass Company; and J. M. Moffatt of the Metropolitan Street Railway Company of Kansas City.

SONS OF JOVE, ATTENTION!

Sons of Jove will hold a rejuvenation at El Jebel Temple, corner Eighteenth Avenue and Sherman Street, Denver, on Friday evening, Oct. 8, at 8 p. m. Immediately following there will be a banquet at the Hotel Savoy. Visiting Jovians are cordially invited. Apply for dinner tickets to John J. Cooper, Mountain Electric Company, 1621 Glenarm Street.

TO CONVENTION VISITORS

When Denver undertakes a thing
It never is a frost;
She pushes it along with vim
Regardless of the cost.
She gives to all a welcome that
Is warm throughout, and true;
And when it comes to promises,
Whate'er she says, she'll do.

If you should fail to find while here
Her welcome warm and true,
Just blame yourself for missing what
Has been prepared for you.
For everything that's possible
Has been arranged, you bet,
For making this, "the Denver meet,"
The greatest ever yet.

—E. B. Grimes.

BURLINGTON SPECIAL FROM CHICAGO

The special train from Chicago to Denver arranged for by the Burlington Route, for members of the associations, their families and friends, left the Burlington Station, Chicago, at 4 p. m. Saturday, Oct. 2, was on time at every one of its junction points, and arrived in Denver promptly on time, at 4:30 p. m., Oct. 3.

The special was one of the finest equipped trains ever furnished for the street railway convention during the 27 years in which these meetings have been held. The train consisted of eight modern and up-to-date Pullman cars, two of the Burlington's finest dining cars, and a buffet club car and baggage car. On the rear of the train were two transparencies, one portraying the emblem of the association, the other the trade mark of the Burlington Route, which added luster to the train's appearance.

On departure from Chicago every one of the 195 passengers was handed a souvenir list of the passengers, enclosed with note paper in an envelope already stamped for mailing. The passenger list was unique and one of the most beautiful booklets of its kind ever prepared. It was printed in brown and gold, on imported Italian paper, showing the names and addresses of the passengers in each car. The note paper was a heavy white deckle-edged paper, specially printed in gold for this train; and with much forethought the Burlington officials had stamped the envelopes so that the list could be mailed home at once and preserved as a souvenir of the trip. A further supply of the special note paper and envelopes was found in the writing room of the observation car for the use of members of the party en route. Souvenir post cards were also distributed and a full line of current magaines was in the observation-library car. Beautiful bouquets of flowers had also been placed in the observation car and dining car, and everything that could possibly have been thought of for the comfort and convenience of the passengers had been arranged for.

The train was personally escorted by O. L. Dickeson, assistant to the second vice president, and A. J. Puhl, city ticket agent of the Burlington, Chicago, Ill.

CLAIM AGENTS'—FIRST MEETING

The sixth annual convention of the American Street & Interurban Railway Claim Agents' Association was called to order at 2 p. m. Monday in the Metropole Hotel. About 50 members were present. The first order of business was the presidential address delivered by C. B. Hardin, who called particular attention to the number of new men before him. He regarded their presence as a proof that the Western companies were well represented. He said that the constantly increasing draft upon the treasuries of the street railway companies by those who are really injured and those who think they are injured, and the growing sentiment that he who is injured shall be compensated by the one committing the injury has made it necessary that the claim agent should broaden out. By constant study he could fit himself to meet the new conditions and properly direct a department that has become one of the most important spokes in the wheel of operation of which the general manager is the hub. Thus he could become something more than the door-keeper of what has frequently been called "the rat hole of the treasury." He was particularly interested in the question of an index bureau, as claimants are increasing so rapidly that something must be done toward securing a systematic record for quick and ready reference. In conclusion, Mr. Hardin expressed his thanks to the several committees and the secretaries of the parent and claim agents' associations.

On the conclusion of the president's address, the executive committee offered the following amendments to articles III and IV of the constitution as determined at a meeting held in New York on Jan. 28, 1909:

Executive Committee Report

A. Active members, consisting of active members of the American Street & Interurban Railway Association. Each member shall be entitled to one vote, which shall be cast by the properly accredited representative of the claim department.

B. Associate members, consisting of claim agents and others employed in or by the claim department of street railway companies which are not members of the American Street & Interurban Railway Association. Assoicate members shall have the same privileges as active members, except that they shall not be entitled to vote or hold office, nor shall they have the privileges of the floor unless permitted by the association. No person shall be elected to membership except by the unanimous vote of the executive committee, and in event of any associate member severing his connection with the claim department of a street railway company his membership in the association shall cease, and all his rights and privileges herein are forfeited and ended. The fees and annual dues for associate members shall be those charged by the American Street & Interurban Railway Association.

A further amendment to By-laws, Section 1, provides that former presidents of the association, who are eligible to membership may by vote of executive commitee, become honorary members of said committee.

Article IV (a) was changed to read as follows:

"The capitulation shows 208 1908 members in good standfore each regular meeting of the association, and shall hold such special meetings as may be necessary. Such special meetings may be called by the president Five members shall constitute a quorum at all meetings. A vote of the executive committee may be taken by mail when deemed necessary by the president.

A proposed amendment to the By-laws, Section 1, provides for making the office of secretary-treasurer an honorary position, without salary, and transfer the active duties of the office to the secretary-treasurer of the American Street & Interurban Railway Association. (This amendment was requested by the execuitve committee of the American Street & Interurban Railway Association.) This proposed amendment was defeated by unanimous vote.

It was moved and adopted that a committee of three be appointed by the chair to consider the questions of index bureau and Alliance Against Accident Fraud, and report their recommendation to the convention in 1909. It was also moved and adopted that the question of uniformity of accident reports be referred to a special committee of three, to be appointed by the chair, who shall consider the same and formulate a plan and report to the convention of 1909 for adoption. It was also moved and carried that the chair appoint a committee of three to confer with the executive committee of the Accountants' Association the question of classification of reports. The chair appointed John J. Reynolds, H. R Goshorn and F. J. Ryan.

After considerable discussion it was decided that the question of subjects for the next convention be referred to a committee of three to be appointed by the president, and upon their report to the president he should designate the men to bring the subjects before the next convention And it was further decided that debates on all questions were to be limited to five minutes to each member wishing to talk. It was decided that no papers should be prepared but subjects should be allotted by the president to four or five members to prepare and to give their views orally before the next convention.

In April a mail vote of the executive committee was taken as to the advisability of a question box for the 1909 convention. It was decided to dispense with the question box for that convention.

Secretary-Treasurer's Report

On the conclusion of the executive committee's report, Secretary-Treasurer Davis recited a number of cases where warning circulars had been sent out from his office in connection with accident fakers. He had also corresponded with Acton Burrowes, secretary-treasurer of the Canadian Street Railway Association, regarding the interchange of fake claim circulars. As treasurer, Mr. Davis reported that there had been no funds in his charge since Oct. 1, 1908, but that the parent association had charged a total of $1,274 against the Claim Agents' Association to cover all expenses for the last year. The reports of the executive committee and Mr. Davis were adopted as read.

Subjects Discussed

W. A. Satterlee, assistant general manager of the Kansas City Railway & Light Company and F. J. Ryan, claim agent of the Syracuse Rapid Transit Company, were assigned to the topic "What is the Best Means of Preventing Collisions of Cars and of Cars With Vehicles and Pedestrians?" After a general discussion of this subject a photograph of the delegates was taken and arrangements made for an informal dinner at the Metropole Hotel at 6:30 Wednesday evening. President Hardin announced the following committee on nomina- carried that the chair appoint a committee of three to con- Rapid Transit Company; James R. Pratt, assistant general manager of the Baltimore United Railways & Electric Company; H. B. Drown, general claim agent of the Public Service Railway Company; H. M. Braun, claim agent East St. Louis & Suburban Railway; W. Tichenor, claim agent of the Terre Haute, Indianapolis & Eastern Traction Company. This committee will report at the Wednesday morning session.

The program for Tuesday will comprise two sessions, one beginning at 9:30 a. m. and the other at 2:00 p. m., as announced in the official program. The program committee consists of E. C. Carpenter, claim agent Indiana Union Traction Company; J. R. Pratt, assistant general manager of the Baltimore United Railways & Electric Company; and John J. Reynolds, claim agent Boston Elevated Railway Company.

ADMISSION OF THE PUBLIC

Many requests for admission to the exhibition have come from the general public, and it has been determined to admit the people of Denver for a nominal fee on Thursday. The proceeds will be turned over to Denver charities. Those strangers who desire to visit the convention exhibits on other days, and who have a legitimate interest therein, should apply for passes to George Keegar, secretary of the Manufacturers' Association.

The timber line on the mountains of Colorado is 11,000 ft. above sea level.

NEW STEEL CARS OF THE SEATTLE RENTON & SOUTHERN RAILWAY

Ten all-steel cars of an original design are now being built by the Moran Company of Seattle, Wash., for the suburban and interurban service of the Seattle, Renton & Southern Railway Company. These cars were designed by Charles H. Anderson, chief engineer of the railway company. Accompanying illustrations show the general appearance and some of the detail features of this type of car, which is built on rather original lines.

The body and underframing of these cars are entirely of steel, practically all of the members of which are standard structural shapes. In the design of the body the single side-entrance feature of the California type car has been used, but unlike most electric railway passenger cars, the body has no monitor deck. The roof is formed from steel plates carried from the top of the windows on one side to the top of the windows on the other side and supported within the car by T-section ribs, one over each window post. Four 6-in. channels extending from bumper to bumper carry the main floor stresses. It was necessary at the center side-entrance to cut one of these sills, but the structure at this point is reinforced with a deep channel, the back of which forms a part of the top entrance step, and with structural shapes carried beneath the steps as shown.

The general dimensions of the car bodies are:

Length over bumpers	50 ft. 2½ in.
Length over sills	49 ft. 0 in.
Center to center of trucks	32 ft. 0 in.
Width inside	8 ft. 6 in.
Clear height inside of car	8 ft. 3 in.
Bolster centers distance	31 ft. 0 in.
Height from top of rail to top of first step	1 ft. 0 in.
Seating capacity	70 passengers

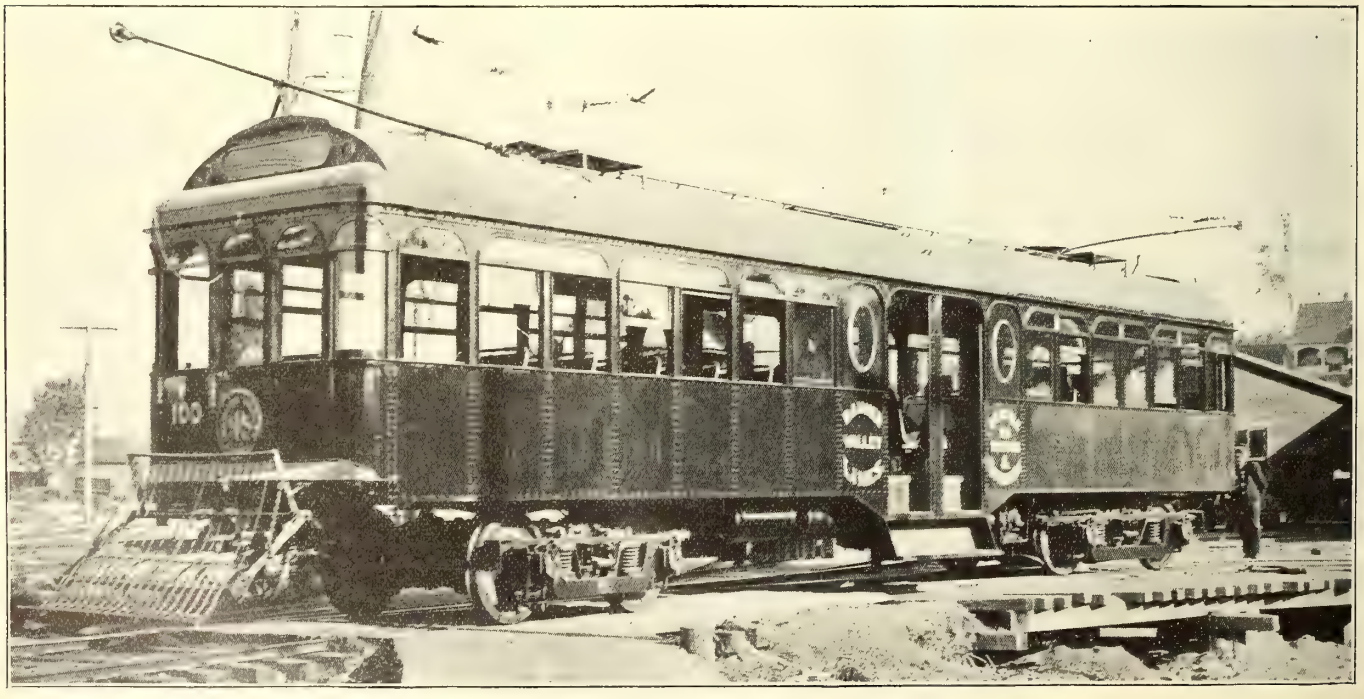
A diagram showing an analysis of the stresses in the body of one of these cars is presented. In calculating stresses it was assumed that the car body loaded with passengers would have a total weight of 44,000 lb. uniformly distributed over its entire length. The channel-iron sills, the angles above the windows and 10½ in. of the No. 10 gage steel plate only, were taken into account when calculating the stresses at the side entrance opening. The overhang from the center line of the truck to the end of the car was considered as being carried by a girder composed of the material below the windows only. With these assumptions and the materials chosen the designer of the car found a unit stress of 1800 lb. per square inch at the height of the channel-iron sill and at the center of the car length. The neutral axis



Seattle & Renton Steel Cars—Center Side Entrance

of the body structure between center bearings was found to be 35.4 in. above the bottom of the sills. The unit stress in the deck rail above the center door was found to be 2630 lb. per square in. The stresses at this point on the door side are carried by a 2½x3-in. 4.5-lb. angle and the 10½-in. section of the No. 10 gage steel plate forming the turtle-back roof. At the bolster where the neutral axis is 14 in. above the bottom of the sills unit stresses of 1750 lb. and 3000 lb. were found in the sills and at the window arm-rail level respectively.

A half-sectional view of one of the car bodies is shown, together with a partial seating plan. The cars are designed

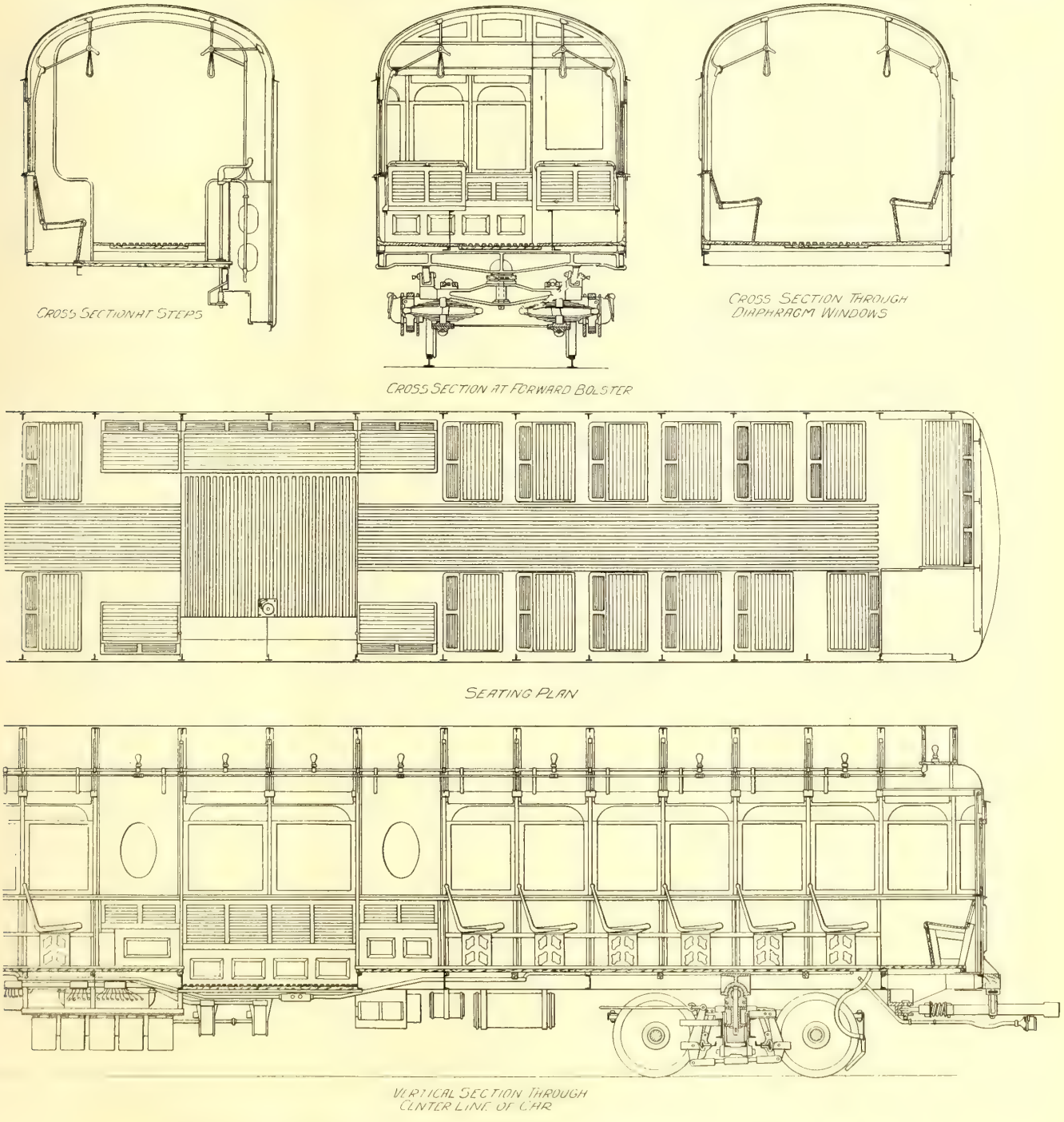


Seattle & Renton Steel Cars—Side View Showing Center Entrance

for single-end operation, but are equipped with double-end control. Seats are provided for 70 passengers. A specially designed seat built of teakwood is used. The exceptionally large seating capacity of 70 passengers in a 49-ft. body is obtained by placing cross seats at each end of the car with the backs close against the end bulkhead, and a long side seat on the blind side of the car facing the center entrance. A motorman's cab is provided at the right-hand forward end of the car. This enclosure is made with sliding doors so arranged that the motorman can be entirely shut off from the body of the car. A clear view forward and back of the car is obtainable from practically any part of the car body.

The steel framework of the car sides and window posts in connection with the roof supporting ribs is so designed that the bottom window sash may be raised and lowered entirely out of their ways and thus easily be removed for renewal or repair. The sash and the very flexible window arrangement were designed by Mr. Anderson. The curtain fixtures also are special and provide as usual for one Pantasote curtain in front of the window sash. The curtain rollers are supported on brackets a short distance away from the sash grooves so that clearance may be had when it is desired to raise the sash clear of the window opening.

The interior of the car body is illuminated by two rows of incandescent lamps supported with their tips up and carried by two lines of heavy conduit, one along either side of the car. This conduit is securely supported at the proper height to afford a substantial strap rail. The curved turtleback roof serves as an excellent diffusion medium for the rays of light from the vertical lamp globes. At each end of the car a destination sign box is built in the steel framework and arranged to be illuminated by incandescent lamps in series with those which illuminate the interior of the car body. The single wide door-opening of this car is fitted with sliding doors directly above the steps operated with an air-actuated mechanism. Each half of the center entrance is closed with a door which is moved toward and away



Seattle & Renton Steel Cars— Half Plan and Longitudinal and Cross Sections.

from the center post on the steps in closing and opening.

Each car body is mounted on two heavy M. C. B. type Baldwin trucks equipped with a bolster and center bearing of special design. The bolsters, both body and truck, are cast steel. In place of the usual form of through king bolt and in addition to the flat center bearing the body bolster has a hemispherical recess which rides on a spherical bearing pivot carried by the truck bolster. This knuckle joint permits the truck to turn or tilt in any direction without

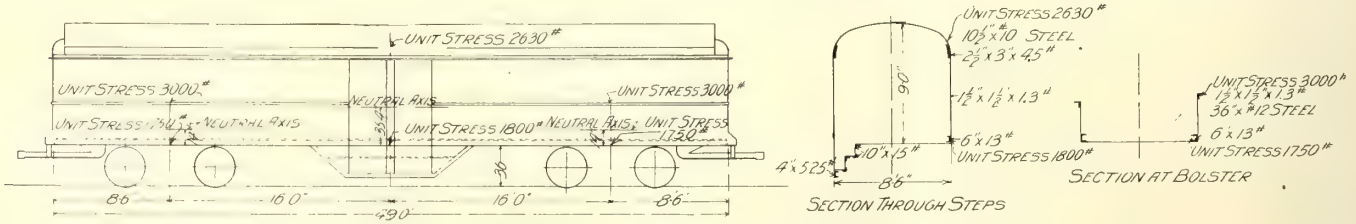


Seattle & Renton Steel Cars—Front End View

placing any strain on the car body. Ball bearings are provided to assist in reducing the friction for the turning of the truck in a horizontal plane. Both trucks are equipped with Westinghouse automatic air brakes and with track sanders built according to the designer of this car. The outlets for the sand are carried on the truck frame and connected with the sand boxes in the car by flexible tubing, so that distribution always is made directly in front of the wheels.

The rear truck carries two Westinghouse No. 304 90-hp motors hung between the axles. No motors are carried on the forward truck, and therefore it was designed with a comparatively short wheel base. Westinghouse unit-switch control arranged for automatic acceleration is installed for double-end operation. The wiring for this control is all carried in steel pipe supported between the channel-iron sills.

Some of the detail equipment of this type of steel car as constructed for the Seattle, Renton & Southern Railway, is as follows: Tomlinson automatic couplers; Worcester fenders; General Electric headlights; Symington journal boxes; Sherwin-Williams paint; Ideal trolley retrievers; Standard steel wheels.



Seattle & Renton Steel Cars—Diagram of Stresses in Steel Body

THE DENVER AUDITORIUM

In many respects the Auditorium, where the convention is held, is unique. To begin with, the land and building belong to the City of Denver, the enterprise being authorized by popular vote. So far the building has cost $575,000. It is a fireproof steel, concrete and brick structure fronting 175 feet on Curtis Street and running back 266 feet on Fourteenth Street. The exterior is dignified and handsome. As a convention hall it will seat 12,500 people comfortably, being the largest hall in the United States with a plastered ceiling. The ceiling is 60 feet from the floor. There are two galleries at one end of the building and three at the other. By a most ingenious arrangement the hall can be transformed within an hour into a theater having seating capacity for 4,000. The roof is supported by steel trusses 175 feet long resting on steel columns independent of the walls

A heating, lighting and power plant is located in the basement, consisting principally of Babcock & Wilcox boilers, Ideal engines and Northwestern d. c. generators. Heating is both direct and indirect, four Sturtevant fans, motor driven, being provided for the latter purpose. In summer cooled air is forced through the building by these fans. Two of the generating sets consist of engines direct-connected to 125-kw 220-volt generators. A third equipment includes a 60-kw 500-volt generator for the motors. The three-wire system is used, with a balancer set. The building is lighted by 16-cp incandescent lamps throughout. There are 14 "sunbursts" for general illumination on the ceiling, each containing 96 lamps. In addition the galleries are outlined, and there are ample facilities for stage lighting and other lighting wherever needed. There are 2,500 lamps in all. An emergency connection with the Denver Gas & Electric Company is provided.

Electric motors are used in transforming the hall to a theater. Portions of the balconies at the north or Curtis Street end are arranged to run on tracks and turn on a pivot, so that they can be moved out into the hall or pulled back against the wall by a 10-hp motor operating a winding drum and an endless cable. The proscenium arch and the two pedestals on which it rests (the three pieces together weighing 17 tons) are lifted into or lowered from the rigging loft by three separate motors by means of steel cables.

The building was first used by the Democratic National Convention in July, 1908, and has since been used for automobile shows and many conventions, including now the great street railway convention and exhibition, for which elaborate special preparations were made. The Colorado chapter of the Daughters of the American Revolution has taken an especial interest in the Denver Auditorium—which is indeed a fine representation of municipal public spirit—and has presented to it a curtain portraying an allegory of "Independence" painted by Albert Herter, the well known artist.

Among the Exhibits

MacGovern, Archer & Company, New York, have no exhibit at the convention, but are represented by Frank MacGovern, who is stopping at the Hotel Shirley.

* * *

The National Lead Company was first on the ground with useful souvenirs, for those who have desks at the exhibit found therein a neat leatherbound memorandum book, as well as a paper-clip bearing a reminder of "Phoenix" babbitt metal.

* * *

The arbor of the General Electric Company is a conspicuous feature at the main entrance. It forms a pleasant meeting place and it and the whole exhibit are arranged for easy inspection and with the idea of not obstructing the general view.

* * *

At the booth of the Consolidated Car Heating Company of Albany, N. Y., may be seen standard types of electric heaters, including those for vestibule use and also for house heating. "Consolidated" buzzers are shown operating on a 600-volt circuit. In order to show the durability of its pneumatic door operating device, the company has at the booth a device which has made 1,500,000 cycles or 3,000,000 consecutive operations without failure.

* * *

A new and effective device is being shown by the Electric Service Supplies Company at its exhibit booth, Spaces 270-76 and 321-27. It is a pneumatic gong ringer so designed as to be easily fitted to a standard foot gong. It is operated by the motorman by means of a small valve placed immediately above the brake valve. This valve has a double seat which entirely eliminates leakage of air. The valve is made in single form to operate either the gong ringer or sand trap, or, in double form for the operation of both.

* * *

Each succeeding year since the formation of the Manufacturers' Association, the National Carbon Company has had something new to show the railway men at the convention. The new Laclede brush, a product of two years' constant work on the part of a large corps of chemists and engineers and 12 months' extensive and critical services is being exhibited. It is claimed to represent the highest development in the railway motor brush field. Its texture and characteristics are so accurately graded that it can be adapted to any conditions of operation.

* * *

The heaviest exhibit at the convention is a lathe designed and manufactured by the Niles-Bement-Pond Company of New York for turning street car wheels. The complete machine weighs about 45,000 lb. It is operated by a 25-hp., direct current, 220-volt motor having a two-to-one speed variation. A 3-h. p. constant speed motor is used for moving the tail-stock backward and forward when changing wheels. The machine will turn from 16 to 20 pairs of wheels in a working day with a minimum of manual labor due to the use of power and automatic devices for handling the wheels, clamping the tools, etc. Only one man is required to operate the machine. The representatives present are E. S. Leeds and D. H. Teas.

* * *

American Automatic Switch Company, of New York, is exhibiting at Space 241 an electro-mechanical interlocked control cabinet for controlling switches and signals, a signal for low speed work, a switch-throwing mechanism controlled from a cabinet and one of the company's new type 14 electric track switches. The control cabinet is so arranged that it is impossible for the operator to give the signal for a car to proceed into the switch until the latter is in the safe position at the end of its stroke. Then, after the car has started over the switch, the switch cannot be thrown between the trucks of the car. It is also impossible to give two signals simultaneously so as to send two cars into a colliding point. An automatic switch-throwing mechanism, known as type 14, containing the newly-patented mercury stuffing box, is shown. All this apparatus is wired up and is operated by the representatives present.

* * *

The American Mason Safety Tread Company, Boston, Mass., has recently received an order from the American Car & Foundry Company for safety treads and new Karbolith top floors to equip 110 cars for the Interborough Rapid Transit Company, New York. The treads are to be used at the center side doors as well as at the end doors and in the vestibules. Another large order is from The J. G. Brill Company covering treads for 334 cars, most of which are to be electrically operated. The Dallas (Tex.) Consolidated Electric Railway Company has also ordered Mason treads for car steps, while the Brooklyn Rapid Transit Company is buying more for its elevated railway stairways.

* * *

The first exhibit to be installed and finished at the convention this year was that of the Pay-as-You-Enter Car Corporation in Spaces 180-184. It consists of two full-sized sections of pay-as-you-enter car platforms. One represents the type used on the Third Avenue Railroad, New York, and the other is the type of platform adopted in Chicago. These two types, with some slight modifications, have been adopted in many other cities. The company is represented by Thomas W. Casey, general manager, and David Murdoch, special representative in charge of the exhibit. Mr. Vanellman is also representing the company. More than 5,000 pay-as-you-enter cars are now in service in 42 cities. The system is under consideration for use in many other cities which have not adopted it so far and the list of roads using it is being increased daily.

* * *

McCord & Company, Chicago, Ill., are exhibiting a spring dampener, which, when applied to coil springs, gives the coil springs the same even action as is obtained from the more expensive elliptic spring. The spring dampener saves a great deal in first cost of application, as well as in maintenance, while the same easy action is obtained. They are also showing McKim gaskets, which are used extensively for maintaining steam-tight connections, especially under high pressure; and an equalizing wedge for 4¼-in.x8-in. pedestal journal boxes, together with the brass that has been in service nearly eight months. The brass shows the even wear produced by the equalizing wedge, which insures, no matter in what position the box may be relative to the axle, an equal bearing to all parts of the journal.

* * *

The Whitmore Manufacturing Company, Cleveland, Ohio, is distributing some striking blue prints which show the value of Whitmore's gear protective composition in a very graphic manner. One print shows a gear and pinion which have been in service on the Spokane & Inland Railway. These ran 194,700 miles in one direction, with a total loss of metal of only 1.053 lb. A second print shows a gear and pinion as it appeared after running 100,059 miles on the Utica & Mohawk Valley Railway, and a third print shows the excellent condition of a gear and pinion removed from a Schnectady Railway Company's interurban car after making 53,232 miles. An interesting feature in connection with these records is the presence of the gears and pinions themselves, which were removed solely for purposes of exhibition at the booth, Space 415. Examination shows that their pitch lines have not been destroyed in a single case. After

the convention these gears and pinions will be returned to their owners for further service and next year will be placed on view again to show how much wear has taken place in the meantime. The company is also ezhibiting a blue print and the originals of four pinions used on the Cleveland, Painesville & Eastern Railway. The first view is a new pinion and the second and fourth show the fine condition of the pinions after running respectively 29,286 miles and 55,330 miles with the gear protective composition, while the third, which was lubricated with graphite grease is practically worn out, although it ran only 23,078 miles under the same conditions. This striking exhibit, including journal and compressor oils, is in charge of S. W. Whitmore, president and general manager of the company; W. M. Lawyer, New York representative, and Henry Stuckenholt, western representative.

* * *

The Automatic Ventilator Company, New York, has an exhibit in space 203-205 which is a visual demonstration of the efficiency of its system of ventilation for steam and electric railway cars. A section of the clerestory of a passenger coach made practically air-tight is equipped with automatic ventilators and an electric fan playing on the exterior deflectors of the ventilators reproduces the conditions of a car in motion. The rapid change of air in the interior of the clerestory can be seen through glass panels. A door at each end gives access to the ventilators for tests of both the intake and the exhaust. George H. Ford and Ross Taylor are in attendance prepared to explain the action of this device.

* * *

The exhibit of the Goldschmidt Thermit Company, New York, at the street railway conventions is always interesting. This year it consists of samples of welded rail joints for both T and girder rail, samples of welds of heavy sections such as locomotive and truck frames, motor cases and similar work and numerous photographs of the operation of making thermit welds of various kinds. Thermit is extremely useful in foundry practice and several samples of metals and alloys free from carbon which are produced in this process are exhibited. These alloys include 99 per cent pure chromium, manganese, manganese copper, ferro-vanadium and several others. The company is represented by C. E. Pellissier, Henry S. Mann and L. Heynemann. Practical demonstrations of thermit welding will be given every day on Curtis Street just outside the annex. Announcement of the time at which these demonstrations will be made will be published in a later issue for tomorrow.

* * *

The National Brake & Electric Company, Milwaukee, Wis., reports that the demand for National straight-air brakes as well as for the latest types of National emergency and semi-automatic air brake equipments, has, in view of the trade conditions during the past year, far exceeded all expectations. The appreciation of the high standard of National air brakes is shown by the orders received for National apparatus since the 1908 Atlantic City convention. These amount to over 2,000 equipments, including straight-air, emergency and semi-automatic equipments, and also 1,200-volt air brake equipments for the Milwaukee Electric Railway & Light Company's Watertown interurban line. Some of the larger orders for National apparatus placed during the year, were received from the following companies: Chicago Railways Company, Chicago, Ill.; Milwaukee Electric Railway & Light Company, Milwaukee, Wis.; Portland Railway, Light & Power Company, Portland, Ore.; Seattle Electric Company, Seattle, Wash.; Seattle-Everett Traction Company, Everett, Wash.; Cincinnati Car Company, Cincinnati, Ohio; New York State Railways, Rochester, N. Y.; Louisville Railway Company, Louisville, Ky.; Chicago & Oak Park Elevated Railroad Company, Chicago, Ill.; Bay City Traction Company, Saginaw, Mich.; Louisville & Eastern Railroad Company, Louisville, Ky.; Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis.; Central Pennsylvania Traction Company, Harrisburg, Pa., and the Tidewater Power Company, Charleston, S. C. In addition to the foregoing railroads in the United States, numerous large orders for air brake equipments have been received during the past year from foreign railway companies.

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The exhibit of city and interurban railway tickets made by the Globe Ticket Company, Philadelphia, Pa., includes about 1,000 styles of ticket transfer books, cash fare receipts and mileage books, etc., used by steam and electric railways throughout the United States, Cuba, Mexico and South America. To any one interested in tickets, this will be a most instructive exhibit. Particular attention is called to the Pope patented P. M. coupon transfer. This style has been adopted by many large systems, and it is claimed that it has solved the problem of transfer abuses. The entirely different appearance of the transfers issued in the morning from those issued during the afternoon and evening is apparent at a glance to the receiving conductors, and prevents trading transfers received in the morning and used at night. Many other special forms of tickets, books and cash fare receipts, etc., designed to meet special conditions are well worth inspection.

* * *

The Peter Smith Heater Company, Detroit, Mich, is exhibitng in Space 27, a number of types of hot water heaters for city and interurban cars. During September this company received orders for 195 heaters from the following electric railways: Twin City Rapid Transit Company, Minneapolis, Minn,. 58 No. 2-C; Wheeling (W. Va.) Traction Company, 8 No. 2-C; Rochester (N. Y.) Railway Company, 25 No. 2-C; Illinois Traction System, 2 No. 1-C; Nashville (Tenn.) Interurban Railway, 1 No. 1-C; Public Service Railway, Newark, N. J., 5 No. 1-C; Detroit United Railway, Detroit, Mich., 5 No. 1-C; Dayton & Troy Electric Railway, Dayton, Ohio, 1 No. 1-A; Rock Island & Southern Railroad, Monmouth, Ill., 14 No. 1-C; Michigan United Railways, Lansing, Mich., 3 No. 1-C; Saginaw Valley Traction Company, Saginaw, Mich., 1 No. 3-B; Chicago & South Bend & Northern Indiana Railway, South Bend, Ind., 1 No. 1-C; Ohio Electric Railway, Columbus, Ohio, 3 No. 1-C; Saginaw & Flint Railway, Saginaw, Mich., 3 No. 2-C; Winona & Interurban Railway, Warsaw, Ind, 8 No. 2-C; Indianapolis Traction & Terminal Company, 2 No. 2-C; Houghton County Traction Company, 5 No. 2-C; Syracuse (N. Y.) Rapid Transit Railway, 50 No. 2-C.

* * *

Since the presentation last year of the report of the committee on maintenance and inspection of electrical equipment of the Engineering Association, in which the use of an extra high grade of carbon brushes was recommended, the Speer Carbon Company, St. Mary's, Pa., has perfected a new grade of brush which fully conforms with the recommended requirements. This brush is made by a new process and is perfectly homogeneous and uniform, containing no laminations. It is furnished in four degrees of hardness, grades H, H-1, H-3 and H-8. During the past year very thorough service tests have been made with these brushes on a number of large city and interurban railway systems. The results have been very satisfactory. The tests were made on all types of motors without regard to the condition of the commutators or brush-holders. Some of the motors were specially selected on account of badly worn brush-holders, as it was desired to give the brushes the most severe test possible. The mileage of the brushes tested varied between 30,000 and 50,000 miles, thus proving that this grade of brushes will fully meet the suggested specifications.

EXHIBIT OF THE WESTERN ELECTRIC COMPANY

A comprehensive display of telephone apparatus for steam and electric railways is being shown by the Western Electric Company in Spaces 114-26. The selectors shown are the same as those installed on a number of steam railroads. The principal function of these selectors is to make it possible to call any one of the stations on the line without ringing the bell at any other station. This individual selector scheme has proved of great value in saving time in the transmission of train orders.

The apparatus shown at Denver is similar to that exhibited at the Street Railway Convention at Atlantic City last October and at the convention of the Association of Railway Telegraph Superintendents held at Detroit, Mich., last June, together with a representative exhibit of standard Western Electric telephone apparatus.

Electrose insulation will also be displayed in a variety of forms in the Western Electric booth. Five boards illustrating overhead line material, special arc light hangers, third-rail insulators, etc., are shown. Insulators of this material are made in various shapes and sizes, to resist all commercial voltages. The strain insulators exhibited possess superior electrical and mechanical qualities, owing to the relation and form of the metal parts. The insulating material disposed between them is placed under compression when under tension, thereby making the strength of the insulation far in excess of ordinary requirements. They have interchangeable terminals, thus making possible any combination desired and rendering it impossible for the line to drop. One interesting type of insulator shown is the disk type. The design of this insulator affords a large interrupted insulating surface to limit surface leakage and provides a very large factor of safety. Deposits of dust, etc., cannot form a continuous path over the surface of an insulator of the disk type. The form of the strain members and their disposition relatively to each other and to the insulating disk is such as to provide a strain insulator of great strength combined with the highest possible form of electrical insulation. This type of insulator may be used separately or a number of them may be linked or connected together either flexibly or rigidly for use where currents of very high potential are employed. They are furnished with various forms of terminals, the metal parts being interchangeable.

Another use for electrose shown is for arc light insulators of various types and designs. Electrose third-rail insulators of several types are made up in two parts and are provided with means of securely locking them together so that they may be used as a single insulator unit if required. The supporting portion of the base is provided with a large surface for sustaining the weight of the insulated section and the rail. The overhead and trench type of insulators differ in construction only. Equal care has been given to their construction. The overhead form is known as the Steinway Tunnel type and the trench design as the Third Avenue Railroad type. This latter design is provided with pin holes adapted for receiving cement for securing the pin in position. It is also furnished with a threaded pin hole adapted to screw on the pin, thereby avoiding the use of cement.

The latest type of trolley wire suspension shown is the Ideal locking cap and cone. This is provided with a heavy malleable iron protection ring throughly imbedded in electrose, which prevents the cap from breaking either when being carelessly installed or by blows from the trolley pole. It also permits the suspension to be readily disconnected and removed. The cone is threaded and when in position locks the cap, suspension body and cone together and prevents the line from dropping by the unscrewing of the cap due to vibration. It can be installed with an ordinary monkey-wrench or with a special cap and cone wrench.

Among other devices shown are a line of standard Western Electric ears, clamps, section insulators, overhead frogs and crossings and armatures, field coils and Kalamazoo trolley wheels and harps.

THE WAGNER MORALOMETER

One of the most popular booths at the convention is that of the Wagner Electric Manufacturing Company at Space 154. The attraction is the Wagner "moralometer," made famous at this year's National Electric Light Association convention, Atlantic City. This instrument indicates in electric railway parlance, the morals or idiosyncrasies of those who will submit to its searching power. Indications such as "star connected," "trolley off," "overloaded," "air-blast" are given by the Wagner moralometer. The reading is taken by placing the subject who is courageous enough to have his "morals" divulged, in a chair and adjusting a headpiece to his head. The operator by manipulating the instruments on the switchboard, assisted, perhaps, by a tip from the gentleman who has introduced the subject, is able to throw the proper switch so as to complete the circuit of occult forces by which the machine is operated. The indication of the morals of the person being tested is then conspicuously displayed on a dial so that one who runs may read. The moralometer has never been known to make a wrong diagnosis. At Atlantic City the Wagner booth was the center of much gayety, and few of those who had readings taken of themselves failed to return with one or more subjects, sometimes called victims.

The mysterious construction and faithful accuracy of the moralometer, however, are not the only subjects which the representatives of the company there present are able to discuss. They are ready to talk about Wagner single phase motors and large power transformers. Wagner single phase motors are not built for the operation of electric cars, but for stationary service, and the company claims that they make consistent and profitable the sale of electricity for power to farmers and the like, who are located along any high-voltage transmission line. Some electric railway companies are selling power from their trolley circuits, but others are opposed to this practice because of fire insurance restrictions. When high-tension transmission is utilized, it is a round-about way to sell current, which is first generated, then stepped up, then transmitted to a substation, then stepped down, then passed through a rotary converter and finally transmitted to its point of use. A single phase motor, such as built by the Wagner Electric Manufacturing Company, can be tapped off from any three-phase high voltage transmission line. Only one transformer and very simple connections are required. Farmers are not only good power customers, but their demands for power are usually in the morning or early afternoon, that is, at a time which is not at the evening peak load when the company requires all of its power for the operation of its cars. The matter of unbalancing is almost a negligible consideration because of the small current demand of any one motor or group of motors, and generally the different connections along a transmission line can be evenly distributed between the different phases. Wagner representatives in attendance at Denver include Walter Robbins, assistant general manager; Frank N. Jewett, sales manager, and Ray D. Lillibridge, advertising manager.

One of the unique features of the exhibit of William Wharton, Jr., & Company, Inc., Philadelphia, Pa., is the high switch stands shown at the entrance to the space occupied by this company. These stands are so tall that ladders are furnished as a part of them, to enable the trackman to get to the lamp. They are known as "Blizzard" stands, and are used extensively in sections of the country where the snowfall is such that a high stand is necessary.

List of Exhibits

Adams & Westlake Company, The, Chicago, Ill., Spaces 366-363—Headlights, both arc and incandescent, signal lamps, lanterns, car trimmings, basket racks, brake handles, switch locks, water closets and earthenware. Represented by Charles E. Carson, William J. Piersen, Alfred Connor.

Allen Switch Company, Pueblo, Colo., Space 719—Automatic track switch. Represented by A. B. Allen, O. D. Allen.

Allis-Chalmers Company, Milwaukee, Wis., Space 200-210, 251-258—Air brakes, railway motor and controllers. Represented by J. H. Waterman, F. G. Bolles, J. R. Jeffrey, James Gardner, I. L. Dimm, R. B. McConney, E. W. Stull, F. W. Fanger, George Baiz. Phone Champa 90, Branch 51.

Aluminum Company of America, Pittsburg, Pa., Space 403—Aluminum cable for high-tension transmission lines, aluminum feeder cables, lead-covered aluminum cables, rubber and paper insulation, various styles of joints, aluminum bus-bars. Represented by E. H. Noyes, F. N. Baylies, S. K. Colby.

American Automatic Switch Company, New York, N. Y., Space 241—Interlocking control cabinet, automatic track switch. Represented by G. E. Willis, Ralph Sanger, H. A. Goode, R. V. Collins.

American Brake Shoe & Foundry Company, Mahwah, N. J., Spaces 33, 35, 37 and 39—Brake shoes and brake heads, (standards of the American Street & Interurban Railway Association). Represented by F. L. Gordon, J. S. Thompson, A. T. Herr, C. C. Higgins, J. G. Tawse, W. L. Boyer, E. A. Gregory, E. L. Janes, E. B. Smith.

American Locomotive Company, New York, N. Y., Space, Track Exhibit—American Locomotive type of heavy interurban truck as shown under a car of the Denver & Interurban R. R. Represented by William Wampler.

American Mason Safety Tread Company, Boston, Mass., Space 711—American Mason Safety tread, lead and carborundum filled, karbolith composition flooring for cars and buildings. Represented by Henry C. King.

American Railway Guide Company, Chicago, Ill., Space 106—Travelers railway guides, bureau of railroad information and reservation of Pullman accommodations. Represented by Geo. E. Armstrong.

American Steel & Wire Company, Chicago, Ill., Spaces 28-32, 127-131—Electrical wires and cables; rail bonds and bonding tools; right-of-way fence. Represented by Charles R. Sturdevant, B. H. Ryder, F. A. Keyes, J. M. Holloway, J. D. Sutherland, E. R. Pool, W. H. Williams, W. R. Abbott, E. E. Aldous. Phone Champa 90, Branch 10.

American Wood Preserving Company, Chicago, Ill., Space 245—Distributing literature describing antiseptine wood preservative. Represented by H. W. Weihe, R. J. Bird.

Ames, Cortlandt F., Chicago, Ill., Space 713—Hercules bumping post, automatic lock nut, gear shield, rope shield. Represented by Cortlandt F. Ames, J. A. Schwartz.

Anderson, Albert & J. M., Manufacturing Company, Boston, Mass., Space 221-223—Sixty-six thousand volt disconnecting switches of the truss type; full line of switches and pure copper castings; remote control mechanism for oil switches and time switches for alternating circuits up to 3,000 volts. Represented by Alfred E. Anderson, Ernst Woltmann, Henry Woltmann.

Anglo-American Varnish Company, Newark, N. J., Space 378—Reception booth. Represented by William Marshall.

Archbold-Brady Company, Syracuse, N. Y., Space, Box between booths 418-419—Photographs, circulars and blue prints of catenary bridges and construction, transmission line towers and spiral towers for long high tension crossings over rivers and railroads. Represented by C. Loomis Allen, W. K. Archbold.

Atlas Railway Supply Company., Chicago, Ill., Space 168—Atlas straight, compromise, insulated and special rail joints; tie plates and rail braces. Represented by D. Thomson, J. G. McMichael.

Automatic Car Coupler Company, Los Angeles, Space 605—Automatic car coupler for city. Represented by W. H. Soale, F. R. Bonney.

Automatic Switch Company, Denver, Colo., Space 378, 181.

Automatic Ventilator Company, New York, N. Y., Spaces 203-205—Large and small working models of car ventilator. Represented by George H. Ford, Ross Taylor, Frank A. Barbey.

Avery Scale Company, North Milwaukee, Wis., Spaces 616-618—Automatic track scale, one automatic elevator scale. Represented by N. C. Webster, B. P. Ordway.

Babcock & Wilcox Company, New York, N. Y., Space 174—B. & W. model of horizontal boiler and two types of boiler heads. Represented by Charles Onderdonk, William Turner, F. A. Einfeldt, Harry Byer.

Badger Fire Extinguisher Company, Boston, Mass., Space 201—Chemical fire engines for car barns, repair shops, parks; hand chemical fire extinguishers of various sizes for buildings and electric cars. Represented by Charles R. Edwards, A. E. Stone.

Barber Car Company, York Pa., Spaces 615, 617, 619—Single truck trolley car in operation on tracks of Denver City Tramway Company. Represented by Guy Webster, Edward A. Barber.

Bayonet Trolley Harp Company, Springfield, Ohio, Space 411—High-speed trolley equipment, including detachable trolley harps, roller bearing bases with detachable pole clamps, self-lubricating trolley wheels, butterfly sleet cutters. Represented by R. A. Garlough, J. M. Olinger.

Beaver Dam Malleable Iron Company, Beaver Dam, Wis., Space 714—Tie plates. Represented by F. S. McNamara.

Berry Brothers, Ltd., Detroit, Mich., Space 166—Finished panels of native and foreign woods, varnish, varnish and paint remover. Represented by F. W. Hormann, Thomas J. Lawler.

Bonney-Vehslage Tool Company, New York, N. Y., Spaces 207, 209, 211, 213—Many types of ticket punches. Represented by E. C. Vehslage.

Brill Company, The J. G., American Car Company, G. C. Kuhlman Car Company, John Stephenson Company, Wason Manufacturing Company, Danville Car Company, Spaces 218-222, 269-273—High speed truck M.C.B.-E3; single-motor truck No. 39-E, city and surburban trucks Nos. 27-GE1 and 27-GFE1; car sets, seating materials, fare boxes, "Dedenda" platform gong, "Dumpit" sand box, truck springs of various types, "half-ball" brake hanger, one-piece pressed steel seat pedestals. Represented by Geo. H. Tontrup, D. B. Dean, S. T. Bole, E. Bronenkamp, S. K. Colby, Fred Brill, F. E. Markham, G. Wade, S. M. Wilson.

Brown, Harold P., New York, N. Y., Spaces 128, 130, 132—Plastic rail bonds, electrical contact alloys, electropneumatic chisel, electrical testing outfit, bonding tools, hand power grinder, flexible shaft, Stay-There track bolt and "O. K." locks. Represented by Harold P Brown, Clarence F. Brown, John T. McClure, J. M. Coote.

Buckeye Electric Company, Cleveland, Ohio, Space 380—Buckeye tantalum railway lamps. Represented by L. P. Sawyer, Geo. S. Merrill, J. H. Cooke, A. G. Lucas, J. M. Johnson. Phone Champa 90, Branch 59.

Buda Foundry & Manufacturing Company, Chicago, Ill., Spaces 50, 52, 153, 155—Manganese center special work, switch stands, track drills, jacks, motor and hand propelled velocipedes. Represented by W. S. Weston, F. C. Webb.

Burroughs Adding Machine Company, Detroit, Mich., Spaces 215-219—Burroughs adding and listing machines especially adapted for street and interurban railway accounting. Represented by F. A. Willard, W. J. Parrish, G. M. Green, C. H. Smith.

Carnegie Steel Company, Pittsburg, Pa., Spaces 16-26, 115-125—Skeleton mine showing mine timber construction with steel shapes and portable steel tie track. Soft welding and threading steels, specimens showing hot and cold bends. Section of interurban car truck made entirely with Carnegie welding and threading steel. Slack barrel hoops for spike and bolt kegs and miscellaneous packages. Steel wheels for street and interurban service. One pair wheels mounted on axles showing 89,368 miles serviced without turning. Piece of track with standard 100-lb. rail with steel cross ties showing type of concrete construction. Duquesne rail joints. Steel sheet piling for coffer dams, specimen of steel piling used for core walls for dams. Represented by K. E. Porter, C. B. Friday, N. D. Trist, W. E. Berry, J. C. Holding, L. P. Lincoln, R. B. Carr, E. S. Mills, N. M. Hench, E. M. Sparhawk, A. H. Hawkins, O. M. Ash. Phone Champa 90, Branch 2.

C. A. Wood Preserver Company, Austin, Tex., Space 620—

Railway ties treated with C. A. wood preserver, removed from Denver City Tramway tracks after 5 years' service. Other samples of treated timber and photographs. Demonstration in Denver City Tramway tie yard of method of treating ties with the C. A. wood preserver. Represented by Herman F. Gerhard.

Chicago Car Heating Company, Chicago, Ill., Spaces 170, 172—Hot water heater in operation, special fitting for increasing circulation of hot water, regulating temperature and facilitating filling system without air pockets. Represented by W. P. Cosper, E. H. Gold. Phone Champa 90, Branch 7.

Chicago Varnish Company, Chicago, Ill., Space 370—Car sides showing 6-day process of painting and varnishing. Represented by O. H. Morgan, G. S. Bigelow, F. L. Olds. F. H. Gundrum.

Chisholm & Moore Manufacturing Company, Cleveland, O., Spaces 76, 179—Chain hoists. Represented by H. E Dickerman. Ludlow track drill. Represented by W. E. Ludlow.

Cincinnati Car Company, Cincinnati, Ohio, Spaces 186, 188, 190, 192—Completely equipped double truck car for city service built for Ogden Rapid Transit Company. Ogden, Utah. Represented by Henry C. Ebert, Dana Stevens, Thomas Elliott.

Coin Counting Machine Company, New York, N. Y., Space 160—Coin counting machines, registering fare boxes. Represented by W. P. Butler.

Coleman Fare Box Company, Buffalo, N. Y., Space 179—Fare boxes for pay-as-you-enter cars. Represented by J. H. Coleman, Geo. H. Dreybus, E. C. Rutherford, E. A. Rooney.

Consolidated Car Fender Company, Providence, R. I., Spaces 229, 231—Providence fender, Providence wheel guard, snow broom section, lockers. Represented by Albert J. Thornley, George H. Hollingsworth.

Consolidated Car Heating Company, Albany, N. Y., Spaces 316, 369—Electric car heaters, motorman's cab heaters, house heaters, quick break knife switches, high-voltage push button, signal system, light signal to motorman indicting when doors are closed on multiple-unit train service, pneumatic door operator. Represented by Cornell S. Hawley, Thomas Farmer, Jr., W. S. Hammond, Jr.

Cooper Heater Company, Dayton, Ohio, Space 71—Hot water heater. Represented by W. L. Blackwell, W. E. Hinmon.

Couch & Seeley, Boston, Mass., Space 625—Coin separating, counting and packaging machine. Represented by C. N. Smith.

Coulter & Company, C. J., Hammond, Ind., Space 611—Rail wrench, track drill. Represented by C. J. Coulter, J. W. Paxton, A. A. Stapp.

Crane Company, Chicago, Ill., Space 613—Tilt traps, cast-steel, Ferro steel and extra heavy gate valves; hydraulic and extra heavy brass valves. Represented by F. W. Knapp.

Crouse-Hinds Company, Syracuse, N. Y., Spaces 360, 362—Arc and incandescent headlights, condulets, panelboards and cabinets, knife switches, harpoon guy anchors. Represented by A. F. Hills, F. F. Skeel, F. W. Buchanan, D. C. Gidley.

Curtain Supply Company, Chicago, Ill., Spaces 406, 408—Ring curtain fixtures, Forsyth fixtures, Acme cable fixtures, Climax cable fixtures, Burrowes fixtures, Keeler Eccentric fixtures, car curtain material. Represented by R. F. Hayes, S. W. Midgley, F. C. Kenly.

Day & Williams, Weldona, Colo., Space 419—Guard rail lubricator. Represented by W. L. Day.

D & W Fuse Company, Providence, R. I., Space 116—Fuses and cut-outs including railway cut-outs, service switch boxes and fuse boxes for 250 and 600 volts and transformer and high-tension junction fuse boxes for both pole and subway installations, square and rectangular wires with Deltabeston insulation, field and armature coils. Represented by Willard S. Sisson.

Dearborn Drug & Chemical Works, Chicago, Ill., Spaces 308, 310, 361, 363—Scientific methods in the treatment of boiler feed waters to prevent scale, corrosion, pitting and foaming. Represented by George R. Carr, H. G. McConnaughy, D. E. Cain. Phone Champa 90, Branch 54.

Duff Manufacturing Company, Pittsburg, Pa., Space 150—Genuine Barrett track jacks, Duff-Bethlehem hydraulic jacks, Duff ball-bearing screw jacks, Barrett motor armature lifts, motor lifts, wheel and axle lifts, special car equipment jacks. Represented by E. A. Johnson.

Duntley Manufacturing Company, Chicago, Ill., Spaces 176-178—Pneumatic cleaners, motor-driven section cars. Represented by George Clements, L. C. Thompson.

Eclipse Railway Supply Company, Cleveland, Ohio, Space 601—Eclipse life guard fender. Represented by Ross Forward.

Edwards Company., The O. M., Syracuse, N. Y., Space 384—Car window fixtures, sash balances, steel trap doors. Represented by E. F. Chaffee, G. G. Norris, C. H. Rockwell.

Electric Railway Equipment Company, Cincinnati, Ohio, Spaces 624 and 626—Catenary line material, iron and steel tubular poles, pole brackets, electric mine haulage supplies, trolley pole splicers. Represented by J. G. Kipp, A. L. Johnston, E. P. Morris, O. H. Davidson. Phone Champa 90, Branch 13.

Electric Railway Improvement Company, Cleveland, Ohio, Spaces 214, 216, 265, 267—Electric welding rail-bonding car in operation. Represented by W. B. Cleveland, George Long, W. E. Huber.

Electric Railway Journal, New York, N. Y., Spaces 1-13—Twenty-fifth anniversary souvenir convention number, and convention daily issues printed at Denver. Represented by James H. McGraw, J. M. Wakeman, Joseph A. Kucera, H. W. Blake, L. E. Gould. Rodney Hitt, F. Nicholas, Walter Jackson, W. E. Keily, C. A. Babtiste, W. K. Beard, C. T. Walker, R. M. Babbitt, E. J. Hunt, H. E. Hopkins, Malcolm Muir, Miss J Phelps, Miss M. Murphey. Phone Champa 90, Branches 11 and 12.

Electric Renovator Manufacturing Company, Pittsburg, Pa., Space 413—Invincible renovators, commercial domestic and junior types; car and house air cleaning machinery with accessories. Represented by Chas. P. Fenner, W. T. Bridgers, W. W. McCauley.

Electric Service Supplies Company, Philadelphia, Pa., Spaces 270, 272, 274, 276, 321, 323, 325, 327—Pay-within car, automotoneer, Garton-Daniels lightning arresters, Keystone pneumatic bell ringer, sander and valves, protected rail bonds, Keystone overhead material, improved St. Louis trolley pick-up, Lyon reinforced steel gear cases, sheet steel tool boxes. Represented by Chas. J. Mayer, J. W. Porter, Max A. Berg, J. V. E. Titus, E. R. Mason, Thos. H. Henkle, C. E. Ewing, G. W. Cox, M. S. Earl. Phone Champa 90, Branch 57.

Electric Traction Supply Company, St. Louis, Mo., Spaces 207-213—Overhead line material for plain and catenary construction; high tension porcelain insulators; Recording Register and Farebox Company's printing registers and P. A. Y. E. and the cash-fare boxes. Banner Electric Company's high efficiency tantalum railway lamps; Van Dorn & Dutton Company's gear pinions; Van Dorn Electric Company's armature and field coils; Bird folding fenders and automatic wheel guards; Brann car replacers; G. & S. wheel-press jog. Represented by O. W. Uthoff, Ernest Boehme, Nat Fallek, E. C. Veshlage. Phone Champa 90, Branch 60.

Emery Pneumatic Lubricator Company, St. Louis, Mo., Space 410—Emery pneumatic lubricators for traction service, automatic freight equipment and passenger cars; also several forms of lubricants. Represented by E. L. Adreon, E. A. Emery, R. E. Adreon, C. P. Cass, F. P. Livingston.

Eureka Tempered Copper Works, North East, Pa., Space 402—Commutators, commutator bars, trolley wheels, bearings, controller parts, brush holders, line material, wire stretchers. Represented by O. C. Hirtzel, Fred Rundell.

Felt & Tarrant Manufacturing Company, Space 717—Calculating machines. Represented by W. B. Plettner.

Fertig, Charles T., Colorado Springs, Colo., Space 627—Automatic fusible lightning arresters. Represented by O. E. Collins, C. T. Fertig, C. B. Garnett, A. Elliott Hart, Andrew Reid.

Flood & Conklin, New York, N. Y., Space 721—Reception room.

Ford & Johnson Company, Chicago, Ill., Space 607—Car seats, cane webbing. Represented by E. Morris, B. H. Forsyth, C. A. Van Derveer.

Forsyth Bros. Company, Chicago, Ill., Spaces 212, 263—Doyle steel post for wood and steel cars; Forsyth metal sash with adjusting shoe; Hedley anti-telescoping device. Represented by A. L. Whipple, A. H. Sisson.

Forsyth Steel Tie Company, operating Pittsburg Pole &

Forge Company, Pittsburg, Pa., Spaces 78, 181—Forsyth steel tie, Verona seamless trolley pole, Pittsburgh standard span wire pole, Pittsburgh steel insulator pin. Represented by W. D. Forsyth, B. D. Foster, Parker Biggert.

Galena-Signal Oil Company, Franklin, Pa., Spaces 68-74 and 171-177—Reception room. Represented by Geo. A. Barnes, L. J. Drake, Jr., W. A. McWhorter, E. H. Baker, H. C. Mason, J. V. Smith, C. H. Thomas, W. O. Stieff, C. L. Richards, Robt. McVicar, Alfred Green, Mr. Lemon, Geo. J. Smith, C. E. Schauffler, Mr. Toppan, Wm. Walsh, E. N. Hedley. Phone Champa 90, Branch 6.

General Electric Company, Schenectady, N. Y., Spaces 2-14, 101-113—Type M control equipment; complete emergency straight-air brake equipment for motor car and trail car; New York variable release motor car air brake equipment; railway motors; aluminum cell lightning arresters; Magnetite arc headlights; indicating and recording steam meters; air compressors; A. C. railway signal system; complete line of rail bonds and line material. Represented by F. H. Gale, J. G. Barry, H. N. Ransom, W. G. Carey, C. E. Barry, E. D. Priest, F. E. Case, A. H. Armstrong, S. W. Trawick, W. J. Clark, C. B. Keyes, T. Beran, H. G. Geier, R. E. Moore, H. L. Monroe, J. W. Buell, G. D. Rosenthal, C. C. Peirce, H. M. Winter, A. W. Arlin, A. V. Thompson, C. W. Blivin, H. C. Marsh, W. J. Hanley, Irving Hale, G. A. Woolley, H. C. Glaze. Phone Champa 90, Branch 9.

Gest, G. M., New York, N. Y., Space 29—Cable racks. Represented by H. H. Stannard.

Globe Ticket Company, Philadelphia, Pa., Space 233—P. M. coupon transfers, books, cash fare receipts, strip tickets, one-way and round trip tickets. Represented by P. C. Snow, R. C. Osman.

Goldschmidt Thermit Company, New York, N. Y., Spaces 71, 73, 75—Thermit rail joints, compromise joints, Thermit solid-section joint, welded motor cases and pipes, various metals produced free from carbon by Thermit process. Represented by George E. Pellissier, H. S. Mann, L. Heynemann.

Griffin Wheel Company, Chicago, Ill., Spaces 41-45—Chilled iron car wheels and axles. Represented by C. K. Knickerbocker, J. O. Ferguson, W. H. Dickinson, C. F. Kopf. Phone Champa 90, Branch 14.

Gulick-Henderson Company, Pittsburg, Pa., Space 609—Reception booth. Represented by Henry Gulick, W. O. Collins.

Hale & Kilburn Manufacturing Company, Philadelphia, Pa., Spaces 312-314-365—Electric railway car seats of several patterns, including those adopted for 700 new cars of the Chicago Railways Company; steel doors and steel window sash; rattan canvas-lined seat covering. Represented by H. T. Bigelow, A. F. Old, C. W. Laskay.

Handlan-Buck Manufacturing Company, St. Louis, Mo., Space 140—Switch lamps, markers, semaphore lamps, lanterns, oilers, engine lamps, bells, Yale & Towne chain hoists, metal signal flags, machine tools, lock washers. Represented by H. O. Rockwell, A. H. Handlan, Jr.

Hendrie & Bolthoff Manufacturing & Supply Company, Denver, Colo., Space 80-183.

Hess-Bright Manufacturing Company, Philadelphia, Pa., Space 126—Ball bearing G.E. 74 motor 65-h. p. that has been in constant daily use during the last year on the Schenectady Railway, in operation at booth; ordinary babbitt bearing G. E. 74 motor in operation at booth. Photographs of railway cars and motors employing ball bearings on various railway systems. Represented by Cyril J. Hopkins, H. E. Brunner.

Heywood Brothers & Wakefield Company, Wakefield, Mass., Spaces 38, 137—Car seats. Represented by Bertram Berry.

International Register Company, Chicago, Ill., Spaces 134, 136, 138—International fare and recording registers, coin receiver and register, register fittings, trolley and bell cord, conductors' punches, Heeren badges. Represented by Arthur H. Woodward, John Benham, Wm. G. Kirchhoff.

Ironsides Company, The, Columbus, O., Space 709—Gear shield, wire rope shield, paint, torrnay oilers. Represented by James L. Bone, D. J. Holliger, Homer C. Smith, E. R. Carter.

Jeandron, W. J., New York, N. Y., Space 351—Carbon brushes. Represented by W. J. Jeandron, E. S. Taylor.

Johns-Manville Company, H. W., New York, N. Y., Space 152—Porcelain insulators, transite asbestos wood, low-voltage overhead line material, catenary line material, moulded insulations, indurated fiber forms for third-rail protection, high-voltage oil-switch tanks and fiber conduit, Noark enclosed fuse and service boxes, fuses and devices for high and low-voltage service, J-M guy anchors and mine supplies, friction tape and rubber compounds, asbestos and magnesia pipe and boiler coverings, packings, linolite, desk and table lamps. Represented by J. W. Perry, George A. Saylor, A. H. Pierick.

Kenfield-Fairchild Publishing Company, Chicago, Ill., Space 102, 104—Represented by H. J. Kenfield, George S. Davis, W. J. Field, R. M. Standish.

Kerite Insulated Wire & Cable Company, New York, N. Y., Spaces 414, 416—Insulated wires and cables for A. C. and D. C. feeders, transmission, signals, telephone, telegraph, car wiring, and car house wiring. Represented by R. D. Brixey, Azel Ames, P. W. Miller, J. A. Renton J. V. Watson, B. L. Winchell, Jr., R. E. Butterick.

Lang Retrieving Trolley Company, Petaluma, Calif., Space 703, 705—Retrieving trolley base. Represented by C. E. Lang, H. H. Oellig, J. E. Bowers.

Lorain Steel Company, Philadelphia, Pa., Spaces 42, 44, 46, 48, 141, 143, 145, 147, 149—Girder rails, high tee rails, special track work, electrically welded joints. Represented by P. M. Boyd, F. J. Drake, E. B. Entwisle, H. C Evans, Wm. W. Kingston, H. F. A. Kleinschmidt, A. S. Littlefield, S. P. McGough, H. C. Stiff, A. L. Verner. Phone Champa 90, Branch 3.

Massachusetts Chemical Company, Walpole, Mass., Space 114—Liquid and rubber insulating specialties, as armalac, enamelac, friction tapes, splicing compounds, filling compounds, cement; moulded rubber specialties, as motor bushings, pump valves, car-seat bumpers, field coil cushions, switch rubbers, brake rubbers. Represented by L. O. Duclos, A. E. Duclos, E. W. Furbush.

McConway & Torley Company, Pittsburg, Pa., Spaces 318, 320, 322, 371, 373, 375—Janney radial equipment for interurban cars. Represented by Stephen C. Mason, E M. Grove, H. C. Buhoup, I. H. Milliken.

McCord & Company, Chicago, Ill., Space 148—McCord journal boxes; McCord spring dampener; McKim copper asbestos gaskets; National equalizing wedge. Represented by Clive Runnells, D. J. McOsker, Morrell Dunn.

McGuire-Cummings Manufacturing Company, Chicago, Ill., Space on tracks of Denver & Inter-Mountain Railroad Company—Two double-truck sweepers, one double-truck passenger car. Represented by John J. Cummings, W. J. Cooke, W. H. Stevenson, C. T. Biddison.

Meyer Safety Guard Company, Omaha, Neb., Spaces 600, 602—Full sized models of pay-as-you-enter car and open car with Meyer safety guard attached. Represented by Martin Meyer, E .W. Gwynne-Vaughan, Otto Baysdorfer.

Midvale Steel Company, Philadelphia, Pa., Space 239—Reception booth. Represented by W. P. Barba, James C. H. Ferguson, Ernest Harrah, W. J. Patterson, Stuart Hazelwood, F. S. Remhold. Phone Champa 90, Branch 62.

Nachod Signal Company, Philadelphia, Pa., Space 409—Signal for trolley roads, Nachod automatic signal. Represented by Carl P. Nachod.

National Brake & Electric Company, The, Milwaukee, Wis., Spaces 350-358—New semi-automatic air brake equipment for motor cars and trailers, mounted as a working exhibit. 3VS air compressor driven by d.c. motor and combined automatic controlling apparatus which embodies an automatic starter, unloading device and governor; portable air compressor outfit; automatic governors and motorman's valves; repair parts for National air brake apparatus; a National air compressor sectioned so as to show details, operation and the ready accessibility of all parts. Represented by R. P. Tell, S. I. Wailes, C. N. Leet, W. H. Goble, W. N. Bisel, J. J. Nef, B. S. Aikman, J. J. Riley, G. W. Johnstone, W. J. Richards, C. W. Chase.

National Brake Company, Buffalo, N. Y., Space 112—Ackley adjustable brakes and Peacock brakes. Represented by G. S. Ackley, W. D. Brewster, F. D. Miller, J. C. Raymond, Alphonso Wigmore.

National Carbon Company, Cleveland, Ohio, Space 372—New Laclede railway motor brushes, also Columbia, National high grade Partridge, high-grade Partridge Perfection and other railway motor brushes, special graphite brushes, standard pig tail brushes, Columbia

dry cells, railway signal dry cells, head-light carbons, turbine rings. Represented by W. B. Brady, O. T. Weaver, F. D. Kathe, F. J. Kysela.

National Lead Company, St. Louis, Mo., Space 108—White lead, babbitt metals, solders, metal compositions, raw materials. Represented by J. B. Mendenhall, W. B. Sale, E. A. de Campi.

National Lock Washer Company, Newark, N. J., Spaces 142, 144—Car curtains, curtain fixtures, sash locks, sash balances, window fixtures, lock washers. Represented by F. B. Archibald, John B. Seymour.

New Tone Company, Denver, Colo., Space 603—New Tone preservative, a transparent preparation to be used for refinishing the varnish, paint and metal surfaces on passenger cars. Represented by E. H. Newton, M Pfeffer.

New York Pole Company, New York, N. Y., Space 29—Reinforced trolley pole. Represented by H. H. Stannard.

Nichols, A. O., Omaha, Neb., Space 417—Street car signal warning of approaching car on parallel track. Represented by A. O. Nichols.

Niles-Bement-Pond Company, New York, N. Y., Spaces 61, 69—Niles lathe for turning street car wheels. Represented by Edward L. Leeds, D. H. Teas. Phone Champa 90, Branch 18.

Ohio Brass Company, Mansfield, Ohio, Spaces 47-59—Trolley hangers, ears and clamps, catenary fixtures, mine trolley fixtures, rail bonds, automatic car couplers, pneumatic sanders, electric car signals, third-rail insulators, high-tension procelain insulators. Represented by C. K. King, A. L. Wilkinson, L. W. Olson, E. F. Wickwire, G. A. Mead, N. M. Garland, J. E. Slimp, F. V. Cook, E. C. Brown, F. E. Johnson, R. J. Deneen, F. S. Deneen, G. W. Cooper, C. H. Tomlinson and A. L. Price. Phone Champa 90, Branch 4.

Ohmer Fare Register Company, Dayton, Ohio, Spaces 15, 17, 19, 21, 23, 25—Registers for street and interurban railway cars, including new machines for the indication and registration of from one fare up to 60 classes of fares; operating devices and registers for use in pay-as you-enter or pay-within cars. Represented by John F. Ohmer, J. H. Stedman, John P. Breen, C. W. Ketteman, C. V. Funk, J. C. Liggett, Edward Seebers, P. F. Buckley, R. D. Buckley, E. R. Diehl.

Onderdonk Engineering Company, Denver, Colo., Space 174—Model of horizontal B. & W. boiler, asbestos packing, two types of boiler heads, valves, tie plates, and other engineering specialties. Represented by Charles Onderdonk, William Turner, F. A. Einfeldt, Harry Byer.

Pantasote Company, The, New York, N. Y., Spaces 405-407—Pantasote car curtains; Agosote for head linings, panels, etc. Represented by W. A. Lake, W. S. Barrows, John M. High.

Pay-As-You-Enter Car Corporation, New York, Space 180-184—Two sections of the pay-as-you-enter car; one illustrating the type used in Chicago, the other the Third avenue, New York. Represented by T. W. Casey, A. J. Varrelmann, David Murdoch. Phone Champa 90, Branch 8.

Pennsylvania Steel Company, Steelton, Pa., Maryland Steel Company, Philadelphia, Pa., Spaces 157-169, 54-66—Parts of several special work lay-outs built for the Denver City Tramway Company, including pinless tongue switches, renewable hard-center Manard frogs and mates; Manard hard-center steam railroad frog; New Century switch stand, Positive switch stand, main line switch stand, solid Manard crossing, Manard reinforced crossing; No. 20 reinforced Manard frog, locking spring box for tongue switches, B. & I. box, Gem box and automatic box; permissive and positive tongue locks for tongue switches; Manard concaves, mantles and heads for ore crushing machinery; Titanium, nickel, chrome and low phosphorus high carbon open hearth rail sections, and sample of rolled Manard (improved manganese steel) rails; Automatic stereoptican showing views of the various mill operations in the manufacture of special track work, rails and other products. Represented by H. F. Martin, Charles C. Clark, John C. Jay, Jr., R. C. Hoffman, Jr., William C. Cuntz, H. B. Green, C. E. Irwin, N. E. Salsich, Drew Allen, Bent Weaver, G. S. Vickery, William H. Henderson, W. R. Miller, Robert E. Belknap. Phone Champa 90, Branch 5.

Pittsburgh Pole & Forge Company, Pittsburg, Pa., Space 78, 181—(See Forsyth Steel Tie Co.)

Planet Company, Chicago, Ill., Space 374—Eclipse curtain fixtures, planet babbitt metal, Schroson journal bearing. Represented by T. P. Convey, H. J. Summers.

Rail Joint Company, New York, N. Y., Spaces 156, 158—Continuous, Weber and Wolhaupter rail joints for T, high T and girder rails, both standard and compromise. Represented by F. C. Webb, J. A. Greer, W. T. McCaskey, W. E. Clark, E. L. Vandresar, P. D. Watson.

Roebling's Sons Company, John A., Trenton, N. J., Space 31—Reception room. Represented by A. B. Conover, W. H. Slingluff, J. McG. King.

Scott & Company, J. F., Highland Park, Ill., Space 723—Scott combination hanger and ear, flexible mesh rail bonds, H. B. Clark section breaker skate. Represented by J. F. Scott.

Scully Steel & Iron Company, Chicago, Ill., Space 245—Simplex jacks. Represented by B. A. Ragan, A. E. Barron.

Sherwin-Williams Company, The, Cleveland, O., Space 314—Paints and varnishes for railway use. Represented by E. M. Williams, Henry E. Billau, F. A. Elmquist, E. Donnely, L. W. Cole.

Smith Heater Company, Peter, Detroit, Mich., Space 27—Nos. 1-C, 2-C and 3-C Peter Smith magazine hot-water heater, No. 2-P-2 Peter Smith forced-circulation hot-air heater. Represented by Daniel W. Smith, Elmer J. Smith, M. J. Phelan. Phone Champa 90, Branch 17.

Speer Carbon Company, St. Marys, Pa., Space 110—Motor and generator brushes of all kinds. Represented by J. S. Speer.

Standard Brake Shoe Company, Aurora, Ill., Space 400—Brake shoes. Represented by C. P. Wright, F. C. Peck.

Standard Motor Truck Company, Pittsburg, Pa., Spaces 608-614—City and suburban type O-50 short wheel-base double truck, 50,000 lb. capacity; C-60 Interborough type high speed double truck, 60,000 lb. capacity; five sample forged steel wheels made by the Forged Steel Wheel Company. Represented by A. W. Field, W. G. Cory, W. G. Price.

Standard Paint Company, New York, N. Y., Space 404—Reception room for explaining and recommending P. & B. and S. P. C. varnishes, compounds and insulating tape; also Novac compound for impregnating coils, without the aid of a vacuum. Represented by Charles E. Smith, Bernard C. Beckman, John H. Thomas, J. I. Pfeiffer. Phone Champa 90, Branch 55.

Standard Steel Works Company, Philadelphia, Pa., Spaces 36 and 135—Reception booth. Represented by H. de H. Bright, F. W. Weston, E. S. Lewis, C. H. Peterson, C. H. Dodson, C. a'Becket.

Standard Varnish Works, Chicago, Ill., Space 382—Insulating specialties. Represented by L. Robinson, H. P. Salmon and local representative.

Star Brass Works, Kalamazoo, Mich., Space 364—Kalamazoo trolley wheels and harps, Root track scrapers. Represented by F. P. Crockett, F. N. Root.

Sterling Varnish Company, Pittsburg, Pa., Space 418—Insulating materials and metal protective paints. Represented by A. S. King, W. F. Hebard, W. V. Whitfield.

St. Louis Malleable Casting Company, St. Louis, Mo., Spaces 621, 623—Malleable iron specialties, Way cross-arm attachment, high tension pins, telephone and telegraph pins, service brackets, O. K. pole anchors, malleable iron feeder arms, wood strain insulators, malleable trolley line material, expansion bolts and malleable iron washers. Represented by R. H. Manwaring, W. A. Manwaring, Duncan Bond.

Stromberg-Carlson Telephone Manufacturing Company Rochester, N. Y., Spaces 34, 133—Telephone apparatus and railway signaling apparatus. Represented by A. M. Hanbrich, H. W. Lucia, C. P. Button.

Symington, T. H., Company, Baltimore, Md., Spaces 40, 139—Journal boxes, dust guards, ball center bearings. Represented by C. J. Symington, D. Symington, W. W. Rosser. Phone Champa 90, Branch 19.

Taylor Electric Truck Company, Troy, N. Y., Spaces 604 606—Electric car trucks, elliptic and coil springs and T. M. C. steel tired wheels. Represented by John Taylor, C. H. Dodge.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio., Space 227—Hardened gears and pinions. Represented by C. E. Sawtelle.

Traction Lubricating Company, Chicago, Ill., Space 622—Solidified oil mixed with wool waste, especially pre-

pared, for use on armature and motor axle bearings. Represented by D. W. Kimball, C. L. Kimball, H. F. Kimball.

Transfer Issuing Machine Company, Boston, Mass., Space 625—Transfer issuing machine. Represented by N. C. Smith.

Transportation Equipment Company, New York, N. Y., Space 711—Fare box as used on 300 cars of the Metropolitan Street Railway of New York City. Represented by Robert C. Adams.

Trolley Supply Company, The, Canton, Ohio, Spaces 162, 164—Peerless roller and National roller and ball bearing trolley bases, Knutson No. 2 and Peerless retrievers, Ideal catcher, Star and Climax headlights, semaphore dash headlight. Represented by J. E. McLain, Jos Hollis.

Under-Feed Stoker Company of America, The, Chicago, Ill., Space 412—Reception booth and printed matter regarding the Jones stoker. Represented by Gilbert Wilkes & Company, Denver representatives; C. H. Thomas, D. Hunter, Jr.

U. S. Wood Preserving Company, New York, N. Y., Spaces 82 and 185—New and old wood block pavement for street car tracks. Represented by Alexander Reed, H. B. Langan.

Van Dorn Company, W. T., Chicago, Ill., Space 146—Various sizes of Van Dorn coupler heads and draft gears including M. C. B. couplers. Represented by W. T. Van Dorn, H. E. Van Dorn.

Wagner Electric Manufacturing Company, St. Louis, Mo., Space 154—Wagner single-phase motor, skeleton governor mechanism of single-phase motor; Wagner "moral-ameter," an entertainment feature. Represented by Walter Robbins, Frank N. Jewett, Ray D. Lillibridge, O. H. Davidson. Phone Champa 90, Branch 15.

Western Electric Company, New York, N. Y., Spaces 118, 120, 122, 124—Railway telephones, portable telephone sets, bells, buzzers and batteries, Electrose insulation, strain insulators, Ideal cap and cone hangers, line and over-head construction material, armature and field coils, Kalamazoo trolley wheels, harps and sand boxes. Represented by F. C. Killion, R. H. Harper, W. E. Harkness, M. H. Nichols, C. L. Howk, A. Brown, H. C. Biglin, H. Olsen. Phone Champa 90, Branch 1.

Western Elaterite Roofing Company, Denver, Colo., Space, Box between Spaces 418 and 419—Elaterite car roofing. Represented by E. J. Yetter.

Westinghouse Companies, Pittsburg, Pa., Spaces 250-268 and 301-319—A 60-ton interurban car of the Denver & Interurban Railway, equipped with unit switch control and four 125-horsepower motors, and designed to operate on 11,000-volt a.c. and 600-volt d.c., a 15-ton mining locomotive, a 25-kw turbo-exciter set, a No. 5 Westinghouse-Leblanc condenser with motor-driven air and water pump; line and trolley material, catenary construction, poles; car circuit-breakers, arc headlights, multiple-unit switch control apparatus, train connectors, gears, traction brakes, lightning arresters, interpole railway motors, types CCI, DA, HF and SA motors; series, 110-volt and "W" and "V" sign tungsten lamps. Represented by Jos. R. Ellicott, Chas. Ellicott, S. D. Hutchins, S. J. Kidder, W. M. McFarland, A. L. Humphrey, N. W. Storer, Thomas Cooper, E. L. Adreon, E. H. Sniffen, C. Kyle, T. J. McGill, J. A. Brett, Q. W. Hershey, C. W. Register, J. L. Tuttle, Horace Clarke, C. Olmstead, C. C. Chappelle, L. L. Brinsmade, G. O. Noble, E. H. Heise, A. A. Miller, E. A. Craig, W. S. Bartholomew, W. V. Turner and J. C. McQuiston. Phone Champa 90, Branch 52.

Wharton, Jr. & Company, Wm., Inc., Philadelphia, Pa., Spaces 300-306, 353-359—Wharton H. C. switches, mates, frogs and crossings (girder and high T-rail), of solid manganese and manganese steel centre construction, manganese steel rail and pointed split switch, restored manganese steel frog; also tongue locks, spring boxes, switch stands and views of track layouts furnished different roads. Represented by V. Angerer, L. R. Ashhurst, Jr., R. C. McCloy, Arthur S. Partridge, W. McLain, J. C. Robinson, Joseph Cavanaugh. Phone Champa 90, Branch 53.

Wheel Truing Brake Shoe Company, Detroit, Mich., Space 225—Abrasive brake shoes for grinding car wheels Represented by J. M. Griffin, F. F. Griffin.

Whitmore Manufacturing Company, Cleveland, Ohio, Space 415—Gears and pinions that have been in service on eastern and western roads showing exceptional service and mileage lubricated with Whitmore's gear protective composition, Whitmore's gear protective composition, Whitmore's journal oil, Whitmore's compressor oil. Represented by S. W. Whitmore, Henry Stuckenholt, W. M. Lawyer. Phone Champa 90, Branch 57.

Wilson, George, Pasadena, Cal., Space 401—Wilson's continuous railway rail joint. Represented by George Wilson.

Wonham, Magor & Sanger, New York, N. Y., Space 241—"H. B." life guard. Represented by George E. Willis, Ralph Sanger, H. A. Goode, R. V. Collins.

Wright Wrench Manufacturing Company, Canton, Ohio, Space 700—Patent quick adjustment monkey wrenches, automobile wrenches and pipe wrenches. Represented by J. F. Wright.

Wyoming Yarn Company, Wyoming, R. I., Space 415—Samples of "Wypak" journal packing. Represented by E. M. Tillinghast.

The electric fountain at the City Park will play at 8 o'clock on Tuesday, Thursday and Friday evenings. City Park is at the end of Colfax Avenue and can best be reached by a Colfax Avenue car.

* * *

Harold P. Brown, New York, is making an interesting exhibit at space 130. He is showing his new electro-pneumatic bond chisel as used to secure a better and larger rough surface for the application of his well-known plastic alloy than is possible by hand filing. The non-rusting quality of this alloy is proved by a specimen joint cut out from a main line track of the Denver Tramway Company's system after six years' service. Mr. Brown is also showing an electrical rail joint drill, rail grinder, motorman's mirror and a complete testing set for demonstrating the conductivity of the plastic rail bond. This testing set comprises a motor-generator outfit, switch board, measuring instruments and a sample rail joint installation.

* * *

The pleasure of the trip on the special train over the New York Central and Rock Island from New York to Denver was enhanced by the thoughtfulness of the representatives of the Wagner Electric Manufacturing Company, who were numbered among the passengers. On entering the train at New York each member of the party was presented with an artistic little booklet giving the name of each person on board the train, the point at which they intended to board the train, the number of the car and berth reserved for each and the company which they represented. The book was of great assistance in enabling those on the train to locate their friends and to become acquainted with their neighbors. The booklet also contained an announcement that upon request the stewards in the dining cars would provide without charge to each guest at dinner on both evenings a "Wagner, Quality" cocktail. After dinner "Wagner, Quality" cigars were distributed. Each of the ladies on the train was presented with individual boxes of chocolates. Similar boxes of chocolates were given the ladies on the Boston train. Another feature of the New York trip contributed by the representatives of the Wagner Company was the taking of a photograph of the entire party on Saturday at Goodland. If these photographs are satisfactory when developed prints may be secured during the week at the Wagner exhibit in Space 154.

Edward Hungerford of the Brooklyn Rapid Transit Company will be one of the lecturers who will address the class in journalism which the Twenty-Third Street branch of the Y. M. C. A. of New York will conduct this winter. Mr. Hungerford was at one time a member of the editorial staff of the New York Sun. Many magazine and newspaper editors will also address the class, among them Chester S. Lord, managing editor of the New York Sun, and Alexander Black, editor of the New York Sunday World.

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Of this issue of the ELECTRIC RAILWAY JOURNAL, DAILY EDITION, 10,000 *copies are printed.*

President Shaw's Address

The address of President Shaw delivered yesterday was followed with close attention by those present. While longer than those customarily presented at annual meetings of the associations it would be difficult for even the most captious critic to suggest a place where it could have been shortened. Logically, it can be divided into three parts; (1) A brief statement of the reasons for meeting at Denver; (2) A discussion of national issues and of the conditions of the industry at large; (3) The condition of the association. Each of these demanded attention and the remarks on each give food for thought.

The first part of Mr. Shaw's address contains a reference to the interest taken in association matters by the officials of The Denver City Tramway Company and its predecessors which teaches a lesson. There may be some companies in the East which can furnish as good a record for attendance at conventions as that of Denver, but there are not many. None, we believe, can show such a performance in distance traveled to attend meetings of the associations. It was certainly a duty which the association owed its loyal Western members to hold a convention nearer their home than has been done during the past 27 years, and it is equally a duty not to let so long a time elapse before re-visiting the far West.

The significant remarks of President Shaw on the conditions of the industry and on national issues cover so wide a field as to preclude detailed consideration here, but they are all worthy of the most careful thought. His comments, especially, on the income and corporation tax, awakened the greatest interest, while his remarks on the favorable financial condition of the association were received with applause.

In his analysis of the affairs of the association, President Shaw touched upon a subject which is, of course, of the greatest interest to every delegate who had the privilege of listening to it. Often in years past the question has been asked: "Of what value is the association and is it increasing or decreasing in usefulness?" These questions have been raised less frequently in recent years by those who are acquainted with the work of the association, but it is perhaps only natural that since the establishment of a New York office by the association, and especially this year, on account of the length of the trip to Denver for most companies, they should have been asked by some in elucidating these points. President Shaw took occasion to review briefly the history of the association, and showed that while it has had its fluctuations of prosperity and membership, the progress has always been consistently forward. During the last year it has gained greatly in both active and associate membership, as well as in value of the work accomplished, and the goal set of 750 active members and 5000 associate members does not seem so impracticable as it might have two or three years ago.

Report of the Committee on Education

The ideal professional man, whether he is a lawyer, physician or engineer, knows thoroughly both the technical, or scientific, and the practical side of his calling. Experience has shown that he can learn either first, but that he cannot be considered fully informed in his chosen field until he has acquired a knowledge of both sides of his work. If he begins with the practical side, he should later acquire a knowledge of the underlying laws which control the phenomena which he has already learned to understand. If he elects to learn these principles first, he must subsequently become conversant with their practical application.

The committee on education was appointed to determine the best method of developing men for the higher positions in the electric railway service, and its report last year was devoted to outlining a course by which the technical graduate could study in the school which is taught by experience. As a result it recommended the establishment of individual apprenticeship courses, which since have been inaugurated by several companies. Its report this year gives some particulars of the results secured by the adoption of this plan by several companies, but is devoted principally to the second phase of the work, that of making the practical man technical. To this end, it suggests a correspondence course somewhat along the line followed by the American Gas Light Association, which has already been described in these pages, and was mentioned by Professor Norris last year.

There may be a difference of opinion as to which method should be most productive of good, but there can be none tnat each is necessary, if all of the available human material which will be required by the electric railways of the country in the future is to be utilized. All of the most successful generals of the army have by no means been graduated from West Point, nor could all of the most prominent admirals in this country claim Annapolis as their alma

mater. Natural ability is bound to assert itself, and it is not only a duty which the railway companies owe to their men to give them the opportunities which they need for self-improvement, but it is obligatory on them to offer avenues of advancement equal to those in other lines of industry, if the electric railways expect to attract men of ability to their employ. It may be argued that the establishment of apprenticeship and instruction courses involves considerable labor and some expenditure of money, and that little benefit is derived if, after a company goes to the trouble of educating a man, he leaves its employ and enters that of another road. This is a risk which must be taken in every business. But if the work is conducted primarily by the association, individual loss in cases of this kind is limited, and what one company loses, another gains. Moreover, it is safe to say that while some men are afflicted with a wanderlust, most would prefer to remain with a company with whose methods they are familiar, unless there is considerable inducement to change.

The number of college professors on the committee on education makes the third of its conclusions particularly interesting; namely, "that by adopting the educational process, the companies will produce a reflex action upon the schools and will influence them in improving their methods." This growing community of interest between the schools and the practical business is a very healthful sign. It is only within a few years that the representatives of the leading educational institutions of this country have considered it worth their while to attend railway conventions. Up to that time neither the colleges nor the railway companies thought they could secure much, if any, benefit from the other, but the bond of connection between theory and practice is growing closer, as it should, and as the colleges are becoming better acquainted with the needs of the companies, so the latter are adopting methods more closely approximating university standards. In fact, there is a general acceptance of the doctrine that each is a proper complement of the other.

Mr. Gonzenbach's Paper

The phase of Mr. Gonzenbach's paper which elicited the greatest discussion was where he advocated a scientific organization for a small road, rather than a "one man" management. As he truly said the latter may for a considerable time be the easier and cheaper, but if the "one man" suddenly becomes incapacitated the chances are that the resulting loss will be greater than if each important official had been training a subordinate to assume the more important of him own duties in case of emergency. Another point emphasized in the paper was the value of the training in electric railway operation, afforded by service on a small road. Possibly some of his views on this point would hardly be considered orthodox by the colleges. Nevertheless, there is no doubt that the man on the small electric railway who is thrown on his own resources will develop ingenuity if he has any to speak of; and as successful electric railroading consists very largely in the solution, not of old problems, but of constantly recurring new ones, the man with resources will win out where he who depends entirely on routine will fail.

One application of this truth lies in the recognition of ability to carry out successfully a definite task, rather than mere experience. A man who has "made good" in one department of a company, has organized his forces to carry on the work assigned to him and has conducted what has been given him to do efficiently and economically, is often as good a man, if not better, as the head of another department with a more responsible position, than an outsider. The latter may have a reputation for having accomplished certain results under certain conditions but his ability to do as well under entirely different conditions has not been demonstrated, and he certainly is less acquainted with the system and the public with which he will have to deal than the successful chief of the subordinate department.

Report of the Committee on Way Matters

The report of the committee on way matters is devoted this year entirely to the subject of rails, their section and composition, although a large variety of phases of these two topics is considered. No change is made in the standards recommended for grooved or girder rails, but a slight change is suggested in the form of the 7 in. T-rail recommended by the committee as standard for heavy service in paved streets. In this connection the committee takes occasion to recommend strongly the use of T-rails in paved streets, except in cities of the largest class where a dense vehicular traffic makes the use of a flanged rail advisable.

The question of material is next considered. Only thirteen companies of those reporting have tried open-hearth rails, but the results secured on steam roads and abroad from rails of this process of manufacture have been such as to recommend their adoption to the committee.

The use of open-hearth steel instead of Bessemer steel for rails is comparatively new in this country and its marked superiority for high T and girder sections, according to several speakers, is still to be demonstrated. The demand for it began about two years ago when the steam railroads became alarmed over the increasing number of breakages of rails, and the open-hearth process was recommended in quarters as a possible means of improvement. As a result some quarters as a possible means of improvement. As a result of the agitation for better rails the steel manufacturers were practically forced into changing their process of making rail ingots for the most part from Bessemer to open-hearth. The demand for open-hearth T-rail from the steam roads has led to a demand for open-hearth girder rails also. The Bessemer process is especially suitable for making low-carbon steel, but it is generally acknowledged that the open-hearth process produces steel of more uniform composition throughout each heat. It is also easier to control the uniformity of chemical composition of several successive heats in the open-hearth furnace. The causes of failure of steam railroad rails are usually segregation, which causes brittleness, or inherent flaws due to pipes in the ingot from which the rail was rolled.

Under the heavy axle loads of steam railroad practice rails break due to the stresses produced in them when acting as a beam, and also to the shock of impact. Flaws or brittleness are fatal to the life of rails in this service. In street and interurban railway track, however, the conditions are entirely different. The extreme axle loads are less than 15 tons as against 22 to 25 tons and in heavy girder rails the unit stresses for the same imposed load are less, owing to the larger section modulus. Street railway rails wear out by abrasion before they break. The principal advantage if any, of the open-hearth process over the Bessemer process for girder rail would seem, therefore, to be the possibility of producing uniform steel with a high carbon content and good wearing qualities. The difficulty of rolling complex girder rail sections in high carbon steel is recognized by all metallurgists and as eminent an authority as Dr. C. B. Dudley of the Pennsylvania Railroad long ago pointed out the desirability of keeping the carbon within reasonable limits.

One electric railway company only of those reporting has used manganese rails in places other than in special work. No results are given, but the use of the rail for straight track is so new that the specifications given by the committee for manganese rails will attract attention. The report concludes with a mathematical discussion upon the design of the grooves in rails and of the proper track gage for curves.

CONVENTION PROGRAM FOR TODAY

American Association.

(AUDITORIUM HALL.)

2 P. M. to 5 P. M. (Executive Session.)

Appointment of Nominating Committee.
Reports of Committees.
(a) Interstate Commerce Commission Affairs.
(b) Compensation for Carrying United States Mail.

Accountants' Association.

(SAVOY HOTEL.)

9:30 A. M. to 12:30 P. M.

Convention Called to Order.
Annual Address of President.
Annual Report of Executive Committee.
Annual Report of Secretary-Treasurer.
Paper—"Interurban Statistics," by S. C. Rogers, Treasurer and Secretary, Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.
Report of the Committee on Interline Accounting.
Appointment of Convention Committees.
Appointment of Nominating Committee.
New Business.

1 P. M.

"Get-together Luncheon." (Place to be announced at Wednesday morning session.)

Engineering Association.

(ROSE PARLOR, AUDITORIUM BUILDING.)

9:30 A. M. to 12:30 P. M.

Report of Committee on Equipment.

2 P. M. TO 5 P. M.

Report of Committee on Power Generation.
Appointment of Nominating Committee.

Claim Agents' Association.

(METROPOLE HOTEL.)

9:30 A. M. to 12:30 P. M.

Discussion:
The Unreported Accident; Its Evils and Remedy.
General Business.
Reports of Convention Committees.
Report of Nominating Committee.
Election of Officers.
Installation of Officers.
Adjournment.

Transportation and Traffic Association.

(AUDITORIUM HALL.)

9:30 A. M. to 12:30 P. M.

Appointment of Committee on Nominations.
Report of Committee on City Rules.
Report of Committee on Transfers and Transfer Information.
Paper—"Transfer Laws and Suggested Changes," by Arthur A. Ballantine, Boston, Mass.
Paper—"Chicago's Transfer Crusade," by Joseph V. Sullivan, General Supervisor, Chicago Railways Company, Chicago, Ill.

Transportation and Traffic Association.

(AUDITORIUM HALL.)

9:30 A. M. to 12:30 P. M.

Unfinished Business.
Report of Committee on Training of Transportation Employees.
General Business.
Report of Nominating Committee.
Election of Officers.
Installation of Officers.
Adjournment.

Conventionalities

And to think that this magnificent exhibition of electric railway machinery and appliances is only for a week!

Like Chicago and other cities, Denver is planning a "civic center." The city issues a weekly paper, Denver Municipal Facts, and that tells all about the project.

George Stanton of the Cleveland Frog & Crossing Company is on hand, of course. Would the convention be complete without him? It would not!

One member of the old guard who is attending this convention is E. S. Goodrich, formerly president of the Hartford Street Railway Company, of Hartford, Conn. Mr. Goodrich was on the special train from Boston.

The Brooklyn Rapid Transit Company is represented at the convention by C. E. Roehl, electrical engineer; W. G. Gove, superintendent of equipment, and C. L. Crabbs, engineer of way and structure.

C. H. Morse and W. F. R. Mills, president and secretary, respectively, of the Denver Convention League, have won deserved praise for their painstaking efforts to make provision for every need of the large number of visitors.

The traction interests of Rochester and vicinity are well represented by W. R. W. Griffin and J. C. Collins, respectively general superintendent and secretary-auditor of the Rochester Railway Company; H. R. Martin, claim agent of the Buffalo, Lockport & Rochester Railway Company, and J. H. Stedman, the transfer man.

H. T. Edgar, manager of the Northern Texas Traction Company, Fort Worth; H. S. Potter, general superintendent of the El Paso (Texas) Electric Railway Company, and K. C. Schluss, superintendent of power of the Puget Sound Electric Railway, are three Stone & Webster men who apparently have to watch one another, for they keep together pretty closely.

The United Railways & Electric Company delegation from Baltimore is composed of the following gentlemen, who are staying at the hotels mentioned: N. E. Stubbs, auditor, Savoy; James R. Pratt, assistant general manager, Metropole; W. C. Ludwig, superintendent of transportation, Albany; A. T. Clark, acting superintendent, Adams.

How does Dubuque get along while L. D. Mathes, manager of the Union Electric Company of that city, is in Denver? Mr. Mathes knows more ways to cook a prairie chicken than any other man in the Mississippi Valley, but at present he is a little downcast because of the year's record of the Dubuque baseball club.

The Sioux Falls (N. D.) Traction Company has distributed at the convention copies of its paper published every little while under the title of "On The Cars." It is a cleverly edited sheet and serves as the official organ of the company. It contains information about the schedules of all the lines in Sioux Falls and many items of local news.

The friends of James Rawle, president of The J. G. Brill Company, and of S. M. Curwen, vice president of the same company, will regret to hear that their absence from this convention is due to deaths in their families. Both Mr. Rawle and Mr. Curwen have been familiar figures at the street railway conventions in years past, and their absence will be noticed.

A. W. McLimont, who rejoices in the titles and emoluments of treasurer, general manager and purchasing agent of the Chicago & Milwaukee Electric Railroad Company, is a most interested spectator and participant at the convention. Mr. McLimont was formerly electrical engineer of the New York Public Service Commission, District No. 1, in which position he was expected to go gunning without mercy after those bad, bad railway fellows. He is now one of the

hunted himself, but he doesn't seem to mind it. Apparently his experiences in South America and New York have inured him to almost anything.

H. G. McConnaughy of New York is one of the most active and energetic members of the exhibit committee. He seems to be ubiquitous.

Among the delegates from Philadelphia are noted the cheerful faces of F. H. Lincoln, assistant general manager, and W. S. Twining, chief engineer, of the Philadelphia Rapid Transit Company.

Just fancy one of those bright Denver reporters wandering around with a claim agent's badge! If it had not been for the eagle eye of Secretary Davis, who can spot a claim agent at 150 paces, said reporter might still be "among those present."

Who has the newest thing at the convention? He would be a rude man who attempted to answer that question, but the Dearborn Drug & Chemical people are distributing freely a little souvenir which is so new that it relates entirely to the future.

L. P. Sawyer, of Buckeye fame, arrived Tuesday morning from Cleveland. He was busy all day receiving the congratulations of his friends upon the recent arrival of "Sorry Junior." Ask him to tell you about the tantalum lamps on the Denver cars.

If there is a busier man at the convention than George Keegan, secretary-treasurer of the Manufacturers' Association, he will have to "go some." Mr. Keegan is the guide, philosopher and friend of the supply men—the chaps with the red badge of courage.

Texas is the Lone Star State, and, perhaps, that is the reason why the C. A. Wood Preserver Company of Austin is the only member of the Manufacturers' Association in that State. Herman F. Gebhard is the star who is representing that company at the convention.

Two of the big Ioway men of the convention—with the accent on the "big"—are F. J. Hanlon of Mason City, otherwise known as "the Little Cupid of Clear Lake," and P. P. Crafts of Clinton, respectively ex-president and president of the Iowa Street & Interurban Railway Association.

H. H. Polk, of Des Moines, is a pretty busy man managing his father's extensive estate, which owns among other things, a controlling interest in the Des Moines city and interurban lines. But when the lure of the convention was combined with the charms of Denver, he couldn't resist the call, and he came in the Iowa special.

The Westinghouse Companies are distributing through their bureau of publicity their regular annual diary for 1910, containing the usual amount of technical information for electrical and mechanical engineers; also a handy loose-leaf memorandum book. If you have not received one of these souvenirs ask for it at their booth.

Guides have been stationed at the power house, shops and car houses of The Denver City Tramway Company, who will take pleasure in showing visitors around. A cordial welcome is extended to all convention people. The office of S. W. Cantril, superintendent of transportation, is at "Central Loop," Fifteenth and Arapahoe Streets, and here, too, visitors are made welcome.

F. G. Bolles, in charge of the large Allis-Chalmers exhibit, is no novice in convention matters. Those who attended the Cincinnati convention of the National Electric Light Association several years ago will remember many courtesies extended at Norwood and elsewhere. Mr. Bolles is now commercial engineer of the Allis-Chalmers Company, with headquarters in Milwaukee.

Don't forget that the "Wishbone" sightseeing trip for the ladies comes this afternoon. This is a 51-mile trip in trolley cars "seeing the foothills." Cars will leave the Brown Palace at 2 o'clock. This is said to be the best short trip around Denver. A stop will be made at Golden, formerly the State capital, where the School of Mines will be inspected. The return trip will terminate at the "White City" barbecue. W. K. Beard, of the **Electric Railway Journal**, is the member of the entertainment committee in charge of the trip.

Numerous side-trips and after-trips are being arranged. A. G. Thornley, general manager of the Consolidated Fender Company of Providence, R. I., for instance, is anticipating an exceptionally pleasant time after the convention. Together with Mrs. Thornley he will go to the Pacific Coast and Seattle on the special tourist train organized by Charles S. Clark of the Boston & Maine Railroad.

A surveying party engaged in running lines between Denver and Pueblo on the Colorado Southern railroad, visited the convention halls on Monday. There were 17 in the party, among whom were D. S. Hooker, George F. Bidwell, Jr., Richard Bennett, Frank Egan, C. W. Saunders and Ezra M. Stutzman. The party came to Denver from Colorado Springs where the engineering corps is now located.

Major H. C. Evans of the Lorain Steel Company is not a stranger in Colorado. He formerly lived in Aspen, in Pitkin county, and he proposes to visit his old home before he returns to the East. He probably will not find many familiar faces, for at the time Major Evans was a resident of the State, 27 years ago, he and six other men who were prospecting for gold in the Gunnison country were about the only white men in the neighborhood.

The executive committee of the Manufacturers' Association meets daily at 12 o'clock at the entrance headquarters for the purpose of settling any matters in relation to exhibits that require attention. Careful and prompt attention is paid to any complaints or complications needing adjustment. Great credit is due to President Joseph R. Ellicott, Secretary George Keegan and Director of Exhibits K. D. Hequembourg for the efficient manner in which all business in connection with the exhibits is handled.

Somebody discovered Atkin looking longingly at the Rocky Mountains, and it turned out that he was trying to figure out some way of sailing his yawl among them. By Atkin is meant Godfrey H. Atkin, manager of the Chicago office of the Electric Storage Battery Company. Accompanying him are Mrs. Atkin and H. B. Marshall, manager of the St. Louis office, and R. L. Lunt and G. H. Morris of Chicago. Mr. and Mrs. Atkin will go to Colorado Springs after the convention, and stop in Kansas City on their way home.

J. McMillan, general manager of the Pacific Electric Railway and the Los Angeles-Interurban Railway, arrived on Tuesday. His system is one of the largest in the world. It operates over 600 miles of interurban track and has a magnificent twelve-story terminal building of which the company is justly proud. Mr. McMillan arrived with a cinder in his eye; an oculist had failed to remove either. The exhibits made Mr. McMillan open his eyes so wide the cinder fell to the ground, and the result was instantaneous relief.

There was some doubt as to whether the convention would be up to former standards until the arrival of W. Worth Bean of Benton Harbor, Mich. Mr. Bean holds the unique record of having attended every street railway convention, including the organization meeting in Boston in 1882. The present convention, therefore is the twenty-eighth which he has attended. He is very well pleased with the appearance of everything and says that the Denver convention is as good as any of the others. Since his sale of the St. Joseph & Benton Harbor Electric Railway several years ago Mr. Bean has not been actively engaged in electric railway work, but he is just as interested as ever in all improvements and developments. His many friends hope that he will attend the convention for many years to come.

TUESDAY MEETING OF THE AMERICAN ASSOCIATION

The first session of the American Street & Interurban Railway Association was called to order by President James F. Shaw at 2:30 p. m. on Tuesday, Oct. 4, in the Auditorium Hall. The first order of business was the presentation of the annual report of the executive committee. The report was read by Secretary Bernard V. Swenson, and upon motion of E. C. Foster, New Orleans, was accepted.

Report of the Executive Committee

The report of the executive committee consisted of the minutes of meetings of the executive committee on Oct. 15, 1908, Jan. 29, 1909, the report of the secretary to the executive committee at that meeting and the minutes of the meeting on Oct. 4. The main facts of the meetings held previously to that in Denver were published at the time in the Electric Railway Journal. At the meeting yesterday the committee formally approved the papers presented at this convention and also passed a resolution extending its thanks to the Manufacturers' Association for the badges presented to past presidents of the American Association. A discussion then followed concerning the advisability of the appointment of a committee on general policy to consider the work of the association as a whole and the president was requested to appoint such a committee, consisting of three members of the executive committee, with instructions to report the results of its deliberations before the close of the 1909 convention. The secretary submitted a list of the changes in the membership of the association since his last report. The committee adopted as an official seal that portion of the design of the badges presented to the past presidents enclosed within the wreath.

The following rules governing registration for future meetings were then adopted:

(a) Associate membership registration at the convention is primarily for those who cannot register either as delegates of member companies or as representatives of the Manufacturers' Association.

(b) Associate members who belong to member-companies should register as delegates of their respective companies.

(c) Associate membership in the American Street & Interurban Railway Association does not carry with it any commercial privileges incident to the convention. All associate members who derive such benefits from attendance at the convention should pay their dues to the Manufacturers' Association and obtain manufacturers' badges.

(d) All associate members should register at the Railway Association booth and receive an associate member's convention emblem.

(e) Associate members' convention badges will be given only to those associate members who cannot register as delegates in one or another of the various associations.

President Shaw then said that the success of the meeting in Denver was in no small sense due to the untiring efforts of the local reception committee and the Denver City Tramway Company, of which William G. Evans was chairman and president respectively. He then introduced Mr. Evans.

Mr. Evans thanked the delegates for the greeting and expressed the heartiest welcome he could on behalf of the Denver company and the hope that the convention would be a satisfactory one. They were tremendously pleased at the magnificent exhibit made here by the manufacturers. It was the finest exhibit they had seen in Denver.

The annual report of the secretary and treasurer for the period from Oct. 1, 1908, to Sept. 24, 1909, was then read by B. V. Swenson, secretary, and accepted. An abstract follows:

Report of the Secretary and Treasurer

In presenting this, the fourth annual report of the secretary-treasurer since the reorganization of the association, it has seemed wise to make a somewhat general report of the work which has been accomplished during the past year, and to follow this up by a more detailed report, showing the exact status of the membership and finances at the close of the fiscal year. Much additional information, some of it statistical, relative to the association work during the past year is contained in the address of the president.

General Report

Immediately after the close of the last convention, the work of placing the 1908 proceedings of the different associations in book form was pushed as rapidly as possible with the result that paper-covered copies of the reports of the various affiliated associations were completed and sent to the member companies before Jan. 1, 1909, and the cloth-bound copies of the proceedings were ready for distribution on Jan. 20 last.

The 1908 proceedings are the first to contain an annual report of the Transportation & Traffic Association, which was organized in January of that year. In addition to several new lines of work, this association has taken over practically all of the general and more public work heretofore done by the American Association, and the annual proceedings of the latter are practically confined to member company matters

As all associate members this past year have been furnished with cloth-bound copies of the proceedings of both the Engineering and the Transportation & Traffic Associations, the reports of these two associations have been bound together and constitute Volume 1 of the 1908 proceedings. The Accountants' and Claim Agents' Association proceedings have, as in past years, been bound together and constitute Volume 2. The American Association proceedings are bound separately in Volume 3.

Five hundred paper-covered copies of the reports of each of the four affiliated associations were printed, and one copy of each of these reports was sent to each member company. In addition, there were printed 2000 cloth-bound copies of Volume 1, and 1250 cloth-bound copies of Volume 2. The excess number of copies of Volume 1 were for distribution among associate members. The number of copies of Volumes 1 and 2 supplied to each member company, was in proportion to the amount of annual dues paid by the company, the distribution being made upon the same basis as in previous years.

As the American Association proceedings are primarily of interest to the higher officials under the new condition of affairs, only 750 copies of Volume 3 were printed, and these were all bound in cloth. Each member company was supplied with one of these books.

The action taken by the president and secretary in the matter of binding and printing the 1908 proceedings, and in the method of their distribution, was duly approved by the executive commitee at the January meeting.

During the past year the office of secretary-treasurer in each of the four affiliated associations has been purely honorary with no salary attached. It will be remembered that the Accountants' Association made this change at the 1907 convention, and that the Transportation & Traffic Association started out in this way. The Engineering and Claim Agents' Associations continued on the old basis up to the 1908 convention, but the change became effective with the beginning of the year just closed.

Shortly after the close of the 1908 convention your president took active steps toward increasing the membership in the association by the appointment of two large and comprehensive committees, one on active membership and the other on associate membership. These committees have done a vast amount of work during the year, and the results have been most gratifying. The reports of these committees will be presented at this meeting and will show more in detail the manner in which the work was carried on. The results obtained are shown in complete detail in the latter part of this report.

At the 1908 convention the association adopted an official pin or emblem to be worn by associate members Soon after the close of the convention the executive commitee of the Manufacturers' Association very generously volunteered to supply the association with 1,000 of these pins in solid gold and blue enamel, similar to the original design. This offer was accepted and a vote of thanks was extended to the Manufacturers' Association by the executive committee at its January meeting. These pins have been sold by the secretary for the sum of $3 each, which amount covers their original cost and the postage; this money going into the treasury of the American Association. Over 375 of our associate members are wearing this pin. It has been found that the official emblem has been an important factor in the large increase in associate membership this year, and there is no question but that it will have an even more important bearing upon associate membership in the future, not only in the matter of increasing such membership, but also in making it more stable and permanent.

The executive committee at its January meeting decided that the convention this year should be held in some city west of the Mississippi river, and appointed a Convention

Location Committee to take this matter in charge, with power to act in the selection of the time and place for holding the convention. While several other cities west of the Mississippi river were considered, the committee was of the opinion that the convention should be held in Denver, if satisfactory arrangements could be made, not only so far as the American Association and its affiliated organizations were concerned, but also from the standpoint of the Manufacturers' Association. A conference to decide this matter was held in Denver on April 19, 20 and 21, at which our Convention Location Committee was represented by John I. Beggs, E. C. Foster, A. E. Lang and B. V. Swenson. The Manufacturers' Association was represented by J. R. Ellicott, C. C. Peirce, J. H. McGraw and George Keegan.

After a conference lasting three days, an agreement was reached between the Denver people and the representatives of our associations, and it was decided that the 1909 convention should be held in Denver.

At the January meeting of the executive commitee the secretary, because of his desire to enter into other business relations, tendered his resignation to take effect on that date, or as soon thereafter as would be practicable from the standpoint of the association work. By vote of the executive committee this matter was left to the president and vice-presidents of the association, and an arrangement was made at that time whereby the present secretary would devote such a portion of his time as might be necessary to the association work until his successor was appointed and installed in office. The thought then was that this would be but a temporary condition of affairs lasting two or three months at the most, but no change was made up to the close of the fiscal year. While the association work has been carried along in a most excellent and effective manner during the past seven months, the results obtained have been due in large measure to the great amount of time and thought devoted to this work by President Shaw, personally, and to the untiring efforts and most loyal support which the secretary has received at all times from H. C. Donecker, the office manager of the association. While such an arrangement might be temporarily effective, and even over a period of several months, it is essential to the welfare of the association that, with the beginning of the new year, a secretary and treasurer be appointed who will devote his entire time and energy to its work.

In addition to the various important features of the association work of the past year, some of which have been previously mentioned, and others of which are considered in the address of the president, may be mentioned the many important committee meetings which the American Association and its affiliated associations have held at various times during the year, a number of them at the New York headquarters. The results of the work of these committees are shown in the many valuable reports which will be presented at the different sessions of the various conventions this week.

In the following pages of this report will be found complete information concerning the present status of both active and associate membership and the financial statement showing the receipts and expenditures for the period from October 1, 1908, to September 24, 1909, both inclusive. A supplemental report will be presented at the conveniton by the secretary, covering the last six days of the fiscal year.

Capitulation of Associate Members, Sept. 24, 1909.

Associate members, Oct. 1, 1908 (see 1908 Proceedings, Vol. 3, page 86)		249
Resigned	8	
1909 dues unpaid	33	
		41
Total 1908 members in good standing Sept. 24, 1909		208
1906-1907 associate members reinstated	4	
Delinquent	1	
1906-1907 associate members reinstated in good standing		3
Total old associate members in good standing		221
New association members		596
Total associate membership, Sept. 24, 1909..		807*

*The cash statement shows 805 payments of associate membership annual dues. This is made up as follows:

1909 dues from 1908 associate members in good standing, Oct. 1, 1908	198*
1908 dues from old associate members delinquent at Oct. 1, 1908	4
1909 dues from old associate members delinquent at Oct. 1, 1908	3
1909 dues from new associate members	596
1910 dues paid by old members in addition to paying 1909 dues	4
Total payments of dues of all kinds	805

*The capitulation shows 208 1908 members in good standing; ten of these paid 1909 dues in September, 1908, making 198 paid during this year.

Capitulation of Active Members Sept. 24, 1909.

Active members, Oct. 1, 1908		262
1909 dues unpaid	11	
Resigned	14	
		25
Total 1908 active members in good standing.		237
Active members reinstated during period from Oct. 1, 1908, to Sept. 24, 1909, inclusive, by payment of 1908 dues	13	
Withdrawn	2	
Total reinstated active members in good standing		11
Total old active members in good standing..		248
New active members admited during period from Oct. 1, 1908, to Sept. 24, 1909, inclusive.	63	
1909 dues unpaid	7	
New active members in good standing, Sept. 24, 1909		56
Total active members in good standing, Sept. 24, 1909		304

Cash Statement.

Receipts.

(Period from Oct. 1, 1908, to and including Sept. 24, 1909.)

Cash in bank, Oct. 1, 1907		$3,365.24
Engineering Association cash balance from secretary-treasurer	$ 0.62	
Admission fees	620.00	
Company annual dues	26,420.00	
Associate membership dues	4,025.00	
Interest on bank deposits	138.88	
Sale of annual reports	240.75	
Sale of rule books	47.00	
Sale of standard classification of accounts	46.40	
Sale of associate membership badges.	1,101.00	
Sale of pamphlet "The Fare Question"	69.05	
Sale of report of Standardization Committee	11.25	
Portion of cost of reporting conference of committee on Interurban Rules paid by technical press	59.00	
Account location of convention in Denver, Colo.	5,000.00	
Exchange	.90	
Receipts during period ending Sept. 24, 1909		37,779.85
Total cash, including balance of Oct. 1, 1908		$41,145.09

Expenditures.

(Period from Oct. 1, 1908, to and including Sept. 24, 1909.)

Salaries	$9,008.33
Printing and stationery	2,989.49
Postage	1,633.91
Miscellaneous office expenses	383.59
Rent of office	2,700.00
Telephone, telegraph and messenger	465.15
Express, freight and cartage	180.16
Traveling expenses, secretary	819.70
Traveling expenses, other committees	342.05
Miscellaneous general expenses	901.71
Associate membership badges	22.00
1908 convention	461.43
Annual report, 1908	1,214.13
Furniture and equipment	449.45
Accountants' Association (a)	1,614.88
Engineering Association (b)	3,387.56
Claim Agents' Association (c)	1,271.74
Transportation and Traffic Association (d)	3,105.87
Total expenditures, period ended Sept. 24, 1909	30,951.15

(a) Proportionate cost of 1908 proceedings and advance papers, $736.50; account of appropriation, $878.38.

(b) Proportionate cost of 1908 proceedings and advance papers, $1,717.98; account of appropriation, $1,669.58.

(c) Proportionate cost of 1908 proceedings and advance papers, $916.44; account of appropriation, $355.30.

(d) Proportionate cost of 1908 proceedings and advance papers, $1,437.80; account of appropriation, $1,668.07.

Recapitulation.

Cash on hand, Oct. 1, 1908	$3,365.24
Receipts during period from Oct. 1, 1908, to Sept. 24, 1909	37,779.85
Total cash	$41,145.09
Expenditures during period from Oct. 1, 1908, to Sept. 24, 1909	30,951.15
Balance on hand Sept. 24, 1909	$19,193.94

Metropolitan Bank.

New York, Sept. 25, 1909.

American Street & Interurban Railway Association, New York City:

Gentlemen.—We beg to advise that at the close of business Sept. 24, 1909, the balance to the credit of your Association on our books was $11,448.16.*

Yours very truly,

(Signed) A. C. CORBY, Cashier.

*Deducting checks outstanding to the amount of $1,254.22, makes the correct balance of $10,193.94 as shown in cash statement.

Sept. 27 1909.

To the Executive Committee of American Street & Interurban Railway Association:

Gentlemen.—I hereby certify that I have carefully audited the accounts of Bernard V. Swenson, treasurer of the Association, for the period Oct. 1, 1908, to Sept. 24, 1909, both inclusive, and I have found the same correct.

The statements showing receipts for admission fees and annual dues from member companies and from associate members check with the books of the Association, and proper vouchers have been audited covering all expenditures. (Signed) M. R. BOYLAN,

General Auditor, Public Service Railway Co.,

Newark, N. J.

Respectfully submitted,

(Signed) B. V. SWENSON,

Secretary-Treasurer.

The next order of business was the annual address of the president, James F. Shaw. This address is published elsewhere in this issue. The address of President Shaw was received with applause and was accepted by the members of the association and a vote of thanks extended for the very able, interesting and practical report.

The report of the committee on subjects was presented by T. N. McCarter, Jersey City, chairman, and adopted.

Report of the Committee on Subjects

In presenting this report, your committee on subjects desires to express its appreciation of the large amount of work done by the affiliated association committees which have had immediate charge of the programs of their particular associations.

Considerable preliminary work was done previous to the first meeting of the committee which was held at the Association Headquarters in New York City on Jan. 28 last. At that time the programs of the American and each of its affiliated associations were discussed and outlined in detail, and a report embodying the results of the deliberations of the committee was presented to the executive committee of the American Association at its mid-winter meeting on the 29th of January.

While from time to time changes have become necessary as the work of the committee progressed during the intervening months, the original plan has been carried out in all important phases, and the results of the work of the committee during the past year are before you in the arrangement of the program for the Convention week; in the hours and places of meeting; in the addresses, papers and committee reports for the various meetings; and in the general disposition of the work of each session for the various associations, all of which is contained in the official program of the 1909 convention. As far as possible, the work has been so planned that the times of meetings of a similar nature do not conflict.

Respectfully submitted,

THOMAS N. M'CARTER, Chairman; W. A. HOUSE, C. O. KRUGER, DANA STEVENS, R. N. WALLIS, PAUL WINSOR, C. B. HARDIN, C. LOOMIS ALLEN, Committee on Subjects.

The report of the committee on active membership, in the absence of C. S. Sergeant of Boston, the chairman, was presented by C. N. Black of San Francisco. The report was adopted.

Report of the Committee on Active Membership

To the end that a thorough and effective campaign for active membership in the association might be carried on during the year, your president, shortly after the close of the 1908 convention, appointed a large committee composed of gentlemen who are officials of member companies in the various parts of the United States, Canada and Mexico. This made it impracticable for the committee to hold any meetings and the report of its work for the year is, therefore, presented to you by the chairman.

The plan followed and the work done may be briefly outlined. The determining factors in the selection of the individuals composing the committee, were their prominence in the electric railway profession, their interest in the association and their geographical location. Each member was assigned a particular territory and was given the names of the member and non-member companies in that territory, together with a large fund of information relative to the association and its value to the electric railway companies, much of which was in printed form and supplied in quantities sufficient for distribution to these non-member companies. Each committeeman was given great latitude in the method of conducting his own campaign. One or more officials of every non-member company received not only communications from the committeeman in direct charge of the territory in which the company was located, but also from the chairman of the committee, from the president of the association and from the secretary's office Some of these were in the form of letters, and some contained booklets, pamphlets or other printed matter descriptive of the purposes, plans and work of the association and its value to the member companies.

While you no doubt are somewhat interested in the manner in which the committee has operated, I feel that you must necessarily be more interested in the results obtained, and I take pleasure in reporting that 65 companies have become members of the association during the year, among which are such important companies as the United Railroads of San Francisco, the Los Angeles Railway Company, the Pittsburg Railways Company, the Brooklyn Heights Railroad Company, the Interborough Rapid Transit Company, the Old Colony Street Railway Company, the Winnipeg Electric Railway Company of Winnipeg, Manitoba, the Honolulu Rapid Transit Company of Honolulu, Hawaii, and the Sao Paulo Tramway, Light & Power Company of Sao Paulo, Brazil. A complete list of these new member companies is contained in the annual report of the secretary and treasurer. The annual dues to be received from them should increase our revenue not less than $2,000.

Your chairman desires to take this opportunity to express his thanks to the members of this committee who have by their personal efforts and earnest exertions accomplished so good a work for the enlargement of the membership of the association.

Respectfully submitted,

C. S. SERGEANT,

Chairman.

The president then called Vice President Arthur W. Brady to the chair, who presided during the remainder of the day's session.

The report of the committee on associate membership was presented by D. A. Hegarty of Little Rock, Ark. The report was approved and adopted.

Report of the Committee on Associate Membership

Because of the large number of members of the Committee on Associate Membership, and because of their widely different geographical location, no meeting of the committee has been held during the past year, and it becomes necessary for me, as chairman, to present the report of the work which has been done by its various members.

In the belief that a systematic and active campaign would result in a very largely increased associate membership, your president, early in the year, appointed a committee on associate membership.

In the choice of committeemen, it was the desire to bring the association into close touch with all phases of the electric railway business in the entire territory covered by the association. A great amount of individual work was done by the various members of the committee, some of whom were very active and most enthusiastic. Each committeeman was amply supplied with various pieces of print

ed matter descriptive of the association, its associate membership and the value of such membership to those interested in the electric railway business. In addition to many letters written by the individual members of the committee, communications in the form of letters and printed matter from the chairman of the committee, from the president of the association and from the secretary's office, were sent from time to time throughout the year to thousands of individuals interested in electric railways in various parts of this country, Canada, Mexico and other foreign countries.

While the direct benefits of associate membership were at all times clearly and forcibly dwelt upon, an appeal was also made to the prospective associate member to take his stand with the many other individuals identified with the electric railway in general in an endeavor to create a better sentiment on the part of the public toward public service corporations, which is one of the primary objects of associate membership in the American Street & Interurban Railway Association.

While much effort has been made, not only by the committee, but also by many other individuals who co-operated with it and by the office of the association, the results obtained have more than justified the time, energy and expense devoted to this work. I am pleased to report that the associate membership on Sept. 30 at the end of the fiscal year has been increased during the past year from 249 to 817, a gain of 568 or 244 per cent.

In closing, your attention is called to the fact that this large increase in membership is due, in great measure, to the interest shown and hearty co-operation given by the Manufacturers' Association executive committee and by many individual members of that association. Another factor which played an important part in the large increase in the number of associate members was the official association pin, emblematic of associate membership, which was adopted at the 1908 convention.

Respectfully submitted,
C. LOOMIS ALLEN,
Chairman.

The report of the special committee appointed to consider the suggestions contained in the annual address of President Goodrich at the 1908 convention was read by Third Vice President George H. Harris, and was accepted and adopted.

Report of the Committee to Consider the Suggestions Contained in the Address of President Goodrich

In his address, presented at the 1908 convention, President Goodrich gave much consideration to the association work and made some very thoughful suggestions concerning especially the method of conducting the annual conventions of the American Association and its affiliated organizations, which seemed to him would result in a stronger and better balanced organization doing more effective and valuable work for its member companies. These suggestions are fully set forth in the 1908 proceedings of the American Association; they are still fresh in your memories, and it hardly seems necessary to repeat them in this report. They were discussed at some considerable length in two of the sessions of the 1908 convention and as a result, the following resolution was adopted at that time:

"Resolved, that the recommendations of the president relating to a separation of the meetings of this association and its affiliated associations be referred to a committee to consist of the incoming president and seven other persons to be appointed by him, at least two of whom shall be past presidents, which committee shall report its conclusions, together with any other recommendations as to the organization and procedure of the association at the next annual meeting; and

"Resolved, further, that the report of the committee be printed and sent to the members of the association at the earliest possible date and not less than thirty days before the date of the next annual meeting."

In accordance with this resolution and soon after the close of the convention, your president appointed the following named gentlemen as members of this committee: J. F. Shaw, chairman; C. G. Goodrich, W. C. Ely, A. W. Brady, C. L. Allen, R. N. Wallis, A. E. Lang and G. T. Rogers.

At the time of his appointment, each member of the committee was requested to give the entire matter serious and careful consideration and to be prepared to discuss it in its various phases at a meeting to be held in conjunction with the annual midwinter meeting of the executive committee in January. Such a meeting was held at the association headquarters in New York City on Jan. 29 last, at which all members of the committee were present. As a result of this meeting, the following resolution was duly adopted by the committee:

"Resolved, that it is the sense of the committee appointed to consider the recommendations of the president, made at the 1908 convention, that no change be made in reference to the holding at the same time and place of the annual meeting of the American Street & Interurban Railway Association and its affiliated and allied associations, but that such annual meeting be supplemented by a conference to be held in the City of New York, at the time of the winter session of the executive committee, which conference shall be open only to the president or other duly accredited representatives of the member companies, and which shall consider in executive session such matters as may be deemed of pressing interest and report to the executive committee its recommendations and instructions as the policy to be pursued in respect to such matters, and

"Resolved, further, that the chairman of this committee report to the annual 1909 convention of the American Street & Interurban Railway Association the conclusions and recommendations of the committee as contained in this resolution."

In accordance with the resolution passed at the 1908 convention, in which was embodied the request that the report of the committee be printed and sent to the members of the association at the earliest possible date and not less than thirty days before the date of the next annual meeting, such a printed report, containing the resolution adopted at the January meeting, was made to the member companies early in February.

This report is presented to you now in conformity with the resolution adopted by the committee at its January meeting that the chairman should report to the annual 1909 convention of the association the conclusions and recommendations of the committee.

Respectfully submitted,
JAMES F. SHAW,
Chairman.

A paper on "Organization, from the Standpoint of the Smaller Companies," was then read by Ernest Gonzenbach, president and general manager, Sheboygan Light, Power & Railway Company, of Sheboygan, Wis. This paper is published elsewhere in this issue. In presenting his paper Mr. Gonzenbach said that some of the things that he would say were as obvious as the sum of two and two, but there were a great many small companies that were not operating as well and did not handle the organization as efficiently as might be done, and the paper was written in the hope of benefiting those.

Mr. Hegarty thought Mr. Gonzenbach had covered the subject very thoroughly, especially in regard to the one-man power. That was a feature that ought to be taken into consideration, and there should always be an understudy for the other man, so that in case of illness or the necessity of change there would be a man to fill the place.

P. P. Crafts, Clinton, Iowa, said he was connected with a small company where it was necessary for one man to look after more than one department, and the method had always been carried out of having one man inferior to the heads of departments who was able at a moment's notice to step into his superior's place and carry on the work successfully, which had saved the day.

Mr. Foster of New Orleans stated that in the operation of small companies, it was necessary to depend very largely upon one man, who was usually the superintendent, because the president of the smaller companies was very seldom an operating man. The president provided for the financial interest of the corporation. The operation devolved upon the superintendent, and that man was generally a practical man, thoroughly familiar with the details of all departments, and he perfected his organization the best he could. If he could have an understudy or second man for every position, it was desirable that he should have it and as a rule he would have it. But there were small companies which could not afford to have men of very great ability. There were very small companies which had but one engineer and a fireman. It would be very expensive for such a company to have a second engineer. The best thing to do was to educate the fireman as rapidly as possible so that he might be able to fill

the position of the chief engineer in case anything should happen. The organization as outlined was without doubt a perfect organization, but the small companies could not all afford to organize in that way. Those that could afford to do so would come as near doing it as possible by having their second man or men in an inferior position educated to the highest degree possible consistent with that department. The larger organizations were operated in departments and the department heads were held responsible and each had an understudy, the department heads usually reporting to the chief operating official, chief executive officer. The idea he entertained about the smaller companies was that they would be very glad to have a perfect organization, but he thought that in practice it was not possible always to have as perfect an organization as could be desired.

H. W. Blake, **Electric Railway Journal,** said there was one statement which he particularly noticed in Mr. Gonzenbach's paper, and that was the reference to the demand for car maintenance employees and the impossibility of getting them. This paper might possibly be considered in connection with the reports of the committee on education, which last year had recommended a system of practice instruction for technical graduates and this year suggested a course of instruction for the non-technical men in the employ of the company. Possibly there might be a third kind of education or apprenticeship course under the auspices of the electric railway companies in order to train men in car maintenance work. At present no means existed by which a young man could learn that part of the business, and this work was constantly increasing in importance.

Gen. George H. Harries, Washington, D. C., stated that it was his fortune 15 years ago to move directly from an active military life into the presidency of a street railway; and, realizing his shortcomings, he proceeded to qualify himself. It was not a large company, as companies were regarded today. As the years moved along other companies were taken in one after another—mostly bankrupt, mostly the small, one-man company—until finally quite a system was made. There was no question but that there could be a very satisfactory organization in a small company today, a vastly better organization than was dreamed of at that time in that community. The company had not made any great stride. It had its corps of specialists, high grade men, the best that could be secured, he thought. But he looked back at that first company and was fairly well satisfied that it set a pace then which was a good, live gait today. It was possible to give much more of personal attention to the small company than to the larger one. The man who had the military organization to which Mr. Gonzenbach referred could see everything, and if he did not do everything he could supervise the doing of everything. He was thoroughly satisfied with the experience acquired in the one comparatively small company. Without that experience it would have been an extremely difficult thing to have succeeded. In the conduct of a public service corporation there was nothing better than a military system. He might seem to be prejudiced on that score, but it was as Mr. Gonzenbach had said, the oldest system. It had been brought down through the centuries and had survived. There was really nothing better, not merely in the operating, but in the other features of the business.

The report of the committee on education was presented by H. W. Blake in the absence of the chairman of the committee, Prof. H. H. Norris.

After this report had been read Vice-President Brady announced that as the hour had nearly arrived for the adjournment of the afternoon session, and there would not be time to give the report the thorough discussion its importance deserved, the discussion would be postponed until the meeting on Wednesday.

Secretary Swenson announced that President Shaw had appointed the following to serve on the committee to draw up suitable resolutions on the death of Thomas Lowry of Minneapolis and of Howard F. Grant of Boston: A. W. Brady, chairman; Percy Warner and Anton H. Classen.

It was also announced that President Shaw had appointed a committee on resolutions relative to the convention, as follows: George H. Harries, chairman; P. P. Crafts and H. C. Page.

Secretary Swenson stated that A. L. Whipple, the chairman of the entertainment committee, wished to have an announcement made at this meeting in relation to the excursion over the Moffat road to Corona and return on Friday. Arrangements had been made with the Accountants' Association whereby the Friday sessions would be advanced to Thursday. The sessions of all the other associations would be completed by that time, so that there would be no session on Friday. Mr. Whipple desired especially that everybody procure tickets as early as possible from the entertainment committee at the entertainment bureau. The start would be made at 8:30 a. m. sharp and the return to the city about 5:30 o'clock. This was considered the finest trip out of Denver.

Mr. Swenson called attention to the necessity of validating all railroad tickets. Tickets to the Pacific Coast would be validated in advance of the departure of passengers, but not to exceed seven days in advance. Tickets which were for Colorado points, from the East especially, must be presented for validation on the date the return journey commenced. They could not be validated in advance. All tickets were validated at the ticket offices of the respective railroad companies over which the return would be made.

Invitations had been received, Mr. Swenson said, from the Business Men's Association of Saratoga Springs, New York, and from the Niagara Falls Bureau of Conventions, of Niagara Falls, N. Y., to hold the 1910 convention in those cities.

Adjournment was then taken until 2 o'clock on Wednesday afternoon.

CLAIM AGENTS' ASSOCIATION—TUESDAY MEETINGS

The Claim Agents' Association held its second and third meetings at the Metropole Hotel Tuesday morning and afternoon. The following program of topical discussions was completed at the morning session:

Morning Session

(3.) What is the best plan of having trainmen procure and report an increased number of witnesses to accidents?

(4.) Is it good practice, when statement of injured party is obtained of accident, to furnish him with copy of his statement?

(5.) Is a school of instruction for trainmen essential?

Afternoon Session

The afternoon program of topical discussions was completed. The questions raised were:

(6.) Should information be furnished newspapers regarding the work of the claim department?

(7.) What should be the relationship of the medical and claim departments? How can the medical best serve the claim department in the handling of accidents?

(8.) The claim department and its relation to the operating department.

In the evening a banquet was served to members of the association in the dining room of the Metropole Hotel.

The election of officers will take place at the closing session to be held at 9:30 this morning at the Metropole Hotel.

ASIRMA GOLF TOURNAMENT ABANDONED

Owing to the many unusual points of interest which delegates desire to see while in Denver, it has been decided by the entertainment committee of the Manufacturers' Association to abandon the Asirma golf tournament announced in the program of entertainment.

PRESIDENT SHAW'S ADDRESS TO THE AMERICAN STREET & INTERURBAN RAILWAY ASSOCIATION

The State of Colorado is famed for its natural resources, climate and scenery, and the center of its industries, its politics and its social life is its capital, the city of Denver named for Gen. James W. Denver, first governor of the territory of Kansas, of which Colorado was a part when the city was founded. Denver, in half a century, has grown from a frontier settlement to a beautiful and prosperous city of 225,000 inhabitants, with an area of 60 sq. miles and with 1,200 miles of streets, many of which are magnificent boulevards interconnecting its 14 beautiful parks. The city has nearly 2,500 factories with annual payrolls of over 12 millions of dollars and 18 banks with resources of 75 millions of dollars. Seventeen great railroad systems enter the city and 126 passenger trains arrive and depart every 24 hours. Much of the development of Denver may be ascribed to the fact that many of those who amass their fortunes in Colorado remain at home and spend their money there. This accounts, in a considerable degree, for the city's modern business district and beautiful residences, and its well-paved, clean and brilliantly illuminated streets.

On account of the great distance to Boston, no representative of the Denver City Railway Company, as it was then called, was present at the organization meeting of this association in 1882, but the following abstract from a letter by L. C. Ellsworth, president of the company, was read at the organization meeting:

If it were practicable, I should be glad to be present, but I hardly feel that I can see my way clear to meet with you. If I understand aright the objects of the association, it has my hearty approval, and I shall be glad to do what little may lie in my power to advance its interests. I shall be glad to become a member of the association, and trust that I may hear from you the result of the meeting.

The first annual report of the association, however, shows that the Denver City Railway Company paid its initiation fee and dues, and by this act became a member of the association on March 6, 1883, less than three months after the association was formed, and it was represented at the first annual convention after the organization meeting, which convention was held in Chicago in October, 1883, by D. H. Longstreet, who was then a director of the company, and who, later, in 1892, when he was vice president and general manager of the West End Street Railroad Company of Denver, was honored with the presidency of this association. No better illustration of how faithfully the Denver street railway people have stood by the association during this long period could be had than by the record of its representation at the annual conventions. Including the organization meeting and the present convention, there has been a total of twenty-eight such meetings at which the Denver properties have been represented at all but seven. I doubt very much indeed if any other street railway property can show a better record. Another fact which makes this record even more impressive, is that it has been necessary for the delegates of this company, in attendance at previous conventions, to travel an average round trip distance of nearly 3,000 miles, and to several of the conventions the company has sent three and even four delegates. Surely the Denver City Tramway Company officials have earned the right to have a convention held in their own city. While Denver's record is undoubtedly unique, many of our other Western companies have consantly sent delegates to the convention from very much greater distances, especially those companies located in Texas, California and the Pacific Northwest.

The center of gravity of the twenty-seventh annual meetings of this association which have preceded the Denver convention, lies about midway between the cities of Akron and Youngstown, Ohio, which is a distance of approximately 500 miles east of the Mississippi River. This is very close to the actual center, from a mileage standpoint, of that portion of the United States and Canada which lies east of the Mississippi River. Therefore we may say that, on the whole, the territory west of the Mississippi River has not been considered in the location of convention cities in the past. Those member companies located west of the Mississippi River have, for the past few years at least, constituted over 20 per cent of our total membership and have contributed over 20 per cent of its annual revenue. Is it any wonder our Western member companies have had the feeling for several years past that we should hold a convention in the territory in which they are located, and is it any wonder that many Western companies have felt that the association was not national in its character, but was dominated by the wishes of the companies lying far east of the Mississippi River? It was a careful consideration of such facts as the foregoing which led the executive committee, through its convention location committee, to decide upon Denver as the 1909 convention city. One of the determining factors was the opportunity that this would afford to the representatives of member companies to become familiar with the most excellent system of the Denver City Tramway Company, which is recognized as being one of the very best in the country and which has many features of interest to the street railway fraternity at large, among which may be especially noted its very light weight cars of distinctive design, all of which are built in Denver; its shops and yards in which all special work for tracks is constructed, and its large and very complete storerooms for supplies.

Magnitude of the Electric Railway Business

The majority of those who are engaged in the electric railway business are so much occupied with their various duties that they seldom, if ever, stop to consider its magnitude. In round numbers, there are 1250 operating street and interurban railway companies in this country, with a total of 35,000 miles of single track and 75,000 passenger cars. The total number of passengers carried annually is 10,000,000,000 and the gross annual income is $440,000,000. The total outstanding par value of stock and bonds is nearly $4,000,000,000, and there are 225,000 salaried employees and wage earners engaged in the operation of these properties who receive, annually, more than $150,000,000 in compensation for their services. In considering the magnitude of the street railway business, there should also be taken into account the many millions of dollars invested in large and small manufacturing enterprises which supply the electric railways with their materials, and the many thousands of men who are directly and indirectly employed by these industrial concerns.

Important Events of the Past Year

Financial and general business conditions have so important an influence on the traffic and earnings of electric railways that it is possible to emphasize with great satisfaction the improvement which has taken place in the last 12 months. Ordinarily, the business of street railways is stable and is not affected in the same degree as are industrial properties, by fluctuations in general conditions. Gross revenues, under circumstances which usually prevail, should show a fairly uniform rate of increase year after year. With a street railway that is fairly well established in a district where there is good diversity of business and a reasonable amount of pleasure traffic, a diminished rate of increase or the failure of the gross revenue to show any enhancement over the previous 12 months, represents all that would take place under panic conditions of the character through which this country has recently passed. In certain districts, however, where the traffic is dependent almost entirely upon the operation of large industrial plants, serious curtailment of revenues follows decreased industrial activity.

During the association year which has just ended, sub-

stantial recovery from the effects of the panic of 1907 has been manifest in the earnings of many of the companies. The recuperative powers of the industries throughout all parts of the United States are so great that slight improvement grows quickly into substantial gains and the traffic of street and interurban railways resumed rapidly the position which it should hold in a country that has greater business vigor and more promising prospects for development than any other known in the history of the world. The effect of reduced traffic was apparent not only in the revenues of the company but also in the enforced suspension of improvements resulting from decreased earnings and the inhospitable attitude of the money market. The difficulties of borrowing funds at reasonable rates which were experienced in the year preceding that which has just closed were followed by accumulation of funds in banking centers, easy rates and an improving and eventually excellent market for bonds. This situation has permitted many companies to fund floating debts and has enabled resumption of improvements and extensions. The next logical step resulting from the present aspect of the business situation will be the creation and development on an extensive scale of plans for electric railway construction in all parts of the country where there are fair traffic prospects that it will be possible to establish such lines on a permanently successful basis.

A movement which will have profound effect upon the future of street and interurban railways is that which originated in Massachusetts for the adoption of needed increases in rates of fare. While the fixed rate of 5 cents which was adopted as standard for urban street railways in the early history of the industry was believed to be adequate compensation for the risks involved in the enterprise, it was found in later years that the public demand and progress of the art required improvements which added greatly to the capital cost of properties of this nature. With the substitution in some cases of cable railways for horse car lines, followed by another change when the desirability of electricity as a motive power was made plain, the original investment was increased several fold. The effect of these changes, so far as the public was concerned, may be realized by comparison of the old types of cars and equipment with those which modern practice prescribes and recollection of the character of service formerly rendered. From a few main lines serving only the districts where the most inviting density of traffic prevailed, the companies have increased their investments until, in all large cities today, they reach into the outlying suburban districts where the population and resultant traffic are small. In recognition of public demand, the railways have extended their lines, permitting settlement of outlying territory and decentralization of the population. Arising in part from the necessity of these changes and in part from recognition of the public convenience afforded, the transfer system has come. With the establishment of the transfers, there has been a steady dilution of the average rate of fare per passenger carried, resulting not only from the legitimate tender of transfers but also from the illegal use and unjustified barter of this privilege which has been granted by the railway companies in many instances where they were not required by franchise conditions. High speed interurban lines have also found increases in fares necessary to meet the larger expenses arising from greater costs of labor and material, and, in some instances, the failure of expected traffic to materialize. A general movement toward a rate of fare which shall be based more scientifically than has been the case in the past upon the cost of operation with allowances for unforeseen expenditures is a just course for events to take.

Present railway conditions may be improved in either one of three ways: (1) By increasing the present rates of fares. (2) By reducing the distances the passengers are carried under the present rates of fares. (3) By relieving the companies from certain forms of taxation, State or municipal requirements.

Recently, instead of being relieved, the corporation tax under the Payne tariff law of 1909 put an additional tax on our business. The constitutionality of this tax will be passed upon by the courts. Personally, I am opposed to such a tax as it not only seems unjust to the corporations, but also to the owners of the capital stock who are to suffer loss from their incomes while the owners of bonds are relieved from any additional burden. While undoubtedly many will disagree with me, I believe the proposition to amend the Constitution by giving Congress power to levy a tax on incomes (at least in cases of emergency) is much more just, as it will reach those who are possessors of large incomes and will not materially affect others.

The point I wish to particularly emphasize is, that the corporation tax penalizes the pioneer or developer of enterprises whose holdings are represented by capital stock and that it relieves from taxation the owner of the underlying securities upon which there is a minimum of risk.

The Cleveland situation is still somewhat chaotic but continued injustice has been done during the year to the company which owns the street railway system in that city. The people of Cleveland have now rejected twice at referendum elections projects fathered by Mayor Johnson. The number of years spent in fruitless negotiations have been prolific of benefit to the political agitators concerned but equally prolific of injustice to the owners of the property affected.

Public service commissions are now practically active forces in the management and operation of street and interurban railways in the States of New York and Wisconsin. Whether or not these commissions will follow the conservative course which has characterized the attitude of the Board of Railroad Commissioners in Massachusetts is a question which can be determined only in the future. Reasonable public regulation on the part of the State may produce conditions which will prevent repetition of the disgraceful contests which political agitators have been able to wage in some of the large cities in the country during the last few years, notably in Chicago and Cleveland. To be effective, permanently, regulation of this character must safeguard the interests of the corporation and its employees just as effectively as it protects those of the traveling public.

The important influence of rapid transit systems on city development is being realized in New York as never before. Hardly had the present subway been completed than its traffic capacity was taxed to its uttermost. Since the initial trip, various improvements have been adopted by which the length of station stops has been reduced. This has proportionately increased the carrying capacity of the subway, but there has been no cessation of the demand for the development of further rapid transit routes which seems as imperative as ever before. During the past year, the Hudson & Manhattan Railroad, the most important as well as the longest subfluvian railway in the world, has been in in operation connecting the States of New York and New Jersey by four tunnels and is the precursor of many other similar lines which will undoubtedly be laid under the Hudson River and other wide stretches of navigable waters.

No important trunk line railways have changed to electricity this year any portion of their suburban systems for which plans had not previously been made, but the officers of those companies which are now using electric power have expressed themselves as well satisfied with the service rendered. A new type of locomotive, differing from any used on the other trunk lines of this country, has been developed for the Pennsylvania Railroad tunnel, and several of the railroad companies in the Central and far Western States are carefully considering the adoption of electric power for certain sections of their lines.

Each of the sectional and street railway associations has shown activity and growth and several new associations, designed in some cases to foster the interests of all public utilities, have been organized in various parts of the coun-

try. This willingness to co-operate in the advancement of mutual interests is a healthy sign and one that should be encouraged. Our own organization and its affiliated and allied bodies have never before been in so good a condition and at no previous convention has there been such a volume of valuable reports and papers.

The Association in the Past

As many of you know, the American Street Railway Association was organized in Boston on Dec. 13, 1882, by the representatives of 56 railway companies. This was in the old horse car days, before the advent of cable traction, when all of the companies were small and located in the more important cities, there being no interurban railways of any kind. The association continued to exist through a period of nearly 23 years with a somewhat fluctuating membership and value to its member companies, although on the whole greatly increasing in its membership and its effectiveness over this portion of its life. At the 1905 convention its membership was composed of 183 companies in good standing, and it was recognized as an association of great importance to the electric railway interests of the country. For two or three years previous to the 1905 convention much consideration was given to plans for reorganizing the association and combining with it the accounting, engineering and claim departmental associations which had been organized quite independently to carry on work in their respective branches.

During the three years after the reorganization in 1905 and immediately preceding the year just closed, the work done by the American Associotion and its various affiliated bodies fully demonstrated the wisdom of the reorganization. The bound volumes containing the reports of the various associations show the immense amount of work done during this time.

At the end of the first year the membership had increased to 200 companies and 113 associate members had been added. At the end of the next year the company membership had increased to 227 and the associate membership to 148. At the close of last year the company membership was 262 and the associate membership 249. The revenue the first year was $22,800; second year, $24,700; and the revenue last year was $26,800.

The Work of the Year

The association work of the past year, like that of the three years immediately preceding, may be divided primarily into three parts: 1. That done by the committees of the American Association. 2. That done in the general office of the association. 3. That done by the affiliated associations.

In addition to several special committees, the American Association has committees on subjects, membership, insurance, education, welfare of employees, compensation for carrying United States mail, public relations and Interstate Commerce Commission affairs, all of which will present reports at the sessions of this convention. The members of these committees are all prominent in the electric railway business and they have been selected for their peculiar fitness to serve on particular committees. They have devoted much time and thought to the work before them, and the reports which they will present should be fully discussed and given careful consideration.

Four years ago, when the New York office was first established, the office force consisted of the secretary, an assistant and a stenographer. Since then the work has increased so rapidly that at present there are eight people employed in the association office, and even that number is not sufficient to accomplish the work which must be done without the necessity of some or all of the office force working several hours overtime a large portion of the year. Some of the many duties which have devolved upon the New York office during the past year are the following: Between 15,000 and 20,000 first-class letters written, signed and mailed; distribution of 23,000 data sheets, 15,000 bulletins, 16,000 pamphlets, 6,000 folders, 1,000 classifications of accounts, 2,500 city and interurban rule books, 900 copies of the engineering standards, 5,700 volumes of annual proceedings of the various associations, 5,000 copies of the convention advance papers, all of which were required to be prepared for printing and proof-read; 12,500 convention bulletins, the sending out of blanks and forms to various member companies, nearly 1,000 replies to requests for information from member companies, many of which required the preparation of special compilations, besides the routine work heretofore required of secretaries of the affiliated associations, all of which has been turned into the main office. In addition, the vigorous campaign for membership this year has naturally largely increased the work of the main office in the sending out of written communications and the working up and distribution of printed matter; and the resultant effects of this campaign, as shown in the large increases in both classes of membership, has also entailed a large amount of additional labor in the matter of written communications, distribution of literature, proceedings, etc.

I wish also to call attention to the very satisfactory increase in our active and associate membership during the past year. The active membership has been increased by 65 companies, and among these you will find some of the most prominent electric railways of the country. The enrollment of associates has during the present year been increased from 249 members to 817. This result has been brought about by various means, as, in addition to the work of the membership committee, thousands of written and printed communications, folders, etc., have been distributed in an endeavor to awaken interest among individuals which is so necessary if our association is to do the full good of which it is capable. You will recall that at the 1908 convention there was adopted an official badge or pin emblematic of our associate membership. The first lot of these pins was distributed toward the latter part of January last. The success of the pin was immediate, and today nearly 500 of our associate members are wearing it. As a means toward that publicity which is so essential to our work, I believe the adoption of this pin has been one of the best minor moves the association has ever made, and unquestionably great good can be brought about through the open display of this emblem by each and every one of our associate members. All this has not been done without a great effort, however, and, necessarily, a considerable expenditure of money. Much praise is due to the members of the active and the associate membership committees, and I wish to take this opportunity of thanking them, not only on behalf of myself but of the association and its executive committee as well. They have done excellent work, have spared no pains to accomplish the end desired, and the results speak for themselves.

I feel that I cannot let this opportunity pass without calling attention to the assistance given this year by the members of the Manufacturers' Association, not alone in the presentation of 1000 associate membership badges and the badges for the past presidents, but particularly with regard to associate membership itself. Three hundred and eight individuals, representing the members of our Manufacturers' Association, are enrolled as associate members with us. These represent 121 companies out of a total membership of 287 companies in the Manufacturers' Association, and 164 of these members are wearing the associate membership pin. It is needless for me to call attention to the great good these associate members can do us in effecting a better understanding between the public service corporation and its patrons. They travel from place to place and are thrown in close touch with those who take advantage of the facilities which our transportation companies offer. They come to know them well and intimately, and their words can do much good for our business if raised in support of

the work which we are doing, the service we render, and the small amount of return we receive.

The attendance at this convention, located so far away from a large majority of our member companies, is in no small part due to the magnificent work of the members of the various transportation committees which have the sincere appreciation of every member of our association.

This year has also brought about a closer relation between our association and the State and sectional organizations. It has been our endeavor to be represented at each of the meetings of these various associations, with the result that there is a strong tie existing between our association, which is national in character, and these other bodies which are more or less local in their field of action. This is as it should be, as our association obviously cannot take up those questions of detail such as the local organizations discuss, but must necessarily work along lines which are more general in character. Our vice presidents and others who have officially represented the association at many of the meetings of these organizations during the year just closed, have done splendid work and much credit is due them for the time and energy expended in our behalf.

Member Companies Must Co-operate in the Association Work

Former presidents have touched upon the necessity for co-operation among our member companies in the furnishing of information to the association. Having been in close touch with the work during the past year, I have come to realize more clearly the need of this co-operation. Our member companies require at times certain statistical information to combat restrictive legislation, public ill-feeling and other adverse sentiments or conditions. The first thought should be, and in many cases is, the files of the association's headquarters. The association may or may not have investigated the particular subject in which the member company may be interested. If the subject has been investigated, certain data are, of course, on file, and if the subject has not been investigated, recourse is had to other member companies for such information as they may be able to furnish. These other member companies, however, may not have found the necessity for having the information asked for, either as applied to their own work or that of other companies, and oftentimes pay little heed to the requests from the main office. The consequence is, that though there is on file a great deal of information, it is neither in quantity nor quality such as an association of the scope of our own should have. A committee has been appointed to suggest certain subjects of investigation for the ensuing year, and I ask you to assist in the upbuilding of the association and the increasing of its value to the member companies in times of need by full co-operation in the furnishing of information when requested by the association itself or by any of its committees. We cannot hope to reach the point of maximum value to our members without your aid, and I might also say that the information furnished by non-member companies (and for which they received comparatively little in return) in comparison with that furnished by the member companies is far in excess of what would naturally be expected.

Criticism may be made that much of the information has been asked for at one time, more particularly this year, and that this fact precluded some of the smaller companies and, indeed, many of the larger ones, from giving the time necessary to properly provide the data called for. It is hoped that the coming year will see this remedied, and that the information will be gleaned at different times throughout the whole year. Doubtless, this will result in more generous responses, and I hope that you will each do your share toward giving as much of that which is asked for as you can consistently.

No doubt, there are many of us who fail to realize the great extent of the committee work of the various affiliated associations. For your information, I would state that last year 132 individuals were engaged in this work. The work of these specialists is fully set forth in the valuable reports which are being presented at this convention. In a way, every one of these committeemen has been added to the working force of your company. Surely, the careful thought of 132 master minds upon important subjects in the various phases of the electric railway profession cannot be other than of very great value to every member company. Many railway officials fail to realize the handicap under which these committeemen work in not receiving full returns from the various companies covering the questions asked by the committee bearing on the subjects under consideration. Surely, when so many busy men, having important personal duties to perform, are willing to devote their time and energy to the welfare of the companies in general, these companies in their turn should be more than glad to devote such time as may be necessary to supply the required information.

As indicative of the growing appreciation of the work of the headquarters of the association, it may be stated that during the year just closed nearly 1000 requests for information have been received, among which I would call particular attention to the following: inquiry relative to the practice of electric railways in connection with the use of air brakes on single truck cars; request for wages paid by the different companies in connection with arbitration proceedings; request for information relative to taxation; request for information regarding the minimum headway of cars and passengers per car mile for use in municipal investigation; requests for information regarding miles of track per population; information relative to the practice of different electric railway companies in connection with the handling of overages and shortages; information relative to compensation received by electric railways for carrying United States mail; information regarding the practice of different companies in connection with funeral car service; information regarding the operation of mail boxes on street cars; information regarding agreements with city and interurban lines relative to the use of tracks; information regarding the practice of different companies in connection with the handling of coal shortages, in addition to which have been many requests for information regarding transfers.

Financial Status of the Association

While great care was exercised by the officers of the association in the matter of expenditures during the year preceding the one just closed, the report of the treasurer on Sept. 30, 1908, showed a balance of but $3,365, which was a decrease of $2,772 in comparison with the balance at the close of the preceding year. This resulted from the fact that the work of the association was steadily increasing, while the receipts did not increase in like proportion, due to the financial conditions prevailing throughout the country at that time. The balance on hand for the year ended Sept. 30, 1909, was $10,564.79, an increase of $7,199.55 over last year, and a difference for the year of receipts over expenditures of $6,828.70. To make the figures for the two years comparable, however, we should deduct the amount gained by the association on account of better terms and arrangements for locating the 1909 convention in Denver, over those secured for the 1908 convention. With this deduction made, the balance would appear as $5,564.79, or an increase of $2,199.55 over the balance shown on Sept 30, 1908, which, considering the deficit of 1908, means an actual gain of $4,972.26. The expenses for 1909, as you will see, show a slight increase, but this is due almost entirely to the increased committee work and the necessary expenses of the newly formed Transportation & Traffic Association, which in 1908 was charged with expenses of but slightly over $100, while in 1909 this association has been charged

with $1,668, some of which expenditure, however, was incurred in 1908.

The Work of Our Affiliated Associations

I wish to dwell briefly upon the work of each of the four affiliated associations during this year.

The most important features of the work of the Accountants' Association has been the establishment, in connection with the division of statistics and accounts of the Interstate Commerce Commission, of a working basis for the consideration and determination of questions arising under the classfication of the commission, which, as you know, is similar to that of our own. The result of this arrangement is, that any questions coming before either the commission or the Accountants' Association are passed upon by the classification committee of the Accountants' Association. The second matter which I believe to be of importance, is the consideration of the uniformity of interline accounts and settlements which has had careful consideration by the special committee and which will report to the convention of the Accountants' Association this year. Another matter is the taking up again of the work begun at the 1904 convention of the joint committee of the Accountants' and Engineering associations looking to a clear understanding of the accounting requirements of the engineering officials. I feel this is a gratifying manifestation of the good the affiliated associations can do by joint action in establishing better relations and understanding between the representatives of the different associations in the same and different companies.

The work of the Engineering Association is done entirely by five committees which pay particular attention to equipment, power distribution, power generation, way matters and standards. The value of this method of conducting the work of the association is clearly shown by the admirable reports which are being presented by these various committees I wish to call attention, also, to the value resulting directly to the company in permitting its men to serve on these committees. While a large amount of time is necessary, they are brought in touch with other men in their particular field of activity and in so doing obtain a great deal of information, only a small portion of which, perhaps, bears on the subject in hand. The filling out of data sheets is also, in my opinion, of great value to the company, as it calls the attention of the engineers, as well as the higher officials, to the actual facts and conditions so far as their own property is concerned.

While the Claim Agents' Association has been active throughout the year in its particular line of work, I wish to call to your attention, especially, the interesting program which will be given consideration by that organization. In the past some managers have not given sufficient consideration to the claim department, but have looked upon it as an avenue through which possible dividends disappear, whereas there is no question but that, in many cases, a well-supported and well-conducted claim department will make it possible to pay these dividends.

The first convention of the Transportation & Traffic Association was held last year and the value of the work has done more than justice to this organization. During the past year its work, like that of the Engineering Association, has been done entirely through committees. The reports of these committees will cover the training of transportation employees, passenger traffic, transfers and transfer information, freight and express traffic, city rules and interurban rules. These committees have been very painstaking in their work and our association should take action in approving and recommending for adoption the reports of the committees on city rules and interurban rules.

I have already given consideration to the work of the different associations, the results of which are for the most part contained in the various papers and committee reports to be presented at this convention. Every railway man here should attend as many of these meetings as possible and should participate in the discussions. It is only in this way that the greatest value may be obtained from these convention meetings.

In closing this review of the association work of the past year it is not only my duty but my pleasure to call to your attention particularly the great assistance we have received at all times and upon all occasions from the technical press. This has come not only in the wide dissemination of our notices, committee reports, papers, etc., through the columns of the weekly publications, but also in the loyal support given to us in editorials and in valuable suggestions and information bearing on various lines of the association work.

The Exhibit of the Manufacturers

It is with great pleasure that I call your attention particularly to the magnificent, comprehensive and valuable exhibit which our good friends, the manufacturers, have brought together for your benefit. I wish to forcibly impress upon you the desirability of devoting as much time as possible outside of the hours of the convention sessions in which you are particularly interested, to the inspection of exhibits. By so doing you will not only find yourselves fully repaid, but you will also show to the manufacturers your appreciation of the time, effort and money which they have expended in this connection.

Committee on General Policy

While I feel that much of value has been accomplished by our own association this year in the gathering and disseminating of data required by member companies in specific cases, in the distribution of information covering the field in general, in the advertisement of the work of the association through correspondence, the distribution of literature, representation at various meetings held throughout the country and the publication of notices of the many committee meetings, all of which were fully described in the columns of the technical press, in the adjustment of this committee work along certain well defined lines which the experience of the past four years has seemed to determine and in the added strength which our increases in membership have given us, personally, I feel that much has been left undone. The great difference of opinion which has always existed concerning the nature of the work the American association should do makes it difficult for the presiding officer to settle upon any hard and fast policy for the prosecution of the work, and the realization that this condition should be immediately remedied has suggested to my mind the formation of a committee to consider and outline certain specific lines along which the American Association should work during the coming year. Your executive committee has appointed such a committee, and it is my hope that it will submit to the executive committee a detailed program of just what work the association headquarters should engage upon during the year 1910.

Closing Remarks

In closing, I wish to briefly dwell upon the future of the association. The affiliated associations have done much valuable work during the past four years and if they continue to advance in the future as they have in the past, we need have no fear but that they will take care of their share of the work in the best and most efficient manner. The American Association should at all times assist its affiliated bodies and give them every possible encouragement. This may be done by officially approving the standards created by the Engineering Association, the classification of accounts of the Accountants' Association, and the books of rules of the Transportation & Traffic Association; and giving official sanction to other important matters which are taken up and acted upon by these various bodies.

I wish to impress upon you not only the desirability but

the necessity of increasing the membership in the association, and thereby increasing the revenue with which to carry on this great work. There have been many things left undone in the past simply because the association did not have the necessary funds. Instead of a membership of 325 companies and 825 associate members, we should have a membership of at least 750 companies and 5000 associate members. Instead of an annual revenue of $38,774.20, we should have an annual revenue of from $60,000 to $75,000. These figures may seem somewhat startling to those who have not given the matter careful consideration, but they are no larger in proportion than what have been secured and are being obtained in other great national organizations of this general character.

Electric railways are now generally recognized as the most important agents in existence in reducing the congestion of the tenement districts and in permitting the city worker to bring up his family in the country where his wife and children can enjoy plenty of light and air and a freedom not possible in city life. At no previous period in the history of the country have the interests and welfare of our fellow citizens been so dependent as now upon the roads which we operate. A very large part of the credit for these results is due to the activities of this association and we may well be proud of what it has accomplished. Some claim that sentiment has no part in business. But it seems to me that every member of this association can properly be considered as having assisted in the development and extension of our industry and has, by just so much, helped to make the world better and has thus improved the physical, moral and intellectual condition of his fellow men.

THE HOSPITALITY OF DENVER

No higher compliment could have been paid to the local convention committee of Denver than the unanimous and sincere expression of approval heard yesterday and on Monday of the exhibit arrangements, the courtesies extended by the railway companies and many social and civic bodies in the city, the program of entertainment provided and the spirit of whole-hearted hospitality and good-fellowship which pervades all Denver. There has been nothing perfunctory in the efforts of the Denver City Tramway Company and the distinguished citizens of Denver who comprise the local committee to make the convention a success. They were on hand when the special trains began to arrive to extend a welcome such as is the privilege of few associations to receive in any city. They called on the delegates in their hotels to assure themselves that everyone was comfortable and satisfied. At the first social function of the convention, the reception at the Brown Palace Hotel on Monday night, the committee was present in a body to greet the officers of the associations and all of those whom they had not before had an opportunity of meeting. The reception accorded to the delegates of the associations by the citizens of Denver will long remain the most pleasant recollection of the first visit to the far West.

HEAVY FIRST-DAY REGISTRATION

The useful official list of members and guests of the various associations reveals the gratifying fact that the first day's registration was heavier than at Atlantic City. The first list at this convention contains 105 printed pages of names, compared with 84 in the corresponding list of last year. The list shows a total registered attendance for Monday of about 2150, of whom about 735 are ladies. Several hundred names were added yesterday, so that at the present time the total attendance is probably over 2500.

MEETING OF THE ENGINEERING ASSOCIATION

The first meeting of the Engineering Association was called to order by President Winsor at 2:15 o'clock in the Rose Parlor. Mr. Winsor then read his annual address. This appears elsewhere in this issue. The president announced that he would be obliged to attend the meeting of the American Association and the vice-president, F. H. Lincoln, took the chair.

The secretary then read the annual report of the executive committee, consisting of the minutes of the meetings held by the committee Nov. 16, 1908, at New York, and Oct. 4, 1909, at Denver. Upon motion it was accepted.

The vice-president then called for the report of the secretary and treasurer. The secretary presented his report, showing the expenses of the year to have been $3,197.61. Upon motion the report was accepted.

The vice-president then called for the report of the committee on way matters. As it had been in the possession of members for thirty days it was not read. E. O. Ackerman of the committee presented certain minor amendments to the printed report. They are in the report as printed in abstract elsewhere in this issue.

Discussion on Way Report

Charles H. Clark of Cleveland said that he thought the 17/32 in. web of the 7-in. T-rail of Section A was none too strong. He believed that corrugation was caused to a large extent by the lightness of the web of the rail. In most cases, the web is about 7/16 in. thick, or less than ½ in. As the web in the rail of Section A was more than ½ in. it should be approved. The rail of Section B has a web only 7-16 in. thick. This is too light. The rail shown in Fig. 3 is the standard used in Minneapolis. The flange way blocks shown were cut and he thought that it cost about 6 cents each for cutting the blocks which averaged 4 in. to 5 in. in width. That is, it cost about 36 cents a foot for cutting these blocks on both sides of the track to go under the T-rail. The blocks are of granite, and the rails are cast welded, a process of which he did not approve. In Cleveland, all new track construction is standardized for steel ties and this construction was required by city ordinance. The construction differed somewhat from that on page 399 and used in Utica, which was also with steel ties. In Cleveland 10 in. of concrete is laid longitudinally under the rail. This, with a 5 in. tie, gives 5 in. of concrete under the ties and 10 in. under the rail between the ties. The concrete is installed first between the ties and under the rail and then the space between is filled with dirt so as not to have over about 5 in. of concrete under the pavement. Mr. Clark approved of the recommendations of the committee in regard to T-rails, except that in large cities like Jersey City, Newark and Boston, where the teams follow the track, it might be necessary to use granite paving. In Cleveland, Rochester, Syracuse, Utica and Toledo, and other cities in the Medina stone country, that stone is used and makes a very fine pavement except where the teams are confined strictly to one place. Under such circumstances it will rut out. With asphalt paving, where the teams follow the tracks as in Buffalo and a half grooved rail is used, a groove is worn in the pavement about one half inch below the head of the rail. For such streets, the committee recommends a girder rail, adopting the recommendation of the 1907 committee on way matters, of which Mr. Clark was a member.

This section is called the Cleveland section. It is a 7 in. rail with a 3 in. head, about a ¾ in. slope back and a ⅜ in. groove. The top of the groove is ½ in. under the head of the rail and the side of the groove projects out about ⅜ in. toward the pavement. That was on account of automobile tires. When wagons drive in the tracks, they sharpen the rail. On other sections such as the No. 95-319 and the 94-

313, this injures automobile tires. Where this is apt to occur, Mr. Clark believed it desirable to use a rail with a groove sloping out like a trilby section although not so wide as the true trilby. The 7 in. rail has been adopted in Cleveland because it gives a low weight with a strong rail. On Prospect Street in Cleveland, the company is using this rail with a 5 in. paving stone. The cost of the paving stone at Medina is about $1.45 and the freight from Medina to Cleveland is $1.45 a ton and there are about 3½ yards to a ton. This 5 in. block gives just as good a paving as a 7 in. block. The 7 in. rail is also well adapted for brick paving, with a 5 in. or 4 in. brick. Mr. Clark built a line on Long Island with 80 lb.A. S. C. E. rail with a brick paving and it is giving satisfaction.

As regards specifications for open-hearth steel rails and rolling, he did not believe enough was known to justify the association in saying very much about the subject. He was using open-hearth rails at present and could not get anything else now, but the companies perhaps will go back to Bessemer. A prominent steel man had told him that Bessemer was as good as open-hearth rails. Mr. Clark thought that engineers should advocate wider treads for the wheels. This would require a wide headed rail and for that reason a 3 in. head was adopted in Cleveland. As regards special work, he thought most manufacturers were doing all they could for the companies but believed it would be a good idea, in placing orders for special work, to specify that the heads of the rails should be planed back 4 in. because he believed that the companies before long would adopt wheels with a wider tread.

George Weston, Board of Supervising Engineers of Chicago, said that the Chicago City Railway Company and the Chicago Railways Company were confined to a type of grooved rail by ordinance, although he believed that every engineer who had studied track construction and had had anything to do with its maintenance and care would prefer a T-rail track, provided the pavement could be laid in a permanent manner to withstand wagon traffic, abrasion, etc. The Calumet & South Chicago Railway Company had recently been granted the right to use Shanghai T-rail construction on certain streets in the outlying districts, subject, however, to the approval of the Board of Supervising Engineers. He hoped to be able from this installation to obtain some information regarding the Shanghai rail track construction. He said that in Chicago very little T-rail track construction had been laid up to the present and where the companies had installed it they had met with serious objections from the aldermen, teamsters and citizens generally, who seemed to object to its use. Up until about two months ago the paving done in the T-rail track construction was brick, with a groove in the brick that fitted up against the rail and the flangeway ran in a groove formed by the track. It developed that a great deal of heavy teaming on some portions of the streets on which this track was laid resulted in the abrasion or breaking down of this groove or nose on the side of the track and a method had recently been adopted in Chicago of laying the track, which is shown on page 700. The ordinary paving brick is laid flat on the end and crowned in the center. Mr. Weston thought, from the experience he had had with the nose brick, that this plan will be more satisfactory. They had not tried as yet the use of granite block, along the side of the rail, but he was greatly impressed with the advantage it would have in keeping the pavement in contact and preventing the wear.

He said he wished to make the same criticism as Mr. Clark about the digging of tie holes for the steel ties. In Chicago they first adopted something along that line—that is, they had a heavier section of concrete where the concrete was laid under the ties, but excavated to a less depth in between the ties, leaving a little truncated formation of earth. It was found, during the construction, however, that the men tramping over the concrete in the work of laying the track, tramped this earth down and it was necessary to clean it out, if they wanted to maintain the exact section of the grade, and then put loose dirt back in the track. After considerable study and observation they had concluded it would be better construction to excavate the track to one level throughout and have the concrete all of the same level and roll the foundation. With the digging of tie holes it was impossible to roll the foundation, and he believed that that was a very serious objection. Their type 3 track has a rolled stone foundation with ties on 2-ft. centers and the concrete in between the ties. With this type of track they had observed in many cases that when they rolled this foundation they would find a great many soft places. These spots would probably never have been discovered if they had not put the roller on the foundation. He also believed it was advisable in the long run to install plenty of concrete, to excavate the foundation to a uniform depth and to roll the foundation. These remarks applied to all types of rails.

In designing their track they had hoped to develop a track construction that might be divided into a sub-structure and a superstructure. They had concluded that a wooden tie entirely encased in concrete would be preserved against decay. That theory formed really the basis of the Chicago track construction. The life of the tie was such an important factor in track foundation that they had made a study of the preservation of timber and last year changed their specifications to call for a treated tie. They concluded that a chloride of zinc treated tie would be satisfactory for their purpose, because in a paved street the tie, particularly when imbedded in concrete, is preserved against the action of rain, and the salts are not leached out of the timber. It is a fact that where chloride of zinc is impregnated in timber it will preserve the timber against decay. In Chicago the standard treatment was the chloride of zinc treatment. The specifications, however, also covered the treatment of ties with creosote.

Mr. Weston referred again to the fact that a permanent foundation with a removable structure formed the basis of the Chicago track construction. They intend to preserve the tie from destruction from the action of the rail by the use of tie plates, because in street railway construction, where the track has to be built and the street closed before the cars can be put on the track, it is absolutely necessary to have the tie plate firmly in place before the cars go on the track. That fact prevented the use of a tie plate with corrugations, or the Goldie type of tie plate. Mr. Weston said he thought that type of plate was all right for steam railroad construction, where there was an open track and the construction train and cars could be run over the track, and it was not necessary to pave up to the track and there was a fixed grade immediately upon the completion of the track construction. To make the tie plate a part of the tie they fastened it to the tie with lag-screws, then if there was any movement of the rail it would expend its action on the tie plate and not destroy the fiber of the tie. In their investigation of the failures of track which had been laid in concrete foundation, they had found that in almost every instance the fibers of the wood had been destroyed from the action of the rail and that caused motion in the track and finally disintegrated the concrete. To have their track renewable, without disturbing the tie or foundation, they had adopted the use of screw spikes and hoped that if the ties were preserved against decay, and the tie plate filled its office, and the screw spikes were satisfactory, they would be able to remove the screw spikes and then the rails without disturbing the foundation.

He thought the specifications submitted by the committee for open hearth rail were a movement in the right direction. Their standard rail the past year had been the open hearth rail, and their carbon specifications were the same as recommended by the committee, that is from .60 to .70. The only point of advantage that they had been able to observe up to

the present time in connection with the use of open hearth steel was that in their electrically-welded joints they had had very much less breakage this year. In 1908 they had used a Bessemer rail and on some streets had about 1 per cent breakage. But up to the present time with the use of open hearth steel the breaks had been very much less by comparison and he thought that a point greatly in favor of the open hearth steel. Of course, they expect also to get greater life and greater wear out of the rails, but since these rails had just been laid in the track, he could not make any comparison.

In conclusion, Mr. Weston asked for the experience of the other delegates in regard to paving on concrete foundation. On their work, although they take a great deal of care, they had had trouble with the paving coming up along the rails, both on the inside and on the outside, or else the water seemed to get through the joints, although in some cases they had grouted and in some instances had filled the interstices with tar. The water seemed to cause some action which tended to force the sand up through the joints and then they would find small holes, like worm-holes, all through the pavement, and then the pavement would settle.

Mr. Clark of Cleveland, Ohio, said on that point that in all the track he had recently been laying he had been installing a 6-in. vitrified sewer pipe, buried in ashes. Ashes for this purpose were better than gravel or broken stone. This pipe was laid in the center between the tracks about a foot below the bottom of the ties, and connected about every 50 ft. with a man-hole, leaving an open space of about a foot wide. This they do not fill with concrete, but fill it with broken stone, which they carry across to the pipe. He had found that this would largely prevent a loosening of the blocks. All that was necessary was to take care of the water. The water was what caused the trouble. Their Clifton Boulevard track is alongside a grass plot which the company has to keep sodded. For 21,000 ft. on both sides of the street they had laid a 6-in. drain tile alongside the track, a foot under the ties. They then raised the track 3 in. and put 5 in. of slag under the ties, and paved the entire track with slag. This slag was rolled with a corrugated roller, with horses. They adopted a peculiar way for building the pavement. They put a 2½-in. bevel on the top of the rail and then sprinkled it with fine slag and rolled it with the corrugated roller. It was rolled probably 50 to 60 times, back and forth. They did not use a steam roller because it would not compact the pavement, but would push the material ahead of the rolls. The use of rollers for track beds was desirable but expensive.

R. C. Cram, of the Connecticut Company, said he was a firm believer in T-rails. Several cities in Connecticut had insisted, however, on his company using grooved rails for certain short sections of their track, but they were not so satisfactory as T-rails and it was harder with them to keep up joints. The section generally used is what is known as the Boston section. This rail is laid on a concrete stringer construction. The preferred form of construction consists of a T-rail, either 5-in. 80-lb. A. S. C. E. section for trunk line interurban work and even for small towns when used with a 5-in. or even a 6-in. macadam roadway; or else the 7-in. 95-lb T, Milwaukee section, that is, section 272. The only trouble with that rail was where a wheel tread wider than the head of the rail is employed. The speaker thought a 3-in. tread unnessarily wide.

Victor Angerer, of Wm. Wharton, Jr., & Company, said that he thought Mr. Clark's point in regard to thickness of the web well taken. He also agreed with Mr. Clark in advocating a wide head rather than Mr. Cram, and thought the wider widths would be the coming thing. As to open hearth rails he believed that nobody had had the experience necessary to speak about them conclusively. He thought the same principle applied largely to the subject of specifications for steel rails. Although he had had experience with manganese steel for the last 14 years he would still be unable to prepare specifications for manganese steel, because the subject would carry one into a field which is almost beyond the scope of ordinary practice. It was possible to design proper grooves for curves and the report on this subject in the way report was by one of his engineers. But the trouble was that railway companies usually ran different kinds of cars, with different wheel bases and different wheels and wheel flanges, over the same track, and it was impossible to take care of them all. It was not sufficient that the manufacturer should suit his products to the conditions, but the track man and the engineer should see that the track or special work was installed in accordance with the intentions. A great many track men were so accustomed to the idea that curves must be laid to wide gage, no matter what the rail or what the wheel flange was, and when they get a special work which had been fitted and constructed to the standard gage, they would pull the pieces apart to get a wide gage, and the result could easily be imagined. When the wheels and wheel bases of the trucks should be standardized, the curves could be made to suit. As long as companies run various wheels and various wheel bases over the same curves it is impossible to have a well-fitting curve and get the maximum wear out of it.

Mr. Clark asked Mr. Angerer if it was the practice of the companies to plane the head of the inside rail and the groove of the outside rail.

Mr. Angerer said that when the curve was not wide enough to accommodate the wheel flanges of course the groove had to be planed out. The practice of his company was to plane the side of the head of the inside rail and the side of the guard of the outside rail. That, however, he believed was not the general practice. Some of the engineers specified it, while others specified that the guard should be planed on both sections. They have adopted the practice mentioned because they wanted to preserve the full thickness of the guard of the inside rail, which gets the most wear, while the guard of the outside rail gets the least. Again, the head of the outside rail would be worn sideways as long as the inside guard was sufficient, so they wanted to preserve the full head there.

W. H. Evans of Buffalo did not see that it was really necessary that the rail should be as wide as the wheel tread, though the wheel should always be as wide as the head of the rail. Many companies throughout the Middle and Western States have to operate cars with wheels of sufficient dimensions to pass successfully over steam railroad lines. He thought it very desirable to use a wheel tread at least 3 in. wide rather than to try to get them narrower. In speaking of T-rails he said that Denver was probably the first city in the country to adopt T-rails, and had used nothing else since, and in his opinion the T-rail was largely responsible for the excellent track condition in Denver.

President Winsor asked Mr. McAloney to give some information about the weight of the cars used in Denver.

W. H. McAloney, Denver City Tramway Company, said that the heaviest car they had was 43 ft. 3 in. over all, with seating capacity of 52, and had four 43-hp motors, and weighed 43,000 lb. He thought the weight of cars was not the only factor in rail wear. A company could probably operate on the same section of rail or roadbed a 20-ton car stopping every 2 minutes, longer and with less damage to the track than it could a 15-ton car stopping every 30 seconds. The thrust of the car had a great deal to do with the wear to the track. In Denver there are a great many two-motor cars. The latest two-motor cars have two 65-hp motors each, carried on the No. 2 and No. 3 axles. Personally, he felt that with a two-motor equipment both motors should be on the rear truck, as greater leverage was thereby obtained in accelerating the car. Most engineers, he thought, took the stand that with only two motors, it was better to distribute the weight and the thrust, both in accelerating

and slowing, between the first and second trucks, but probably a little less power would be required with both motors on the rear truck.

Mr. Weston then asked if any delegate had had experience with the use of asphalt grout in pavement, as recommended by Mr. Simmons of Milwaukee.

Mr. Clark said that about three miles of track had been built in Cleveland with a board laid alongside the rail and the track kept about ¾ in. away, but instead of using asphalt grout they had used a rubber cement which melts at a greater degree of heat. This cement was made in Chicago. While satisfactory when properly installed, great care has to be used in heating this cement. The best plan is to use cast iron tanks and bring the cement to a high temperature, being sure to have the tracks clean, because if there was any dirt in the cement it would not make a water-tight joint. If properly prepared and applied nothing can loosen it. Grouting breaks away. Hence Mr. Clark said that every 50 ft. he left an opening in the concrete about 1 ft. wide and filled it with crushed stone and ran this stone to his drain in the center of the track. If drain tiling were used, costing for a 6-in. pipe about 4.6 cents a foot, and the cinders were obtained from the powerhouse, this drain tiling laid should not cost complete over 15 cents a foot and might save $15.

M. H. Brondson of Providence, R. I., though the entire quesquestion one of getting a good bottom for the track construction. The present tendency of his company was to space the ties closer, in fact, less than 2 ft., and there should not be any springing, provided the bottom is good and properly tamped. Many roads do not tamp under the rail and between the ties. This plan would leave a bad place for moisture to gather and cause pumping action to take place. Mr. Bronsdon referred to paving next to track which he had noticed in Denver. The concrete was carried clear over the track to form the top surface and the street proper, adjacent to the track, was paved with an asphalt surface. It looked like a desirable kind of construction.

Mr. Weston explained that his remarks did not apply to deflection in the track due to bad foundation or an insufficient number of ties, but to vibration. He thought that a destruction of the grout in the track could occur even if the track was perfectly stable as regards deflection. It could be caused simply by the vibration resulting from the operation of the cars.

Mr. Schreiber wished to point out that in the way committee report there were two issues which should be thoroughly understood. First, the use of T-rail in paved streets. This question could not be settled solely by the railway companies, but required the co-operation of the municipal authorities of the town or city in which the street railway operated. In the report the endeavor had been to show that in many instances T-rails are practical and desirable. Denver was an excellent example of this. Municipal engineers, however, held the key to the situation and would always have their own ideas, but if the railway engineers could convince the municipal engineers in cities where T-rail was not approved that it was not good judgment to demand a grooved rail like that in New York and Philadelphia, a very valuable work would have been accomplished. The second point was that it was practical to limit the number of rail sections and to standardize both T and girder sections. The desirability of standardizing rail sections could not be too strongly advocated. The large number of sections in use was absurb and unreasonable. Some of the sections required the examination of an expert to discriminate between them, but they might require materially different rolls. There were, he said, upwards of 200 sections in general use, and that meant that the steel companies were paying to store and keep in repair all of the different rolls required to say nothing of the money invested in these rolls. Eventually this extra expense had to be paid by the street railway companies. Of course, with varying weights of rolling equipment, pavements and other conditions it was necessary to experiment so that there was an excuse in part for such a variety of sections, but now it was high time to eliminate a great number of sections. Standard rail sections meant better deliveries and cheaper steel, and this applied to all the accessories of track construction such as joints, braces, etc. He therefore hoped that the seven sections named in the report would be adopted as standards and further that the managements of the railway companies would begin to order rails for renewals according to those standards.

Referring to track foundations, Mr. Schreiber said that he used and always advocated a rolled sub-grade and a trap rock ballast under the ties, whether the track was open or in a paved street. In the street it was simply paved with concrete between the ties and the paving put on top of the ties. He did not use any concrete for foundations, because stone ballast was cheaper and gave just as good service. He did not have any settlement of the tracks, although fairly heavy cars were operated over it. With stone ballast also the important question of drainage need not be considered. There was a natural drainage in stone ballast, and water was practically unknown except in a few cases.

Mr. Schreiber had always been in favor of treating ties. During the past summer he had made extensive experiments in connection with the preservation of ties. He thought that zinc chloride was going to prove a very good treatment. In using zinc chloride, the ties were given a superficial treatment of high anthracite oil which was found in carbolineum. The Denver system used the same preservative. It was found advisable to treat the ties first with a high-class preservative, such as carbolineum, applied hot in an open tank, and then to place the tie afterwards in a cold bath in zinc chloride. This gave a heavy penetration. This treatment should not be confused with the Card process, which places the zinc chloride on the tie first and the creosote on the outside afterwards.

A. E. Bong, roadmaster, Utah Light & Railway Company, Salt Lake City, believed that the engineers should stand solid for the use of T-rail, and that finally by fighting for it the municipal authorities would sooner or later come to an agreement. As a matter of fact, the best track maintained and operated was of T-rail construction. In Salt Lake City nothing but T-rail was used. In that city there was some girder rail construction which has not proved a success. The ball of the rail wore out and the wheels cut down to the flanges, causing friction and requiring more power to operate the cars. He was using in Salt Lake City a carbolineum-treated tie, and believe it was a good thing. It had proved so in the tests which have been made. Untreated ties had been placed in the same localities as treated ties and after five years the untreated ties had almost disappeared, whereas the treated ties were still in good condition and were good for a number of years to come. The matter of drainage was quite a problem. In some places where there were good sewers, it is easy to connect the track to the sewers. In Salt Lake City unfortunately there were few sewers and the drainage was always good. Referring to joints breaking down, he thought it was a good plan, wherever it could be done, especially in paved streets, to lay the joints up close. In the past he had laid track with allowance for expansion, but for a number of years in paved streets he had used no expansion allowance but made the joints tight as he could, and held them by cooling the rails with water.

The president then read a written communication from C. G. Young of New York City ,bearning on the committee report.

W. H. Evans, Buffalo, N. Y., called attention to one point which he believed would develop as quite important. The desirability of moving electric railway equipment over the steam railroad lines on its own wheels had come to his attention. This practice would be increased materially as

the art advanced. This was a further argument for providing the necessary special work to take a wider-tread wheel. It was possible that a compromise might be reached between the standard steam railroad tread and the 3-in. interurban tread. He recently had experience with 3½-in. tread wheels on an interurban line. They ran through the main streets, and except for the trouble experienced with some of the older special work, which was ground out a little to clear the wider-tread wheels, little trouble was experienced and the cars have been running satisfactorily ever since.

Mr. Ackerman in closing the discussion referred to the objection raised by Mr. Clark that the width of the ball of the rail was not sufficient. The association had adopted as standard a 3-in. tread wheel, and also a 2½-in. tread wheel. This wheel was pressed on the axle to ¼-in narrow gage. With the 2¾-in ball of the rail an overhang of the wheel tread of ⅛ in. on either side of the rail is allowed. The committee thought this would not interfere to any extent with any pavement, and at the same time would give a full contact surface with the rail.

With reference to Mr. Weston's remarks relative to the preservation of timber in concrete he himself had had no experience. A few years ago he was led to believe that concrete would preserve the timber, and laid a considerable quantity of white oak ties in concrete, using 6 in. of concrete under the ties and bringing the concrete up to 1½ in. over the ties. That construction was laid in 1901. This year he had occasion to join to that construction at the end and to continue a further construction of the line. He found it necessary to make some excavation at the end of the rail and thought he would investigate the condition of the ties. He took up some half dozen ties and found them largely decayed. This he attributed to the fact that the concrete was somewhat broken in the thin shell that covered the tie, permitting some water to find its way down, and as there was no outlet for the water it resulted in decaying the timber.

With reference to paving blocks rising up along the rail, it had been his experience that the blocks would frequently rise along the rail for the first year after construction, and after a considerable amount of vibration the places seemed to be filled up, so that the blocks got a better seating, and not so much trouble was experienced later on. With reference to pitch filler and asphalt filler, any of these fillers would prevent the blocks from rising. The vibration of the track structure would permit some sand or dust to find its way down under the blocks and give a constant strain on each block which would push them up. In most cases with grout filler this did not occur as frequently as with pitch and asphalt filler.

With reference to the joints on girder and T-rails, he thought that the T-rail is susceptible of being joined a great deal better and more securely than any girder rail ever made. As to light and heavy traffic, a 16 or 18-ton city car operating under 6 to 10 minute headway could be considered as light traffic, and heavier interurban cars or heavier city cars operating more frequently as traffic which would call for the heavier rail. He disagreed with the statement that the frequency of the traffic did not affect the rail to be selected, for the reason that the rail surface was worn more rapidly than most persons realized. After a few years, if there was not sufficient metal in the ball of the rail the rail would be worn so thin that it would have to be discarded. For that reason frequency of service called for a deeper ball to give the rail longer life.

He had had some experience in maintaining a T-rail track on a foundation of concrete girders, 15 in. wide by about 18 in. deep, and 16 ft. long, placed close to the rail, with a space of 2 ft. between the ends of the girders. This was the first concrete foundation work which he had constructed in which no timber was used. It was laid in 1897, and at that time he was unfamiliar with that class of construction, in consequence of which he endeavored to surface the concrete before laying the rail. The rail was then laid on the concrete, previously to which there had been placed anchor bolts in the concrete girders about 12 in. apart on either side of the rail. The rail was put on and thoroughly bolted down to the concrete girders, so that there could not be any movement between the two. A thin grout of cement mortar was filled around the base of the rail and over the anchor bolts, and a common Lorain section, 7-in. T-rail splice bar, was placed on the rail. Today that track was in as good condition as when laid. He attributed that to the use of anchor bolts largely. They seemed to hold the rail ends down, and prevent vibration between the ends. The pavement was granite block, which has had very little repairing done to it, and there had been no repairing of the track work.

Mr. Ackerman then presented the following recommendations of the committee for adoption as standards:

1. For track construction where the type of pavement will permit, as in macadam or other shallow pavement, your committee recommends the adoption as standard of the T-rail weighing not less than 80 lb. per yard adopted as "recommended practice" by the American Railway Engineering and Maintenance of Way Association, April 22, 1908.
2. For track construction for the heaviest service in connection with deep block pavements, your committee recommends the adoption as standard of a T-rail 7 in. high with a 6-in. base, 17-32-in web and a head 2¾ in. x 1 11-16 in. and weighing about 100 lb. per yard, as shown in the drawing marked Fig. 1, section A, of the report.
3. For track construction for light service, in connection with deep block pavement, your committee recommends the adoption as standard of a T-rail 7 in. high with a 6-in base, 7-16 in. web and a head 2½ in. by 1 9-32 in. and weighing 80 lb. per yard, as shown in the drawing marked Fig. 2, section B, of the report, which is identical with the Lorain Steel Company's section 335 and the Pennsylvania Steel Company's section No. 277.
4. For track construction for heavy service in connection with deep block pavement on streets where the traffic is confined to the railway strip, or is so congested that the railway strip is continually used by vehicles, such conditions as exist only in cities of the largest class, your committee recommends the adoption as recommended practice of the half trilby girder sections shown on pages 122 and 123, Vol. 1 of the proceedings of this association for 1907, which sections were recommended by the sub-committee on rails and rail matters to the convention at Atlantic City in 1907.
5. In the matter of the use of open hearth and manganese steel rails and the increased width of gage on curves your committee wishes to report progress and recommends that the subjects be contained.

Mr. Ackerman moved that the recommendations be referred to the committee on standards with instructions to pass upon them as soon as it could consistently do so. The motion was unanimously carried.

William Roberts, Northern Ohio Traction & Light Company, referred again to the question of the wheel bearing on the rail. It was a matter of great surprise to him that the coefficient of friction between the wheel and the rail might vary from 25 to 40 per cent. That variation made a very great difference in the wear on the rails. Another matter which would be surprising to those who had not had actual experience was the weight of cars. Some three or four months ago it was determined in the City of Cleveland to weigh all cars coming into the city over the interurban roads. The weights that were given to the committee before the cars were weighed did not come up to the actual weight by six or seven tons. On weighing the cars it was found that some of them which it was thought would weigh 17 tons actually weighed approximately 20 tons, and those which it was thought would weigh about 33 tons weighed approximately 37½ to 38 tons. That had a great deal to do with the wear on the rail.

Mr. Roberts then moved that the paper be received with a vote of thanks to the committee. The motion was unanimously carried.

The meeting then adjourned.

PRESIDENT WINSOR'S ADDRESS TO THE ENGINEERING ASSOCIATION

Denver greets our seventh annual convention with her bright sun, clear air, her wide streets and beautiful buildings, her rolling prairies and distant mountains! With true Western hospitality she throws open her houses to us, and for our convenience closes her streets to her own people. The City of Denver through her mayor and her citizens, through the Board of Trade and through the street railway company has done everything conceivable to prepare for our reception and to make our stay pleasant and profitable. We are glad that we brought our seventh annual convention to Denver.

The relations existing between our various associations are the very best. President Ely's far-seeing plans and tireless efforts, ably carried on by President Shaw, the hearty cooperation of affiliated associations, and the generous and thorough work of the Manufacturers' Association, have rendered possible this Denver meeting. The American Street & Interurban Railway Association, and its affiliated associations, the Accountants, Engineering and Claim Agents and the Traffic, is today big, alive and powerful; and the work that it has done for the street and interurban railways is tremendously to the benefit of them, their owners, the communities through which they operate, the people that they carry, and last, but not least, to the officers and employees, arousing an interest that makes our work a daily joy and profit.

It is a great pleasure to call to your attention the fact that all our reports were completed, published and in the hands of our members fully a month ago. Through the action of your executive committee, copies of these have been distributed to the associate members, and with the approval of President Shaw, extra copies have been sent to the member companies. In this way the committee work as represented by the papers has been widely distributed, so that you all come here with a full knowledge of the work that is before you, with the result, I hope, of a full and profitable discussion. The work of your committees has been most thoroughly and painstakingly done. The reports that have been presented to you, and which will come before you for discussion are most interesting and useful. I sincerely hope that you will second the work of your committees by doing your part, by entering into the discussions and making them as full and valuable as the papers themselves.

This year, for the first time, the preparation of papers has been entirely in the hands of standing committees. Our work naturally divided itself into distinct classes, so that the work of the various standing committees is clearly defined, and the personnel of these committees will largely be carried forward from year to year; the work will become simple and each year's work will supplement the work that has gone before. I believe that this form of organization is correct, and will work out to be very beneficial.

Gentlemen of the Engineering Association, we are extremely fortunate in being in a line of business which is not only in itself tremendously interesting, but in which we cannot work solely as individuals, each in his own small sphere. Each of us must work with the others in his own department, and with the other departments of his own road, and more fortunately still, he must work with the other roads, and with other engineers, and last, but not least, with the manufacturers. It is this that makes the work of the street and interurban railway engineer the most interesting that can be imagined.

In the past many companies, owners and managers have questioned the usefulness to them of our associations, and some, at least, have believed that it is not to their interest to pay dues, and to have their men take the time necessary to do our committee work and to attend our conventions. I believe, however, that this feeling has been pretty thoroughly eliminated, and it certainly will be in the minds of those who attend this convention. The work done by our committees as shown by the reports speak for themselves. The standards that we have adopted, the practices we have recommended, and the complete information that we have got together, will work for a direct money profit to the railway.

There is another point in connection with our work, which seems to me fully as important as the papers, which are generally pointed to as the profitable work of our association, and this is the arousing in the individual an interest in his work. I believe that the best way, if not the only way, to get good and profitable work, both for the company and the individual, is to make the men interested in the business. Correspondence schools, night schools, lectures and all other aids to education are useless unless the individual is interested in his work. If we can arouse this interest the matter of education will naturally take care of itself. But without the interest there is no profit to one to study.

There is nothing that arouses this personal interest so far as I know, to the extent that it is aroused, as this association work. While a committee member gives up a very considerable amount of time to the association work, he gets fully repaid in the direct information he obtains from his investigation, but he gets a further profit, in my mind. The most important benefit is from his contact with his fellow worker, from his seeing what other people are doing, and from his aroused interest in his business. This is a matter that we should, as individuals, pay great attention to, and do everything that we can to arouse in the individual this all absorbing interest in his work.

I want to speak for the untiring and unselfish work done by your secretary-treasurer, Mr. Corning. He has served in his capacity now for several years, and under several presidents, and this year, owing to the financial condition in which the main organization found itself, has served without pay. I presume the work would have gone on if someone else had attended to it, but certainly his work has been of great profit to the association and to you, and has been appreciated by the officers and committees who have worked with him.

In conclusion I would suggest that in the future your association should continue the reports, on the same lines by standing and special committees, and should give particular attention to the question of standards, recommended practices and specifications. I believe that you can do a great deal of very profitable work on this last item—specifications. Your committees have offered for your consideration this year a number of specifications, and I believe that this work when more thoroughly thought out and organized, will be one of great profit to you.

In order that the coming sessions shall be what they ought to be, it is necessary for you to give your prompt attendance to the meetings, that you all come, and all enter into the discussions, and that you give of your spare time outside of the sessions to the examination of the wonderful exhibit that has been prepared for us.

IMPORTANT CHANGE IN ACCOUNTANTS' ASSOCIATION PROGRAM

The executive committee of the Accountants' Association has decided to abandon the session planned for Friday morning and will confine the business to the meetings of today and Thursday. This change was made in order that the members may have the opportunity of taking the trip on the Moffat Road, which has been arranged by the Manufacturers' Association for Friday. A similar change was made in the program for the meetings of the Engineering Association. All the sessions of the Accountants' Association will be held at the Hotel Savoy instead of part at that hotel and part at the Rose Parlor, Auditorium building, as announced in the official program.

TRANSPORTATION & TRAFFIC ASSOCIATION--- TUESDAY MORNING MEETING

The meeting was called to order at 10 a. m. by President Allen.

The report of the committee on interurban rules was read by C. D. Emmons, general manager, Fort Wayne & Wabash Valley Traction Company.

President Allen said that no amendments or suggestions which changed simply the typography or the grammatical construction of the rules would be entertained. Such changes would be submitted to the committee for consideration in 1910. He desired to repeat the burden of his remarks made on Monday that this was the first definite piece of work to come before the association for adoption, and he urged that it should be given careful consideration. He announced that the rules had been submitted to the executive committee of the American Association, and had been approved with the understanding that amendments might be made in the meeting.

The rules were considered by divisions and were not read.

William P. Rockwell, general manager, Syracuse & Suburban Railroad, Syracuse, N. Y., asked what was meant by the sentence, "Employees, in accepting employment, assume its risks."

Mr. Emmons replied that this was the same as the rule of the American Railway Association, and had been upheld by the courts.

Time Tables

C. A. Coolidge, superintendent, Oregon Electric Railway, Portland, Ore., said that rule 84 "Supersedure of Time Tables," had been discarded by the American Railway Association, a great many years ago. In this connection he also wished to say that the conditions affecting the operation of many of the Western interurban roads are such that they are required to operate under the American Railway Association's standard code of rules.

One reason for doing this was that they could take trainmen from the steam roads and put them to work on electric roads with the assurance that they were familiar with the rules. Under the code of rules recommended by the committee, a steam railroad man would be absolutely lost. The interurban time table rules particularly give a steam railroad man considerable difficulty. The electric railways on the coast would be compelled to follow the code of the American Railway Association, regardless of what the Transportation & Traffic Association adopted.

Mr. Emmons replied that a careful study of the American Railway Association rules on time tables and the rules in the committee report on the same subject would show that there was not a great variance. The steam road rules provided that on the supersedure of an old time table by a new, a train running, for example, as No. 8 under the old time table could assume the rights of No. 8 on the new schedule and proceed under the new time table. Under the interurban procedure all that it was necessary to do was for the dispatcher to give that train an order to run as No. 8 under the new time table. He did not believe that the old time table should in any way affect the new schedule going into effect.

Mr. Coolidge moved that rules 84 and 85 of the proposed code be amended by the substitution of Rule 4 of the Standard Code of Train Rules of the American Railway Association which reads as follows:

Each time table from the moment it takes effect supersedes the preceding time table, and its schedules take effect on any division or subdivision at the leaving time of their initial stations on such division or subdivision, but when the schedule of the preceding time table corresponds in number, class, time of leaving, direction and initial and terminal stations, with the schedule of the new time table, the train is authorized by the preceding time table to retain its train orders, and assume the new schedule with the corresponding number of the new time table. Schedules on each division or subdivision date from their initial stations on such division or subdivision, and not more than one schedule of the same number shall be in effect on any division or subdivision.

W. R. W. Griffin, general superintendent, Rochester, N. Y., Railway Company, offered an amendment to the motion, that the American Railway Association rule be adopted in the code as an optional rule.

J. D. Wardle, superintendent Cedar Rapids & Iowa City Railway & Light Company, said that his road had been operating under standard steam road rules ever since it was organized six years ago. There has been no rule that has been harder to understand by the men than rule 4. Every change of time table necessitated special instructions, to all new men particularly, and especially to those who had not been well acquainted with steam road rules. He suggested that the interurban roads which operate under steam road rules might embody such a rule as a special time table rule, if desired.

Mr. Emmons called attention to the fact that most of the electric roads put their schedules in effect at an hour when there were no trains upon the road.

Mr. Griffin said his road was operating under the standard code at the present time, and was getting men from the steam roads. He had but little trouble handling those men because the rules used were practically unchanged. He wanted to see the interurban code rearranged and renumbered to correspond with the numbers of the American Railway association standard code. He, for one, would not use the code with the rules numbered as they were.

The motion that Rules 84 and 85 and Rule 4 of the American Railway Association standard code should appear in the interurban code and be optional as to which rule should be used, was lost, 20 to 13.

Movement of Trains

F. A. Boutelle, superintendent Puget Sound Electric Railway, Tacoma, Wash., said in referring to Rule 203, that the Puget Sound Electric Railway operated entirely under standard steam road rules. Rule 203 provided that where trains come from a branch line onto the main line at points where no train register is maintained, the conductor or motorman should ask the dispatcher whether all trains due had arrived or departed. Asking the dispatcher a question was equivalent to giving a verbal order, and was decidedly unsatisfactory. He contended that it was unsafe to take any verbal orders or give any right of track merely by word of mouth over the telephone. His practice was to issue an order the same as a clearance, being in effect a 19 order, giving to all trains a positive order stating what trains have passed and what trains have not passed. He suggested that some change be made in the rule to make it obligatory on the train crew to have positive orders or positive clearance. In rule 203a he took exception to the explanation of "protected by flag." On the coast they had a good many fogs and handled heavy freight trains. All Puget Sound Electric passenger trains are made up of two and three cars and are run at high speed. Motormen and conductors were required to take the same precautions as the steam railroads in preceding a train at a safe distance at all times with a flag. He did not believe it was safe to run at high speed within the range of vision as expressed in the rule. He believed that if a train has no rights on a main track it should be protected absolutely.

Mr. Emmons explained that the intent of rule 203a was that an opposing train should run only so fast that it could stop in one-half the range of vision on straight track. This was supposed to take care of fogs. The committee endeavored to make the rule as concise and safe as possible without making it as lengthly as some rules have been made to cover a situation of this kind. By adopting the wording as given in the rule and then providing for flagging around curves, it was thought trains would be protected under all conditions.

Mr. Boutelle thought that the wording of the rule gave the trainmen too much discretion. He believed that the rules for protecting trains should be made certain and definite.

P. P. Crafts, general manager Iowa & Illinois Railroad, Clinton, Iowa, presented an amendment to rule 219, which relates to the protection of trains when stopped on main line between stations. He could find no point in the rules where the proper procedure to be followed by the flagman is laid down. The amendment to rule 219 was as follows:

In case a train is stopped on the main line between stations or is delayed under circumstances under which it may be overtaken by another train, the CONDUCTOR MUST IMMEDIATELY GO BACK with stop signals, not less than fifteen hundred (1,500) feet, and at night drop a red fusee five hundred (500) feet in the rear of train. Day stop signals will be two torpedoes and a red flag, night signals two torpedoes, two red fusees, red and white lanterns. Place one torpedo on the rail and remain until another train arrives or until recalled. Motorman of any approaching train will promptly acknowledge signals and stop.

When conductor is recalled and no approaching train has arrived, light a red fusee and place a second torpedo two hundred (200) feet nearer his train than the first and return.

On exploding one torpedo approaching train will stop, then proceed with extreme caution; if second torpedo is exploded motorman will know that flagman has been recalled and will proceed cautiously, keeping a sharp lookout for train ahead. Conductor of any train stopped by projecting signals, will protect his train in the same manner as heretofore described.

When necessary to protect the front of a train the same precautions shall be taken by the motorman or a flagman, who may return to his train, after placing signals, to make necessary repairs. If necessary he may call in the conductor to assist him.

The dispatcher shall be immediately notified of a stop between stations. When ordered to proceed run train to front signals, if any, and remove same before proceeding.

Mr. Crafts explained that this rule was copied almost word for word from the rules of the Chicago & Northwestern Railway. He quoted a newspaper clipping outlining the accident record of the Pennsylvania, the Burlington and the Northwestern Railroads for the fiscal year, 1908. None of these roads had an accident in which a passenger was killed. A part of this safety, of course, was due to the use of block signals, but rear-end collisions are the cause of many deaths of passengers and trainmen, and he thought the efficiency on the Northwestern, on which this amended rule was used, indicated that part of the efficiency was due to the provisions of this rule.

Mr. Rockwell thought that 1500 ft. was an unnecessarily long distance to send a flagman back on a straight track. He believed in making only such rules as could be absolutely carried out.

Mr. Crafts agreed that perhaps 1000 ft. would be safe on most roads.

Mr. Emmons said that the committee and Mr. Crafts had had a long discussion on the subject at Washington. The committee felt in adopting the American Railway Association rule, which was very concise and definite, that it was doing the best thing. There appeared in large type in rule 219, these words: "Conductor or flagman must go back immediately with red signals a sufficient distance to insure full protection, not less than 1000 ft."

The amendment was lost by a vote of 30 to 2.

Mr. Coolidge expressed the opinion that rule 210 was altogether wrong in specifying the spacing of trains by distance. Trains should be spaced by time, by means of fusees and torpedoes, and not by distance.

C. E. Morgan, general manager, Indianapolis, Crawfordsville & Western, referred to rule 212 and moved that it be eliminated, as he believed it to be a dangerous rule Rule 213 covered all situations sufficiently.

Mr. Emmons said that he believed rule 212 was an essential rule in the operation of a road.

The motion of Mr. Morgan to eliminate rule 212 was lost, 19 to 14.

Mr. Boutelle moved that rule 203 be amended to read as follows:

A train must not leave its initial station on any division, or a junction, or pass from double to single track, without order or clearance, and until it is ascertained that all superior trains due have arrived or departed.

Where a train register is maintained it shall be the duty of the conductor to register and to note carefully whether all trains due have arrived.

If in such case the motorman or conductor cannot reach the dispatcher, the train will proceed on time table rights "fully protected by flag in advance of the train," then call from all succeeding telephone stations until he has succeeded in communicating with the dispatcher.

He also moved to eliminate rule 203a. The amendment was lost, 16 to 3.

Rules for Movement by Train Orders

Charles R. Henry, president and general manager Indianapolis & Cincinnati Traction Company, objected to rule 256. He thought that there should be eliminated from this rule the provision that the conductor should read the order back to the dispatcher. This was a matter upon which the Indiana roads had had a very full discussion at the time of getting up a code of rules with the State Railroad Commission. It was decided in that conference it should be optional with each company whether they should put in that provision. There was only one road in the State which had adopted that portion of the rule. The other companies believed that if the motorman read the order and the conductor took the order, the man not taking the order reading it carefully, that should be the end of it.

Mr. Emmons said that his road was the only one in Indiana using the double check. He felt that it was the only way to be absolutely sure that both men get the order and that they fully understood it. His dispatcher had rigid instructions to refuse to complete an order until he got the second voice over the telephone. The objection to it was the time that it took. He got trains over the road about as fast as the other companies and found no difficulty on account of the extra time needed. The committee was not a unit on this point.

F. W. Coen, general manager Lake Shore Electric Railway, said it had always been his idea that the train order should be received by the conductor. The place for the motorman was on his car, and he should stay there. In 10 years of operation he had seen nothing that indicated the necessity of having both receive or repeat a train order.

Mr. Henry moved to substitute the following procedure to obtain orders at telephone stations in rule 256:

The motorman or conductor, whichever is most convenient, will call the dispatcher, who will give such orders as are necessary, whereupon the one taking the order will write the same plainly, on blank provided for the purpose, with carbon copies provided for that purpose, and when he has finished writing the order, he will repeat it to the dispatcher, who will complete the order if correct, by giving the initials of the superintendent or other designated authority, and the time of completion, which initials and time shall be promptly written on the order. When the order has been properly completed, the one receiving the order shall then sign his name to the order, after which the order will be in force and effect. The one who has not taken the order will then read the order aloud in the presence of the one who has taken the order, and sign his name to the order, taking one copy for his use until the order is fulfilled.

He believed Mr. Emmons' rule took unnecessary time, and that the dispatcher paid no attention whatever to the second reading.

Mr. Griffin pointed out that any time a train movement was made other than as provided by the time table an element of danger was introduced. Any dispatcher's order was dangerous and he did not believe they could be hedged around with enough safeguards. He had known it to happen that one man would receive and write an order and repeat

it back; when that order was read by a third person it was not written as it had been given. He thought the third party should intervene in every case.

J. C. Calisch, Buffalo & Lake Erie Traction Company, said he would rather have the message repeated by the second man to the dispatcher and know that it was on record than to take the chance that the motorman might not read the order to the conductor.

S. W. Cantril, superintendent of transportation, Denver City Tramway Company, was opposed to dividing the responsibility between the motorman and the conductor. He preferred to have the motorman deal with the dispatcher.

H. A. Nicholl, general manager, Indiana Union Traction Company, read a letter from J. N. Shannahan, the chairman of the committee, who, since the report was printed, had changed his opinion on rule 256. Mr. Shannahan suggested the following rule:

Procedure if 31 order is given:

The dispatcher will give such orders as are necessary to the motorman, who will write the same plainly, and without unauthorized abbreviation, on the blank provided for that purpose with sufficient carbon copies for each person addressed and when he has finished writing the order he will read it to the dispatcher, who will O. K. the same, if correct. The motorman will then read the order to the dispatcher and if correct, the dispatcher will complete the order, by giving the initials of the superintendent, or other designated authority, and the time of completion. The time of completion and the word "complete," together with the signature of the conductor, shall be promptly written upon the order by the conductor, after which the order shall be in full force and effect. The conductor shall personally deliver copies of the order to each person addressed.

Both Mr. Henry's and Mr. Shannahan's amendments were rejected on vote.

Mr. Henry then moved to strike out "procedure under 19 order" as given in rule 256.

Mr. Henry made another motion that his first amendment as originally read be put in the rules as optional, alongside of the rule adopted.

J. H. Pardee, operating manager, J. G. White & Company, thought that there should be a provision that the interurban code was subject to the rulings of State Commissions or of laws or of municipal regulations.

The motion of Mr. Henry was carried by a vote of 19 to 17.

Mr. Griffin moved to amend rule 258 as follows: "To issue train orders at stations where there are operators or agents, the dispatcher will instruct the operator or agent to display a stop signal for the motorman and conductor to stop for orders. The motorman and conductor must not pass a station where such signals are displayed without reporting to the agent or train dispatcher, and until such signals have been taken down, removed or cleared.

"The dispatcher will give such orders as are necessary to the operator, who will write the same plainly and without unauthorized abbreviation on a blank provided for that purpose, with sufficient carbon copies for each member of the crew, and when he has finished writing the order he will read it to the dispatcher, who will O. K. the same if correct. The operator will thereupon sign his name upon the order and hand the same to the conductor of the train, who will then read the order to the dispatcher, and if correct the dispatcher will complete the order by giving the initials of the superintendent or other designated authority and the time of completion, which initials and time of completion, together with the signature of the conductor, shall be promptly written upon the order by the conductor, after which the order shall be in full force and effect."

Mr. Griffin's amendment was not seconded.

Mr. Coen thought rule 440, relating to ejectments, might involve some legal difficulties because it left to the discretion of the conductor where a passenger should be put off the car.

Mr. Emmons said that the paragraphs in this rule were submitted to the general counsel of most of the companies with which the members of the committee were connected, and it had also been taken up and discussed with counsel by the chairman of the committee. He felt that it had been fully considered from a legal standpoint and was all right.

Mr. Pardee offered the following resolution:

Whereas, the committee appointed at the last meeting of this association has prepared and reported a certain code or set of rules governing the operation of electric interurban cars, which code is intended to include such general rules as represent the best and most modern practice in electric railway operation, and

Whereas, this association has duly and carefully considered and amended the same in some particulars, and

Whereas, it is for the interests of the members of this association that the association adopt, approve, promulgate and recommend a code of rules which shall be considered the standard code, except in so far as it may, in specific instances, be necessary to omit, add to or change rules in order to conform to state or municipal laws and regulation or to local conditions.

Now, therefore be it resolved, That the rules reported by the committee and as changed, omitted or amended at this meeting be the standard code of rules of this association for the operation of interurban cars, until such rules may be duly amended or changed at a meeting of this association, and

That this association request its members to adopt this standard code of rules for the operation of interurban cars on their respective railways except insofar as such rules may conflict with State or municipal laws or regulations or be unwise or inapplicable on account of local conditions, and

That the committee on Interurban Rules be continued to report at the next meeting of the association such proposed changes or amendments as may seem wise or necessary.

Mr. Coolidge moved an amendment to the resolution that the standard code of train rules of the American Railway Association be substituted for the code as proposed.

C. J. Franklin, general superintendent, Portland (Ore.) Railway, Light & Power Company, seconded the amendment made by Mr. Coolidge. He said the rules of the American Railway Association were the fruit of many years of study by steam railroad men of the operating conditions with which they have had to cope during these years. He did not mean anything disrespectful to the committee, as he realized that the committee had worked hard. He asked, why not adopt the American Railway Association Rules in the beginning and insert such other rules as were necessary to meet local conditions?

Mr. Pardee explained that the amendment provided that the standard code of the committee be adopted, with such changes as would meet the electric operation of street railways. The standard code of the American Railway Association could not be adopted bodily, and would have to be changed and worked over to suit the conditions of the individual electric railways. That was exactly the work which the committee had been doing for the past two years.

The amendment of Mr. Coolidge was lost, 32 to 3.

The resolution offered by Mr. Pardee was carried by a vote of 41 to 3.

Mr. Coolidge then moved that the committee on rules be instructed to confer with the committee on rules of the American Railway Association, with the idea of making any changes that may be deemed desirable in either code of rules.

The motion, after some discussion, was unanimously carried.

President Allen appointed a committee, with Mr. Coen as chairman, to frame suitable resolutions to be presented at the meeting on Thursday morning thanking the committee for the work it had done.

The meeting then adjourned.

REPORT OF THE COMMITTEE ON EDUCATION*

By H. H. Norris, Chairman; R. E. Danforth, A. S. Richey and D. C. Jackson

The committee on education has devoted its attention during the past year to a study of educational methods by which the efficiency of the employees can be increased. This study has shown that educational work must be divided into two distinct classes.

(1) That directed to preparing properly educated young men for positions of executive responsibility, and

(2) That designed particularly for raising the grade of work done in all departments.

At the first meeting held, a circular letter was drafted for the purpose of obtaining data as to the present practice of the member companies along the lines mentioned. This letter was afterward sent out, and a large number of replies were received.

Since its appointment the committee has devoted the larger part of its attention to apprentice or cadet courses, designed particularly for technically trained young men. These courses are being developed by several of the member companies, the Metropolitan Street Railway Company of New York being a conspicuous example. The practice of the Public Service Railway Company was described in last year's report from this committee. This company continues the practice therein described, having about 20 technical graduates employed in the various departments according to a fixed schedule by which each so-called cadet is given work for a stated time in each of the operating departments. Ten of these cadets have been with the company over one year and, in several instances, show good promises of developing into excellent operating men, several showing marked ability in the mechanical department. After one more year's service, when these cadets will have covered the entire course, they will be assigned to the departments in which they show the greatest ability.

The company does not anticipate that every cadet will make good. Those who are found unsuited for the railway business are weeded out as their weaknesses develop. The head of each department devotes sufficient time to the cadets employed under his direction to be able to pass upon their qualifications. In order to describe the relative merits of each cadet their characteristics are divided into 10 points, each point counting 10 per cent; the total being 100 per cent. The head of the department expresses his opinion of the value of each cadet by the percentage system given him on his record while in his department. Those under whom cadets have been employed during the past year are well pleased with the manner in which they perform the duties assigned to them and their readiness to learn practical methods.

Before leaving for the time the matter of cadet corps, the committee desires to suggest to the Association for purpose of record the following resolution:

Whereas, The plan as outlined by the educational committee and put into practical use by certain member companies, under which technical graduates are systematically given opportunity to learn the rudiments of the various branches of the electric railway business has met general approval, and

Whereas, The association believes that the training obtained in the course as outlined is that best suited for preparing young men for responsible positions, before they are assigned to regular or permanent work in particular branches of the business, therefore this association hereby approves the plan, and recommends it to the various member companies, for the purpose of putting young men in line for responsible executive positions.

Having called attention to the importance of this matter, the committee has felt during the past year that the large body of young men who have not had the advantages of a technical education should now receive consideration. The committee was gratified at the response to its circular addressed to the member companies, the demand for a correspondence course being stated as practically unanimous. Out of the 75 replies 56 were entirely favorable to such a course, four did not believe it would be useful to them, while the remainder did not commit themselves one way or the other. The last named either failed to reply to the questions or in a few cases they doubted if the plan would be of help to them.

The committee asked for an estimate of the number of young men who might be interested in such a course if it could be established. The estimate returned by 50 companies was over 500, or an average of 10 per company. This response has convinced the committee that such a course has considerable possibilities. It affords a new channel through which the Association may serve its members.

The Suggested Correspondence Course

As indicated in the circular letter, it is proposed that sets of questions be sent out at regular intervals to the young men enrolled in the course. These questions would be so framed as to require the students to use every possible means for securing information. The students would be forced to educate themselves by means of their actual surroundings. The power house, the car barn and the shop may furnish excellent educational material. Foremen and superintendents are always pleased to answer intelligent questions, and hence they could furnish much useful information for the students. The companies could place at the disposal of the students a few books and periodicals, the questions of which would encourage the latter to study.

Replies to the questions would be sent into the central office where they would be carefully examined, revised and returned for correction if necessary. In the central office the service of a competent assistant secretary would be required. He would work under the general direction of the general secretary, who would be available for advice and suggestion.

Commenting editorially upon this proposed plan the **Electric Railway Journal**, July 3, 1909, remarks:

Attention has been directed from time to time in these columns to the work of the committee on education of the American Street & Interurban Railway Association. When this committee was appointed last year there was no distinct idea in the minds of its members as to its exact functions. The first duty was to determine the lines of work which were feasible and which would be of greatest service to the member companies of the association. As the individual members of the association had previously shown great interest in a study of methods for recruiting the executive and engineering forces of their companies, this subject was considered first. The time between the appointment of the committee and the date of the convention of 1908 was so short that it was only possible to obtain incomplete information from a few companies which were known to have successfully inaugurated definite plans for educational work. No recommendations were made in the 1908 report, as the data were not complete enough to enable the committee to draw conclusions.

During the past year the committee has been accumulating a large amount of information, which probably will result in the formulation of several important recommendations to be presented to the association. The graduate apprentice plan has had a gratifying development and the member companies are regarding with increasing favor the systematic recruiting and training of technical graduates in electric railway work. It will be a number of years before the results of the application of this plan will be evident, but one confidently expected result is an increase in the number of technically trained men occupying positions of executive responsibility.

In addition to the work on the apprentice scheme, the committee has devoted attention to the problem of helping the large body of young men who can never hope to secure a college training. These young men must educate themselves while holding their present positions. Many of them only need encouragement and guiding in this commendable educational process. It is the intention of the committee on education to formulate a plan to supply the incentive to study and to suggest lines of profitable application to stu-

*Abstract of report read before the American Street & Interurban Railway Association, at Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

dent employees. The committee believed the establishment of a correspondence course under the auspices of the association would bring about the desired end, but had some doubt as to whether such a plan would meet with the approval of the member companies. Since the replies have been received to a circular letter sent out on April 10, asking the member companies their opinion as to the value and need of such a correspondence course, all doubts have been removed. With practical unanimity the plan has been endorsed. One company writes:

"We feel that anything which can be done to increase the knowledge of employees must not only benefit them, but also the company, in making it possible for the company to secure a higher standard of efficiency of the work of the men. If there is any organized movement of this character it will raise the standard of efficiency of street railway employees in general."

Replies from other companies have been equally encouraging, and it now remains to ascertain the practicability of such a plan by putting it into effect.

It is understood that the committee will recommend that a correspondence course be established by the association, with the stipulation, however, that a financial plan be devised by which no additional burden shall be placed upon the treasury of the association. It is probable that it would be necessary to appoint an assistant secretary, who would have charge of the educational work and devote his entire time to it. No doubt such a plan would cost a considerable sum of money annually to maintain, but if those in favor of the scheme can demonstrate that it will produce the desired results the money will be forthcoming.

There is no agency which can do this work more efficiently than the association as at present organized. The general secretary is in a position to give to the suggested new department his advice and general oversight. If a man with the proper qualifications can be secured to manage the details, there is not any question as to the ultimate success of the plan. He must be a practical railway man, who is in hearty sympathy with the desire of young men for advancement and education. He will need tact and patience, and will find it necessary to frequently visit his pupils and their employers in order to maintain a close personal interest in them. He must be one who has worked in the shops and car barns as a boy, and who can think and feel as boys do.

In order to make the whole matter of the correspondence course perfectly definite, the committee at its second meeting, framed the following suggested resolutions:

Whereas, The replies to inquiries received from member companies clearly demonstrate that 56 companies, being 80 per cent of those replying to them, are favorably interested in a correspondence course of instruction as outlined by the educational committee, therefore be it

Resolved, That the association approves the plan as outlined by its educational committee, provided that the expense of such a course be not met out of the regular funds of the association, and be it further

Resolved, That the matter be referred to the executive committee with a request that the details of the plan be worked out, and that it be put into operation if and whenever they deem it practicable.

The committee wishes to emphasize a few points in connection with its investigations.

Conclusions

(1) That the companies have a responsibility to themselves and to the young men in their employ, to furnish these young men with every opportunity for making the most of their natural ability and their acquired experience.

(2) That it is not a necessary part of their educational scheme outlined by the committee, that the company utilizing one or the other should be a large one. Either scheme may be adapted to the needs of a single individual.

(3) That by continuing the educational process the companies will produce a reflex action upon the schools, and will influence them in improving their methods.

Following are a few of the helpful comments made by officers of the member companies, who gave the committee's request careful attention:

We have always taken young men in as apprentices, changing them from one department to another until they have a working knowledge of all branches. This apprenticeship is for three years. They start in power station and subsequently work in car house, on line construction and on meters. While in car house they are taught to run both ends of a car as conductor and motorman. Being a small company these men as soon as their intellectual wings are grown usually fly to some place where they can earn more; several are now occupying high places in the electrical business.—J. W. Cartwright, Jr.

The difficulty is to make a practical operating executive out of a man with a technical education, but when you get a good combination of the trained with the practical you have the ideal, and the one that the present condition of economical operation demands. I, myself, am of the "old school," in the class with the old street car horse, but think I have sufficient sense to appreciate present needs.—J. F. Calderwood.

We feel that anything which can be done to increase the knowledge of employees must not only benefit them, but also the company in making it possible for the company to secure a higher standard of efficiency of the work of the man, and that if there is any organized movement of this character it will raise the standard of efficiency of street railway employees in general.—R. S. Goff.

Our business involves the questions of franchises, public policy, procurement of business, financing, accounting for and collecting revenues, maintenance, operation and construction. There is so much in the business that the departments are co-ordinate rather than subordinate. We need that a comprehensive scheme be submitted embracing all departments and sub-departments.—Isaac B. Smith.

Invariably the young technical graduates move about from place to place following the more entertaining parts of construction work, and it seems hard to get them down to studying the operation side of the work. Our young men trained up through the car and power house, who have a good grounding in mathematics before starting work, invariably take precedence over them in handling the various duties. Among the non-technical men employed throughout our engineering works there is a persistent search made for knowledge, which fact is made known by the large number and the great variety of questions asked.—Chas. E. Taylor.

Several of our employees have taken such an apprentice course. Men with an ambition to study and acquire a full understanding of the apparatus and equipment which they handle are extremely valuable to small proprietors. Such proprietors cannot afford to employ specialists.—P. P. Crafts.

Give the employee training enough so that he can fit himself for one place higher up at a time. Then, if in that position he proves capable, train him for the next step. Don't give him so much at any one time that he will be dissatisfied with advancement one step at a time, for then he is discontented and of not much use.—R. R. Smith.

My judgment and experience indicate that technical men are on the whole not particularly adapted to the condition of street railway service. They are of value in a limited number of positions, and to a limited extent. Generally, they don't know the value of a dollar, are lacking in initiative and inventive ideas, have but litle executive ability and do not widely harmonize with other workmen. Much of their knowledge is useless, they have not acquired habits of industry, lack in physical stamina and manual skill and cannot produce results rapidly and economically. Technical training is of more value in the complex conditions of a large urban system than in the ordinary street railway system. As a college graduate, with long experience in employing technical men, I am firmly convinced that most of the best railroad men are graduates from the university of hard knocks. Our systems need men of executive force, men who can do things rather than men who merely know and want some other fellow to do. Men who grow up in the service are as a class more dependable, efficient and contented than the technical man, who is apt to think his knowledge is not appreciated.—W. J. Kelly.

The committee's plan shows careful consideration of the subject, and seems to meet the reasonable requirements of the service at this time. Undoubtedly further experience will suggest improvements, but for the present, I would give the proposed plan a thorough trial before suggesting changes or improvements. I endorse most heartily the proposed correspondence course. Besides the technical knowledge that will be disseminated concerning the duties, position and obligations of the employees, it will lead to the building up of a strong organization, loyal and true to their employers, and capable of the best service obtainable in their respective lines of business. It is a long move in the right direction.—J. N. Moyer.

There are no technical school graduates in the service of this company, but we all study as well as work. The men here who hold the best jobs have all worked their way up to their positions, and it would be contrary to the spirit which prevails here to put any newly-made "B. S." on top of any of our men. The plan of instructing men, engaged in electric railway service, in study and research appeals to me, but I should engage a graduate, put him at the bottom, and let him secure a "daylight" run through the established process.—A. H. Rogers.

The plan outlined would, I believe, be a good start in the right direction, and after being followed for a time such alterations could be made as might be suggested by the experience thus gained.—G. O. Nagle.

We have no trouble in getting technical men started. It must be borne in mind, however, that it is necessary for the company to "make good" to the man, as one failure to give an opportunity to the man who is justly entitled to it will upset the entire scheme.—C. Loomis Allen.

I believe that the proposed course in conjunction with the apprenticeship system is the ideal proposition. I am sufficiently interested myself to want to know more about it.—W. P. McRay.

It might be well to consider a proposition for the American Street & Interurban Railway Association to organize a correspondence school in connection with the office of secretary and treasurer to be maintained by the association. There are a large number of young men and boys now engaged in railway work who would be glad to take advantage of the opportunity to gain some technical knowledge. Young men and boys, who are employed by companies which are members of the association, would be eligible for membership, provided they received a recommendation from the president or general manager of the company with which they are connected. The details of this arrangement, of course, can be worked out along the lines suggested by the committee in reference to the correspondence course. I also believe that books of reference and information pertaining to street railway construction, maintenance and operation should be kept in the club rooms or car house lobbies for the use of students, motormen, conductors or other employees, also that the leading technical and street railway publications be placed at the disposal of the employees in the reading-rooms or lobbies.—E. G. Connette.

HIGH CLASS VAUDEVILLE BY AMATEURS

Honored by the presence of Governor Shafroth of Colorado and Mayor Speer of Denver, who sat in a box with President Shaw of the American Association, the fifth annual vaudeville show of the supply men was a distinct success. The Tabor Grand Opera House was packed to overflowing, many standing up, and the audience, including many ladies, was eager and interested. The supply men gave a good show, and they were ably assisted by the Denver City Tramway Troupe and Band, every member of which is regularly employed by the local company. The Denver men very kindly volunteered their services.

The opening feature consisted of a burlesque female baseball team, and the girls played a weird game, said to be umpired by "Mr. Whipple." These merrymakers were chased from the stage by a chorus of farmer supply men, who, in a barnyard setting, sang "The Old Oaken Bucket" and other old songs, Mr. John H. Thomas of the Standard Paint Company, New York, taking the solo parts. The closing song was "Where Is My Wandering Boy Tonight?" The "boy" was found, fortunately, and the girls rushed on the stage in the general rejoicing, and there was a lively dance, in which all joined.

Messrs. J. J. Kreidler and F. C. Nester, employees of the Tramway Company, did a laughable "Dutch comedian" act, and then Charles C. Peirce of the Boston office of the General Electric Company, vice president of the American Street & Interurban Railway Manufacturers' Association, made a little speech. The general entertainment arrangements are under the direction of Mr. Peirce, for the association, but he gave all the credit to Chairman A. L. Whipple of Forsyth Brothers, New York, for the faithful work which is being so amply crowned with success.

Mr. Thomas, who has a fine voice and a good stage presence, sang two songs most acceptably, and A. J. Price, a Tramway conductor, gave a clever piano-playing act, winding up with playing a quick rag-time air on the piano after the keys had been covered with a cloth. One of George Ade's stories, "The Attenuated Attorney Who Rang in Associated Counsel," was told with good effect by A. V. Thompson of the San Francisco office of the General Electric Company.

When the curtain went up on the second part it disclosed a regulation old-time black-face minstrel troupe, with George H. McCauley, motorman, as interlocutor, C. A. J. Price, conductor, and J. J. Kreidler, motorman, as endmen. There were new patriotic, sentimental, pathetic and comic songs, sung, and sung well, by E. F. Smith, F. S. Nester, V. A. Thodpe, E. W. Neighber, H. O. Nelson, J. J. Andis, and J. J. Foster as well as by the others mentioned. All are conductors or motormen of the Tramway Company.

John H. Stedman of Rochester, N. Y., and of the Ohmer Fare Register Company, gave "L'Habitant Things and Other Things" in his own inimitable way. As a raconteur and poet, Mr. Stedman is the pride of the association, and he upheld his reputation.

Following came the olio of the minstrel show, with selections by the Denver City Tramway Quartette, consisting of W. L. Albin, V. A. Thorpe, Theodore Sparks and R. DeGerminy. The singing was first-class, and, like all the features of the show, was liberally applauded.

A little comedy, "A Dutchman's Mishaps in a Hotel," written by J. J. Kreidler, and with all the parts, as well, taken by Tramway employees, came next. It was really amusing and greatly enjoyed by the audience. Then came the stirring finale, with the flags of Mexico, Canada and the United States borne in by girls, while the Denver City Tramway Band played the national airs. As the musicians gave "The Star-Spangled Banner" the curtain, bearing a representation of the handsome badge of the A. S. & I. R. A., fell on a performance, which, if somewhat long, had been thoroughly enjoyed and for which all present felt indebted to the supply men and their Denver collaborators.

After the performance the Denver Tramway men taking part in the show were entertained at a "Dutch Supper" by the entertainment committee at the Kaiserhof.

THE HUMBLE NICKEL

Let the Englishman boast of pounds, shillings and pence,
The Frenchman delight in his francs.
Marks, pfennigs and scudi, lire, florins and sous,
Each does very well as it ranks.
But the purchasing power of these coins is mere folly
When a nickel will buy you a ride on the trolley.

—John H. Stedman.

NO SPECIAL MOFFAT RATES FOR SATURDAY

On account of the shoving ahead of the Engineers' program and the transferring of the meetings from Friday to Thursday so that all may attend the official excursion over the Moffat Road on Friday, there will be no special excursion rates for Saturday, as originally planned and as previously announced. The regular rates will apply for that day. Those intending to "take in" this excursion on Friday, which promises to be one of the best features of the program of entertainment, should remember that it is very important to purchase tickets by Thursday noon in order that the arrangements can be made for trains and lunches. The fare for the round trip to Corona is $3, including lunch.

Attention is called to the Far-Famed Georgetown Loop trip on Saturday and Sunday, Oct. 9 and 10. The trip over the Loop is one of Colorado's finest one-day trips. The round-trip rate on Saturday and Sunday is $2.00. Trains leave the Union Depot at 8 and 8:10 a. m., returning in the evening at 5:35 and 5:45 p. m. Those who desire may extend their trip beyond to the summit of Mount McClellan, reaching an elevation of 14,007 ft., by paying an additional fare of $2.00. Those who desire to "take in" Mt. McClellan should take the 8 a. m. train.

ORGANIZATION FROM THE STANDPOINT OF THE SMALLER COMPANIES*

By Ernest Gonzenbach, President and General Manager, Sheboygan Light, Power & Railway Company, Sheboygan, Wisconsin

Organization is frequently mentioned but not very often discussed. For one thing, it is a subject too vast for more than casual discussion in any one paper or at any one session. It is customary to cite as one of the advantages of consolidation, the fact that large companies can afford to maintain a better organization than is possible for smaller companies. It seems as if an undue amount of stress has been laid on this argument; it has weight and substance, to be sure, but is not paramount. We cannot dispute the fact that theoretically the larger the company, the better the organization, but it is quite possible for the small company to do almost as well as the larger companies, and this paper is written for the purpose of discussing ways and means.

A perfect organization employs specialists for each kind of work. Among railways, each department is in charge of a man who has specialized in that line and who sums up in his person the combined specialized knowledge of his subordinates. The specialist at the top must have a working knowledge of the specialties of those in his charge, for when he ceases to report to someone who knows about his specialty, he becomes a professional. The unit of any organization is the man who knows how to do something especially well, a little better or a little faster than the ordinary man. But even he is merely a link in the chain.

Organization is a method, the object of which is to impress the qualities of the man at the top on all of his followers. The leader must possess all of the qualifications which he wishes to impress upon his followers, and, in addition, he must win their absolute respect; if he possesses these two things, then confidence in him follows automatically. The leader himself may have qualifications not necessarily possessed by his followers, but always he must have a thorough knowledge of the strength and weaknesses, the degree of reliability and the loyalty of those who are to execute his commands. Perfect organization produces blind confidence in the leader, the proof of which comes only when the individual members are so welded together that no temptation in the way of greater rewards offered from other sources will tempt any one unit to sever himself from the others. It is not often that such perfection is reached in these days of commercialism, but is frequently found among the oldest organizations in the world, which are the ones founded on the profession of arms. All others are patterned after them. The same qualities and methods which enabled Caesar and Napoleon to produce results in their day will enable the modern industrial organizer to succeed. The most efficient organization to-day are those which are commanded by men who themselves have performed most of the tasks which are demanded of their subordinates.

A large railway company can afford to select its men so as to fit its organization, and the larger the company, the more specialists it can employ. There the work is split up into various divisions, and the divisions into sub-divisions, and it can be arranged that a man of such and such qualifications should fill a certain place. A large organization usually has the entire country as a recruiting field and it finds suitable specialists for all divisions sooner or later. By means of careful drilling, these independent units are fused by the flux of loyalty and respect into a comprehensive unit, ready to start and stop and to execute evolutions at the nod of the leader.

The small company is not in as strong a position, for its organization must fit the man, instead of the man fitting the organization. The field from which it must recruit its organization is necessarily more limited, and, operating as must of them do in small cities, they are handicapped by the unwillingness of the average man to separate himself more than a few miles from the sights and scenes of the flesh pots of Egypt. It was even so in the days when organizations were known only to the profession of arms, for the lovers of wine, women and song remained at home and waxed fat, while it was considered a test of manhood and loyalty to perform the actual work in the field. Recognizing the fact that the small company must necessarily draw its organization from a local and limited field, it requires more than the ordinary skill to hammer out of the crude mass a homogeneous unit which will efficiently respond to the peregrinations of the mind which moves it.

In the matter of college-trained men alone, the small company is at an enormous disadvantage. Not so long ago, college graduates in the street railway business were as scarce as brotherly love among Arctic explorers, but the climate is changing and the output of graduates has been so great that at the present time some organizations are so fortunate as to be able to employ college men in their section gangs. Unfortunately, the college graduate does not often stray very far afield, for what distinction is there in wearing a dapper Greek letter fraternity pin in some Jay town where the girls do not even know what it means? The executive of the small company must look to local productions and prodigies for his organization. These are the men whose boyhood homes were in the neighborhood or who have some other magnet which draws them to the smaller and more limited field. As a matter of fact, and contrary to the popular belief, the small company presents more opportunities for acquiring knowledge and getting a variety of experience in the shortest possible time than any other class of employment in the street railway field, and in making up an organization it is always wise to select men who have received their training in a small company. There is nothing more utterly hopeless and useless than the employment by a small company of some man who has had long experience in a larger concern, where he has specialized far beyond the needs of the small company. But for some mysterious reason, there is a class of small companies which seem to delight particularly in getting hold of a man who has received all of his training in a large company and therefore lacks the larger general knowledge required in the smaller field. The man who has been in charge of a one-horse power station where he had to do his own firing, oiling and engine-adjusting, is going to be a much better superintendent of motive power than the man who got his training piece-meal in a 15,000-hp plant. A man who has had charge of a few cars where he had to do his own wheel-changing, his own greasing, armature-winding, brake-adjusting, etc., is going to make a better master mechanic than the man drawn from the large shops, always of course, provided that he is the right man.

Incidentally, it may be mentioned that in no department of electric railway operation is there such an inviting field for men of ability as exists in the car-maintenance department. The country is fairly crying for competent men who understand car maintenance and the loudest and longest cries come from the companies where the master mechanic's insignia of rank consists of a pair of blue overalls and three streaks of grease on each side of his face. Many of the smaller companies would be willing to pay wages nearly as high as is paid to their general manager if they could only get the right man for that place. Now, if there is any part of the road where greater saving can be effected by judicious management, by careful attention to detail and knowledge of business, than in the maintenance of cars and equipment, we do not know where it is. Among the smaller companies we do not need wheel-specialists; we are not looking

*Paper read before the American Street & Interurban Railway Association at Denver, Colo., Oct. 5.

for expert commutator-repairers nor for air-brake professors; we need men who have acquired general knowledge from actual contact with the work, supplemented by careful study. The presence of grease and mud deters some of our best men from specializing in this class of work. The dirt is there, but this impression of its omnipresence is wrong, resulting principally from the fact that the class of men whom we have, perforce, been obliged to employ for this work seem to have lost their perspective of the little niceties of life, for some would as soon butter their bread with axle grease as with jam and eat the whole with unwashed hands. The men who are earnest enough and capable enough to take up this class of work will look as clean before, during and after their work as any other class of mechanical service will permit.

Selecting men for the small road is the most important of all the duties of the executive head. Strict departmental divisions can be maintained and should be maintained, but must be in accordance with the qualifications of the departmental head. If one employs a superintendent whose qualifications limit him to the handling of men and schedules, then that should be his sole duty. If he is competent and capable of taking on additional duties, the organization should be flexible enough to permit such additional duties to be added with a commensurate increase in his compensation. It is always a good plan to employ a highly skilled mechanical man to take charge of equipment, by all means a college graduate, if such a man can be had. Fortunately, there is a continually increasing bear market in college graduates and it is now possible to pick up competent and certified ones in almost every hamlet. If the executive head of a company himself has acquired his position through the mechanical department, that department may be allowed a somewhat smaller amount on the general salary list than should be the case if the executive head is not himself a technical man. But the chief engineer is, by all odds, the most important man in the organization of the small company. This is amply evidenced by the fact that the younger heads of electric railways have mostly graduated to their executive positions through the mechanical department. Recognition of the limitations of personnel should include the recognition of his own short-comings by the executive. If he is inclined to be over-active or impetuous, his personal advisers and assistants should not possess the same faults, but can be so selected as to serve as a natural balance wheel to whatever short-comings it is desired to correct. Good organizations begin at the top and recognize that we are all human and prone to error and that the same faults we criticize in our subordinates may need correction in ourselves.

As to the total number of sub-divisions which may be permissible in a small railway organization, that is a matter depending entirely upon individuality and personnel of its members. It is safe to say that most small companies subdivide too much, rather than too little. If the executive head of the company has six or seven heads of departments reporting to him direct, he will not be as efficient as if he had only three or four heads reporting direct to him. The head of an electric railway has no business at any time with routine matters. The demands made upon his time from outside sources, political, financial and strategical, are too great and uncertain to warrant his being tied up to routine. When no political or financial clouds are on the horizon, the executive should be able to step out of his office on a minute's notice and be absent for several weeks without causing a ripple in the routine of affairs. If he cannot do this, he is not organized up to maximum efficiency.

As already stated, the departments can be more efficiently handled if there are not too many. In the small electric railway, the accounting department may with propriety and efficiency also include the purchasing department and claims. The superintendent may be in charge of transportation, employment and traffic and in many cases it is found advisable to add the responsibilities of track-maintenance to his work, and there are many reasons in favor of this; one of the principal ones is that one man is responsible for the condition of the track over which the cars in his charge operate. Shops and power station are best combined under one head, even if not located under one roof. But no absolutely rigid lines can be drawn as the individuality of the employee is the determining factor.

The greatest payroll leaks existing among smaller companies are the result of departmental lack of organization. It is quite common to see two or three men getting good wages doing miscellaneous work around the shops from cleaning cars to winding armatures. More money can be made by organizing the little details and every-day routine than by any other method. The most efficient work is done by companies who make it a rule to have each task assigned to a certain man and to have that man do the same task day after day. If there are enough cars to keep one man busy cleaning, this man should under no circumstances be used for other purposes; if there are not enough cars to keep a man busy at this, then other daily duties should be added, but his task must be so apportioned that he can just perform it within the limits of his working hours, no more and no less. The "everybody busy" principle is the foundation rock on which paying organizations are built. One man under-employed is as dangerous an infection as a scabby sheep in the flock. High-priced mechanics chasing all over the shops for pieces of waste and tools are too expensive a luxury for the sort of roads which are obliged to squeeze pennies till the Indian lets out a war-whoop. One man assigned to one task, and keeping him everlastingly at it, is what makes low operating costs for small railways.

There are times when extraordinary help is required, but for such tasks, a floating gang is the solution and salvation of the small electric railway. This gang, as pointed out in a paper presented before last year's convention, consists of carefully selected men, "Jacks of all Trades," but trained to be the light cavalry of the campaign, who can instantly come to the aid of any division in distress.

An undue amount of stress is laid on the amount of wages which can be afforded. It is sometimes said that small companies cannot pay the wages which the larger companies do, but good organization will enable a reversal of these conditions. The small company really can afford to pay proportionally more than the larger company. Wages are the smallest part of a man's value. What one receives in return for wages is what counts. Unfortunately, in the street railway business we are still obliged to pay wages in return for time, and time is a poor asset. If we could devise ways and means whereby we pay for services rendered, it would be far better. Take the case of a man who has had training in a power station where he has gone through the various degrees of coal passer, fireman, oiler and shift engineer. He may be worth a hundred dollars a month in a large power station as shift engineer, but if his experience is supplemented by studious habits, alertness and decision, he may be worth a good deal more than that as chief in the power station of a smaller company.

The essential thing in organization is to make the individual units responsible for certain things, and to have each man responsible to one head from whom he receives praise or discipline as may be necessary. Probably more organizations have been disrupted from the violation of this basic principle than from any other cause, particularly among the smaller ones. In a company employing in the neighborhood of a hundred men, it seems to be rather a common occurrence to have the executive head give instructions to a foreman or employee, unintentionally ignoring the head of the partment. The various units and the head of the company are in such close contact with each other that there is constant danger from this source, a danger which is as insidious as a malignant disease, and must be guarded against as studiously. There can be no organization unless the power

of discipline is centered in the one man to whom the employee reports. Neither can there be any organization if the power of employing his subordinates is taken away from any man. This is a cardinal principle sinned against all too often. The head of the company should select and recognize only the department heads and staff. The department heads will be required to select and appoint their foremen. The executive, under no circumstances, dictates to the department head as to whom he is to employ, but if the department head employs anyone who does not meet with the approval of the executive, then the offending one is removed, not by the executive but by the head of his department. Exactly the same rule is applied in the departmental organization. The head never dictates to the foreman as to the workingmen he shall employ. The foreman cannot be allowed as much discretion in the employment of men as the department head, but the foreman and the department head jointly select the employees and no employee is ever retained for a single moment if he is obnoxious to the foreman. If personal differences arise, the department head attempts to adjust them, but if they are beyond adjustment, somebody must step out, as no organization, large or small, can live if divided against itself. This plan would make unnecessary the employment bureau which has been found advantageous in some companies, but some one of the staff may keep a list of available employees, approximating the functions of the employment bureau. However, the principle of giving the immediate superior of the employee all the right of selection is never departed from. In the same way discipline and praise are bestowed. Never, for a single moment, is any employee allowed to believe that either he has an extraordinary high standing with his superior or that any superior may harbor any personal grievance against him. This principle precludes the employment of relatives of officers of the road. In a company where nepotism is practised, no organization can be maintained. The near relation of any officer of the company, if he must be provided with a job, should be worked off on one's friends, rather than in one's own organization. There is no quicker or surer way of destroying the delicate balance of a well organized force of employees than to introduce our dear relations.

One of the essential points of good organization is that each and every incumbent of office is provided with an understudy. This is one of the important things which is often overlooked. Everyone knows of some company where the organization is dependent upon an individual, and should that individual suddenly be taken sick or be incapacitated from any cause, that organization requires weeks and months to reach again its normal state. Efficient organizations have been, and are, established on the one-man principle. There is one case within the knowledge of the writer when a railway of considerable size was built and operated on the one-man principle. The one man worked early and late. He had in the neighborhood of 18 different foremen reporting to him every day, and he laid out each day's work for every foreman. It worked all right so long as the man was available and on the job every day. When he was suddenly taken sick, however, the loss for weeks was stupendous and would have paid many times the salary of an understudy or of an efficient organization plan. The general manager who is afraid to provide himself with an understudy for fear that he may lose his iron grip on the salary list, is not worthy of the place. The understudy should preferably be one of the department heads. In a similar way the department head, with the general manager, may select a suitable understudy from among his foremen or staff. The foreman himself has an understudy among the rank and file. The system of understudies not only is an insurance against emergencies, but it serves beautifully to keep the hatbands of the men in all places from becoming too small for the owners' heads.

There is no line of study which an electric railway executive can pursue with greater profit to himself than the study of military history, for nowhere has there been greater experience in organization, nor has it been carried to greater refinement anywhere. Political organization is not recommended as worthy of consideration because the aims and purposes of politics are personal advantage, regardless of cost to the whole. The aim of the military organization, on the other hand, is results, regardless of the individual. The military plan has established certain fixed rules which are essential and which are recommended for careful investigation by the student of industrial organization.

ANNUAL MEETING OF MANUFACTURERS' ASSOCIATION

The annual meeting of the American Street & Interurban Railway Manufacturers' Association will be held in Auditorium Hall this afternoon at 5 o'clock. Every member should be represented, as five members of the executive committee are to be elected. The retiring members of the executive committee are Charles C. Peirce, W. M. McFarland, Henry C. Evans, A. H. Sisson and K. D. Hequembourg.

HO FOR THE BARBECUE

The entertainment feature for this evening is decidedly Western in character and should prove a novelty to nearly all the visitors and a pleasant entertainment to every man and woman attending the convention. A wild-game barbecue is to be held at the "White City" beginning at 6:30 o'clock, and three elk, 25 bear and deer and 250 sage hens and grouse will be barbecued on the grounds. The exclusive use of the "White City" amusement park and all of its attractions has been secured through the courtesy of the Denver City Tramway Company, which has also generously provided the barbecue. A number of special cars will leave the Brown Palace at 6:00 o'clock, stopping at all other leading hotels en route. The ladies' "seeing the foothills" cars will also wind up at the "White City" in time for the barbecue. In addition, for the benefit of the people at the Auditorium, special cars will be in waiting at convention headquarters until after the annual meeting of the Manufacturers' Association. These cars will take those in attendance directly to the "White City" to attend the barbecue. Delegates and visitors are requested to wear their official badges in plain sight. They will do well not to miss this feature, for a jolly good time is assured.

COLORADO STATE CONVENTION

The seventh annual convention of the Colorado Electric Light, Power & Railway Association will be held Oct. 7, 8 and 9 at the Auditorium Hotel, corner of Fourteenth and Stout Streets. Delegates and guests of the American Street & Interurban Railway Association and allied associations have been invited to attend the general sessions, while the delegates and guests of the Colorado Association have been officially invited to attend the general sessions of the American Street & Interurban Railway and affiliated associations, and the exhibition and entertainment provided by the American Street & Interurban Railway Manufacturers' Association.

The active and associate members of the Colorado Electric Light, Power & Railway Association, who do not belong to one of the affiliated associations will receive official badges upon application to B. V. Swenson, secretary of the American Street & Interurban Railway Association.

The air brake equipments in the various exhibits are fine pieces of machinery and they have the additional merit that whenever they are put in operation everybody in the halls is aware of the fact by the soothing murmur which becomes evident to the delighted listener.

REPORT OF THE COMMITTEE ON WAY MATTERS*

By E. O. Ackerman, Chairman; J. H. Hanna, M. J. French, J. M. Larned, Martin Schreiber and G. L. Wilson

Your committee on way matters begs leave to report that, in accordance with the instructions of the executive committee, it has given its principal consideration to the subject of "The Use of T-Rails in Paved Streets," and herewith submits a report on that subject. It also submits a brief report on the subject of "The Use of Open Hearth and Manganese Steel Rails."



Way Matters—Track in Utica, N. Y., Laid in 1908, with 100-lb. Open-Hearth T-Rail, Steel Ties, Concrete Foundation, Clark Joints

In regard to the very important question of economical maintenance, your committee has deemed it advisable to request that this subject be made the principal topic for consideration by the next committee as it is one of such serious importance that the time at our disposal does not permit a satisfactory treatment of the subject.

The Use of T-Rail in Paved Streets

Your committee recommends the use of T-rail for track construction in paved streets, except where the traffic is confined to the railway strip or is so congested that the strip is continually used by vehicles. Such conditions exist only in the largest cities, and here it is the opinion of the committee that a rail of girder section should be adopted, preferably sections following closely the lines of the two Trilby rails recommended by the committee on way matters of the American Street & Interurban Railway Engineering Association of 1907. In this section the rail is made concentric with the wheel loading, 7 in. and 9 in. in depth, and, at the same time, provided with a deep, roomy, self-cleaning groove that incidentally does not increase power consumption; besides it has a substantial, heavy, beveled head to suit the street paving and which allows a maximum wear.



Way Matters—One of the Most Congested Streets in Milwaukee with Pavement Eight Years Old.

This committee wishes to condemn the adoption and use of so many types of rails as are at present in vogue. Certainly the girder sections recommended satisfy the general requirements of modern practice and no improvements have been suggested up to this time that appeal to the committee as warranting a change in the proposed standard. It is recognized that unusual conditions occur which cannot be changed and which necessitate the use of types varying from the standard. Both types of girder rails mentioned have practically the same head or wearing part, but although the low rail, especially with the welded joint, has an advantage for stability, it is understood that it is not as desirable as a 9-in. rail where a mechanical joint is used.

Again, the particular type of paving in use should be carefully studied before specifying the height of rail. So it is not in the province of this committee to point out a definite rail section and height without knowing the particular conditions on the property in question; but it should not be a difficult matter to select a standard rail as long as the general principles recited above are taken into consideration.

Where the use of T-rail is recommended, if the type of pavement will permit, as with macadam, wood or other shallow block, a standard T-rail having a height and base equal, and weighing not less than 80 lb. per yard should be adopted. The committee recommends the use of the American Railway Engineering & Maintenance of Way Association standards, Section A and Section B, for such service.



Way Matters—Minneapolis Street and Roadway Paved with Granite Laid in 1905

For the heaviest service in connection with deep block pavement a T-rail 7 in. high with 6-in. base, 17/32-in. web and a head 2¾ in. by 1⅜ in., weighing about 100 lb. per yard, is suggested. This is the section of rail recommended to the 1907 convention of the American Street & Interurban Railway Engineering Association, except that the depth of head has been increased to 1⅜ in. to suit a deeper wheel flange and give longer life.

For light service with a deep pavement, the committee recommended a T-rail 7 in. high with a 6-in. base, a 7-16-in. web and a head 2½ in. by 1 9-32 in., and weighing 80 lb. yd., which is identical with Lorain Steel Company section 335 and Pennsylvania Steel Company section 227.

Recommendations

In conclusion, the committee on way matters recommends the adoption of the following:

(1.) For track construction where the type of pavement will permit, as in macadam or other shallow pavement, your committee recommends the adoption as standard; the T-rails weighing not less than 80 lb. per yard adopted as "recommended practice" by the American Railway Engineering & Maintenance of Way Association, April 22, 1908.

(2.) For track construction for the heaviest service in

*Abstract of report read before the American Street & Interurban Railway Engineering Association, at Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

connection with deep block pavements, your committee recommends the adoption as standard, a T-rail 7 in. high with a 6-in. base, 17/32-in. web and a head 2¾ in. by 1 11/16 in. and weighing about 100 lb. per yard, as shown in the drawing marked Fig. 1, section A. of the report.

(3.) For track construction for light service, in connection with deep block pavement, your committee recommends the adoption as standard of a T-rail 7 in. high with a 6-in. base, 7/16-in. web and a head 2½ in. by 1 9/32 in. and weighing 80 lb. per yard, as shown in the drawing marked Fig. 2, section B, of this report. This section is identical with the Lorain Steel Company's section No. 335 and the Pennsylvania Steel Company's section No. 277.

(4.) For track construction for heavy service in connection with deep block pavement on streets where the traffic is confined to the railway strip, or is so congested that the railway strip is continually used by vehicles such conditions as exist only in cities of the largest class, your committee recommends the adoption, as recommended practice, the half-trilby girder sections shown on pages No. 122 and 123, Vol. 1, of the proceedings of this association for 1907, which sections were recommended by the sub-committee on rails and rail matters to the convention at Atlantic City in 1907.

(5.) In the matter of the use of open hearth and manganese steel rails and the increased width of gage on curves your committee wishes to report progress and recommends that the subjects be continued.

Type of Rail.	No. of Cos. Using.
Standard T-rail, 70 lb. to 100 lb. per yard	7
6-in. high T-rail	8
7-in. high T-rail	16
8-in. high T-rail	2
6-in. girder rail	1
7-in. girder rail	11
8-in. girder rail	1
9-in. girder rail	11

Practically all agree that heavily loaded vehicles can turn out of the flangeway along the rail now being used in modern track construction as easily or better than from rails formerly used; that vehicles are not damaged in crossing or turning out from said tracks, and that the rail now being used is considered by the city engineer or highway official to be as satisfactory for wagon traffic as any rail in service.

The T-rail track and paving is satisfactory to 30 companies; unsatisfactory to 2 companies, and 8 companies did not answer the question.

The groove-rail track and paving is satisfactory to 13 companies; unsatisfactory to 11 companies, and 16 companies did not answer the question.

The T-rail track and paving is reported satisfactory to city authorities by 26 companies; unsatisfactory to city authorities by 2 companies, and 12 companies did not answer the question.

The groove-rail track and paving is reported satisfactory to city authorities by 19 companies; unsatisfactory to city authorities by 2 companies, and 19 companies did not answer the question.

Thirty-one companies make recommendations for a standard rail for use in paved streets, of which

13 companies favor 7-in. T-rail for all conditions.
6 companies favor Trilby or grooved rail, 7 in. or 9 in. high, for use where vehicular traffic is very heavy, and T-rail in outlying residence districts where vehicular traffic is light.
6 companies favor Trilby or grooved rail, 7 in. or 9 in. high, for all conditions.
6 companies favor standard or other sections of T-rail.

The height of rail considered as best practice is: 7 in. by 15 companies; 9 in. by 9 companies; scattering, 6 companies; and 10 companies did not answer.

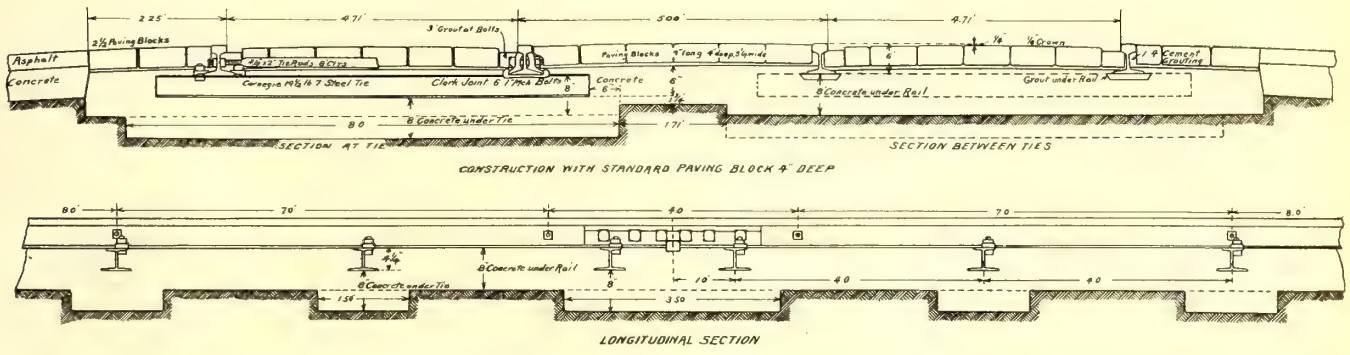
Nineteen companies are required and 18 companies are not required to use the same kind of paving in the tracks as is used in the balance of the street. Three companies did not answer the question.

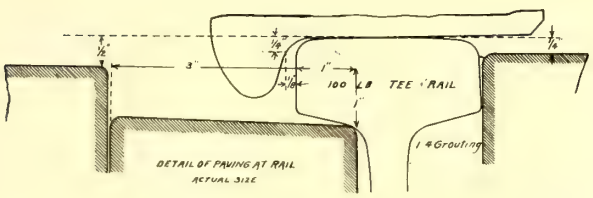
The type of paving considered as best practice is as follows:

First—For heavy vehicular traffic on both T-rail and groove-rail tracks:

Kind of Paving.	No. of Cos.
Granite block	11
Brick	11
Wood block	3
Miscellaneous and unanswered	13

Second—For light vehicular traffic on both T-rail and groove-rail tracks:





Way Matters—T-Rail Track of the Utica & Mohawk Valley Railway Company

[The committee collected and presented drawings and photographs of track in two cities where T-rail is used exclusively, and in one city where it is used extensively in paved streets. These drawings and photographs were furnished by George L. Wilson, engineer of maintenance of way, Twin City Rapid Transit Company; Fred G. Simmons, superintendent of construction and maintenance of way, The Milwaukee Electric Railway & Light Company, and M. J. French, engineer of maintenance of way, Utica & Mohawk Valley Railway Company. Parts are reproduced with this abstract.—Eds.]

Rail for Track in Paved Streets

Forty replies to Circular No. 11-a were received from as many companies, representing a total of:

4085 miles of track (on single track basis).
2180 miles of track in city streets, paved.
1174 miles of track in city streets, unpaved.
435 miles of T-rail track of modern construction in paved streets.
645 miles of groove and half-groove rail track of modern construction in paved streets.

The types of rail now being used in modern track construction in paved streets, as shown by the replies, are:

Kind of Paving.	No. of Cos.
Brick	15
Wood block	3
Granite block	3
Bitulithic	2
Miscellaneous and unanswered	17

The miscellaneous types include asphalt, macadam, concrete, Hassam block, slag brick and Belgian block

The Use of Open Hearth and Manganese Steel Rails

The committee has received reports from only 13 companies that have used manganese rails. This service has been of such short duration as to preclude any recommendations based on actual experience.

The use of open-hearth standard T-rail is quite prevalent and has been for some time, particularly abroad. In view of the fact that this subject has been very thoroughly investigated by steam railways, we have decided to recommend as standard specifications for open-hearth T-rail the specifications adopted by the American Society for Testing Materials, which are substantially those in use by the different manufacturers. Specifications are made a part of this report.

The use of open-hearth steel for high T- and girder-rail has not been sufficient to warrant the recommendation at this time of standard specifications. We recommend, however, that the specifications for such rail now followed by the manufacturers be used until further developments warrant the preparation of standard specifications.

The use of manganese steel in special work is quite common, but its use in rails has so far been confined to locations where the conditions are unusually severe. The only specifications for manganese steel rail that we have been able to obtain are those of the Manganese Steel Rail Company. Other manufacturers of manganese steel rail state that they have no specifications that they are willing to publish; and we consider that, while the use of this type of rail has given in some instances very satisfactory results, it is still in its infancy, and the adoption of any standard form of specification must await future developments.

A summary of the replies to Data Sheet No. 11-b showed that of 33 companies replying, 20 companies had no open-hearth rail in use and 13 companies had a total of 113.8 miles in service. Of the 33 companies only 1 had any manganese rail in service, outside of specials. The report of this company is interesting and is given herewith in part:

Miles of open-hearth rail? 5.1. Rail section? 85-lb., A S. C. E.

How does it wear in comparison with the Bessemer section? About three times as long.

Under what specifications was the rail obtained? Company's standard specifications.

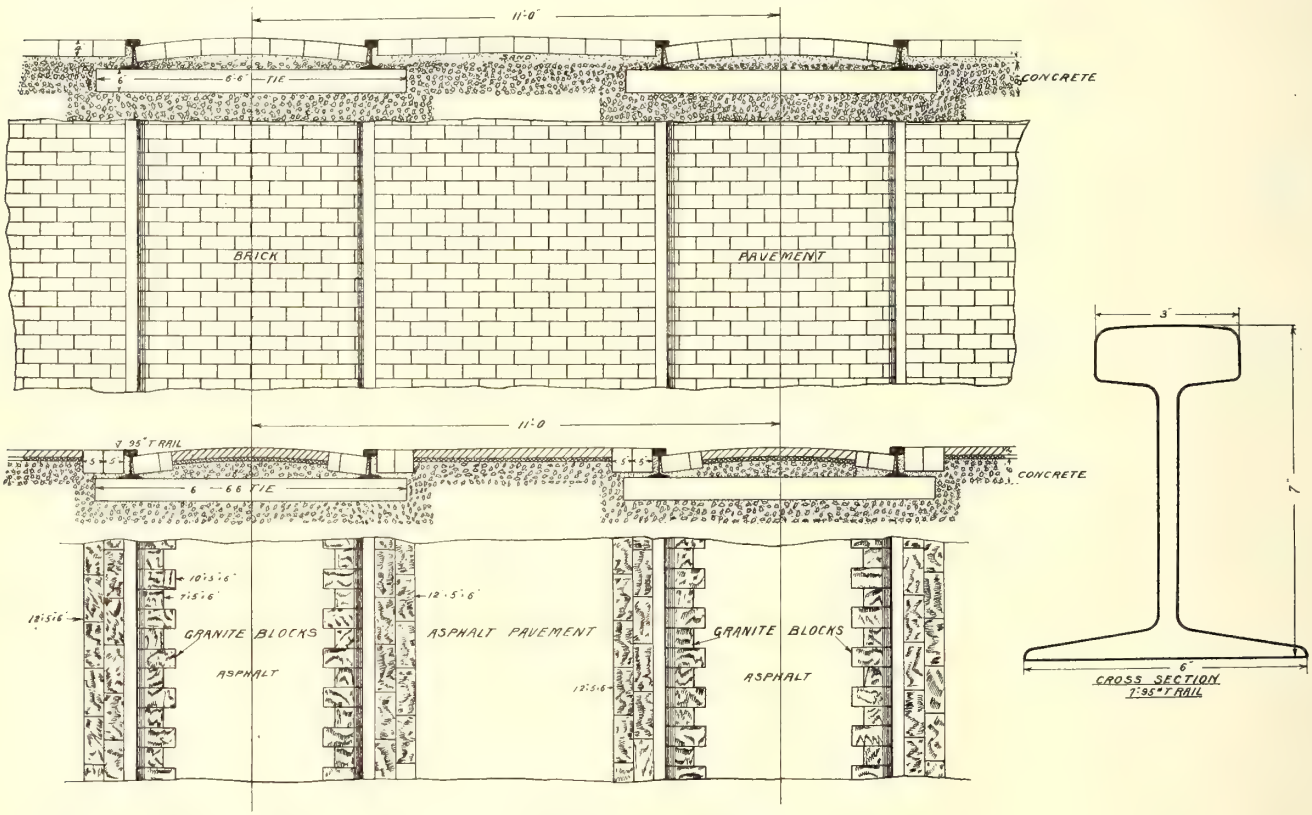
Are you using any manganese rail outside of specials? Yes.

What is the section? 85-lb.; both rolled and cast?

How long in use? Cast since 1902; rolled since November, 1908.

How does the life of the cast manganese compare with that of Bessemer or open-hearth? Cast manganese rails wore 54 times as long as Bessemer rail on curve, having center radius of 89 ft.

In what manner do you apply rail bonds to manganese steel rails? The bond terminals are compressed in holes punched in rails. Bond holes in rolled rails are punched and drifted to size by the manufacturer. Those in cast rails are made by casting a piece of iron pipe in the rail, and reaming the hole to size.



Way Matters—Track Construction in City Paving, The Milwaukee Electric Railway & Light Company

Manufacturers' Specifications for Manganese Steel Rails.—Manganese Steel Rail Company

(1.) Chemical Composition.—	Percentage.
Carbon	0.90 to 1.20
Phosphorus	Not over 0.10
Silicon	Not over 0.50
Manganese	9.50 to 16.00
Sulphur	Not over 0.06

(2.) **Section.**—Unless otherwise specified, the section of rail shall be the American Standard, recommended by the American Society of Civil Engineers, and shall conform, as accurately as possible, to the templet furnished by the railroad company, consistent with clause No. 3, relative to specified weight. An allowance in height of 1/16 in. under, and 1/32 in. over will be permitted. A perfect fit of the splice bars, however, shall be maintained at all times.

(3.) **Weight.**—The weight of the rails shall be maintained as nearly as possible, after complying with clause

No. 2, to that specified in contract. Rails shall be accepted and settled for according to actual weights.

(4.) **Length.**—The standard length of rails shall be 30 or 33 ft. Ten per cent of the entire order will be accepted in shorter lengths, varying by even feet down to 24 ft. A variation of ¼ in. in length from the length specified will be allowed.

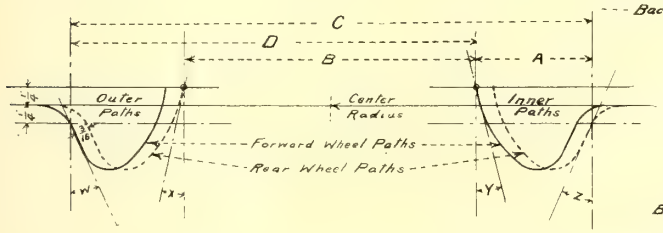
(5). **Branding.**—The name of the maker and the year of manufacture shall be rolled in raised letters on the side of the web, and the number of the heat shall be stamped on each rail.

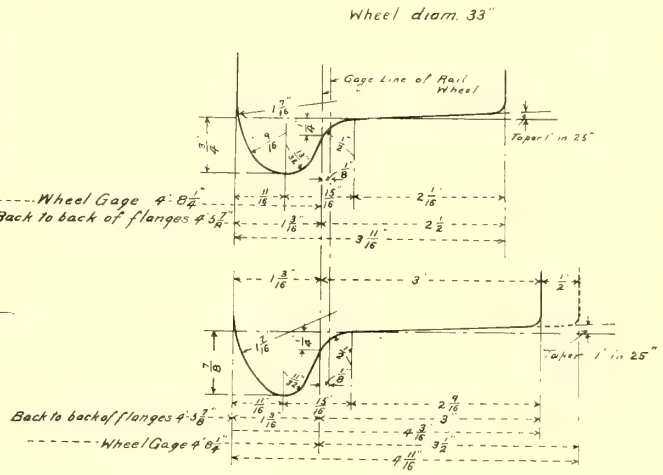
(6.) **Drilling.**—Circular holes for splice bars shall be punched or drilled in accordance with specifications of purchaser. They shall be accurate in every respect to drawing and dimensions furnished, and free from burrs.

(7.) **Finishing.**—Rails to be straightened while cold, to be smooth on head, to be sawed square at ends, and, prior to shipment, to have the burr occasioned by saw cutting removed, and to have the ends made clean. They are to be free from injurious defects.

(8.) **Inspection.**—The inspector, representing the purchaser, shall have free access to the works of the manufacturer at all times while his contract is being executed, and shall have all reasonable facilities afforded to satisfy himself that the rails are being made in accordance with specifications.

The manufacturer shall furnish the inspector, daily, with carbon determinations of each heat, and a complete chemical analysis every 24 hours, representing the average of the other elements contained in the steel.





Cen. Rad. of Curve	4'6" Wheel Base								6'0" Wheel Base								7'6" Wheel Base								9'0 Wheel Base							
	A	B	C	D	W	X	Y	Z	A	B	C	D	W	X	Y	Z	A	B	C	D	W	X	Y	Z	A	B	C	D	W	X	Y	Z
35' 0"	1 11/16	4' 3 3/4"	4' 8½"	4' 6 7/16"	23° 0'	17° 15'	16° 45'	22° 25'	1 23/32	4' 9 1/16"	4' 8½"	4' 6 25/32"	25° 25'	18° 45'	23° 30'	22° 45'	2 3/32	4' 8 1/8"	4' 8 7/16"	4' 6 7/8"	27° 20'	20° 30'	24° 30'	27° 15'	2 1/4"	4' 9 1/4"	4' 8 7/16"	4' 6 1/4"	30° 35'	23° 40'	28° 50'	30° 20'
40' 0"	1 13/16	4' 3 5/16"	4' 8½"	4' 6 7/8"	24° 30'	14° 35'	16° 30'	24° 20'	1 27/32	4' 9 5/16"	4' 8½"	4' 6 29/32"	24° 00'	15° 40'	20° 30'	22° 15'	1 29/32	4' 8 13/16"	4' 8 7/16"	4' 6 7/8"	25° 15'	19° 40'	23° 10'	25° 00'	2 1/16"	4' 9 1/16"	4' 8 7/16"	4' 6 1/2"	27° 35'	21° 30'	25° 30'	27° 40'
45' 0"	1 17/32	4' 3 11/32"	4' 8½"	4' 6 15/16"	24° 40'	13° 00'	15° 30'	24° 45'	1 31/32	4' 9 5/16"	4' 8½"	4' 6 31/32"	24° 05'	13° 30'	18° 30'	22° 40'	1 31/32	4' 8 13/16"	4' 8½"	4' 6 15/16"	23° 20'	16° 45'	21° 45'	25° 15'	1 31/32	4' 9 3/32"	4' 8 7/16"	4' 6 11/32"	25° 25'	19° 30'	24° 30'	26° 00'
50' 0"	1 7/8	4' 3 3/8"	4' 8½"	4' 6 15/16"	25° 40'	11° 10'	14° 40'	26° 20'	1 35/32	4' 9 3/4"	4' 8½"	4' 6 31/32"	24° 55'	12° 55'	17° 10'	24° 30'	1 3/4	4' 8 13/16"	4' 8½"	4' 6 3/8"	24° 30'	17° 20'	19° 25'	24° 10'	1 7/8	4' 9 1/8"	4' 8 7/16"	4' 6 7/16"	23° 35'	18° 30'	19° 35'	25° 30'
60' 0"	1 11/32	4' 3 13/32"	4' 8 7/16"	4' 6 29/32"	26° 45'	9° 25'	13° 20'	25° 00'	1 7/16	4' 9 11/32"	4' 8 7/16"	4' 6 7/8"	26° 25'	11° 40'	13° 50'	22° 15'	1 5/16	4' 8 3/32"	4' 8½"	4' 6 3/32"	25° 40'	15° 00'	17° 15'	25° 00'	1 3/8	4' 8 5/16"	4' 8½"	4' 6 3/32"	26° 35'	17° 40'	16° 30'	23° 05'
75' 0"	1 5/8	4' 3 5/32"	4' 8 7/16"	4' 6 7/16"	26° 35'	8° 25'	11° 25'	25° 00'	1 39/64	4' 9 5/16"	4' 8 7/16"	4' 6 31/32"	26° 05'	9° 35'	10° 45'	26° 10'	1 11/16	4' 8 5/16"	4' 8 7/16"	4' 6 1/8"	25° 00'	11° 45'	15° 05'	24° 25'	1 7/8	4' 8 1/4"	4' 8½"	4' 6 1/8"	26° 15'	13° 40'	15° 35'	26° 15'
100' 0"	1 13/16	4' 3 1/2"	4' 8 7/16"	4' 6 29/32"	23° 30'	6° 00'	8° 00'	23° 30'	1 45/64	4' 9 1/4"	4' 8 7/16"	4' 6 31/32"	23° 30'	8° 00'	10° 20'	23° 30'	1 13/16	4' 8 5/16"	4' 8 7/16"	4' 6 1/8"	25° 00'	9° 50'	12° 05'	24° 30'	1 15/16	4' 8 1/2"	4' 8 7/16"	4' 6 3/32"	26° 50'	12° 25'	13° 55'	26° 20'
150' 0"																	1 15/16	4' 8 5/16"	4' 8 7/16"	4' 7"	25° 00'	7° 15'	9° 00'	25° 25'	1 15/16	4' 8 1/2"	4' 8 7/16"	4' 6 31/32"	24° 25'	8° 30'	10° 00'	26° 25'
200' 0"																	1 31/32	4' 8 5/8"	4' 8 7/16"	4' 7 1/32"	23° 30'	5° 40'	7° 00'	23° 30'	1 15/16	4' 8 5/16"	4' 8 7/16"	4' 7"	23° 30'	5° 50'	8° 05'	23° 30'
300' 0"																																
	Wheel Path Development Drawing No. 51522								Wheel Path Development Drawing No. 51512								Wheel Path Development Drawing No. 51532								Wheel Path Development Drawing No. 51542							

Way Matters—Tabulated Flange Path Data, Prepared by Pennsylvania Steel Company

Width of the Gage in Curves

Circulars were sent out to member companies in reference to best practice and recommendation for gage of curves. Thirty-two replies were received, which show a considerable variation in the practice of increasing the width of gage. However, in the majority of reports the general practice is shown to be that of increasing the gage for curves varying from 100 to 35 ft., center radius, from neat gage to plus ⅜ in.

On account of many companies being burdened with cars of different types and it not being practicable to change the size of the throat of guard rails for varying radii, it follows that the extreme conditions must be taken care of, which probably accounts for the greater number of reports showing an increase of gage on curves.

The committee is very glad to append to the report a discussion of this subject with accompanying diagrams by C. W. L. Filkins, M. C. E., with William Wharton, Jr., & Company, Inc., Philadelphia, Pa., furnished through the courtesy of V. Angerer, vice president and general manager; also a drawing of the Pennsylvania Steel Company, giving the tabulated flange-path data for cars on curves under varying conditions, presented by Charles Alden, chief engineer railway department, Pennsylvania Steel Company. [Mr. Filkins' paper will be found elsewhere.—Eds.]

The committee believes that in T-rail work it is best to place the T-guard rail ½ in. to ⅝ in. higher than the running rail, as compared with ⅜ in. for the rolled guard. This increase in height is necessary on account of the beveled edge or rounded corner of the T-rail.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

Many members of the associations who are also members of the American Institute of Electrical Engineers will be interested in the knowledge that R. W. Pope of New York, secretary of the Institute, is attending the convention. Mr. Pope has been "swinging around the circle" in the interests of his society. He left New York Aug. 18 and has been to Seattle, Portland, San Francisco, Los Angeles and Salt Lake. At all these cities he has addressed members of the Institute and has greatly quickened the interest in the affairs of the organization. He has been cordially welcomed everywhere by electrical men and is gratified at the success of his trip. He was the guest of Prof. H. J. Ryan at Stanford University, where he gave a talk to the students of the engineering courses, Sept. 17. He also visited Visalia and California Hot Springs. In Denver his headquarters are at the Hotel Standish, where he will remain until Friday. During his stay there will be a luncheon for Institute members, probably on Thursday, the arrangements for which are being made by W. E. Goldsborough. On Oct. 9 Mr. Pope will address the St. Louis section of the Institute in that city.

The Manitou & Pike's Peak Railway was completed on Oct. 20, 1890. The project was first conceived in 1884 and the first grading commenced in 1889. Its exact length is 47,992 ft.

RAIL GROOVES AND TRACK GAGE FOR CURVED TRACKS*

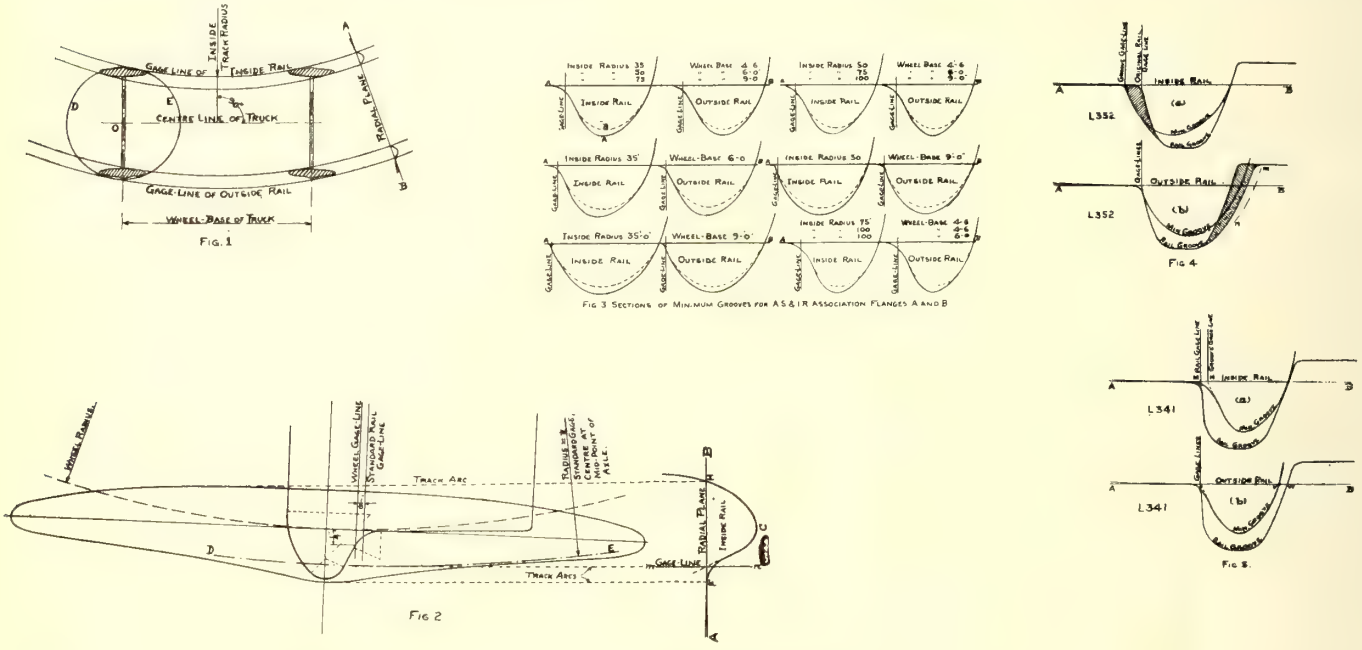
By C. W. L. Filkins, M. C. E.

The primary principle of wheel contact on curves is that the forward inside wheel of a car truck shall bear against the inside guard and the rear outside wheel against the outside guard, thus keeping the flanges of all of the wheels clear of either rail head and eliminating the side-wear on the heads. In practice this is impossible, due to irregularities, and could not be maintained, due to the wearing of the guards. The ideal conditions would be new wheel flanges and a particular rail for every curve, wheel-base and flange, but this is prohibitive, both for the traction company and the manufacturer, owing to inaccuracies in wheel setting, different flanges and wheel-bases over the same track, and most particularly to the necessarily limited number of types of rolled guard rail sections.

Determination of Minimum Groove

Having a fixed rail groove as above intimated, it is desired to know if that groove will properly serve under the given conditions, and if not, how to alter it to meet them. Without discussing the question of wear on wheels or rails, as others have somewhat thoroughly considered that in the forms of wheel flange and rail groove, let us find the minimum groove in which a given wheel flange will run, on the assumption that the equipment is geometrically perfect. In a car traversing a curve, the longitudinal axis of the car truck is normal to the radius of curvature of the track drawn to the mid-point of the truck, the wheels being held rigidly parallel to the axis. The portions of the wheel flanges which determine the size and shape of the minimum groove are the portions below the shaded sections shown in Fig. 1. The shaded areas are sections of the wheels on a level with the wheel-tread. If we project these portions of the flanges upon a radial plane, we obtain the contours of the minimum grooves, as shown at AB. To obtain these projections (see ABC, Fig. 2), pass a series of planes perpendicular to the axis of the truck. They will cut lines from the surface of the flange. Project these lines by means of track arcs upon the radial plane AB (shown rotated about line AB, as an axis, into the plane of the paper). The outline curve FCH, tangent to all of these projections, is the contour of the required minimum groove.

The gage-line of a grooved rail or of a groove is customarily taken as the intersection of a horizontal plane through the tread-line with the head side of the groove produced, the rounded corner being ignored. Accepting this in what follows, we inquire the position of such a gage-line for the minimum groove as compared with a gage-line as determined by the standard gage. If in Fig. 1 with the mid-point O of the axle as center, we describe the circle D-E, of diameter equal to standard gage and draw track arcs tangent to D-E, one on each side, and produce then to A-B (Fig. 2), we determine the position of the standard gage-line. Only one such determination—at m-n—is shown in Fig. 2. For wheels set to a gage ¼ in. less than standard gage and with the wheel gage-line taken at a point on the fillet of the flange ¼ in. below the level of the tread, it is found that the standard gage-line and the minimum groove gage-line coincide for all flanges used at the present time. This also holds for M. C. B. flanges set to M. C. B. Association standard (M. C. B. Association Report of 1907). There may be a slight exception to the above conclusion in the case of American Street & Interurban Railway Engineering Association flanges A and B, for which the groove gage-line appears to fall outside the standard gage-line 1/32 in. for large wheel-bases and very short track radii. As other conditions will cover this item, we will ignore it in what follows.



Rail Grooves and Track Gage for Curved Track—Figs. 1, 2, 3, 4, and 5

By the method set forth above, the following set of minimum grooves has been obtained for the American Street & Interurban Railway Engineering Association flanges known as A & B (See Fig. 3).

The dotted lines refer to flange B, the gage-line shown on these contours indicates the position of the standard gage-line, as explained above. In a similar manner, the minimum grooves for other flanges have been plotted, and the data so obtained used in Fig. 6, as will be explained later.

In what follows we premise that, owing to the uniformity of the wheel flange section, the practical inside groove required under given conditions is the same as the minimum groove for the same conditions; also that the inside guard guides the truck around the curve.

For equipment at the present time it seems reasonable to limit the range of irregularities in wheel setting to ¼

*Paper presented as a part of the report of the Committee on Way Matters.

or ⅛ in. to each wheel, distributed 1/16 in. on each side of the normal position of the wheel. Since this variation may occur simultaneously to double the effect, there is an ⅛-in. change outward and inward from the normal position of the outside wheel flange. The outward movement will seldom require attention, as it will probably be taken up by the fillet and riding on the head of the outside rail, and practice indicates that irregularities in that direction are rare. The inward movement of ⅛ in. must be provided for by holding the outside guard back, thus increasing the width of the outside minimum groove that amount for practical purposes.

Let us now adapt the minimum grooves of Fig. 3 to the following case: American Street & Interurban Railway Engineering Association flange A, Lorain Steel Company rail section No. 341, inside track radius of 50 ft., and wheel-base 4 ft. 6 in. Place the guard of L-341 tangent to the inside minimum groove contour for the given conditions—see Fig. 5 (a). The minimum groove lies wholly within the rail groove, and the rail gage-line fails to coincide with the standard gage-line by the amount M-N. Evidently the standard gage should be widened the amount M-N, and there is no planing of the rail section for the inside rail. Fit the head of the rail section into the outside minimum groove contour—Fig. 5 (b). The rail and standard gage-line coincide, and hence there is no widening of the gage due to this last operation. If V-W be not less than ⅛ in., the outside groove will be sufficiently wide to take care of irregularities. In general, if the width of the given rail groove exceeds that of the inside minimum groove, widen the standard gage the amount of the excess, the wheels being set as explained above. A further widening of the gage will but decrease V-W, and ultimately the wheels will bind between the guards, unless the outside groove were planed to greater width.

By width of groove is meant the horizontal distance between the guard and the gage side of the groove measured on a level with the tread, the rounded corner due to fillet or head being ignored. By plotting the widths of the minimum grooves as abscissae and the wheel-bases as co-ordinates, it is found that for a given flange the width of the groove varies directly as the wheel-base and inversely as a function of the track radius. Without insisting upon an accuracy closer than 1/32 in., the following simple formula for the width W (in inches) of the minimum grooves for the American Street & Interurban Railway Engineering Association flanges A and B was obtained:

$$W = \frac{1}{16}\left(\frac{45\,B}{R} + 18\right),$$

where B = length of wheel-base in feet and R = radius of the curved rail in feet. Similarly for M. C. B. flange:

$$W = \frac{1}{16}\left(\frac{8{,}000\,(B-2)}{R^2 + 100\,R} + 24\right)$$

Six other flanges, whose groove widths have been used in Fig. 6, were determined in a similar manner, the formulae being similar in form to the first one given above. The formula for the American Street & Interurban Railway Engineering Association flanges does not give grooves wide enough by 1/16 in. or less for radii much in excess of 100 ft., but above 100 ft. the minimum groove differs inappreciably from the form and size of the flange section.

By means of the grooves which have been plotted, we are enabled to note the effects of variations in the given data as follows:

(a) The width of the groove increases directly with and in the same amount as the width of the wheel flange.

(b) Increasing the depth of the wheel flange slowly increases the width of the groove, depending greatly upon the form of the flange in obtaining the increased depth.

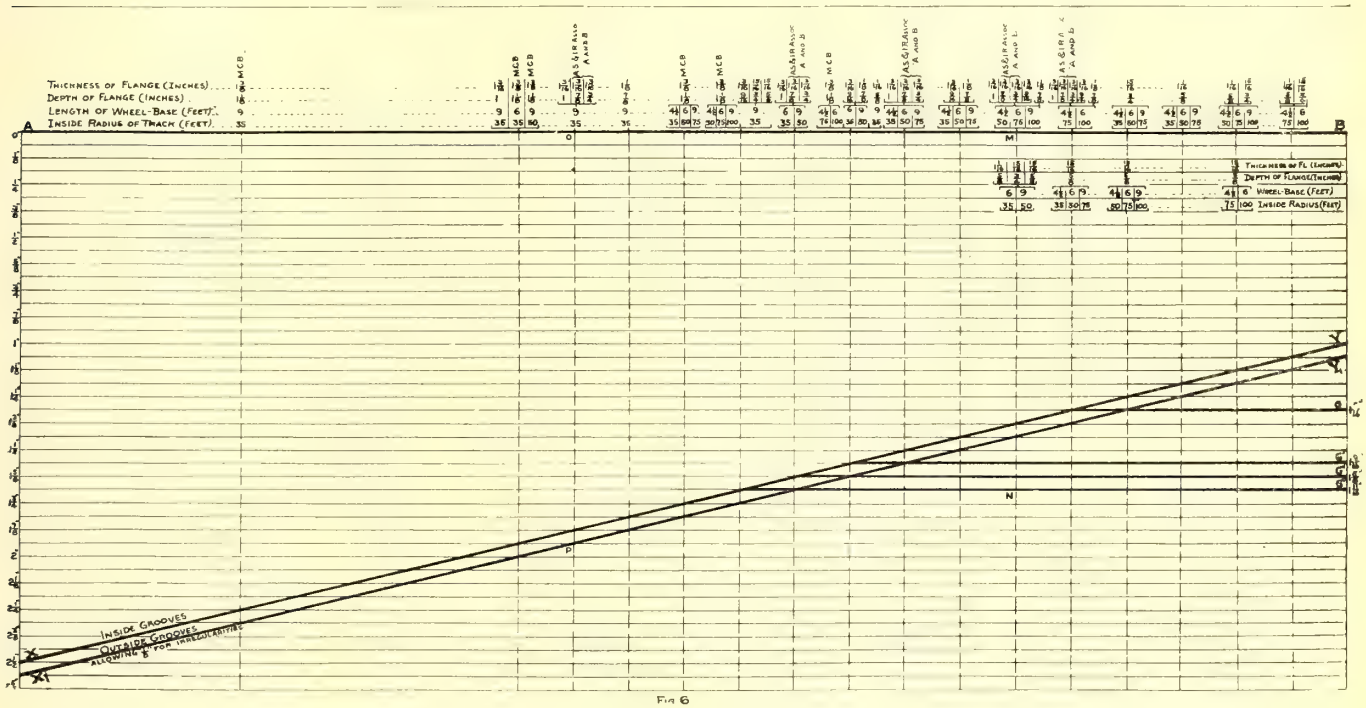


Fig 6

The vertical distances between base-line AB and line XY represent the width of inside groove, measured on the level of the tread line of the rail, to pass the wheel flanges, in combination with the wheel-bases, on curves of the radii, all as given at the base-line AB. The vertical distance between line AB and line X_1 Y_1 represent the width of the groove of the outside rail which should be used in conjunction with that given for the inside rail, to allow for variations in wheel setting.

For wheels set to a gage ¼ in. less than the standard track gage and with the wheel gage-line taken at a point on the fillet of the flange ¼ in. below the level of the tread line, curves with grooves as in diagram should be laid to standard track gage.

Horizontal line G, G', G'' and G''' represent the width of grooves in commercial girder guard rails now rolled. Where the width of groove necessary for the combination of wheel flanges, wheel-bases and radii, as given by the diagram, is smaller than the width of groove in the girder guard rail to be used, the gage of the track on the curve should be widened by an amount equal to the vertical intercept between the line XY and the line G, G', G'' and G''' respectively. Where the width of the required grooves are greater than the width of the rail groove, the amount of planing is indicated by the intercept between XY and X_1 Y_1 and the lines G, G', G'' and G''' respectively.

Rail Grooves and Track Gage for Curved Track—Fig. 6— Width of Rail Grooves on Curves Under Varying Conditions

(c) The effect of wheel radius upon the grooves is negligible for the present range of wheel radii.

(d) The effect upon the grooves of different track gages from 4 ft. 8½ in. to 5 ft. 4½ in. is inappreciable.

(e) The factors, outside of the wheel flange, which critically affect the grooves, are the length of the wheel-base and the track radius.

(f) For track radii greater than 100 ft., the minimum groove is practically the same as the flange section.

(g) The effect of the gage is to make the width of the outside minimum grooves about 1/16 in. less than for the inside; hence the practical outside groove, allowing ⅛ in. for play, should be 1/16 in. greater in width than the inside minimum groove.

Using the inside minimum grooves as a basis (Fig. 6), draw a convenient oblique line X-Y as referred to a fixed base-line A-B. By means of the vertical scale, find points on X-Y at distances below A-B equal to the widths of these inside minimum grooves and draw the verticals to A-B, designating them as there shown. Results for a 7.5 ft. wheel-base have not been tabulated, but values for this wheel-base may be read off from Fig. 6 by direct interpolation. Thus, for a flange 1⅛ in. thick, ⅞ in. deep and a 50-ft. inside track radius, the width of groove is 1 9/16 in. for a 9-ft. wheel-base and 1 7/16 in. for a 6-ft. wheel-base; hence 1½ in. is the width of groove for a 7.5-ft. wheel-base, as would be given by the mean vertical.

Note.—The thickness of flange as used on this diagram (Fig. 6) is measured on a level with the wheel tread and is the distance from the guard side of the flange to the wheel gage-line, the latter being ⅛ in. inside of the standard track gage-line and at a point on the fillet ¼ in. below the wheel tread. The depth of flange is its extreme depth below the level of the wheel tread.

Since the width of the practical outside groove must be 1/16 in. wider than that of the inside minimum groove, in Fig. 6 draw X_1-Y_1 1/16 in. below X-Y. The vertical lines between X-Y and A-B give the necessary widths of inside grooves for the given conditions, as indicated at A-B, and similarly the necessary widths of the outside grooves, ⅛ in. being allowed for irregularities, are given between X_1-Y_1 and A-B.

Theoretically the rail grooves should have the widths thus obtained, but we are limited by the commercial product in rolled sections, the widths of grooves of which are 1 5/16 in., 1 9/16 in., 1 5/8 in., and 1 11/16 in., and a few specials. The widths of these grooves are shown in Fig. 6 by the horizontal lines G, G′, G″, and G‴. The effect of using some standard rail under given conditions is now easily seen. For example, for American Street & Interurban Railway Engineering Association flange A, wheel-base 9 ft., inside radius 100 ft. and a 1 9/16-in. grooved rail; on line M-N of Fig. 6, we read the required width of inside groove = 1⅜ in. and of the outside groove = 1 7/16 in. Evidently the 1 9/16-in. groove of the given rail is 3/16 in. wider than the required inside groove and ⅛ in. wider than the required outside groove, as easily seen by the intercepts on M-N between G′ and X-Y or X_1-Y_1 respectively. Hence the gage must be widened 3/16 in., the intercept on M-N between X-Y and G′. We also note that there is a clearance of ⅛ in., the intercept on M-N oetween X_1-Y_1 and G′, between the outside flange and the outside guard over and above the allowance for irregularities. It might be well in this case to widen the gage an additional ⅛ in. and thus make greater allowance for irregularities and obtain earlier bearing against the inside guard.

With the same flange, wheel-base and same rail, let us try a 35-ft. radius. It is seen that the rail groove is 5/16 in. narrower than is required by the inside flange and ⅜ in. too narrow for the outside flange. The head of the inside rail must be planed 5/16 in. and the outside guard ⅜ in. The locations of these planings are so taken as to least affect the wearing portions of the rails, as shown in Fig. 4. Since planing a rail places it in a type with a wider groove, it must be placed in the wider groove class in examing for change from the standard track gage. The inside rail groove is now 1⅞ in. wide. The intercept on O-P between X-Y and a horizontal line corresponding to a 1⅞-in. groove is zero; hence there will be no widening of gage.

For the determination of the exact amount and contour of planing, place the guard of L-352 tangent to the inside minimum groove contour for the given conditions. See Fig. 4 (a). The shaded portion shows the amount of planing necessary to adapt this rail to the conditions. On planing this rail evidently its new gage-line will coincide with the standard and the minimum groove gage-lines, since the latter practically coincide, thus again showing that there will be no change in the standard gage due to this operation.

Now fit the head of the rail section into the lines of the outside minimum groove for the given conditions. It is seen that the rail gage-line and the standard gage-line coincide; hence there will be no widening of the gage for these particular conditions, provided we do not allow for any irregularity in the setting of the wheels which would tend to increase the normal gage distance. That such irregularly tends to decrease rather than increase the normal gage distance of the wheels is a practical fact.

From Fig. 4 (b) we see that planing of the guard is necessary, but due to irregularities in wheel setting, the total amount of planing is not immediately shown. Allowing for this ⅛ in. in Fig. 4 (b), as shown by the dotted line, and drawing the fine full line to give a reasonable groove contour, the shaded area shows the amount of planing of the outer rail for practical conditions. To reduce the amount of planing from either rail, a slight shifting of the section along A-B, requiring a slight planing of the guard in Fig. 4 (a) or of the head in 4 (b), may sometimes be advisable. By increasing the amount of planing of the outside guard by ⅛ in. and widening the gage ⅛ in., allowance may be made for an outward movement of the outside flange for irregularities, and an earlier bearing bearing against the inside guard also obtained.

For uniform practice it is suggested that in the case of a widened gage the gage-line of the inside rail be made to conform to the geometrical position of the standard gage-line and the outside rail moved outward the amount the gage is to be widened. Geometrical purposes would thus require that the gage narrow abruptly at the points of tangency, even though not carried out in practice. Some of the usual methods of eliminating this widening in the neighborhood of tangents is to narrow the gage of the curve as it approaches the tangent; another is to carry the widened gage through onto the tangent and there gradually narrow down to the standard. As a matter of fact, the gage of the curved track contiguous to the tangent and the gage of the tangent should have an increased widening, as compared with the more central portion of the curve, as the straight track acts as a curve of increased radius in conjunction with the curve. This additional widening could be accomplished very effectively by giving a slight curve to an extension of the inside rail into the straight track, commonly called the straight guard on the end of curves.

Conclusions

In conclusion, we might summarize as follows: For the flanges in use at the present time and provided the wheels are set ¼ in. less than standard gage at a point ¼ in. below the level of the wheel tread; also allowing ⅛ in. for tightening of wheel gage due to irregularities in wheel setting.

(a) There will be no widening of the standard track gage when the width of the rail groove does not exceed that of the required inside grooves;

(b) If the width of the rail groove exceeds that of the required inside groove, widen the gage the amount of excess;

(c) If the rail groove be too narrow, plane the inside head to give the width required for inside groove and the outside guard to give a width 1/16 in. greater than that of the planed inside groove;

(d) If the rail groove be of correct width for the inside groove, do not widen the gage, but plane the outside guard to increase the width of rail groove by 1/16 in.;

(e) For the range of radio in common use (not less than 25 ft.), there will be no narrowing of standard gage.

(f) For a given rail, the widening of gage is greater the longer the track radius;

(g) When the outside rail is not guarded, the statements as to widened gage still hold, but obviously the planing of the outside guard need no longer be considered.

Practice will call for some modifications in the application of these theoretical conclusions, as it is obviously impracticable to change the gage for every radius of curve in a layout. The tendency of the practice, therefore, should go towards selecting a rail with a groove nearest suitable to the combination of conditions, or plane the groove to suit where necessary, and lay the curve to the standard gage.

Where cars of different wheel-bases and wheel flanges traverse the same curves, the combination calling for the widest groove must govern the groove and the combination calling for the narrowed groove then applied to the wide groove must govern the gage, with extra allowance in the width of the outside groove equal to the widening of the gage.

COMMUNICATIONS—SHARP FLANGES

Denver, Colo., Oct. 5, 1909.

To the Editors:

The writer suggests the following as a possible remedy for the sharp flange trouble with steel wheels:

The design of motor trucks has now been improved to the point where there is not much probability of their getting out of square, and roller center and side bearings remove any other cause for this trouble.

In the experience of the writer whenever one of a pair of wheels begins to show wear on the flange this wheel is invariably a trifle smaller in diameter than its mate, so that the cause for wear on this flange then is the large wheel running ahead on a straight track and thus crowding the flange of its mate against the rail. It is very evident that the remedy is to grind the large wheel to the same size or a very trifle smaller than the one with the sharp flange, which will remove the cause, or will reverse the grinding action, and permit the wheel with the sharp flange to build out slightly as the tread wears down.

The grinding could be done possibly by using an emery filled shoe. The emery filled shoe must be applied before the sharpening of the flange has progressed very far, or when this wheel is but a trifle smaller than its mate. When the flange has become so much worn that it would be necessary to turn down the wheels there will be a difference in diameter of the wheels of from ¼ in. to ⅜ in., which is too much difference to be removed by grinding.

W. G. PRICE,
Engineer, Standard Motor Truck Co.,
Pittsburg, Pa.

Clarence A. Ross, president of the Engineering Construction & Securities Company of Chicago, is attending the convention. Mr. Ross brings the cheering news that construction work is proceeding vigorously. His company is about to build a 10-mile interurban extension from Albia to Buxton, Ia., and also another of 33 miles from Clarinda, Ia., to Tarkio, Mo. In addition the firm of Rattenborg, Ross & Judd of Atlantic, Ia., of which Mr. Ross is a member, is about to build a 58-mile extension of the Atlantic, Northern & Southern, connecting Villisca and Manning, Ia. This will be a steam road.

A NOCTURNE

Many railway and supply men give serious consideration these days to the question whether it is better to stay up all night or to try to get some sleep. To all such the little poem on "The Lark and the Owl," written by John H. Stedman, the poet laureate of the association, some time ago, and published in Life, will be read with thoughtful attention. Here it is:

The blithesome lark on joyous wing
  Rises to seek the light;
The owl, though, does a better thing
  In sitting up all night.

Weary with early-rising cares
  The lark rests with the sun;
The owl the joys of darkness shares—
    His lark has just begun.

Let the bird that flies at daylight
  Kite and carol as it may;
The bird that's bumming 'round at night
  Is the wisest, all men say.

Tennesee has its quota of delegates to the convention, and one of them, who is also well-known among electrical men in other parts of the country, is W. E. Boileau, general manager of the Chattanooga Railway & Light Company.

George W. Knox of the Knox Engineering Company, Chicago, is wandering about, dispensing happy smiles hither and yon. One reason appears to be that he has been retained to do the engineering for the new power house of the Rock Island Southern Railroad.

Charles L. Henry, president of the Indianapolis & Cincinnati Traction Company, and the one to whom the honor has been given of having promoted, built and operated the first interurban railway in the state of Indiana, is with us. Mr. Henry was prominent in the organization of the Central Electric Railway Association and is a past president of that aggressive body of railway officials, which controls the destinies of the electric railway properties in Indiana and Ohio.

W. T. Van Dorn of the W. T. Van Dorn Company, Chicago, is not only a pioneer in the manufacture of drawbars but he has the further distinction of being a pioneer of Denver. Mr. Van Dorn first came to this city in July, 1864, after making the journey from Quincy, Ill., by ox team and caravan. Mr. Van Dorn had some interesting experiences during the two and a half months which was required to make the trip from the Missouri river to Denver, as the Indians were very hostile.

Frederick W. Darlington, electrical engineer of the Denver & Interurban Railroad, the single-phase line connecting Denver and Boulder, was one of the pioneers in heavy electric traction. In the early nineties, Mr. Darlington installed for the Pennsylvania Railroad the electrical equipment on its Burlington & Mt. Holly branch. This was the first branch of the Pennsylvania Railroad to be equipped with electricity and was the first steam railroad to be electrically equipped. Later, Mr. Darlington was chief engineer of the Philadelphia Traction Company, one of the constituents of the present Philadelphia Rapid Transit Company, and had a large part to do with the design and construction of the company's electric power stations at Thirteenth Street and Mt. Vernon Street and the one at Thirty-third Street and Market Street. Mr. Darlington was also a pioneer in the design and construction of electric fountains and installed a number of the largest electric fountains in the country. His work in connection with the Denver & Interurban 11,000-volt equipment has attracted wide attention among engineers.

Among the Exhibits

Paul Stewart of the John A. Stewart Electric Company, dealers in electrical and steam machinery, Cincinnati, Ohio, is on hand with a special list of large power apparatus. His headquarters are at the Brown Palace Hotel and in the Electric Railway Equipment Company's exhibit space.

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The Whitmore Manufacturing Company, Cleveland, Ohio, is distributing as a souvenir a unique metal bookmark and paper cutter. The handle is in the shape of a gear whose life has been preserved intact by Whitmore's gear protective composition.

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At the booth of the Archbold-Brady Company, Syracuse, N. Y., may be seen photographs and blue prints of catenary bridge construction and towers for transmission lines and high-tension crossings over rivers and railroads. Some large photographs of catenary bridges, of which this company makes a specialty, are particularly interesting.

* * *

Albert & J. M. Anderson Company, Boston, Mass. are showing 66,000 volt disconnecting switches of a truss type; a full line of switches and "Boston nuggets" in the shape of pure copper castings; a remote control mechanism for oil switches; and time switches for a.c. circuits up to 3000 volts. The company is represented by Alfred E. Anderson of Boston and Ernst and Henry Woltmann of New York

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The Eclipse Railway Supply Company, Cleveland, Ohio, is showing at Booth No. 601 in the Annex its new model "Acme" type of "Eclipse" fender, designed for double-end equipment or where trailers are used. With this design it is not necessary to remove the fender when coupling at either end of the car. The company is also showing mutoscope pictures of the life guard picking up a man while the car is running at high speed. The exhibit is in charge of Ross Forward.

* * *

The O. M. Edwards Company, Syracuse, N. Y., Space No. 384 in the Auditorium exhibit, has a complete line of car window and trap door fixtures. It is the aim of this company to have window fixtures to meet all kinds of car construction, either steel or wood. Fourteen designs of window fixtures arranged for single, double, drop or semi-convertible sash are shown. All fixtures exhibited are designed and manufactured exclusively by this company. The steel trap-doors in three designs shown for interurban cars have already come into universal use on cars of this type, replacing the ordinary wooden door used for this purpose.

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The pressing question of fare collection has brought forward one of the most interesting exhibits at the convention in the form of the TEC registering fare box. This is the box recently adopted by the Metropolitan Street Railway of New York City after a year's test of all types of fare boxes that have come on the market. The TEC box collects dimes, nickels and cents, registers them on a dial reading in money and then returns them to the conductor for change. The two important features of this box are: first, it collects and registers all coins of the right denomination, no matter how mutilated or disfigured; second, the conductor has absolutely no control over the destination of the coin. He cannot by-pass coins to a box to which an inspector has access. Collusion is thus impossible. It is claimed for the TEC box that it has no tubes or slots through which the coin must pass; that it is absolutely free of delicate mechanism; that it has nothing to get out of order, and that during the months of the severe tests on the New York City lines it never made a mistake of a single cent. The exhibit is in charge of Robert C. Adams of the Transportation Equipment Company, New York.

* * *

Large crowds have been attracted to the extensive exhibit of the Pennsylvania Steel Company and Maryland Steel Company in the Annex. The Pennsylvania Steel Company is the oldest company of its kind in the United States. It was organized in 1865 and made the steel from which were rolled the first steel rails produced commercially. Its plant is on a tract of land which has been gradually extended until it now covers a distance of three miles along the bank of the Susquehanna River below Harrisburg, Pa.

The Maryland Steel Company, a constituent company of the Pennsylvania Steel Company, is located within 12 miles of Baltimore, where it owns its own wharves, terminal facilities, railway and equipment. In the marine department of this company have been turned out some of the largest vessels, including a number of torpedo boat destroyers, and the noted Dewey dry dock.

The exhibit of railway apparatus of these two companies at the convention is in charge of H. F. Martin, general manager of sales, assisted by sales agents from all the company's offices in this country and abroad. Great interest has been taken by railway delegates in the Manard pinless switch exhibited. This switch is a solid casting of Manard steel, a high grade manganese steel of superior quality. It is so designed and constructed as to prevent any possibility of a depression at the heel which has a bearing surface of 80 sq. in. and holds the tongue in place on a manganese base. Other apparatus shown includes solid Manard crossings, an anvil face frog equipped with "Never Turn" split bolts, a number of types of switch stands, crusher plates, manganese gears and pinions.

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It is rather unusual for a manufacturer to include in his exhibit an article that has actually been in the track under service, because track material is subjected to such rough usage that it is worth little more than scrap when removed from service, but in the space of William Wharton, Jr. & Company, Inc., a frog is shown that has been in use and worn out, and then restored to a condition practically as good as new. This is one of the features of Wharton manganese steel frogs of the class A, B and C types. After having outworn a number of ordinary frogs, they can be restored by a patented process, for a second term of service, at a comparatively small expense. Hundreds of frogs have been treated in this way, and in some cases the same frog has been restored twice, with excellent results.

* * *

The Chisholn-Moore Manufacturing Company, Cleveland, Ohio, is exhibiting a line of Cyclone high-speed hoists of from ½ to 20 tons capacity. This is said to be the only hoist on the market having roller bearings. The minor bearings have bronze bushings. It is also showing the "Matchless" trolley carriage without flanges on the wheels, but with vertical side rollers on eccentric shafts, adjustable to any size of I-beam. A motor-driven model showing the gears of a 5-ton hoist in motion is attracting attention. Another feature of the exhibit is a model of the new No. 6 Ludlow track drill which has steel cut gears. This drill raises 13½ in. from the highest to the lowest point, the operation being accomplished by throwing in a clutch. At the highest point it is 4 in. above the pavement. The exhibit is in charge of H. E. Dickerman and W. E. Ludlow.

* * *

The "Walkover" car seat of the Hale & Kilburn Manufacturing Company of Philadelphia is shown in various forms and upholstered effects in Spaces 312, 365, 367. Several new features are presented, including the new steel frame Chicago electric car seat now in use in over 2000 cars in that

city. The new type of Pacific interurban seat, finished in steam railroad style with high head roll back and spring-edge cushion, polished steel aisle end and grip handle, is believed to be the handsomest car seat so far shown, and meets with universal praise for its elegance, simplicity of mechanism and operation, and light weight. The all-steel car door, of which over 1000 have been built for the Philadelphia Rapid Transit Company's "Pay-within" cars, is likewise shown, together with samples of the steel frame sash as supplied the 50 all-steel electric cars for the Chicago Railways Company. The company is represented by H. T. Bigelow, A. F. Old and C. W. Laskay.

* * *

The D & W Fuse Company, Providence, R. I., is exhibiting in addition to its standard lines of fuses and Deltabeston magnet wire, an entirely new line of field and armature coils. These coils are wound with Deltabeston wire, and are insulated throughout with pure asbestos materials, treated by a new process which renders them both heat-proof and moisture-proof. There are several different types of coils on exhibition, and this company is prepared to estimate upon coils of every description. In addition to round wire, the company is now manufacturing square and ribbon wires with the Deltabeston insulation. It is also showing a new line of 2500-volt junction boxes for multiphase circuits with fuses of very much larger dimensions for this severe service. The boxes are of the selective type design, which makes it possible to open the box and examine the fuse without opening the circuit or to remove the fuse in the cover at will by simply turning the insulating handle exposed on the surface. The bases in these boxes are made of a specially prepared filled wood, which has been found to possess the best insulating qualities, to be far stronger than porcelain, and more desirable for use in equipment of this kind. The leakage surfaces have been determined by careful experiment to be ample and no appreciable leakage will occur below 6000 volts.

* * *

Kerite Insulated Wire & Cable Company, New York, has on exhibition in Spaces Nos. 414 and 416 a display of car wire, transmission cables for aerial, underground and submarine purposes, etc. Among the most interesting of the exhibits are cables which have been in service as far back as 1875 and are still good to-day. Among other things that should prove interesting to delegates would be a glance at the largest perfect biscuit of Up-River fine Para rubber ever brought into this country, which weighs 763 lb. Among other exhibits is a section of the Panama submarine cable, which was manufactured in one length of 50 miles by the Kerite Company and furnished the Central South American Telegraph Company, and which connects the Atlantic and Pacific cable of that company. This cable is being laid on the ground across the Isthmus from Colon to Panama and upon the completion of the canal will be thrown into the water. In high-power transmission cables the company exhibits pieces of the three-phase submarine cable and three-phase leaded cable furnished the Pennsylvania Railroad in connection with its Camden-Atlantic City electric line. Delegates are asked to investigate closely the merits of the Kerite insulated tape, for which it is claimed that after many years of service none has ever been known to dry out under the most trying conditions. The company is represented by P. W. Miller, R. E. Butrick and J. A. Renton.

* * *

The Electric Railway Improvement Company is making about 50 practical demonstrations of bond application daily at its booth in the Auditorium. The bonding car used in making these demonstrations is adapted for use on either standard or 3-ft. 6-in. gage track. The company announces that it has recently made shipments of leased cars to the following electric railway companies: American Railways Company, Philadelphia, Pa., one car adapted for 3-ft. 6-in., 4-ft. 8½-in., and 5-ft. 2-in. gage track; Illinois Traction Company, Champaign, Ill., duplicate car of former order; Norfolk & Portsmouth Traction Company, Berkeley, Va.,; Union Railway Company, New York City, duplicate car of former order: Pacific Gas & Electric Company, Sacramento, Cal., one car.

* * *

G. M. Gest, the well known conduit contractor, and the New York Pole Company, of which he is president, have an exhibit together in Space 29. A sample of an old sawed-off iron pole reinforced with steel bars and filled in with concrete is exhibited, showing the compact and solid nature of the reinforcement. H. H. Stannard is in attendance at the convention.

* * *

National Lock Washer Company, Newark, N. J., has an instructive exhibit in Space 144, showing full-size models of its automatic car curtains, equipped with the National cam and balance, protected groove curtain fixtures; also samples of the National lock washer. The company is represented at the convention by F. B. Archibald and John B. Seymour. The many friends of W. D. Dodd, the president of the company, regret his inability to be present at the convention.

* * *

The Cooper Heater Company, Dayton, Ohio, in Space 71, has on exhibit one of each size of its new and improved hot water car heaters. This heater has many improvements over other types of hot water heaters and owing to its small size and high efficiency it is possible to apply the apparatus to the smallest city car as well as the large interurban car. It is claimed that a large saving can be made over the cost of heating cars with electric heaters by the use of this apparatus. The company is represented by W. L. Blackwell and W. E. Hinmon.

* * *

Among the unique exhibits at the convention is the booth of Gulick-Henderson Company, Space 609 in the Annex, where may be seen the results of various interesting investigations relative to the quality of materials for traction service. This company makes a specialty of engineering inspection of various materials, such as wheels, axles, rails, cars, bridges, and in fact all materials used in railway service. The company is represented by Henry Gulick, president, and W. O. Collins, vice president.

* * *

The Planet Company, Chicago, Ill., has an attractive exhibit of its car curtain fixtures at Booth 374 in the main auditorium. This company has been represented at the Master Car Builders' Association conventions for several years, but has never before been represented at the electric railway conventions. The curtain fixtures manufactured by this company are of an exceedingly substantial construction. They are designed so that passengers on cars cannot remove them from the grooves. Messrs. Convey and Summers are representing the company.

* * *

The St. Louis Malleable Casting Company, St. Louis, Mo., is exhibitng at Spaces 621-623 a new line of malleable iron cross-arm attachments and overhead line specialties. Since May this company has received orders for 60,000 "Way" cross-arm attachments. This attachment provides a means for attaching insulators to cross arms in a manner absolutely secure without the necessity of weakening them by boring holes of any kind. In fact, the "Way" bracket added to an arm increases its strength and adds to its life. This company also makes a specialty of railway and electrical castings and has contracts with some of the largest manufacturers and street railway companies to make all their malleable iron parts. R. H. Manwaring, general sales manager, and Duncan Bond, local agent, are in attendance prepared to answer all inquiries.

The National Railroad Trolley Guard Company, New York, is represented at the convention by C. R. Ellicott.

* * *

The Union Electric Company of Pittsburgh, Pa., is represented at the convention by John P. Provost, George W. Provost and T. M. Cluley.

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The Holophane Glass Company, New York, is represented at the convention by H. M. Lauritzen, the representative of this company west of Denver to the Pacific coast and British Columbia.

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The Wright Wrench Manufacturing Company, Canton, Ohio, is exhibiting several types of its quick adjustment wrench. This wrench can be used in either hand and is made in a large number of sizes.

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The National Brake Shoe Company, Chicago, Ill., is represented at the convention by B. A. Johnson. The company is not making an exhibit this year but expects to make an exhibit at future conventions.

* * *

Heywood Brothers & Wakefield Company, Wakefield, Mass., is showing an extensive line of seats for city and interurban cars, as well as reed parlor car chairs. Bertram Berry is representing the company.

* * *

Dossert & Company, New York, are represented by H. B. Logan and W. A. Cowling in the interest of Dossert cable joints and specialties. Although the company has no exhibit, Mr. Logan and Mr. Cowling are meeting many friends.

* * *

The Trolley Supply Company's exhibit of Peerless trolley bases and retrievers and the Ideal trolley catcher is located in Spaces 162-64. The Peerless trolley base, which is being shown, has made an enviable reputation for service on high-speed railways.

* * *

The interests of the Columbia Machine & Malleable Iron Company, Brooklyn, N. Y., are ably taken care of by W. R. Kerschner. The many friends of John G. Buehler, the president of the company, regret that he was unable to be present at the convention.

* * *

W. T. Van Dorn Company is showing at its booth four of its standard types of street and interurban car couplers and two new types of couplers which have never before been exhibited. The company is now prepared to furnish couplers for every class of city and interurban service.

* * *

Electric Railway Equipment Company, Cincinnati, Ohio, is exhibiting its improved types of "Sure Grip" catenary construction material, and also a complete line of standard overhead trolley material and "Wire Lock" swedged joint poles. The entire exhibit is well worth inspection by those interested.

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W. R. Kerschner Company, Allentown, Pa., is represented by Mr. Kerschner himself. This company handles the products of the Columbia Machine Works & Malleable Iron Company, Catskill Foundry & Machine Company gears and pinions, Traction Equipment Company car resistances and second-hand car equipment.

* * *

At the booth of the Standard Paint Company, New York, in the balcony of the Auditorium, Space 404, Charles E. Smith, manager of the electrical department and Messrs. Beckman, Thomas and Pfeiffer are explaining the merits of the specialties of this company—P. & D. and S. P. C. Novac impregnating compounds; insulating varnishes and tapes; Ruberoid roofing for cars, car houses, power houses, substations and repair shops; Ruberoid flooring in red, brown and green colors for waiting rooms, offices, stations, power houses and substations. Novac impregnating compound is a new product. Its constituent elements are such that coils can be treated without the aid of impregnating apparatus, but giving the same results.

* * *

The "Avenarius" Carbolineum Wood Preservative Company, Milwaukee, Wis., and Portland, Ore., has a display in Space 701 of its wood preservatives as used on trolley poles and ties. The "Avenarius" brand is the old, original and genuine Carbolineum. This company is represented by B. F. Vreeland of Denver.

* * *

S. A. Benedict of the J. P. Devine Company, Buffalo, N. Y., manufacturers of Passburg vacuum dyeing and impregnating apparatus, is attending the convention in the interest of his company. While no exhibit is being made, Mr. Benedict is armed with a plentiful supply of the company's new catalog, which describes some of the more recent types of machines and contains a long list of users.

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Those who are interested in a perfect lubrication for armature and motor axle bearings should visit Space 622, where the Traction Lubricating Company, Chicago, Ill., has an exhibit. This lubricant is a solidified oil mixed with old waste. It stands a high heat as well as a low temperature, and is not affected by climatic conditions. One application lasts from 30 to 90 days according to the size of the box or motor.

* * *

The exhibit of the R. D. Nuttall Company as usual entertains many visitors, who are welcomed by F. A. Estep, president of the company. The railway appliances of R. D. Nuttall have been for years the standard and Nuttall gears, pinions and trolley harps are used wherever a street car turns a wheel. The Nuttall exhibit is located in the southern part of the Westinghouse pagoda in the center of the Auditorium.

* * *

W. J. Jeandron, sole sales agent for Le Carbone Company, Paris, France, is showing a full line of carbon brushes for traction motors, generators, rotaries, etc. He is also exhibiting a full line of carbon contacts for circuit breakers and lightning arresters and a large variety of telephone carbons. Le Carbone products have been widely adopted by many traction companies, including the Denver City Tramway Company. Mr. Jeandron is assisted by E. S. Taylor.

* * *

The exhibit of the Coleman Fare Box Company, Buffalo, N. Y., includes the original No. 1 type box used by the International Railway Company, Buffalo, N. Y. The No. 2 type used by the Chicago & Southern Traction Company, the Detroit United Railway Company and the Buffalo & Lake Erie Traction Company; also the No. 3 type for one-man operation and the new No. 4 box, which is termed the 5½-in. size. Samples of the Coleman hand fare box, which is used in many Canadian cities and several cities in the United States, is also shown.

* * *

The Western Lumber & Pole Company, Denver, Colo., has an exhibit in Space 701 of eight large genuine Idaho red cedar trolley poles. They reach to the ceiling of the hall, and attract much attention. This company is also exhibiting an Oregon fir traction tie, treated with "Avenarius Carbolineum," the German wood preserver. This tie bears a certificate from the Southern Pacific Railroad that it was in the roadbed, in actual use, from 1900 to 1907, a period of seven years. The tie has been cut for nine years and is as good and sound to-day as when first sawed and treated. "Avenarius Carbolineum" is also used for treating the butts of trolley poles, cedar or any other kind of wood. The company is represented by B. F. Vreeland, W. H. Lewis and M. G. Graff.

The exhibit of the Crouse-Hinds Company, Syracuse, N. Y., includes two new specialties just placed on the market, the luminous arc headlight and a multiple break for trolley service, to be used in place of snap switches, which are often a source of trouble.

* * *

The National Lead Company, under its well-known emblem of the "Dutch Boy Painter," has an interesting exhibit showing the various steps in white lead manufacture from the raw ore to the finished product. The booth is in charge of W. B. Sale of the St. Louis branch.

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The Midvale Steel Company has moved its Denver staff to its booth space 239, where delegates are welcome to have correspondence or any other matters attended to by the company's stenographers. Delegates and visitors are requested to make use of this staff without hesitation

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The Forged Steel Wheel Company of Pittsburgh, Pa., is exhibiting several sizes of its car wheels. These wheels are forged in dies from a sheet of rolled steel, which is considerably larger than the finished wheel. The treads and flanges are compressed by a pressure of 10,000 tons to harden them clear through and thus increase their durability.

* * *

At the exhibit of the National Brake Company are G. S. Ackley and a corps of able assistants, among whom is Alphonso A. Wigmore of Los Angeles, Cal., the company's Pacific Coast representative. The company has on exhibition the Ackley adjustable brake which has been adopted for use by more than 150 railways, of which 75 are in Europe.

* * *

To operating men the exhibit of the Eureka Tempered Copper Works is especially interesting. The exhibit includes several types of trolley wheels and commutators. This company makes a specialty of manufacturing large commutators for generators and rotary converters. The representatives in attendance at the convention are O. C. Hirtzel and Fred Rundell.

* * *

The insulating department of the Standard Varnish Works has an exhibit in Space 382. The representatives of this department are in attendance and will be pleased to explain to those interested in this subject the various insulating processes for treating electrical windings. Special attention is given at this convention to electrical railway equipment.

* * *

In its convention exhibit this year the Sherwin-Williams Company lays special stress on its car-painting systems, from six-day work up. Attractive samples of methods of car painting are shown in connection with the full line of paints and varnishes which the company manufactures. The representatives of the company are E. M. Williams, Cleveland, Ohio; F. A. Elmquist, New York; Henry E. Billau of Chicago; E. S. Donnelly, Dallas, Tex., and F. E. Cole, Denver.

* * *

At the booth of the Electric Traction Supply Company, Spaces 207-213, may be seen a complete line of standard conductors and special ticket punches for all kinds of service, manufactured by the Bonney-Vehslage Tool Company, New York. This line comprises all the best known types of punches. The dies are of tool steel and hardened by a special process which, together with the careful selection of other materials used, makes these punches durable and serviceable.

* * *

Consolidated Car Fender Company, Providence, R. I., is showing as a special feature of its exhibit a perfected automatic air drop device applied to its fender and wheel guard. The fenders and wheel guards of this company can be operated in all or any one of three ways, by an apron, by the motorman or by a special automatic attachment to the emergency air brake equipment. An ingenious and simple sand box is also exhibited. The special feature of this sand box is that the sand cannot leak or clog. In service the box has proven satisfactory. A. G. Thornley, general manager, and George H. Hollingsworth are attending the convention in the interest of the company.

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The Jewett Car Company, Newark, Ohio, expected to bring to Denver one of the 10 new 60-ft. high speed steel under frame interurban cars, which it is building for the Salt Lake & Ogden Railway. Owing to a delay in the delivery of trucks and electrical equipment the car could not be completed in time, so no formal exhibit is being made. The company is represented at the convention, however, by Edwin Besuden, sales manager, who has with him a model of a new self-centering radiating M. C. B. draw bar with remote disconnecting levers.

* * *

Couch & Seeley, Boston, Mass., are exhibiting an automatic machine for counting and packaging coin. This machine is small and compact, being only 20 in. in diameter and 16 in. high. There are two registers on the machine, one counting from 0 to 10,000 and the other from 10,000 to 0. With the two registers any method of checking accounts of collectors, conductors and cashiers can be easily devised, the machine acting in the double capacity of bookkeeper and money packager simultaneously. With only one handling there is no chance of error between the time the cash is delivered until it is deposited. The company is represented by C. N. Smith.

* * *

The Pantasote Company, New York, is showing agasote with water running continuously over the board and down gutters of the same material. The boards are the same which have been displayed at the last two conventions. Many samples of agasote are shown in different shapes and finishes. Fire-resisting agasote only 3-16 in. thick has withstood a flame of 6300 deg. Fahr. for one minute, while in the same test it took only 20 seconds to cut through ¾-in. steel. Pantasote is also shown in various forms and colors in curtains and upholstery. Some of the curtain materials are shown in regular frames. Samples of both agasote and pantasote are furnished to those who desire them for trial. The company is represented by John M. High, W. A. Lake and A. S. Barrows.

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Among the interesting items shown by McCord & Company, Chicago, are the following: A 3½-in. by 5½-in. arch bar truck journal box as furnished the Cuban Railways, where the McCord journal box is standard. A 3¾-in. by 7-in. box, with sections cut out of sides and out of lid, better to illustrate the action of the coil spring, center bearing lid, in its tendency always to hug the face of the box at all points. A 5½-in. by 10-in. arch bar box, with pinless lid, which is the company's latest innovation. This avoids absolutely the loss of lids because in its application the lid is so interlocked as to make necessary for removal one distinct movement which cannot occur in service. A 5-in. by 9-in. cast steel passenger box which is used quite extensively on all-steel passenger cars on steam railroads. A 4¼-in. by 8-in. malleable iron street railway box with steel inserts as used on the 650 "pay-as-you-enter" cars of the Chicago Railways Company, which have been in service now about 8 months. The gray iron or semi-steel street railway box shown is one which has just been ordered by the Chicago Railways Company for application to 350 additional cars. These boxes are arranged to admit the National equalizing wedge, which this company is also exhibiting, and which, together with the McCord box, made such a wonderful record that not one of the Chicago Railways' cars has experienced a hot box since all the 650 cars were put in service.

Among recent orders received by the American Mason Safety Tread Company are the following: Safety treads for the Mobile (Ala.) Light & Railway Company; Karbolith flooring for the Boston Elevated Railroad Company, and for new electric motor and trail cars now building for the New York, New Haven & Hartford Company by the Standard Steel Car Company.

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American Locomotive Company, New York, is represented by William Wampler at the convention, who is taking advantage of the opportunity to show the delegates the American Locomotive Company's trucks in service on the Denver & Interurban Railroad. The management of the latter company has permitted one of its cars to be placed on the exhibit tracks. The body of the car has been jacked up so that the details of the truck construction are plainly shown.

* * *

The Ford & Johnson Company, Chicago, Ill., which is showing a full line of car seats, is among the largest makers of chairs and furniture in the country. The car seat business is a new line with this company, but it has a new factory equipped for all kinds of railroad seating and is going into the business in a large way. The company may be expected to be very successful in its new work, as it has behind it a large and perfected organization with over 40 years of experience.

* * *

Transfer Issuing Machine Company, Boston, Mass., has something entirely new on exhibition in the shape of a transfer issuing machine. It is a neat, simple mechanism, the salient points of which are that it automatically prints upon the transfer, at the time of actual issue, the month, the day of the month, the hour of the day, the number of the machine issuing the transfer and the destination and transfer point. The transfer cannot, however, be issued until it is paid for by depositing a coin into the machine.

* * *

The Standard Motor Truck Company, Pittsburgh, Pa., exhibits one of its C-60 high-speed Interborough trucks and one O-50 city and suburban truck. These trucks are a part of an order for the Oklahoma Railway Company and are equipped with Standard roller-bearing center plates and Standard automatic brake slack adjusters. The company also shows four aluminum models of trucks, one of which is its C-100 A type, as built for the New York, New Haven & Hartford Railroad. An aluminum model of its slack adjuster shows the internal mechanism of this device which is in use by many railway companies.

* * *

The Dearborn Drug & Chemical Works has a handsomely fitted booth in the center of the Auditorium, consisting of four exhibit spaces. The central feature is a beautifully illuminated fountain spouting perfume. Scattered about are comfortable chairs, and the booth forms a convenient meeting place for the friends of the company. Those in attendance are George R. Carr, vice president, Chicago; H. G. McConnaughy, New Jersey manager, New York; D. E. Cain, I. H. Bowen and W. S. Weaver of the Denver office. Robert W. Carr, Chicago, president of the company, and Grant W. Spear, vice president and Eastern manager, New York, who have not missed a convention for 10 years, could not attend this year, greatly to their regret. Many inquiries were made for both of these gentlemen. All of the Dearborn people who are in attendance report that business, both domestic and foreign, is extending rapidly.

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The Stromberg-Carlson Telephone Manufacturing Company, Rochester, New York, has an interesting exhibit of railway semaphore signaling apparatus in Space 133. The representatives present are A. M. Hanbrich, manager of the Chicago office; H. W. Lucia, assistant chief electrical engineer, and C. P. Button, special representative. The system being demonstrated is the well-known signal which was introduced, installed and sold to numerous interurban railways through the United States by the Telegraph Signal Company of Rochester, New York. The Stromberg-Carlson Telephone Manufacturing Company has now secured the exclusive manufacturing and sales rights for this signal system and the skill of its engineering department has in the past few months brought this system up to a high standard of perfection in construction and operation. With the introduction of this system a positive means of enforcing obedience to train orders is afforded. This company is also showing a complete line of telephone equipment, including mine telephones, portable car telephones, portable test sets, desk telephones and jack boxes.

* * *

A thoroughly developed carbon brush, the New Laclede, exhibited by the National Carbon Company, Cleveland, Ohio, in booth No. 372, is of great interest to the visiting railway men. Not only are many new brushes shown, but also samples that have seen six to eight months' service, indicating the life of this brush will be 75,000 to 200,000 miles. This means a remarkable saving in the cost per 1000 car miles. As regards commutator wear, railways which had figured on slotting their commutators once a year find it will be unnecessary with this to slot oftener than once in from four to five years. The uniformity of the brush is proven by the fact that tests on the same motor on various roads have shown practically the same wear and the same excellent condition of the commutator. These gratifying results are the outcome of the thorough investigation by the company's brush engineers and chemists, as well as the improvement in apparatus and operating conditions. With this brush it is not necessary to slot the commutator on the interpole motors, as demonstrated on several of the largest roads. A feature of particular interest to the engineers are the photographs of some of the special machines built by the National Carbon Company to test all the different characteristics of carbon brushes, in line with the suggestions made at the previous conventions and the experience of the company's engineers and chemists. Brush engineers are present at the exhibit to select brushes to fit the conditions of operation on any road and to discuss brush problems.

* * *

United States Wood Preserving Company, New York, represented by Alexander Reed and Harry B. Langa, has an exhibit at Spaces 82 and 185 in the Auditorium, where it is showing the construction of U. S. wood block pavements. These blocks are laid on a concrete foundation 4 in. to 6 in. deep, composed of a 1-3-6 mixture of concrete. On top of this foundation is spread a ½-in. sand cushion. After the latter is drawn to a true surface by a template 3½ in. below the surface of the blocks, the blocks are laid directly upon it, grained vertically. The blocks are driven back tightly every sixth row and then rolled with a five-ton steam roller or tramped until they present a true, even surface. The joints of the blocks then are filled with sharp screened sand and spread with ½-in. sand dressing on top. The street is then ready for traffic. The process of manufacturing U. S. wood blocks either from Southern long leaf yellow pine or Southern black gum is first to saw the 3-in. plank into blocks 3½ in. deep. The blocks are then loaded into caged cars, after which they are run into the creosoting cylinder. Dry heat is then applied under pressure until the wood blocks are heated to a temperature of 215 deg. F. to kill germ life. After this a vacuum is applied until all air and moisture are extracted. Under the vacuum the cylinder is filled with creosote oil of a specific gravity of 1.12, combined with melted resin. Pressure pumps are then applied and the mixture is forced into the blocks until they have taken 20 lb. of mixture per cu. ft. of timber. The pressure is then released and the cylinder allowed to cool and the blocks withdrawn. Many progressive street railways in this country are adopt-

ing wood blocks in preference to asphalt, brick or granite, as it is claimed that they maintain the tracks in better alignment and last longer.

AMERICAN BRAKE SHOE & FOUNDRY CO.'S EXHIBIT

A splendid object lesson in the value of standardization is the unique exhibit of the American Brake Shoe & Foundry Company. On a large white board is mounted a great variety of brake heads of malleable iron construction as used on the many different kinds of trucks, but all arranged to take either the narrow gage or wide gage shoe adopted as the standard by the American Street & Interurban Railway Association. The American Brake Shoe & Foundry Company has good reason to feel proud of this display as it has taken such a prominent part in the development of these standards. Since the standards were adopted two years ago, about 50 per cent of the American street and interurban railways have become actively interested in this question and have taken steps to standardize their equipments as quickly as practicable. The new shoes are so designed that the wearing factor is increased from 50 per cent to 80 per cent, aside from the advantage of uniformity in equipment. Through its engineers the company is prepared to undertake the standardization of any property, supplying heads which will take the standard shoe without disturbing any part of the present brake mechanism. In designing these heads the company endeavors to correct the uneven wear which existed in the hanging of the old type.

WESTINGHOUSE COMPANIES' EXHIBIT

The Westinghouse Companies' exhibit is in the center of the Auditorium Hall, occupying a space of approximately 2500 sq. ft. The space has been transformed into a replica of an Indian pagoda, flanked by Grecian columns. At each end there is a dome. The roof is covered with garlands of artificial flowers, while just beneath the roof rows of potted ferns and plants bank the cealing. The companies represented in this structure by their displays are the Westinghouse Electric & Manufacturing Company, the Westinghouse Traction Brake Company, the Westinghouse Machine Company and the R. D. Nuttall Company. In the exhibit of the electric company there is an array of railway motors, from the ordinary size used on street cars, up to the large 125-hp motor for interurban and main line service. There is a complete line of material used for all purposes in electric railway service, and of motors used for operating machine tools in manufacturing and railway shops. In the exhibit of the Westinghouse Machine Company, there is a complete electric train lighting plant, consisting of a 40-hp generator and a steam turbine. There are also two Le Blanc condensers and other auxiliary apparatus. The Westinghouse Traction Brake Company shows a complete set of air brake apparatus for stopping one car, two cars, three cars, or a train of electric cars. Auxiliary air brake apparatus is also shown. The R. D. Nuttall Company displays a complete set of trolley harps, trolley bases, gears and pinions. The Westinghouse Electric & Manufacturing Company also has on exhibition, outside of the Auditorium, a car equipped for the a. c. single-phase system. This car will be in operation on the Denver & Interurban Railroad, between Denver and Boulder, as soon as the construction of the bridge over the Twenty-third Street viaduct is completed. This a. c. system is the same which is used on the main line of the New York, New Haven & Hartford Railroad between New York and Stamford, the Spokane & Inland Empire Railway and several other roads in this country, France, Sweden, Germany and Italy. Besides the 25 members of the office force of the Denver district of the Westinghouse Companies, of which L. M. Cargo is manager, the companies are represented by men from Pittsburg, New York, Boston, Baltimore, Philadelphia, Cincinnati, Chicago, Kansas City, St. Louis, San Francisco, Los Angeles and Columbus, Ohio.

EXHIBITS OF THE ALLIS-CHALMERS COMPANY

The exhibit of the Allis-Chalmers Company, Spaces 200-210 and 251-258 in the Auditorium Hall, should be visited by every delegate interested in the latest developments in air brakes, railway motors and controllers. There are on exhibition one two-car equipment straight-air emergency brake; one two-car equipment of quick-action automatic brakes; one type R 75 hp street railway motor and one type S-4 controller having a capacity of four 40 hp motors. All of this apparatus has new features never before shown.

The new railway controller, which is of the series-parallel type, has special molded main and reverse drums and the cut-out switch is so arranged that when two motors are cut out the other two may be run both in series and parallel. It also has two blow-out coils which create an especially strong field. The usual interlocks between the main and reversing drums are also embodied in this controller and the fingers are of a special construction which avoids any tendency to buckle. They are provided with massive copper contacts.

The usual connecting board is omitted, the connections from the resistance and motor loads being made directly at the finger terminals.

The fields of the motors are reversed, instead of the armatures, which gives a large potential between adjacent reversed fingers and obviates the tendency to arc from finger to finger.

Delegates and manufacturers are invited to participate in the contest for the handsome souvenirs to be distributed on Thursday. The souvenirs are well worth an effort to secure. The only requirement is the filling out of small cards showing the estimated number of turbine blades contained in a small glass case. Any number of guesses may be recorded.

ADDITIONS TO LIST OF EXHIBITORS

R. D. Nuttall Company, Pittsburg, Pa., Spaces 268, 319—Gears, pinions, trolleys and trolley parts. Represented by F. A. Estep, G. W. Provost, T. M. Cluley, C. J. Mayer, J. V. E. Titus, M. Berg, J. W. Porter, E. C. Mason.

Rooke Automatic Register Company, Providence, R. I., Space 140—Rooke automatic register and Rooke type of stationary fare box for Pay-As-You-Enter cars. Represented by R. S. Rooke.

* * *

Wonham, Magor & Sanger, New York, advise that on October 2 the Chicago Railways Company adopted the H. B. Universal Life Guards as standard for its entire system, after having had 75 cars fitted with this life guard and tested in a 60-day trial.

* * *

The Barber car, from York, Pa., makes trips every 15 minutes, starting on the hour, between the corner of Sixteenth and Arapahoe Streets and Globeville. Convention people are invited to take a ride and inspect the car.

* * *

Goldschmidt Thermit Company will give a demonstration of the Thermit process of rail welding at 4:30 this afternoon.

* * *

Yesterday afternoon's sight seeing automobile trip for ladies added another to the entertainment committee's triumphs. There were 181 ladies in the party, in charge of W. J. Walsh of the Galena-Signal Oil Company, Chicago, for the committee. The autos held parties of from 12 to 20, and a guide and lecturer accompanied each car.

EXHIBIT OF THE GENERAL ELECTRIC COMPANY

The General Electric Company, Schenectady, N. Y., has a very large and complete exhibit of street railway electrical and air brake equipment and overhead line material. Among many new types being shown this year are the types G. E. 219 and G. E. 216 railway motors. These motors are of the commutating pole split frame and box frame types respectively. Both are rated at 50-hp, 600-volt circuit and 40-hp, 500-volt circuit. They are designed to take the Engineering Association standard axles and gears. The G. E. 214 railway motor is of the commutating pole, box frame type, with a rated capacity of 75-hp at 600 volts. It is likewise designed for the Engineering Association standards. Another new motor shown is the G. E. 88, which is of the non-commutating pole design. This is made either with a box frame or a split frame and has a rated capacity of 40 hp at 500 volts.

A complete equipment of automatic type M control for 1200-volt d. c. car is exhibited. This equipment includes the essential pieces of apparatus for the control of four 75-hp 600-1200-volt motors. The contactors, reverser, circuit breaker, master controller, etc., are practically standard 600-volt apparatus, with the exception that all parts carrying the main current for the motors are insulated for 1200 volts. The operating coils are energized from 600-volt current furnished by the dynamotor, which consists of an armature with two separate windings and two commutators, constituting in effect a small motor generator with the two commutators connected in series across the 1200-volt circuit. A tap connected between the two commutators provides current for operating the contactors, etc., at 600 volts.

Two new brake equipments are shown. One is an emergency straight air brake equipment complete for operative motor and trail car. This equipment is provided with quick service valves which admit and exhaust air to and from the brake cylinder directly from the main release and to the atmosphere respectively without passing through the motorman's valve. The operation of the brakes in both application and release is extremely rapid, even in trains of three or four cars. The emergency straight air brake system is particularly adapted for cars which are required to operate both singly and in short trains.

The other brake equipment consists of two complete variable release automatic brakes for motor cars. This equipment is essentially an automatic air brake equipment with special triple valves and other details to provide for quick service application, high pressure emergency application, quick recharge of auxiliary reservoirs and graduated release. This equipment is specially adapted for the operation of electric train service where cars are always run in trains. It operates interchangeably with the Westinghouse graduated release brake system.

Two new types of air compressors designated as CP 27 and CP 28 are shown. The CP 27 compressor has a piston displacement of 15 cu. ft. per minute at 600 volts against 90 lb. pressure. This compressor is shown disassembled, and also fitted with special cover to permit observation of the lubricating system when compressor is operating. The location of all bearings for both motor and compressor in one casting, location of gear in center of crank shaft, and automatic lubrication of all bearings from one source of supply are important improvements. The CP 28 compressor has 25 cu. ft. per minute piston displacement at 600 volts against 90 lb. pressure. It is of the same design as the CP 27 compressor.

Among the miscellaneous equipment is an aluminum cell lightning arrester for 12,500-volt, three-phase ungrounded neutral circuits and K 35 controller, which has a capacity for four 50-hp 500-volt motors. This controller is built with a bridge connection between the series and parallel positions and is fitted with an improved blow-out.

Two types of steam flow meters are exhibited. One is an indicating meter which is operated by unbalanced pressures on two sides of a funnel block which screws into a steam pipe. The unbalanced pressures from the two sides of a mercury U-tube cause the movement of the indicating needle. This meter is quickly adjustable for any size pipe, boiler or superheat. The recording steam flow meter operated on substantially the same principle as the indicating meter except that the U-tube forms the beam of the balance. The displacement of the mercury moves the balance against a counter weight and this moves the indicating pen over a multiplying mechanism. The record is made on a paper roll moved by a positive chronograph. The meter automatically compensates for variations in boiler pressure and can be quickly adjusted for any change or any superheat or other operating conditions.

The top mast motor-driven automatic block signal, such as is used on steam railroads, is shown. The signal is operated by alternating current controlled by a. c. track and line relays. Alternate blocks are energized at different frequencies. Both rails form a continuous circuit for the return of power current and no reactance bonds are necessary.

The car equipment exhibited consists of MR-12-B circuit breaker, magnetite arc headlight, car lighting switch and cut-out, malleable iron controller handles, motor lead connection boxes, R. G. car rheostats and solid gears and split gears for G. E. motors. A complete line of rail bonds and overhead material is exhibited on large panels at one end of the exhibit.

THE BARBER CAR IN DENVER

No delegate to the convention should fail to take a ride on the latest Barber car which is being operated on the one mile of standard gage track from Sixteenth and Arapahoe Streets to Globeville. The car starts on the hour and every 15 minutes thereafter. This car, which is thus serving as a live exhibit, was shipped direct from the works of the Barber Car Company, York, Pa., and placed in operation without any preliminary runs whatsoever. The running qualities, power economy, roominess, perfect ventilation and other advantages of this car are too well known to call for an extended description, but those who are familiar only with the earlier models will be pleasantly surprised to see how greatly the exterior has been improved through the use of arched side and vestibuled windows. The trucks have been materially strengthened for high speed service by the application of bridge trusses for the side framing and as in the present case a 34 ft. car can be mounted on a truck of only 10 ft. wheel base instead of 12 ft. as formerly. The Denver exhibit car is handsomely finished in yellow and brown. It carries two 40-hp motors, hydraulic brakes. Providence wheel guards, Wilson retrievers, Stanwood steps and Van Dorn couplers. The ceiling is painted with a highly reflecting enamel which gives the interior a most brilliant appearance when the lights are on. The seats are of the Wheeler reversible rattan type with plenty of room beneath as the heaters are set in the walls of the car. The windows are absolutely non-rattling and by means of ratchets may be raised to the height most convenient for the passenger. The fares collected are rung up on an Ohmer register. The headquarters of the Barber Car Company are at space No. 615-17-19, where Guy Webster, general manager of the company, and E. A. Barber, inventor of the car, are prepared to receive visitors. Mr. Barber, in particular, is available at any time as a guide for those who wish to study the car in detail.

The Great Salt Lake has an area of 2500 sq. miles. It is more than 4000 ft. above sea level and has a mean depth of about 60 ft. The water contains 22 per cent of solids and it is impossible for a human being to sink in it.

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The Report on Equipment

The report of the committee on equipment this year, like that of last year, is an excellent example of what a report should be, but differs from that presented in Atlantic City last year because it consists largely of monographs, in most cases by members of the committee. Two valuable reports are included, however, from representatives of prominent manufacturers, on recent developments in electrical apparatus. All of the twelve subjects discussed in this report bear directly upon the cost of operation, and all are worthy of careful study. It will be impossible to consider all of them, but a few might be referred to at this time.

Mr. McAloney's paper and that of Mr. Ayres may well be considered together because both relate to the subject of the reduction of the cost of maintenance of the car as a whole. Mr. McAloney treats his topic by taking up parts of the equipment. His analysis of the percentage which the maintenance charges on each part of the equipment bear to the whole furnishes a direct index of the importance which each possess. Under Standard Accounts Nos. 6 and 8, wheels form the largest item and brake-shoes the next largest, while under Standard Account No. 7, the cost of renewal of magnet wire is about 3½ times as large as the next largest item, bearings and babbitt metal. Mr. McAloney offers significant suggestions as to the method of reducing the cost on each. The wear on wheels can be lessened very much by greater care in mating and less frequent use of the reverse in making emergency stops, while the life of magnet wire can be extended by the treatment of coils, although the greatest care is still required in inspection and handling.

The Present Status of the Work

Every convention has its most crowded day, and at the present convention this occurred yesterday. According to Mr. Gonzenbach, the "everybody busy" principle is the most efficient method of conducting business. Certainly everybody was busy yesterday. The American Association, all of the affiliated associations and the Manufacturers' Association held meetings and there were two sessions of the Engineering Association. To-day will be almost as busy with five sessions, because the Engineering Association is to hold the sessions originally scheduled for to-morrow, and the Accountants' Association will also consolidate in one session all of the work planned for two. Practically all of the delegates who were expected are now here and it is possible to say without fear of later developments that the convention has been in every way a success.

A good many people undoubtedly felt some misgivings about the attendance from the East because of the long distance to be travelled, and it is true that a number of familiar faces are missed. A great many of these cases, however, can be explained on account of important business engagements, and not because of the length of the journey. The conditions, in most of these instances, would probably have been the same if the convention had been held at Atlantic City. As yet we have heard no complaint from Eastern delegates of the time taken to come to Denver. It passed quickly, and the fact that most people travelled in special trains added much to the pleasure of the journey. Many new acquaintances were formed and many old ones renewed, and the duration of the trip was not noticed. On the other hand, the attendance from the Central and Far West and from the Southwest has been, of course, very much greater than ever before. Never before has there been so large an attendance at a national convention of railway men from Texas and the Pacific Coast. As already noted, the distance also had no material effect upon the exhibits; while perhaps not quite so numerous as last year, they are in every way very creditable both to the association and to the exhibitors, and three years ago would have been considered remarkable in extent and completeness.

For the first time in three years, the association has met in a city where there is a large street railway system, and this has certainly added very much to the pleasure of the meeting. This was the original plan of the association, and it was followed consistently until the 1903 convention at Saratoga. The advantages were great, and as a different city was selected practically every year, delegates had an opportunity of inspecting the practices of the railway companies in the city visited and derived valuable ideas. The return to the old plan has a most agreeable feature, as the convention partakes of the aspect of a personal visit upon friends. The officers of the Denver City Tramway Company have done everything they could to instill this idea and have been most hospitable, and the unique features of the property have made the visit a very instructive one to Eastern delegates.

It is too early, of course, to consider the location to be selected for future conventions, but we understand there is quite a movement to have the association meet again in

the Far West in 1911, possibly even on the Pacific slope. Such a plan is a daring one, but the suggestion is not so bold as it would have been thought to be a week ago. The convention this week has demonstrated conclusively something which was not previously believed, that a large body of street railway men are willing to go west of Kansas City to attend a convention.

Report on Freight and Express Traffic

The report of the committee on express and freight traffic presented before the Transportation & Traffic Association, is a most valuable compilation of financial results obtained by 39 companies from business of these classes. The data compiled by the committee relate to: (1) A statement of revenue that is divided as far as possible between passenger, mail, express, milk, freight and switching, together with the results per mile; (2) an analysis of expenses which, although not complete, is of remarkable interest; (3) various general information concerning principally relations with steam railroads and express companies and terminal arrangements.

While no names of companies are given, it is evident that information was obtained from properties of various sizes and the complexion of the committee is an indication that different sections of the country were reached in the collection of the data. A number of the companies listed have gross earnings of less than $100,000 per annum. The largest property reporting, which operates 617 miles of line, showed total gross revenue from operation of $2,400,158. The passenger revenue of this company was equal to 92 per cent of the total revenue from all sources and the remainder of the gross revenue was divided between the other earnings from operation as stated. The results of this company per mile of track with respect to passenger business and express and freight revenue are below those of a number of the other properties which furnished information. The smallest gross revenue is $38,249, of which $36,559 was derived from passenger travel, and the balance of 4 per cent represented the revenue from the classes of business described by this company as mail and freight. As this company operates only six miles of line, its passenger revenue per mile averaged $5,223.

Outside of the revenue given in the foregoing by the largest company reporting, classified in the report of the committee as comprising "total freight revenue," there is only one company which shows total gross for these classes of its business of more than $100,000. Thirty-seven of the companies, therefore, have less than $74,000 each of revenue from the freight business and 12 of the railways show total revenue from this source of below $6,200.

The miles of line operated by the companies contributing information show the extremes of 6 and 617, but only five of the roads have over 100 miles. One road did not report its mileage and 25 of the companies have less than 50 miles. This fact is significant as indicating that the small properties have been able to develop some measure of freight traffic even though they were able to give only short hauls on their lines and must have been limited in their arrangements for through routes or re-shipment over other roads, if, indeed, such arrangements existed at all.

By far the largest revenue per mile of line from mail, express and freight traffic is shown by a company with 8 miles of line, which secured 48.5 per cent of its total revenue from express, freight and switching.

The percentage of the total revenue received from the mail, express and freight business varies, for the 36 companies which furnish this figure, from 1.3 per cent to the unusual figure of 48.5 per cent, which is, of course, very far from the results of the average property. For all the companies, the average is 9.39 per cent and this is, we believe, a fair average figure for the present financial results obtained by the companies throughout the country that engage in the transportation of commodities as an addition to their passenger traffic.

The feature of the report of the committee which will be subject to the closest analysis is the table pertaining to the expenses charged against the express and freight traffic. A number of the companies do not furnish any of the figures requested by the committee. Where the expenses are charged, the car mileage basis of division appears to have been adopted generally. Several of the companies made their charges on account of various expenses on an arbitrary car-mileage basis and two of the properties charged against the revenue a total of 15 cents per car mile to cover maintenance of freight equipment and maintenance of track, roadway, etc. Only 8 lines report expenses for wagon delivery.

Following the suggestion made by President Allen in his annual address, it is to be hoped that no matter what other features of the work the incoming committee may take up, every effort will be made to compile data in relation to the financial results, with particular reference to the expense, so far as it may be determined with any reasonable approximation, of transacting the business.

Denver Conductors Well Posted

Members of the various associations who have had occation to use the cars of the Denver City Tramway Company to any great extent in travelling about the city have remarked upon the unusual amount of information which they can obtain from the conductors. Theoretically, conductors on a street railway system should be able to give correct information to all inquiries concerning the localities reached by the cars; but, practically, it is not possible for most companies, with the constant shifting of employees, to maintain a force of men competent and willing to keep themselves posted. It is more important to have the trainmen well informed in a city where there are a good many visitors constantly than in communities where the floating population is light, and this is evidently fully appreciated by the management in Denver. Mr. Beeler mentioned in his address of welcome before the Transportation & Traffic Association the interesting fact that the city system carries each day the equal of the entire population of the city or more, so it is evident that the tourist passenger provides a good share of the total traffic. Strangers in a city are more likely to ride if they can secure needed directions from employees.

The Weight of Cars

Mr. Ayres' thesis on the weights of cars is particularly appropriate in a report to be presented at Denver, because the Denver City Tramway Company was one of the earliest advocates of light cars and has consistently followed the plan in the construction of all of its rolling stock. Mr. Ayres has given a great deal of attention to this subject, as his several papers in the technical press and before engineering associations have testified, but in his association report he has treated the topic from a different standpoint than in his previous writings. In his paper yesterday he analyzed the effect of cars of different weights as they increased the demands for power, the wear of the track, the amount of the car repairs and the distribution system, and then reduced all of these matters to a basis of dollars and cents. Briefly, he found that each of these elements of cost can be represented by two terms, one of which varies with the weight of the car and the other independent of the weight. The sum of all of these terms, under average conditions, and assuming a car mileage of 150 per car per day, amounts to 7½ cents per pound of weight. Of course, with an average greater car mileage per day, or a cost of power higher than that assumed, of 1 cent per kw-hour, the cost per pound would be more. Mr. Ayres then suggested various methods by which the car body, trucks and equipment could be reduced in weight without a sacrifice of their strength.

Conventionalities

The ready smile of W. S. Sisson of Providence, R. I., fuses very nicely with his exhibit.

The Auditorium and Annex are open during the convention from 8 a. m. to 10 p. m.

It has been discovered that the "Rose Parlor" has been so named because the chairs are placed in rows.

Major J. M. Holloway of the American Steel & Wire Company says that this convention life is more strenuous than storming San Juan Hill.

T. H. Hogsett, counsel of the Lake Shore Electric Railway, is here with F. W. Coen, vice president and general manager of that company.

The official list, No. 2, of members and guests registered, that is, up to Tuesday night, makes a book of 128 pages and contains about 2550 names.

Can it be that Stedman and Grimes have a strain of Persian in them? Certainly both are poets and both uphold worthily the traditions of Omar.

Dwight Dean is in evidence and busy and his friends are glad to see him travelling eastward. Mr. Dean has been spending several weeks in California, and he looks the part.

Frank MacGovern of New York is on hand with his debonnaire imperturbability. In spite of his youthful appearance he is one of the oldest established as well as one of the best known men in the business.

John G. Barry, manager of the railway department of the General Electric Company, is one of the notable convention visitors. He is on his way home to Schenectady from an extensive trip to the Northwest and the Pacific Coast.

Among the Los Angeles men here is Alphonso A. Wigmore, who has charge of the Falk Company's business in that city. His work is referred to most enthusiastically by the other Falk representatives. After you, my dear Alphonse!

Today from 1 to 10 p. m. the general public will be admitted to the exhibition on payment of 25 cents a person. The proceeds will be given to Denver charities. A large throng is expected, for Denver people are greatly interested in the convention.

Harry Munroe of Chicago grumbles because, as he says, he has to "stand watch" about all the time at the "G. E." exhibit. Of course if Harry wasn't a natural born kicker he would realize that it is because he is so popular that he is in constant demand.

George Keegan, the able secretary-treasurer of the Manufacturers' Association, is all smiles. Early on Wednesday morning he received a telegram from New York announcing the safe arrival of a baby daughter in his family. Needless to say Mr. Keegan is not going to tarry in Denver after the convention is over.

The Gilpin & Clear Creek District Railway is now building to connect Pactolus on the "Moffat Road" with Russell Gulch, Colo. It will be 22 miles long and will be operated through a mining district by steam locomotives first, but may be electrified later. Robert A. Hall of Denver, general manager of the road, is a convention visitor.

George Weston, a member of the Board of Supervising Engineers, Chicago Traction, is in Denver attending the convention, glad to escape for a few days from the exacting duties of his position and the perplexities incident to a responsible public post. E. N. Lake, division engineer for the Board of Supervising Engineers, is also at the convention.

Ernest Gonzenbach, "the man who made Sheboygan famous," is one of the busiest of convention visitors. A telegram from Sheboygan conveys the interesting rumor that Mr. Gonzenbach is accused of writing "The Confessions of a Reformed Street Railway President" in last week's issue of the Saturday Evening Post. Mr. Gonzenbach is vice president, treasurer and general manager of the Sheboygan (Wis.) Light, Power & Railway Company. He is accompanied by Mrs. Gonzenbach, and the two will spend about a week, after the convention, in the irrigated section of Colorado.

M. C. Brush, general manager of the Buffalo & Lake Erie Traction Company, made up a pool on the time the New York Central-Rock Island train would arrive in Denver. There was great interest in the event and when the train arrived in Denver at 6:34 p. m., Bertram Berry and J. V. Smith, who both guessed 6:35, were declared joint winners.

One of the finest "individual" exhibits is made by the Hildreth Varnish Company. The representative of this company is the one best exhibit of the outfit. Architecturally he is a thing of beauty and a joy forever; personally he is a good fellow. Known to nearly every man in the business, a convention would hardly be complete without Charles C. Castle.

So far as known, the only past-president of the parent association present is John M. Roach of the Chicago Railways Company. Mr. Roach comes from the worries of a controversy relating to a wage adjustment, in which a great street railway strike in Chicago was narrowly averted, and he welcomes the opportunity of spending a few days with his old associates at the Denver convention.

It was H. C. Glaze, railway representative of the "G. E." office in Denver, who, as pitcher, was so largely instrumental in carrying the West to victory in the famous ball game of the East vs. the West at the National Electric Light convention in Atlantic City last June. Mr. Glaze is also to be complimented on the success of the "G. E." exhibit at Denver, for he took the brunt of the work of preparation.

All Denver round-trip tickets must be validated at the Union Depot or at the City Ticket Office of the line over which return trip is made from Denver, **otherwise they will not be accepted for return passage.** Tickets may be validated in advance of the returning date, but the returning date must be specified. No fee is charged for validation. All Pacific Coast tickets must be validated at the joint ticket agency in the Coast city from which the return trip is begun.

The attractive exhibit of the American Brake Shoe & Foundry Company, showing as it does on a sample board a large variety of brake shoes, all centering in the standard of the Engineering Association, is a reminder that F. W. Sargent, chief engineer of the company, is not present. Mr. Sargent expected to come until the last moment but very important matters in the East required his attention. This is the first convention in a number of years which Mr. Sargent has missed.

Oklahoma City is represented by Anton H. Classen, president, and J. J. Johnson, secretary, of the Oklahoma Railway Company. Mrs. Classen accompanies her husband. The Oklahoma system is extending so rapidly that the company is in almost constant need of new material; nevertheless two trucks of different types intended for this company were diverted from their proper destination in Oklahoma City and are on exhibition in the exhibit of the Standard Motor Truck Company.

The entertainment committee has provided a theater party for this evening. Mrs. Leslie Carter in "Vasta Herne" at the Broadway Theater, opposite the Brown Palace Hotel, will be the attraction. The committee has secured the entire house and admission will be by official badge only. Ross F. Hayes of the Curtain Supply Company is in immediate charge of arrangements at the theater. The curtain will go up at 8:30 p. m. After the performance there will be informal dancing in the ball room of the Brown Palace Hotel for an hour.

Ralph W. Pope, secretary of the American Institute of Electrical Engineers, who is attending the convention, is greatly interested in the question of the conservation of natural resources. He attended the conference of governors held at Washington in May, 1908, at the call of President Roosevelt, and he was also an official delegate to the first National Conservation Congress held in Seattle in August of this year. Yesterday there was a meeting of the Colorado Conservation Commission at the State Capitol, and Mr. Pope was present. The Institute secretary finds that in Pope was present.

Ralph Sanger is a newcomer, this being the first convention he has attended. He seems as much at home, however, as he used to be in his former business. Before entering the firm of Wonham, Magor & Sanger he was connected with prominent banking interests in New York. With Mr. Sanger as the leader, supported by H. A. Goode, the cosmopolitan Britisher, R. V. Collins of the American Automatic Switch Company, and the bustling Mr. Willis, the interests of the "H. B." life guard are well taken care of.

Frank W. Frueauff is both president of the National Electric Light Association and first vice president and general manager of the Denver Gas & Electric Company, which is one of the most enterprising public service companies in the country. He shares with Henry L. Doherty the honor of making Denver the City of Lights. Mr. Frueauff is a very welcome convention visitor. He has been tested on the moralometer at the Wagner booth, and the reading was "Star-connected." As Mr. Frueauff's engagement to Miss Antoinette Perry, a charming actress, is announced, the wonderful accuracy of the instrument excited wide and favorable comment.

The entertainment committee of the Manufacturers' Association has appointed the customary ladies' committee to act during the Denver convention. This committee consists of Mrs. William G. Evans, wife of the president of the Denver City Tramway Company, chairman, and Mrs. James Brown, Mrs. Samuel Perry, Mrs. Archbold, Mrs. Brown, Mrs. Fred Moffat, Mrs. Gerald Hughes, Mrs. Rodney Curtis, Mrs. George Saugon, Mrs. John Evans, Mrs. C. Loomis Allen, Mrs. Rockwell, Mrs. Stevens, Mrs. Kimball, Mrs. Linn, Mrs. Lincoln, Mrs. Apperson, Mrs. Purvis, Mrs. Kilpatrick, Mrs. H. C. Evans, Mrs. Will McLain, Mrs. E. B. Entwistle, Mrs. J. L. Replogle, Mrs. Charles C. Peirce, Mrs. McCloy, Mrs. Victor Angerer, Mrs. Charles S. Clark, Mrs. F. J. Drake and Mrs. Boyer.

For the benefit of those who desire to visit the Pacific Coast and who have not made arrangements for such a trip before leaving their home cities, provisions have been made for special excursion round-trip tickets from Denver to Pacific Coast points with Oct. 8 and 9 as selling dates and October 31 as the return limit. The round-trip fare from Denver to Portland, Seattle and Vancouver, or to San Francisco, Los Angeles and San Diego, is $45. The round-trip fare from Denver to Seattle, returning via San Francisco and Los Angeles, or vice versa, is $60. It should be remembered, however, that persons making these trips from Denver should return to that city in time to enable them to reach their home cities on Oct. 31, which is the expiring date of the round-trip tickets to Denver.

The Accountants' Association holds the record for attendance of past presidents. There are present H. L. Wilson of Boston, president 1897-1898; William F. Ham of Washington, president 1900-1901; F. E. Smith of Chicago, president 1903-1904, and W. G. Ross, Montreal, president 1904-1905. W. B. Brockway, Yonkers, president 1905-1906, may arrive this afternoon on his way to San Francisco, where he is going this week, but could not come before as he was detained by an important meeting in New York Tuesday morning. H. R. Goshorn of Philadelphia, president of the Claim Agents' Association in 1907-1908, is the only past president of that association in attendance. There have been no past presidents of the Engineering Association present in Denver at this convention.

CONVENTION PROGRAM FOR TODAY

American Association.

(AUDITORIUM HALL)

2 P. M. to 5 P. M. (Executive Session.)

Reports of Committees.

(a) Education (continued.)

(b) Compensation for Carrying United States Mail (continued).

(c) Insurance.

(d) Public Relations.

(e) Subjects for Confidential Bulletins in 1910.

(f) McGraw Dictionary.

(g) Brill Prize.

Report of Committee on Nominations.

Election of Officers.

Resolutions.

Unfinished Business.

Adjournment.

Accountants' Association.

(SAVOY HOTEL.)

9:30 A. M. to 12:30 P. M.

Report of the Committee on Standard Classification of Accounts and Form of Report (continued).

Paper—"The Electric Railway Auditor, His Duties and Relation to the Organization," by W. B. Brockway, Chief Accountant, Ford, Bacon & Davis, New York, N. Y.

Paper—"Payrolls and Timekeeping," by N. E. Stubbs, Auditor, United Railways & Electric Company of Baltimore, Baltimore, Md.

Paper—"Stores Accounting and Inventory," by E. S. Pattee, Secretary and Comptroller, Twin City Rapid Transit Company, Minneapolis, Minn.

Report of Joint Committee on Shop Accounting.

Reports of Convention Committees.

Report of Nominating Committee.

Election of Officers.

Installation of Officers.

Adjournment.

Engineering Association.

(ROSE PARLOR)

9:30 A. M. to 12:30 P. M.

Report of Committee on Standards.

Report of Committee on Power Distribution.

2 P. M. to 5 P. M.

Report of Joint Committee on Shop Accounting.

Question Box.

General Business.

Report of Nominating Committee.

Election of Officers.

Installation of Officers.

Adjournment.

Transportation and Traffic Association.

(AUDITORIUM HALL.)

9:30 A. M. to 12:30 P. M.

Report of Committee on City Rules (continued).

Report of Committee on Transfers and Transfer Information.

Paper—"Chicago's Transfer Crusade," by Joseph V. Sullivan, General Supervisor, Chicago Railways Company, Chicago, Ill.

Unfinished Business.

Report of Committee on Training of Transportation Employees.

General Business.

Report of Nominating Committee.

Election of Officers.

Installation of Officers.

Adjournment.

WEDNESDAY MEETING OF AMERICAN ASSOCIATION

The American Association held its second meeting yesterday afternoon in the Auditorium Hall. The meeting was called to order by President Shaw at about 2:30 p. m. and the session lasted until 5:30 p. m. The first order of business was the appointment of a nominating committee to nominate officers for the ensuing year. President Shaw appointed the following committee:

E. C. Foster, of New Orleans, chairman; R. T. Laffin, Boston, H. A. Nicholl, Anderson, Ind., W. G. Ross, Montreal, John A. Beeler, Denver.

The session was occupied entirely by a discussion of the two subjects scheduled for the day—the report of the committee on Interstate Commerce Commission affairs and the report of the committee on compensation for carrying United States mail. The discussion on the latter subject was not concluded yesterday and will be carried over until tomorrow, which is the last session of the association.

NOTICE TO THE MEMBERS OF THE BOSTON PARTY

Charles S. Clark, secretary of the Massachusetts Street Railway Association, who has charge of the Massachusetts special train, has announced that on returning from the Moffat-Road" trip, dinner will be served in the dining car "Continental," for the Massachusetts party, immediately upon arrival of the train. Inasmuch as this is not included in the amount collected for the trip, a charge of $1 per passenger will be made.

It is desirable that baggage be in the Boston & Maine baggage car of the Massachusetts special train not later than 10 p. m. of Friday, Oct. 8. Arrangements have been made with the transfer company to send a special wagon at 10 a. m. and 7 p. m. to all hotels at which it is understood that members of the party are located. Members are requested to have baggage properly labeled and ready for one of these trips, and arrange to prepay transfer charge.

IMPORTANT NOTICE TO EXHIBITORS

The executive committee passed a resolution that all exhibits can be packed at 12 M. on Friday and that no dismantling of booths, etc., shall be done before that time. The return shipment of goods has been arranged for through the Weicker Transfer Company. Mr. Lorimer of that company has an office in the southeast corner of the Auditorium. Proper certificates for the return of shipments free can be secured from him. Exhibitors who desire to have their goods packed may arrange with this concern at the rate of 50 cents an hour. Exhibitors who desire to do their own packing, but would like to have the Weicker Transfer Company arrange for the billing, can do so at a fee of 50 cents.

LUNCHEON OF ACCOUNTANTS' ASSOCIATION

Members of the Accountants' Association held their annual "Get-together" luncheon at the Hotel Savoy at 1 o'clock on Wednesday. Following the usual custom President Robert N. Wallis called on various members for short, informal talks and responses were made by William A. Doty, auditor Denver City Tramway Company; O. S. Moore, treasurer and auditor Tucson (Ariz.) Rapid Transit Company; H. S. Norton, auditor Omaha, Lincoln & Beatrice Railway; Will Browne, auditor Utah Light & Railway Company; W. G. Ross, managing director Montreal Street Railway; F. E. Smith, comptroller Chicago Railways Company; H. S. Swift, secretary and auditor Toledo Railways & Light Company; W. H. Forse, Jr., treasurer Indiana Union Traction Company; F. W. Sweney, special examiner Interstate Commerce Commission; and H. E. Weeks, secretary and treasurer Tri-City Railway. President Wallis, in his remarks, thanked the members of the executive committee for their cordial support during the year.

LADIES' AFTERNOON AT THE COUNTRY CLUB

Largely by the good offices of Mrs. William G. Evans, wife of the president of the Denver City Tramway Company, it has been arranged that the Denver Country Club, one of the most exclusive social organizations in the city, shall give a "ladies' afternoon" at the club this (Thursday) afternoon in honor of the ladies of the convention. There will be a reception, music, an afternoon tea, a clock-golf contest and 10 tables of bridge. Special automobiles holding 20 persons will leave the Broadway entrance of the Brown Palace Hotel at 2 p. m. to take the ladies to the club. Ladies should wear their badges without fail. Appropriate prizes will be given to the winners at clock-golf and at bridge. C. R. Ellicott (Westinghouse Traction Brake Company) and N. M. Garland (Ohio Brass Company) will represent the entertainment committee of the Manufacturers' Association at this function.

DENVER TO NEW YORK SPECIAL TRAIN

The train committee who had charge of the Pennsylvania-New York-to-Denver special has arranged with the Santa Fe to run a special train from Denver to New York, which will leave Denver Friday at 11:30 p. m., stopping all day on Saturday at Colorado Springs, leaving there at 10:30 p. m. and running through Kansas City, St. Louis and Pittsburg, arriving in New York Tuesday at 7:40 a. m. The Pullman Company is holding the necessary equipment, but it is necessary to let the Santa Fe know just how many passengers will be on the train. Those holding tickets good returning via the Santa Fe and Chicago & Alton should notify J. P. Hall, general agent, Atchison, Topeka & Santa Fe, 901 Seventeenth Street, telephone Main 280, at once and reserve Pullman accommodations on this train.

LAST CALL FOR MOFFAT EXCURSION

All those who expect to go on the official excursion over the Moffat Road tomorrow are again reminded that it will be necessary to secure tickets from the entertainment committee by noon today, in order that there may be ample provision of train accommodations and food for the hungry. As it expected that there will be several trains, carrying about 2000 people, the reason for this arrangement is obvious. Tickets, including lunch, are sold at $3 for the round trip. The regular rate (without lunch, of course) is $5. Special trains will leave the Moffat Station, Fifteenth and Bassett Streets, at 8:30 a. m. sharp on Friday, going to Corona, amid the perpetual snows, and returning between five and six in the evening.

The guessing contest of the Allis-Chalmers Company on the number of turbine blades for a 1000-kw turbine, shown in a glass case at the company's exhibit, will close at 4 p. m. today. Any conventioneer may guess as many times as he chooses. Valuable prizes will be given to the successful contestants.

The Pacific Coast supply men are arranging to give a dinner to railway men in their territory at the Albany at 8 p. m. tonight (Thursday). About 50 invitations have been issued. S. I. Wailes of the National Brake & Electric Company is a "live wire" in the affair.

The first beet sugar factory in Colorado was erected at Grand Junction in 1899. There are now 16 factories in the state which produced $80,000,000 of beet sugar between 1899 and 1908.

WEDNESDAY MEETINGS OF THE ENGINEERING ASSOCIATION

President Winsor called the morning meeting to order and announced the report of the committee on equipment. The discussion was opened by W. H. McAloney, superintendent of shops, Denver City Tramway. Messrs. L. L. Smith and J. S. Doyle, other members of the committee, were not able to attend the convention.

Mr. McAloney referred to page 5 of the report. Owing to the methods of handling material and stores used in Denver he had not been able to give proportions representing the practical material accounts. The disbursements were divided into about 37 practical accounts. The list was applicable to any system as shown by the percentages and the same ratios or percentages would hold good throughout the country, except as local conditions might vary them. When questioned regarding the material charges for wheels Mr. McAloney said that only eight cars of his road had rolled steel wheels. Cast iron wheels were used, and the charge for wheels made up 15 per cent of the total of all disbursements for material for the entire maintenance of cars, trucks, bodies and electrical equipment. Brake shoes, brake appliances, magnet wire and wheels amounted to practically 50 per cent of all the maintenance material disbursements. The maximum speed of the cars on 500 volts was 22 miles on level track. The average schedule speed on the system was about 9.5 miles and included layovers.

President Winsor read a communication from John Lindall, superintendent of rolling stock and shops, Boston Elevated Railway, addressed to Mr. Smith, chairman of the committee on equipment.

Letter from Mr. Lindall

I do not agree with the committee's suggestion with reference to trolley wheels, that it is economical to increase the life by using large diameter wheels on suburban lines and later transferring them to city lines. From experience on our lines, I am of the opinion that in order to maintain perfect contact between trolley wheel and wire, it is very desirable to make the wheel and outer end of the pole as light as possible and on some of our heaviest and fastest equipment, we have been able to obtain better service from a 4-in. wheel than we have from larger wheels of the same composition. It may not be out of place to call attention at this time to the desirability of having a certain amount of spring in the trolley pole where this can be obtained without interference with the trolley wire at low points, as a pole with considerable spring will absorb shocks and more readily respond to inequalities, both vertical and horizontal, in the wire.

Educational work and a better knowledge by the men "behind the guns" are of the greatest importance. We are just starting weekly meetings of shop and car house employees in an endeavor to more thoroughly ground the men in mechanical and electrical principles, give them a better understanding of the apparatus, and add interest to their work. The subjects will be handled by our engineers, superintendents and foremen, and while the meetings may not be as scholastically handled as by an experienced instructor, it is expected that the connection between the lesson and every-day work will be more direct.

The report on Car Weights as Affecting Operating Costs is of great importance to the railway companies. Undoubtedly, much of the present unnecessary weight in cars is due to lack of proper appreciation of the cost of carrying weights and to patch-work methods of overcoming failures. Where failures occur, it is the usual practice to increase the strength at that point, by increasing the weight without giving consideration to the removal of the cause of failure, or obtaining more suitable material for the purpose. However, in reducing weights of cars we should be very careful to see that the pendulum does not swing too far in the opposite direction and result in failures of equipment.

The work of the committee during the present year as well as in previous years has been of great value in advancing the state of the art of carbon brush manufacture and improving the conditions of motor commutation. Most assuredly a grooved commutator and high grade brush, with low brush tension, is the proper thing. This combination will reduce commutator wear to a minimum, but under these conditions a treated brush is entirely unsatisfactory, for the reason that the dust given off by the wear of the brush will adhere and accumulate in the slot and cause short circuiting of the bars. The brush also becomes gummy and causes friction and sticking in the brush holders. Under these conditions, a low tension is not sufficient to keep the brushes on the commutator. Several high-grade brushes have now reached the point where the wear on the commutator is so slight as to indicate a life of several years. As a matter of fact, the brushes are scrapped long before they are worn out on account of brush holder wear. This points to the necessity of a closer fit in the brush holders, maximum bearing surface, and a brush spring with which the pressure is applied to the brush in a direction radial to the commutator at all times.

The under-cutting device, as shown in the committee's report, is extremely simple, and the time given for doing the work with it is very short, but too much emphasis cannot be laid upon the importance of doing this work thoroughly, as it has been found by experience that poor under-cutting is worse than no under-cutting.

Solid steel wheels appeal to me, but the proposed standard sizes could not be used on the Boston Elevated Railway with present trucks and present track standards.

F. H. Lincoln, Philadelphia Rapid Transit Company, said that meetings of foremen and inspectors and men that had to do with the handling of the equipment had been held weekly or bi-weekly for four years. Men were also given certain lines of work. One of these lines was to watch the pressure of the brushes on the commutator. After investigating brush pressure very carefully it had been found that the men in the barns put in springs that gave brush pressures of anywhere from 7 to 20 pounds, which resulted in excessive commutator wear. By taking up such subjects with the men employed in the car houses it had been possible to overcome that difficulty and to decrease a large amount of the work which before had been necessary in the way of turning down and renewing commutators.

William Roberts, superintendent motive power, Northern Ohio Traction & Light Company, Akron, Ohio, was making a comparative test on two sections of his road, each with about an equal number of cars. On one section the commutators were slotted and on the other they were not. He thought that if the commutators on the motors were to be grooved, then those at the power house on the rotary converters and generators also should be grooved.

Mr. McAloney pointed out that by getting as large a diameter originally as possible there would be a longer time for wear before the point of trouble was reached. Some men held that a diameter of 8 in. or 8½ in. should be the limit. He wished to emphasize the thought that in many shops commutators perhaps were allowed to get too small, and the little economy apparently had in the lengthened life of the commutator gave increased trouble.

Mr. Roberts thought that more attention should be directed to the use of a better class of mica and better copper and to care about the pressure of the springs on the brushes on the periphery of the commutator. These would eliminate the greater part of the troubles.

Mr. McAloney was decided in his views that between the sloting of commutators and the using of high-grade brushes he had done away with much commutator trouble. Whether it was due to the one or to the other he did not know, but thought the combination, with the regulation of brush-holder tension, had brought the good results.

William J. Harvie, chief engineer, Oneida Railway Company, suggested three things which were of the utmost importance. One was the spacing of brush-holders, the second was the tension of brushes and the third was the slotting of the commutator. None was of greater importance than the question of quality of brush to be used. The difference in tension and in spacing which actually occurred was surprising. This suggested the matter of non-adjustable parts; he thought that a motor so constructed that adjustments must be made in the shop, at least in the case of the smaller roads, or by specific arrangement in the case

of the large road, was the most suitable. By the use of a special tool-post, used in a Shafer tool-post, which carried the tool quite a distance forward, it was possible to do quick and accurate work in slotting. His records showed that a commutator of 109 bars had been slotted in 8.5 min.

W. H. Evans, Buffalo, thought that those who operated cars equally in both directions would find that they had more trouble with commutators than those who operated cars in one direction only. He had found, with the 75-hp motor, that just the slotting of the commutator had reduced the trouble very materially without practically any other change having been made.

What Mr. Harvie had said with regard to the adjustments of the springs and brush-holders was very important, but it did not detract from the real advantage of slotting the commutator and he favored slotting all commutators. In regard to the diameter of the commutators, he thought the advantage would be in favor of the larger diameter rather than the smaller one. It would seem, in some cases, that the designers had rather skimped the amount of material used on the commutators to a disadvantageous point.

M. V. Ayres, electrical engineer, Boston & Worcester Street Railway, said that he operated 11 rotary converters that illustrate very well the way in which the different points of view arise in regard to the slotting question. Two machines of 250 kw capacity, three-phase, ran 10 hours a day for two years after they were originally installed, without need for changing a brush. The commutators were not sandpapered. They were not slotted, and he thought that as long as they ran well they would not be slotted. He also operated three 500-kw six-phase rotaries that ran fairly well at first, but afterward developed vicious sparking, and would not run more than a week without severe grinding. He found that these machines after having been turned down and put in good condition would get into bad condition again in three weeks. These machines were subsequently slotted, and the trouble was cured.

A. T. Clark, acting superintendent of shops, United Railways & Electric Company, Baltimore, had found that a most important thing was to clean out the commutators after they had been grooved, otherwise the mica would cause trouble. His men spent more time in cleaning after grooving than in grooving. A hood was put over the commutator and an open space left through which the operator could work. A small fan drew off the accumulation of mica-dirt. He heartily endorsed grooving, which had cut down troubles 75 per cent on certain types of motors.

Mr. Evans had used an air-jet for playing on the groove all the time. This served the purpose of keeping the dust out of the operator's face as well as for cleaning the slots.

A. D. Campbell, master mechanic, Seattle Electric Company, slotted all commutators, using a saw 1 in. in diameter, and running it at about 2000 r.p.m. Setting the armature in place, and slotting a 111-bar commutator, took 4 minutes and 20 seconds. It took 15 minutes to take the armature off the floor, slot it, make the transformer test, and lay it down.

S. M. Coffin, master mechanic, Mobile Light & Railroad Company, did not slot commutators. He thought that the alignment of the brush-holders, and the fitting of the brush, was important. He closely watched the brush holder at the fitting, so that in cars which ran both ways it did not play back and forth.

Mr. Harvie had tried slotting 1/16-in. deep and had found little improvement, but by slotting 1/32-in. the overhauling period had been extended to 50,000 miles.

W. G. Denny, master mechanic, Puget Sound Electric Railway, had six or seven different kinds of armatures and slotted all of the commutators except the GE 57. The work was done on a lathe and took about 15 or 20 minutes. A little steel point was raked through the slot each time, and the results were good.

President Winsor said that the Boston Elevated Railway Company had found great improvement from slotting WP 50 commutators. The life of the commutator was increased six times, but other commutators could not be grooved without causing flashing.

Perhaps only the larger companies could study the question of resistances, as they had done, with a recording ammeter, but the improvements made by resetting the resistance had been astonishing. He thought that some might lay troubles to the slotting, or lack of slotting, when they were due to something else, and on the other hand some condemned the slotting while the trouble was caused by something else.

Regarding trolley wheels, his company used a very light trolley harp and a very light wheel, and the total cost of wheels, harps, poles, trolley bases, etc., was $2100 a year for over 40,000,000 car miles.

R. C. Taylor, superintendent of motive power, Indiana Union Traction Company, had gone into the matter in the last year or so. The men had been able to do very good work with a motor-driven device which carried two saws. They cut two grooves at one time, and have reduced the time even to the limits given by Mr. Campbell. The slotting has reduced commutator troubles very materially.

Mr. Taylor was interested in Mr. Winsor's remarks about trolley poles and wheels. His were high-speed interurban cars and he used 6-in. wheels. He had found that they could get the best result with a 10-ft. pole, which was shorter than usual, and the pressure most satisfactory for the conditions on his road was 35 lb. Unless the pressures were very carefully adjusted, trolley wheel trouble occurred. His method of adjusting the springs was to hang a 35-lb. weight on the end of the pole and screw the base up until the wheel touched the wire.

L. W. Jacques, Fort Wayne & Wabash Valley Traction Company, used a 11 ft. 6 in. pole on interurban cars only. The life of trolley wheels during the last year was a little over 7000 miles. The same trolley wheels were used on the city as on interurban cars, and after they had served 3000 or 4000 miles on the interurban their service was finished on the city cars.

Mr. Taylor said that the Indiana Union Traction Company ran steel tires on interurban cars until they were 12⅜ in. thick and then took them off the interurban and put them on the city cars, and in that way the tire was used completely. The company had a contract for brake shoes on a mileage basis last year and was able in that way to get a very good price. The manufacturers were not willing to renew that agreement this year and the company was now obliged to buy shoes on a tonnage basis.

Mr. Evans thought that the purchase of brake shoes on the mileage basis was going to be the ultimate method where the best quality of material as well as the best results were required.

Mr. Ayres then presented in abstract his paper on "Car Weights as Affecting Operating Costs," which will be found elsewhere.

Mr. Schreiber said that about a year ago the question came up on his road whether or not it was better to operate a certain line with five 20-ton cars or with four 40-ton cars. It was intended at first to take one car off and increase the speed. A profile was made of the entire route and the cars were ridden to get the average number of stops and other data of performance. The current curves were then constructed from this data. It was found, after the power consumption and other savings were figured out, that three or four bridges on the line had to be strengthened in order to carry the heavier cars. The weight of cars was often increased without considering the bridges or the right of way in any manner. It was difficult to tell just what the extra repairs to the track would be or the extra maintenance, but some general idea of it could be gained. The conclusion

reached after making the studies referred to was that it was not economical to operate 40-ton cars in place of the 20-ton cars, even if one car could be taken off. The results obtained approached those given by Mr. Ayres very closely.

The total operating cost per car-mile for the 20-ton cars, as given by Mr. Ayres, was 7.55 cents. The speaker's conclusion was that it cost about 50 per cent more for the 40-ton cars. He knew at least a few roads which were using four-motor equipment where better operating results could be obtained by using two-motor equipment. The increased size of cars caused by the use of the pay-as-you-enter system introduced a new difficulty, that of clearances on account of the long platform. In most cities proper clearances had not been provided for such cars. Of course, cars could pass on double-track curves by waiting, but that would affect the speed schedule. He thought the mechanical men should co-operate with the way engineers to see what effect the increase in size of cars would have on the clearances.

F. H. Lincoln, Philadelphia Rapid Transit Company, said there was another question that should be considered by the engineering department, and that was the education of the men operating the cars, to regulate the consumption of current on portions of the road where it was not necessary to use current. A few months ago Mr. Twining, chief engineer of the company, took that question up on elevated lines in Philadelphia. After going over the grades and station stops, the portions of the road were marked where the motormen could use current in series parallel position of the controller. The current consumption was cut down wonderfully.

William Roberts, master mechanic Northern Ohio Traction & Light Company, quoted some interesting data on current consumption of interurban cars which had been weighed on standard scales. Three men were selected and put on their metal to make a good showing. One man operated over a division on 219 kw.-hours, another on 187 kw.-hours and the third on 160 kw.-hours. The returns of these tests were given in tables which will be embodied in the final printing of the report.

President Winsor asked Mr. McAloney if he had any extra maintenance, due to the light weight of the cars used in Denver; that is, were cars strong enough to carry the passengers and do the work?

Mr. McAloney said he believed that the light weight limit had not been exceeded. In one type of car of which 38 were in operation he felt as if the limit had been reached on the body. They could be improved by strengthening some parts of the body, for instance, the platform, by better application of angles. They had by no means been found to be too weak in construction, however. This particular type of car was 38 ft. 1 in. over all and had a seating capacity of 46. Several years ago Mr. Beeler, general manager of the Denver City Tramway, insisted that the weight question be studied closely to cut it down until the limit was reached. Many cars had a great deal of cast iron used in their construction which could be entirely eliminated, even down to the brake shoes. There was no casting on a car which could not be made of malleable iron or cast steel with less weight.

Mr. Evans pointed out that the tendency in recent years has been towards building cars considerably heavier than the requirements of the service demanded. There had also been a tendency to use extra appliances which were entirely superfluous. There was a notable example of the reverse of this in the Denver cars, which had, in a way, more appliances than usual, including even an appliance for carrying a bicycle on the rear of a car. In going over some cars recently designed, he found that by simply removing parts that were unnecessary if the car would be operated always from one end, 2334 lb. could be saved. The Denver cars with side entrances made it possible to reduce the platform weight very materially at both ends.

E. W. Holst, Boston & Northern Street Railway, said that he had gone into the question of reducing weights very carefully. He had succeeded in cutting down the car body to 14,000 lb. Trucks weighing 14,200 lb. were cut down to 12,000 lb. The electrical equipment, weighing 14,250 lb., was the hardest to reduce in weight. The General Electric Company went over the design very carefully with him and succeeded in cutting out 250 lb. by changes in the gear case and the use of pressed steel on the boxes underneath instead of cast iron, as previously used.

W. P. Barba, Midvale Steel Company, Philadelphia, said the question of rolled steel wheels was one in which his company was deeply interested. He had recently received requests for information as to whether or not a very light wheel for city service could be produced to advantage to the consumer.

Mr. Ayres pointed out that the weight in the rim of the wheel was the worst place in the whole car, because the energy required for acceleration was greatest there. The weight in the rim had to be accelerated up to a much higher speed than the weight in any other part of the trucks.

Mr. Ayres, in closing the discussion on his paper, said that he believed on the whole that his estimates offered a good basis for getting at the facts. He had not taken up the question of grades, as of course, power consumption varied enormously with the grades, and undoubtedly also car repairs. He called attention particularly to the McKean motor car on exhibition at the convention as an example of a wonderfully light car for its size, and he thought many of the principles used in it could be used as well in an electric car. He also believed that while a good deal could be done in reducing car weights without making very radical changes in design, more could be done by making radical changes in design, and that it was worth while to do it. He was going away from Denver a convert to the side entrance and the single end operation. The pay-as-you-enter car was necessarily very heavy, and in his opinion it was a bad car from an engineering point of view.

Carbon Brushes

L. W. Jacques, Fort Wayne & Wabash Valley, presented this section of the report. He said that the improvement in the quality of carbon brushes made by the manufacturers within the last two years was very noticeable. The tests recommended last year by the committee had been carried out by most of the manufacturers, who were using the recommended tests before furnishing brushes to the railway companies. The report this year showed that 23 companies had gone from the low-grade to the high-grade brush within the last year, with satisfactory results and reduced expenses. The manufacturers all stated that the grooving of commutators required a softer brush. Most of the manufacturers stated that the tests as recommended last year were practical for all purposes.

Mr. Evans thought the committee was entitled to much credit on account of the improvement which had recently been made in the quality of brushes.

Steel Tired Versus Rolled Steel Wheels

Mr. McAloney moved that the recommendations at the end of the report on the adoption of standard dimensions for rolled steel wheels be referred to the committee on standards for prompt consideration.

Mr. Taylor inquired if the gage line of the hub of the wheel, as shown in the report, conformed to the standard axle as adopted by the association, and also whether the thickness of the hub should not be specified in making a recommendation. Many companies made it a practice to key-seat the wheels while others did not. He thought that the thickness of the hub should be specified.

Mr. Jacques replied that the proposed standard wheels were in accord with the other standards of the association.

E. W. Holst, Boston & Northern Street Railway, asked what the general practice was in the case of a 33-in. steel wheel, after it is worn down to less than 31 in. in diameter.

Mr. Lincoln replied that in Philadelphia new wheels were 33 in. in diameter. They were of a type which made it possible to wear the wheels down to about 27½ in. in diameter before scrapping them. A number of the older types of motors, such as Westinghouse No. 3, were in use so that the wheels could be worn down to a small diameter.

Mr. Roberts said he was using a 33-in. steel wheel, and a 34½-in. cast-iron wheel, with a 3-in. tread on the steel wheel and a 2¾-in. tread on the cast-iron wheel. These conformed so closely to one of the recommended sizes that he would be able to use that size wheel very easily. While he preferred to adopt a larger wheel, in order to increase the speed somewhat on limited cars, he preferred to increase the gear ratio and keep the cars as nearly as possible to the present height.

Mr. Barba said there was a limitation to the outside diameter of the hub that could be made by standard dies and standard rolls for each given type of wheel. At the present time, for a 5½-in. axle a hub as small as 8 in. was used.

The motion of Mr. McAloney that the recommendation of the committee that the rolled wheels as described in the report be made the standard size, and that this matter be referred to the committee on standards for prompt action, was unanimously carried.

Proposed Flange Contour

Mr. Schreiber did not see any reasons for making any change in the standards in this respect.

Mr. Taylor pointed out that at the time the present standard flange contour was adopted the members of the committee went into the question of flange contour very thoroughly The reason for the adoption of the shape of the present standard flange was the fact that from an examination of many wheels which had long been in service, the wheels were worn to the shape adopted. If a new standard was adopted it would only be a question of time when the back of the flange would be worn off in service, not only wearing the wheel, but the special work also.

Mr. Schreiber moved that the recommendation for changing the flange contour from the adopted standard be stricken out of the report.

Mr. Evans, on behalf of the committee, said that the proposed contour was an exact reproduction of the shape of the M. C. B. standard flange, but he did not see any good reason for making a change.

Mr. Schreiber's motion was unanimously carried.

Gage for Mounting Wheels

W. J. Harvie, Utica & Mohawk Valley Railway, said that the gage shown in the report would not be suitable, without modifications, for mounting anything but steel wheels. The backs of the steel wheels were turned to a very regular surface to apply the gage on, whereas on a chilled wheel the back of the flange was of a different shape and required a different projection on the gage.

Mr. Jacques said he knew of two companies that were using a similar gage, and if the wheel flange of both wheels was standard he did not see why it could not be used.

Mr. Evans' criticism of the design of gage presented was that the back of the flange should not be taken into consideration at all. The throat of flanges should be the gaging points and the back should be taken care of by a separate arrangement in this same gage. He did not think it would be possible to press wheels on with this gage for the reason that the gage fitted the flanges neatly.

A motion to refer the recommendation covering gage for mounting wheels back to the committee, was adopted.

Mr. Evans then offered the following resolution:

"Resolved, That the engineering association take up and investigate the question of the desirable system for the government and instruction of regular apprentices in the mechanical trades in connection with the maintenance of the equipment of electric railways. A regular apprentice, it is understood, is one who has had no previous shop experience and is not a graduate of a technical institution, and is between the ages of 16 and 19 years. This should apply not only to the regular established trades, such as machinists, car builders, blacksmiths, electricians, painters and the others now well known and employed in the electric railway field, but should also include a new trade, which for the want of a better name could be designated as an electric car repairer. This apprentice course should combine practical experience and some knowledge of a number of the regular trades, and should be well defined and of such a character as to greatly improve the ability and efficiency of the class of men to be depended upon in the future to take care of electric railway equipment, both in the general shops and in the car houses."

The resolution was referred to the incoming executive committee.

The meeting then adjourned until 2:15 p. m.

WEDNESDAY AFTERNOON SESSION

President Winsor called the meeting to order at 2:15 o'clock.

The discussion on the report of the committee on equipment was continued, taking up the subject of heat-treated axles.

Mr. Barba said that the Midvale Steel Company, Philadelphia, had just completed 700 axles for the Interborough Rapid Transit Company under Mr. Doyle's specifications which call for no ultimate strength, 50,000 lb. elastic limit, 22 per cent elongation, and 30 per cent discard. Mr. Doyle's requirements could be exceeded in the ordinary type of axle, 5½ in. in diameter, by using a very pure carbon steel properly treated. As a matter of fact, the tests actually obtained from the 700 axles very much exceeded the requirements. He was in favor of materially raising the requirements in the committee report and even to exceed the requirements of the Interborough specifications. There would be no difficulty whatever in making axles having 55,000 lb. elastic limit, and 23 or 24 per cent. elongation. This applied not only to axles, but to armature shafts, and all material of a section sufficiently small in area to permit the full effect of the applied heat treatment being felt all the way through the section. Untreated material which is represented by practically all axles now in use, would give a cold bend which will break at about 30 deg. The treated material having an elastic limit nearly 20,000 lb. higher would bend flat when cold. The cold bend is the nearest approach to a true test of the resistance of metal to what is known as "fatigue stresses." An axle was practically never bent, yet there was a common species of axle failure which was the direct result of repeated bends applied progressively on opposite sides of the exle. By making the ordinary tests, insisting that the material be oil tempered and afterwards annealed, material can be obtained which would be best calculated to resist repeated shocks and vibrations and so-called fatigue stresses.

J. Leonard Replogle, Cambria Iron Company, endorsed Mr. Barba's remarks that the tests are not quite severe enough. There were several features which were very important, but which were not incorporated in these recommendations. Among them was the question of the weight of hammers to be used in forging the billets into axles. It was a very wise thing to use very heavy hammers for the forging process, sufficiently powerful to insure thorough penetration of the blow to reach clear to the center. His company used hammers under which were forged the axles made for the Interborough, which weighed 15,000 lb. He believed that in material of this kind, subjected to severe alternating tension and compression strains, and also heavy torsional stresses, particularly in the motor axles, a very

low phosphorus content should be specified. The element of brittleness was one above all the others which should be limited to a very narrow margin.

President Winsor said that the Boston Elevated Railway put in axles seven years ago which were made to the ordinary steam railroad car axle specifications, and had no special treatment. But one axle had broken, and that was sent to Mr. Doyle. He reported that it was the worst piece of steel he had examined. About 400 of the axles have been very thoroughly examined without finding any cracks, yet new axles have been ordered to replace all of the early axles.

Mr. Taylor wanted to know what could be done with existing axles in the way of heat treatment after they had been in service some time.

Mr. Barba had no hesitancy in saying that any piece of steel whose past history or composition was known can be materially improved by proper heat treatment, unless it had already received the maximum treatment possible. If the composition of old axles was known and the conditions were favorable, they could be heat treated, turned down to a smaller size and put into service again. To the cost of the treatment should be added the cost of stripping and remounting and the machine work. If axle loads go up or the service requirements are increased in some way, where the diameter of the axle cannot be increased, the only recourse would be to better the properties of the metal. There was another point wherein the proposed specification was inadequate, and that was that it would be a wise precaution to limit the number of axles made from one ingot. The danger was one which could only be determined by very close examination, perhaps destroying the ingot to find a possible pipe in the center.

Mr. Roberts said he purchased some time ago a number of trucks, axles and wheels complete, and had a series of broken axles that became so serious that he determined to reject all the axles purchased from that particular company. He rejected all the old axles and put in new ones which had been heat treated. He had not had a broken axle since. The fractures in the first lot of axles occurred next to the gear. The wheel seat on the new axles was made ½ in. larger in diameter than the main part of the shaft.

On motion the specifications for heat-treated axles were referred back to the committee for further investigation and report.

Mr. Heywood moved that the report of the committee on equipment be accepted and printed in the minutes and that a vote of thanks be extended to the members of the committe. The motion prvailed.

Power Generation

The report of the committee on power generation was then considered. W. S. Twining, Philadelphia, presented the first portion of the report, relating to flue gas analyzers in abstract.

Charles Hewitt, Philadelphia Rapid Transit Company, said that at the last meeting of the Engineering Association he had stated that at that time that the results obtained with flue gas analyzers were somewhat misleading and apparently did not fulfill the claims made by the manufacturers. The latter seemed to be based on the assumed fact that the analyzers were analyzing the products of the combustion in the fire box. After a year's experience with two instruments in two different power houses he had reached the conclusion that this statement was not strictly true, and this conclusion was also brought out in the results published by the United States Fuel Testing Bureau. The samples of gas which were analyzed by these devices were not entirely the products of combustion, but were the products of combustion diluted by an unknown amount of infiltrated air. He had thought that some information on the subject would be of interest to the members of the association, so had put the analyzer at the Philadelphia power station in the hands of one of the company's very best engineers and started a test on a particular boiler. They first analyzed the gases without touching the boiler. The second step was to pack with an asbestor compound, made by macerating old steam pipe covering, all the iron doors of the furnace, both the front doors and the side cleaning doors. The third step was to build a temporary brick wall outside the side cleaning doors in order further to shut off any air that might be leaking in from that source. After packing the side cleaning doors and all the cracks which were visible, the blacklayer naturally started at the bottom to build the 4-in. brick wall, and as he got to the top and the space became contracted, the air which leaked in the door, although the latter was packed with asbestos, was very perceptible to the hand. The next step was to treat the brick setting with a liquid cement composed of ordinary Portland cement grout mixed to the consistency of paint. Three separate coats of this were put on. Finally on top of the three coats of paint they put a coating of Muralo, a cold-water paint with a gypsum base. The speaker had some charts showing the different steps under these different conditions. The first chart showed the boiler as it originally stood and gave results averaging about 2 per cent CO_2. The next step, with the doors packed, showed an average of about 14 per cent. The next step, with the side cleaning doors bricked up, showed 15 to 16 per cent. The final step, with the bricks in the setting treated, showed an average of about 17.5 to 18 per cent CO_2. The maximum possible was 20 per cent. This indicated the correctness of the statement made by the speaker last year that the gases in the combustion chamber were very much diluted by infiltrated air. He then showed some other charts that had not gone through the same process. One showed a bad boiler, which stood alone with side cleaning doors on both sides, front doors, back doors and comparatively little brick setting. When the test was started the average was about 4 per cent CO_2. After packing the doors as well as possible with asbestos the average was 10 to 12 per cent. The speaker was sorry he was unable to state a definite saving in coal consumption due to an improvement in reducing the air leakage. Many other things in this plant, and other plants, too, had so influenced the coal consumption that it was impossible to determine the amount. There was undoubtedly some benefit, but the tests did not show the benefits claimed, due largely to the fact that the analyses made were not solely the products of combustion.

B. F. Wood, Pennsylvania Railroad, said he had recently been interested in some tests that seemed to indicate that there was a peculiar diversity in the composition of flue gas, depending on what point in the flue the sample for analysis is taken. This might make a difference of 100 per cent and was due to the fact that the gases were not thoroughly mixed in the combustion chamber. That, in turn, depended to a large degree on the manner in which the boiler was working. If worked to its full capacity, the combustion chamber might be pretty well filled up. If worked to less capacity, the gases would flow in strata and come out of the flue unmixed. He did not think anyone could depend on an analysis of flue gases unless a complete sample was taken throughout the whole flue area, or unless the furnace construction was such as to insure complete mixture of air in the furnace.

Mr. Hewitt said he agreed with the speaker. In his early experience with these instruments he had found that almost any percentage of CO_2 could be obtained by taking the gas at different points. He also found that the most constant results were obtained by running the sampling pipe well into the combustion chamber and putting a cross-pipe across the combustion chamber and having that cross-pipe perforated. Samples of gas obtained in that way should be thoroughly mixed because the gas was being taken from across the entire combustion chamber. Samples taken in that way should give constant results. He added that the

high points in the charts which he had shown were the points of cleaning the fires. The smaller points were those when the firing was done by the fireman. These facts led the speaker to the conclusion that it was very desirable to fire small charges. In some of the charts, where the percentage was as high as 17.5, the instrument was very sensitive to the opening of the fire door. If the fireman should throw on more than eight or nine shovelfuls it would make the point at that particular time too high. Hence, in that particular test, the fireman was limited to nine shovelfuls.

President Winsor thought that the method of gas analysis afforded a very good way of studying what was going on in the boiler room and fire-room. As Mr. Hewitt had said, it showed whether the firemen were firing too heavily and leaving the door open too long, and in this way many things of interest were discovered.

Mr. Twining said that in their case it had shown that they were losing more from leaky settings than from bad firing.

President Winsor then called for the discussion on the subject of steam meters, treated in the report.

Steam Meters

Mr. Twining outlined the report of the committee on this subject.

F. E. Case, General Electric Company, described the recording-flow meter which, he said, would accurately record the rate of flow of steam in pounds per hour, in any diameter pipe, at any condition of temperature, pressure or moisture met with in commercial practice. The meter would also give an accurate record on periodically intermittent flow, such as occurred in operating steam engines, pumps, etc., as well as constant flow, provided it was recalibrated after being installed, or the arrangement of the piping would permit the insertion of the nozzle plug at a point in the steam main where the flow was constant. Since all meters were carefully calibrated on constant flow before leaving the factory, it was necessary to recalibrate only when the flow was intermittent. No change whatever in the main piping system of the station was necessary to install the meter, and as none of the steam being measured passed through it, the meter always remained cool. The meter itself might be located in any convenient place in the station, so long as it was placed on a lower level than the nozzle plug. Drop in pressure caused by the insertion of the nozzle plug in the steam main was inappreciable, even at very high rates of flow. If the temperature and pressure of the gas was constant the rate of flow in a pipe was proportional to the velocity. To measure this velocity a nozzle plug was screwed into the pipe at the point where the flow was to be measured. One set of openings, called the leading set, extended horizontally across a diamter of the steam main and faced against the direction of flow. The other three openings near the center of the plug constituted the trailing set. The steam, impinging against the leading set of openings, set up a pressure in them which was equal to the static pressure, plus a pressure due to the velocity head. The pressure in the trailing set was equal to the static pressure, minus a pressure due to the velocity head. This difference in pressure existing in the two sets of openings was communicated through separated longitudinal chambers to the outer end of the plug and from there, by proper piping, to the meter. The meter consisted of two cylindrical hollow cups filled to about half their height with mercury and joined together at the bottom by a hollow tube. This arrangement of cups and connecting tube formed a "U" tube which was supported on, and was free to move as a balance about a knife-edge. A difference of pressure in the nozzle plug was communicated to the cups by flexible steel tubing placed inside the case. This difference of pressure caused the mercury to rise in the left-hand cup and fall the same amount in the right-hand cup, until the unbalanced columns of mercury exactly balanced the difference in pressure. By the displacement of the mercury, the beam carrying the cups moved downward on the left-hand side of the knife edges. This side would descend until the moment of the weights on the right of the knife-edges exactly balanced the moment caused by the displacement of the mercury in the left-hand cup. The motion of the beam was multiplied by levers and actuated the pen which moved in proportion to the amount of mercury displaced. The time element of the meter consisted of an eight-day clock which drove the drum feeding the paper. The paper on which the record was made was so calibrated that the rate of flow in pounds per hour might be read at any instant, or the average rate calculated for a given time. Meters were equipped with a re-roll device operated by a spring mechanism and having sufficient capacity to accommodate one complete roll of paper.

Mr. Twining asked whether the instrument had been perfected so that it would register and record on a pulsating load.

Mr. Case replied that as sent out it was intended to measure a constant flow, but that it would give an accurate record on periodically intermittent flow, such as occurs in operating steam engines, etc., but it must be recalibrated for that condition. It would not work on an intermittent pulsating load as in a Parsons turbine. In answer to a question he also said, there were adjustments for moisture.

Mr. Hewitt said there were many uses for a steam meter around a power house other than measuring the flow to the main units. As a result of the committee's report last year his company had purchased three new St. John steam meters and had had these meters on several different parts of the station accessories with very interesting results. The first test made was on an air compressor furnishing compressed air for the signal system on the elevated road. This was somewhat of a pulsating load and the compressor was especially piped up at the time so that the condenser condensed all the water, in order to test the steam meter. The meter was found to be very satisfactory, although it was working very near its minimum load, yet the result was within 3 per cent of the weighed water. He had every reason to believe that on higher loads the meter would register within one per cent.

Low Pressure Steam Turbines

Mr. Hewitt referred to the two low-pressure turbines of 800 kw capacity each, which have been in service for several years in Philadelphia and have been working very satisfactorily. The economy of the station was very marked. With the turbines carrying 16 to 20 per cent of the total load of the station, the coal consumption had been reduced from an average of 4.4 lb. to 3¾ lb. per kw-hour. If enough of the turbines were installed to take all the exhaust steam of the station, the economy would undoubtedly be much better. The economy due to the installation of low-pressure turbines depended of course on the original design of the station. The percentage of economy was higher with non-condensing single cylinder engines. It was somewhat less with non-condensing compound engines, and would be still less with compound condensing engines. He believed the results obtained in New York in the plant of the Interborough Rapid Transit Company justified their use.

Mr. Twining said that nothing was said in the report regarding the minimum size of exhaust turbines that the manufacturing companies were prepared to build. So far as he had been able to learn the 500-kw size was the smallest exhaust turbine that had been put on the market. He saw no reason why smaller turbines should not be built, although the relative economy would fall off in smaller sizes. The ratio between the power developed by the exhaust turbine and the power developed by the main steam engine depended on the kind of engine to which the exhaust turbine was attached, and it would vary anywhere between 50 and 90 per cent.

M. H. Bronsdon, Rhode Island Company, thought that compound condensing engines when operated with a low-pressure turbine were really resolved into high-pressure compounding. He would expect an economy of approximately 24 or 25 lb. of steam per kw hour in sizes of 2000 kw. It might go below that, even to 22 lb. The economy of the low-presure turbine was approximately 34 lb. The low-pressure turbine, which was practically the same as the compound engine, should give an economy of about 18 lb. for the compounded unit. The steam used by the reciprocating engine bore only a small relation to the total steam used—that is to say, the consumption of steam was relatively high in the reciprocating engine and if the capacity of the low-pressure turbine, which was practically the same as another reciprocating engine, was added, then the steam consumption of the combined unit would be relatively low.

Mr. Roberts read a lengthy paper on the subject of low pressure turbines, which will be printed in abstract in a later issue of this paper.

Peter E. Mitchell, Birmingham (Ala.) Railway, Light & Power Company, asked whether there were any installations of low pressure turbines regulating properly on other than intermittent admission of live steam. Could a low pressure turbine be made to generate lighting current with proper regulation?

Mr. Twining explained that in the exhaust turbines as regularly connected there was no governor except the safety governor. For lighting service regulation was simply a question of regulating the supply of exhaust steam. When the supply of exhaust steam was very large in volume, it could not be passed through an ordinary throttle valve. He knew of one case, at the Pressed Steel Car Works, where an exhaust steam turbine was running, taking the steam from various pumps and other auxiliaries around the plant, and was operating an a. c. machine to supply the lights. About one-third of the boiler plant had been shut down since that turbine was put into service. There was a governor on the turbine to regulate it, because it was not running in parallel with other machines. As regards the combined steam consumption the conditions at the Philadelphia Rapid Transit Company's plant at Mt. Vernon Street were not ideal, inasmuch as it was necessary to use cooling towers. Any plant that is forced to use cooling towers would not be considered ideal. The installation was made because there was a shortage of power, and this was the cheapest way of getting the power. The total cost was about $80 per kw and the result as a whole had been satisfactory. The cooling tower ran the cost up. The same plant if located where water for condensing had been available could have been put in for probably not over $50 per kw. The condensed water is used over again in the boilers. This involves the use of oil separators. Where an exhaust turbine is used in connection with cooling towers, it was more of a problem to decide the proper size of condensers and the arrangement of cooling tower than the exhaust turbine. The exhaust turbine was only about half the problem. The Philadelphia Rapid Transit Company was among the first to try the exhaust steam turbine, and was now waiting for a larger unit to be installed.

Mr. Bronsdon gave some operating figures on the 5000-kw low-pressure turbine installed in the Interborough power house in connection with 7500-kw reciprocating units.

The steam consumption of the combined units was from 14.4 to 14.8 lb. per kw and the range of load from 9000 to 12,500 kw on the combined unit. The reciprocating unit running alone condensing gave an economy of about 17½ lb.

Mr. Stott, chief engineer of the Interborough Rapid Transit Company, was strongly of the impression that he would get better capacities and better economies with a low-pressure turbine, with the same normal rating as the reciprocating engine. Unless very high boiler pressures were used where a low-pressure turbine was used in connection with an engine that had been operating as compound condensing, it would be found desirable and perhaps necessary to increase the diameter of the high-pressure cylinder.

Mr. Hewitt moved that the report of the committee be accepted, the committee continued and that the thanks of the association be tendered to the committee for the work done. Unanimously carried.

Motion was made and carried that the executive committee consider the question of condensers and forced draft as subjects for the power committee for next year.

President Winsor appointed the following committee on nominations for officers for the ensuing year: Mr. Evans of Buffalo, Mr. Campbell of Seattle, Mr. Ayres of Boston, Mr. Coffin of Mobile and Mr. Twining of Philadelphia. They will report Thursday afternoon.

The meeting then adjourned.

WEDNESDAY MEETING OF THE ACCOUNTANTS' ASSOCIATION

The thirteenth annual meeting of the Accountants' Association was called to order by President Robert N. Wallis at the Hotel Savoy, Denver, at 10:10 o'clock on Wednesday morning.

President Wallis then read the annual address, which is published elsewhere in this issue. After completing his address Mr. Wallis added that he desired to call attention to the courteous acts of the Denver City Tramway Company and of others in Denver who had welcomed the members. The address of the president was accepted.

Secretary-Treasurer H. E. Weeks presented the report of the executive committee which included a resolution saying that the committee did not approve an amendment to the constitution providing for the admission of associate members. The report of the committee was accepted.

Mr. Weeks read his report as secretary-treasurer and it was accepted.

E. F. Arthur, secretary and treasurer Continental Audit Company of Denver, and J. H. Kingwill, auditor Denver Union Water Company and secretary of the Colorado Society of Certified Public Accountants, welcomed the members.

The paper of S. C. Rogers, treasurer Mahoning & Shenango Railway & Light Company, was read in his absence by W. H. Forse, Jr., treasurer Indiana Union Traction Company. Mr. Rogers was prevented from attending the meeting by sickness in his family. An abstract of the paper of Mr. Rogers will be found elsewhere in this issue.

In opening the discussion on the subject of "Interurban Statistics," F. E. Smith, comptroller, Chicago Railways, moved that the association recommend that in computing statistics, both for city and interurban roads, total car-hours and car-miles be used as the basis, instead of revenue car-miles and car-hours. The motion was seconded by W. H. Burroughs, secretary and treasurer, Memphis Street Railway.

Mr. Smith said his practice always had been to figure the revenue car-miles and revenue car-hours, but he thought this was not fair to the power department. For that reason he would be glad to have it changed. If the association said it ought to be changed he thought his company would follow.

Mr. Burroughs said his practice had been to use the total car-miles and total car-hours.

Mr. Smith said he would omit the car-hours from his motion. He wanted to include the dead car-mileage. The Chicago Railways Company had used the revenue-producing trips in computing the mileage. There were some instances where the trip from the car-house to the starting point was longer than the revenue trip, and some of the cars had gone in and out twice during the day, and it made considerable difference. The trip had to be made. Some of the cars did

not take passengers at all, and the passengers that were taken by other cars might be picked up on streets before the regular route was reached. The initial trip from the car-house in such cases did not really yield any revenue.

A. L. Linn, Jr., general auditor, New York State Railways, said that the car-mile as a unit of earnings must be based upon the revenue mileage and the car-mile for operating expenses should include the entire mileage.

W. H. Forse, Jr., treasurer Indiana Union Traction Company, asked Mr. Smith whether or not the information would be valuable as to the advisability of changing the location of the car house as a medium toward figuring the exact mileage. Mr. Smith had stated that on some of his divisions the distance from the car house to the starting point was more than the length of the regular trip.

Mr. Smith said the trip was about 1¼ miles, or 2½ miles for the round trip, but it was over two miles from the car house to the starting point by the route the cars had to follow.

H. L. Wilson, treasurer Boston Elevated Railway, said that certain of the operating expenses depended upon the entire mileage, whether it was dead mileage or whether it was revenue mileage. It seemed to him that it should all be figured. It cost practically as much to run dead mileage as it did to run the other mileage.

It was stated that one of the answers of the Interstate Commerce Commission, under its classification, had covered this point. Mr. Smith said that this decision related to the car-hour part only, not to the car-mileage feature.

M. R. Boylan, general auditor Public Service Railway, thought that dead mileage ought to be included. He included it in every instance.

W. F. Ham, comptroller Washington Railway & Electric Company, said that all were working together to produce the best classification and if the association made an erroneous decision, or if the committee should meet with the Interstate Commerce Commission and a decision should be made which it was proved afterwards could be improved upon, he had every feeling that the disposition of the commission would be to re-consider it.

Mr. Burroughs had found that his company needed information concerning the total car-miles to give the mechanical department the car-mile cost in order that it might estimate the life of wheels and the number of miles made, for showing lubricating cost per car-mile, and unless the total car-miles were used the figure would not be a true one; and if this figure should be used for the expense unit of cost per car-mile, it would certainly be right to use it for the earnings.

N. E. Stubbs, auditor United Railways & Electric Company, said this was a question in which he was very much interested and he was very glad that Mr. Smith had brought it up. He was thinking of making a report to his company about this mileage subject and he should like to have, if possible, the sentiment of the members present as to who included dead mileage and who did not, in order that he might use the information in his report.

President Wallis then asked those who included dead mileage, so-called, as part of the mileage in making these statistics to make it manifest. The proportion was about 16 who did and 7 who did not.

Mr. Linn said his properties used both, depending upon whether the revenue per car-mile or expense per car-mile was to be determined. In determining the mileage the dead car mileage was not included unless the cars hauled passengers in and out of the car-house. Their experience had been that it was preferable and advisable to purchase land more nearly in the center of the city, and thus make a saving in the dead mileage.

Mr. Ham said it seemed to him that the important point was the handling of a passenger car-mile; that was the one thing that indicated the earning capacity of a line; and, in order to get any idea of the real net earnings of a given line, the dead mileage must of necessity be added. If some lines were operated, as had been suggested, at apparently 50 cents a car-mile, but which figured, with the dead mileage included, only 40 cents per car-mile, the elimination of the dead mileage, it seemed to him, would lead to an entirely misleading statement of what the real results of that line were.

A vote was then taken on the motion of Mr. Smith and it was carried.

Mr. Forse, in order to get another phase of this subject before the convention, moved that the mileage of the trailer car and the motor car be included in that. In other words, if a motor car pulled one trailer the mileage was double what it would be in a single-car operation. In some companies "motor car-miles" were used, but they were nothing more than "car-miles." His motion was made in order to get the expression of the convention, because he knew there was a decided difference of opinion on this subject.

Mr. Ham thought that the association was already on record, and before passing upon the question, he believed it would be well to look up the past proceedings. He was not entirely clear in his recollection, but it seemed to him that the conclusion that was reached at a preceding convention was that if the train had an extra crew it should be treated as one car. If, however, the train required an extra crew, or part of a crew, it should be treated as two cars, or more, according to whether there were two or more cars in the train.

Mr. Wilson thought that possibly that was decided before the multiple unit system with large cars was adopted. It was a different problem with an interurban road than with an urban road, and he thought the matter was one that would require considerable thought to arrive at a rule that would be applicable to both classes of property.

Mr. Ham said it seemed to him that where a train was operated and each car carried a full load of people, it was entirely proper to treat those as separate cars. But if two or three small cars were operated as a train, as might be the case in some places, as a single car, that train was to all intents and purposes equivalent to one single car, and he thought it would be unwise to destroy the value of such statistics for comparison with that of any other city, to so make earnings and expenses per car-mile extraordinarily low.

Mr. Burroughs asked the representatives of interurban lines if they had ever used the ton-mile, and how they would figure the maintenance cost of the trailer cars for the mechanical department. In his company the mechanical department was given daily the report of the miles made by each car on the system. A number of trailers were run on one or two lines, and the miles for these trailers were figured separately. There was a conductor on the trailer, and if the trailer car-miles were not shown the mechanical department could not figure the cost of maintenance on the trailers. He thought the same situation would apply, perhaps, to the interurban lines. It seemed to him that if the information was to be of any value to the mechanical department the miles should be figured separately.

Mr. Forse stated that it appeared to him that there were several factors in this problem. One was the mechanical feature that Mr. Burroughs mentioned, the mileage of the wheels or the brake shoe or the trolley wheel. On the other hand, there was the cost of the power used and the wages of the crew. For instance, the mechanical department must know the mileage of each separate car, in order to determine the efficiency of the various parts. But there were so many various types of cars—the single-truck and the double-truck, the light trailers and the heavy motors—and if the power and the wages of the crews were to be figured, judgment must be used, as Mr. Hamm had stated, and it appeared to him as if, in order to get accurate statistics, especially on

interurban properties handling a great deal of freight, the roads were coming, sooner or later, to the ton-mile. That involved a great lot of work, if undertaken. He did not believe that there had been enough discussion to pass intelligently upon such a large subject. He preferred to withdraw the motion and take it up for further consideration at some future time.

A. H. Kayser, auditor, San Diego Electric Railway, moved that the entire subject be referred to the committee on standard classification of accounts. This motion was carried.

Irwin Fullerton, auditor, Detroit United Railway, read the report of the committee on interline accounting. This report is published elsewhere in this issue.

H. E. Vordermark, auditor, Fort Wayne & Wabash Valley Traction Company, said that he was using a system similar to that outlined in the report of the committee.

Robert Morrison, Jr., secretary and auditor, Michigan United Railways Company, asked if the committee would use the same kind of way-bill for local business.

Mr. Forse said that the same general plan would be used on local shipments, with the exception of the five-part way-bill. There would be the four-part way-bill and the same system of forwarding shipments would be used. The reports would only be such as were made by the station agents to the auditor.

Mr. Morrison added that in that event it seemed to him that it would be necessary to use a uniform system of way-billing; the old form for local business and the other form for interurban roads.

Mr. Vordermark said that his company had agents at junction points where shipments were transferred to foreign lines, and an abstract was made of all shipments that were transferred and this was sent in daily and checked up; it was received from foreign lines as shipments were forwarded over the lines or transferred.

Mr. Kayser did not handle any freight business on the electric line. The only place where he met this question was on steam lines. He believed the plan as outlined was a good one, although he had not followed it so far. He had used the steam line blanket way-bills, and the receiving agent made his expense bill therefrom. He thought the plan recommended by the committee, however, was an improvement on that.

H. S. Swift had one road where the blanket way-bill was used. He thought the form shown by the committee excellent. If he could get the other roads to use this form he would try to use it on an interurban line in the Toledo system. It seemed to be superior to the one in use.

H. S. Norton, Omaha, Lincoln & Beatrice Railway, asked why it was better to pay the balance.

Mr. Forse said that less money was handled and that was the principal reason, he believed, why the roads had used this plan. Companies handled a good deal of each other's money, and oftentimes at the end of a month there was very little balance in favor of either one, so that the financial transaction was not a very large one, and it was for the purpose of keeping that as small as possible that the balance plan had been used.

Mr. Swift said that an autographic way-bill machine had been used in his office.

Mr. Forse had used that for the local billing. The way-bills were printed in rolls and were arranged in the machine so that one writing did for the five copies. The agents made separate abstracts for the local and foreign shipments. They started separate pages for foreign shipments, and this record was kept separately in their abstracts, so that the agent's copy would be used. The agent made a monthly report.

Mr. Morrison was using at the present time the steam blanket way-bill. The form of way-bill recommended by the committee had many advantages over the other, and if adopted by the association he should certainly adopt it.

Mr. Kayser said the new form might not be quite as convenient as the old blanket form in checking the freight at the time it was received.

Mr. Forse said that Mr. Kayser had stated the best feature of the blanket way-bill, but the committee thought that the other advantages outweighed that. When the freight car arrived at a small station there were often wagons waiting for the freight, and under this plan the expense bill was already made up by the agent who forwarded the shipment. The agents were saved a great deal of work in that way. In handling loss and damage claims the bills were separately numbered, together with whatever notations might be on the bills, and they were kept on the papers.

President Wallis called attention to the fact that the report of the committee contained several different recommendations.

Mr. Swift moved that the report be accepted and the committee be continued. This was done.

The business next in order was the report of the standing committee on a standard classification of accounts and form of report. This report was read by W. F. Ham, the chairman, and is as follows:

Report of Standing Committee on a Standard Classification of Accounts and Form of Report

At your last convention on Oct. 15, 1908, the recommendation of this committee was adopted that the classification of operating expenses, operating revenues and expenditures for road and equipment, prepared after numerous conferences with representatives of the Interstate Commerce Commission and State railway commissions, should be adopted as the standard of this association.

Quoting from our report submitted last year: "This association has from the outset urged the importance of uniformity and inasmuch as these classifications have been adopted by the Interstate Commerce Commission and will doubtless be adopted by many State commissions, it seems most desirable that the members of this association should use these classifications, whether or not they are subject to federal or State supervision."

Since then classifications substantially conforming with the new standard classification have been adopted and put into effect by the Public Service Commission of the First and Second Districts of the State of New York and by the Railroad Commission of the State of Wisconsin.

We now repeat the recommendation that members of this association should use this classification whether or not they are subject to federal or State supervision, believing that the greatest good can be accomplished by uniformity, even if in some individual cases the classification does not seem the most desirable.

On Aug. 3, 1909, each member company of the association was furnished with two copies of a pamphlet containing the full text of the classification and at the same time copies were sent to each of the railroad commissions and the street railway associations. This pamphlet was prepared with considerable care and we trust will meet the requirements of member companies. Additional copies of the classification may be secured at a price of 30 cents per copy by communicating with the office of the association.

A number of questions having arisen with regard to the new classification, a conference was held in Washington, D. C., on April 22 and 23 between your committee and representatives of the bureau of statistics and accounts, Interstate Commerce commission. The conference was a very harmonious one and after careful consideration decisions were reached on all questions presented to that date. These decisions have recently been promulgated as an order to interstate carriers by the Interstate Commerce Commission. Through the courtesy of Prof. H. C. Adams, in charge of statistics and accounts, Interstate Commerce Commission, we were enabled to send you on Sept. 15 a copy of accounting bulletin No. 2 containing decisions in above cases, known as cases 1 to 58. All of these cases having, as above stated, received the approval of this committee, they are submitted as a part of our report.

In order to bring the matter properly to the attention of the convention, we recommend that the decisions in the above cases be approved, desiring however, that they shall first be fully discussed.

At the meeting above referred to a working arrangement was decided upon for securing uniform interpretations of the instructions contained in the classification. It was arranged that those members of the association that operate interstate roads should correspond directly with the bureau of statistics and accounts, Interstate Commerce Commis-

sion, whenever questions arose as to the proper interpretation upon instructions, and that members of the association not operating interstate roads desiring similar information, should communicate with the chairman of this committee. In either event the questions will be considered jointly by this committee and representatives of the Interstate Commerce Commission.

Your committee has passed upon a great many questions since the meeting in Washington on April 22 and 23 and the decisions in these cases will be published at as early a date as practicable.

It will be recalled that the Interstate Commerce Commission promulgated the new classifications as effective Jan. 1, 1909. It was its intention that companies should be required to rewrite their account for the six months ending Dec. 31, 1908, according to the new classification, in order that the report for the year ending June 30, 1909, should be entirely in accordance with the new classification. Our committee made representations to the Interstate Commerce Commission showing the impracticability of rewriting the accounts for the six months ending Dec. 31, 1908, and the commission decided that accounts for that period need not be rewritten, but could be reported according to the old classification.

The committee has been very active in your interests during the entire year, having kept in close touch with the Interstate Commerce Commission through meetings and correspondence on every matter in any way pertaining to accounting. It is particularly gratifying that our relations with them have been so uniformly pleasant and that we have been able to work together so harmoniously.

Soon after your last convention, C. N. Duffy resigned as a member of this committee and the vacancy so caused was filled by the appointment of F. E. Smith. Your committee desires to make public note of the valuable services rendered to this association by Mr. Duffy. He was one of the original members of this association and the original chairman of this committee, serving in that capacity for many years and giving to the association and to the work of the committee much time, thought and energetic effort.

In order that your committee may be kept as closely in touch with the sentiments of the association as possible, we desire a full and free discussion, particularly from those members who are now keeping their accounts according to the new classification, of any features of this classification which have proven undesirable or unsatisfactory. It is probable that as time goes on this classification will be modified and whatever defects have developed should then be corrected.

W. F. HAM, chairman; H. L. WILSON, W. H. FORSE, Jr., W. B. BROCKWAY, F. E. SMITH.

After the reading of the report and in opening the discussion thereon, President Wallis introduced F. W. Sweney, special examiner Interstate Commerce Commission, who spoke briefly to the members.

Mr. Ham called the attention of the members, in speaking of the decisions promulgated by the Interstate Commerce Commission, to case No. 9, the definition of a car, in which there was a departure from the former practice of the association. The car body, and therefore maintenance of cars, now included the car body and truck, electric bells and wiring, electric heaters and wiring and airbrake equipment and wiring. In the former classification that wiring was treated as the electrical equipment of the car.

Mr. Linn thought the committee was correct.

Mr. Ham said there had been considerable objection to the method of handling store expenses and shop expenses. This was covered in case No. 10. A great many companies would like to have the proper proportion of store expenses and shop expenses distributed, but in all cases the committee had ruled, to be consistent with the classification, that while a company might keep such accounts of its own as it saw fit, in making the annual reports to the commission, and as a standard, there should be one account which should cover all expenses. An important ruling was in case 32, that amounts paid to boards of public works, county officers, etc., for the right to operate cars on and across public highways, should be charged to taxes. A similar ruling was made in case 37.

Will Browne, auditor, Utah Light & Railway Company, said the new classification was considerable of an improvement over the old classification. He formerly used an adaptation of the steam road classification.

Mr. Linn said there was one very slight difference between the New York and the Interstate classifications. He had no criticisms or suggestions to make to the committee.

Mr. Burroughs had not formally adopted the classification, but used it as a matter of reference a great deal.

Mr. Morrison was using the official classification and found that it served the needs of his company very nicely. He had no suggestions or criticisms to make.

Mr. Weeks said the company with which he was connected was following the classification exactly.

Mr. Vordermark found that the classification served requirements much more fully than the old classifications. This classification had been adopted by the Interstate Commerce Commission and by the Indiana Railroad Commission in detail. His company used the classification on the city and interurban lines.

Mr. Ham thought it would be just as well to let the classification work out for itself, and that eventually every company would see the advantage of using it.

Mr. Stubbs did not use the classification entirely, but used it considerably for convenience.

President Wallis announced that further discussion would be taken up at the Thursday morning session. Mr. Wallis then announced the appointment of the following committees:

Committee on Nominations—H. L. Wilson, W. F. Ham, P. V. Burington, Irwin Fullerton and W. A. Doty.

Committee on Resolutions—W. J. Thorp, M. R. Boylan and A. H. Kayser.

ANNUAL MEETING OF MANUFACTURERS' ASSOCIATION

The annual meeting of the American Street & Interurban Railway Manufacturers' Association, held late yesterday afternoon, taxed the seating capacity of the Rose Parlor to the utmost, and many gentlemen stood up. President Joseph R. Ellicott, in opening the meeting, took occasion to thank the executive, exhibits and entertainment committees for their very efficient work. The report of the executive committee was read by George Keegan, secretary-treasurer. Among other matters the speaker referred to the attendance at the successful Denver convention, saying that on Wednesday morning the attendance of men was 1400, which was within 100 of that at Atlantic City last year at the corresponding time, despite the distance of Denver from the Eastern centers of population. The finances of the assoiation were shown to be in a very satisfactory condition. The report was accepted with applause.

After some matters of general business had been discussed, President Ellicott was instructed to appoint a committee of three to express to the citizens of Denver the thanks of the association for their unbounded hospitality. A special resolution of thanks was extended to the exhibits committee, which has done its work under the direction of K. D. Hequembourg. The concluding business was the election of five members of the executive committee. A nominating committee was appointed by President Ellicott, and on its recommendation Charles C. Peirce, General Electric Company, Boston; K. D. Hequembourg, Walker & Bennett Manufacturing Company, New York; Henry C. Evans, Lorain Steel Company, New York, and A. H. Sisson, Forsyth Bros. Co., Chicago, were re-elected. W. L. Conwell, Westinghouse Electric & Manufacturing Company, New York, was elected to succeed W. M. McFarland of the same company. The holdover members of the executive committee are Otis H. Cutter, W. H. Heulings, Jr., Howard F. Martin, Arthur S. Partridge, E. M. Williams, Charles C. Castle, Joseph R. Ellicott, C. S. Hawley, James H. McGraw and J. K. Porter.

TUESDAY MEETING OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

The second meeting of the Transportation & Traffic Association was called to order at the Auditorium Hall Oct. 6, at 9:50 a. m. by President C. Loomis Allen.

President Allen announced the appointment of the following committees:

Committee on Nominations: E. F. Peck, F. I. Fuller of Portland, and H. A. Nicholl.

Committee on Resolutions: P. P. Crafts, J. H. Pardee and H. W. Blake.

President Allen then called upon Mr. Crafts to read the report of the committee on express and freight traffic.

Mr. Crafts prefaced the reading of the report by saying he thought it would be evident that although interurban railways can profitably handle freight and express matter, they could not do so if their roads were operated for the purpose of handling freight only. In other words, freight and express traffic on interurbans was merely an incident in the earnings, the passenger earnings being the principal object for the construction and operation of the road. Mr. Crafts then read the report, which is published elsewhere in this issue.

F. J. Hanlon, Mason City & Clear Lake Railway, Mason City, Iowa, said he thought they were possibly the first road to have through tariffs with steam railroads. Their freight rates were based on the rates charged by the paralleling steam line. On passenger fares they were higher than the steam rate. For instance, between Mason City and Clear Lake, the Chicago, Milwaukee & St. Paul steam rate was 19 cents, while the electric rate was 25 cents. They depended on the service entirely to get them the business.

H. A. Nicholl, Indiana Union Traction Company, said that about 10 per cent of their gross earnings came from their freight and express business. They had separate terminals in some of the larger cities, and in the smaller ones they had a combined freight and passenger agent. They did considerable advertising of their freight business, and devoted one issue out of every three of their monthly magazine to the subject of express and freight. This magazine was then mailed to the various shippers, wholesalers and retailers throughout the district. The company was doing only a state business, not an interstate business. In the larger cities where they had the separate freight terminals and sidetracks as well, they did not solicit a great deal of carload business except livestock, and did not attempt to handle coal or lumber or things of that character. They had done some carload business in gravel and stone, but that was because of quarries located adjacent to the line. The company had not done an interchange business with any steam railroad, and had no through rates with them, nor through tariffs. It was earning about 50 cents a car-mile, or about $45 to $48 per car per day. They also handled express not only for their own company, as it were, but also have a contract with the United States Express Company, which provided for payment on a percentage basis. The express business handled independently was conducted under the name of the Merchants' Dispatch. They handled most of their business on passenger cars and at rates of about 1½ times the first-class freight rate, the minimum rate being 20 cents and 25 cents being the minimum charge.

Discussion on Operating Expenses of Freight Traffic

Mr. Hanlon then discussed the possibility of determining the actual operating expenses of the freight car movement and thought it would be difficult to do this accurately.

Mr. Crafts said they divided up their operative expenses on a car-mile basis between freight and passenger cars. He thought it was a fair assumption that a high-speed passenger coach operating at 50 m.p.h. and over would entail as much wear upon the track, etc., as a freight car operated at 25 m.p.h., even if the freight car was more heavily loaded.

R. C. Todd, Indianapolis, said that the Brooklyn Rapid Transit Company charged its freight equipment at one time with an arbitrary rate of 14 cents.

Mr. Hanlon was of the opinion that a freight car would not do more damage to the track than the average heavy interurban car, mainly on account of the speed. They took very few of their freight cars over street special wark.

A. H. Mackay, general traffic manager, Puget Sound Electric Railway Company, said that line was about 40 miles long and they operated three-car passenger trains, frequently with two-car second sections, with some short hauls between. They had an hourly service with the three-car passenger trains. They also operated two special runs in between, one from Puyallup to Seattle and one between Renton and Seattle. They earn from $12,000 to $14,000 a month on their interurban lines, so that they have to handle considerable freight. They handle from 3500 to 4000 gallons of milk every morning and receive from private companies refrigerator cars built especially for handling beef. The company averaged about five carloads of fresh meat every night. The only drawback at the present time was the terminal facilities at Seattle. They handled everything except livestock and their rates were based on those charged by the steam roads. They had the strongest kind of competition from two steam roads—the Chicago, Milwaukee & St. Paul and the Northern Pacific—and also from the boat lines. They relied very largely on quick dispatch. They watched their freight claims very closely, and last year these claims averaged less than 0.25 per cent of their freight earnings. That figure included all losses, whether from accidents or damage. Their total expense for freight, he thought, was about 45 per cent of the earnings. In answer to a question, Mr. Mackay said their charge for milk was 1 cent a gallon for the first 10 miles and beyond that 1½ cents a gallon. That also included the return of the empty cans. The longest haul on milk was about 32 miles, but the general average was about 20 miles.

F. A. Boutelle, Puget Sound Electric Railway Company, added that besides the freight business mentioned by Mr. Mackay, the company was also handling from 15 to 30 cars of coal per day from Renton. The haul averages about 12 miles.

President Allen in discussing the difficulty of arriving at a proper charge against freight cars quoted the following incident: A number of years ago in the south a road about 75 miles in length was seeking to finance some of its securities and elaborate statements were prepared and presented to the bankers in the financial centers. Various experts were sent to examine the property and they reported that the property was all right. While the territory was thin, it certainly had a heavy revenue, particularly from freight. One of the former railroad commissioners of the State of New York was retained by a trust company to examine the property. In analyzing the gross receipts, he found that the earnings from the smallest station were the largest. He went to that station and asked that the agent would show him from what source that revenue was derived, and it was found that the greatest source of revenue was a gravel bed, the gravel being loaded into the cars and the earnings charged up at the full rate, the gravel being deposited under the track of that road. Mr. Allen said the difficulty of determining the cost of freight operation was not confined to the electric roads. It was just as serious with the steam roads.

George W. Parker, Detroit United Railways, also thought it a serious question. He had recently been asked to appear before the Railroad Commission of his State and give testimony on the cost of freight operation. The opposing counsel took the ground that the handling of freight and express on electric cars should be done much cheaper than with

(Concluded on page 752.)

ADDRESS OF PRESIDENT WALLIS TO THE ACCOUNTANTS' ASSOCIATION

The thirteenth year of the existence of the Accountants' Association has not been as spectacular or exciting as its predecessor, but it has been amply eventful to emphasize the value of the association and to justify the wisdom and foresight of those who organized it. We began the year with a new classification, much different from the old, but still representing in a large part the principles to which this association has been committed after years of formulative labor. This classification is practically identical with the official classification of the Interstate Commerce Commission, in shaping which your representatives—the clasfication committee—were accorded an important part. They, in turn, had the benefit of your advice through your replies to the earlier tentative classification and your discussions for years in conventions. Their co-operation in the work of preparing an official classification by the Interstate Commerce Commission had been asked and given in the interest of uniformity. Uniformity had been from the very inception of this association its rallying cry.

Had all the electric railways of the country come under the jurisdiction of the commission uniformity would have been attained by manifesto. The greater number of companies do not come under its jurisdiction. In some States the law compels the adoption of the system of accounts prescribed by the Interstate Commerce Commission. In others the policy of the State regulating bodies is to be guided largely by the national commission. But still there are very many States in which there are no accounting requirements or no obligation by law or policy to follow the lead of the Interstate Commerce Commission. In the interests of uniformity in electric railway accounting, therefore, it is well that complete co-operation and harmony exist between this association, the offical representative in accounting matters of the electric railways of America, and the National and State commissions. This, I am glad to say, is the case. We are working in harmony with them and we may well take a just pride in the influential position which he hold in their confidence. It is our duty to so maintain our standard of fairness and intergrity in accounting methods that we shall continue to justify their confidence, which will be ours so long as they are satisfied that we are striving for correct principles of accounting. For this confidence we are indebted in large measure to our classification committee, which has labored hard and conscientiously during the year. I call your attention especially to that part of the report of the classification committee which refers to its conference with representatives of the Interstate Commerce Commission to consider rulings upon questions which had been asked of the commission concerning the new classification.

This classification has been before you for a year and you have had a chance to study it and observe its workings. It is within the province of this convention to consider it and to offer suggestions for its improvement wherever desirable. Your classification committee represents you and in no way can it know and understand your opinions, experiences and requirements unless they find expression.

The great work of this association is still the formulation and recognition of the correct fundamental principles underlying electric railway accounting. This was the reason for its inception; it is the reason for its existence today. We are passing through a period of increasing regulation by public bodies which affects the accounting possibly more than any other branch of the electric railway industry. Different regulating bodies naturally take differing views of the principles of accounting. In the interest of the electric railway business it is the duty of this association, therefore, to consistently maintain its position of authority in electric railway accounting methods. This it can do only by sincerity of purpose and by a constant keying up to the highest standards. If its aims are recognized as conscientious (and I believe they are universally so considered) the influence of this association will be far-reaching enough to secure the fundamental uniformity for which it has so long and successfully worked. We can only accomplish this by showing to the satisfaction of executive officers, bankers, commissions and public accountants that the principles which we uphold are sound and based upon the foundation of solid reasoning.

An official visit in June as your representative to the Central Electric Railway Accounting Conference was, I believe, productive of much good in the encouragement of the aims of the smaller body and in establishing close relations between the two. From observation of this conference at close range I am of the opinion that such local organizations, furthering the aims of this association and working in harmony with it, might well be encouraged. As you are aware, many similar national organizations have local branches or allied organizations.

This organization can expect to meet but once—or, at most, as is suggested elsewhere, twice—a year. A neighborhood organization of electric railway accountants can meet profitably much oftener with the result of better acquaintance and more detailed, thorough and intimate discussion of topics of common interest. With frequent meetings, less distances to travel to attend meetings and the more general acquaintanceship formed in such close range conferences, much more intimate detail of discussion can be undertaken than is possible in a national association. Such organizations can encourage by precept and example among those who do not or cannot attend our conventions a high standard of accounting methods. Better acquaintance of neighbors in the same profession leads naturally to higher standards. As the chairman of the Central Railway Accounting Conference aptly put it, the experiences gained in the smaller organizations would better prepare their members for work in the larger association.

For the best interest of all concerned there should always be a close sympathy and co-operation of purpose between this and any local organization of railway accountants, for whatever reason formed. Such organizations should be encouraged to strengthen the purposes of this association to the end that electric railway accounting may rise continually in dignity and usefulness.

During a discussion of the question of a separate meeting time and place of this and the American Association it was suggested by a valued member of this association that in addition to the convention and annual meeting to be held with obvious advantage at the same time with the American Association, there be a mid-winter conference of this association separately. This should be exactly what the term conference signifies, without formalities and without business. The idea certainly has merit and I am glad to give the suggestion publicity.

Second only to its aim for uniformity of accounting methods, and perhaps even paramount to that, this association has always before it the work of putting higher the high-water mark of electric railway accounting efficiency. Through education, through continued insistence upon the dignity of our profession, through holding up a higher standard to attain, this association can do an inestimable service for our industry and the public. It must be continually kept in view in planning the work of the association that its duty is always to raise the standard of efficiency of its membership and of the profession which it represents. It is well, therefore, that we are to discuss at this convention the place of the accountant in the electric railway organization. We may well hope that this discussion will be thorough and that we may receive from it inspiration to higher ideals and added enthusiasm for our work. Also that it may tend to impress those not accountants, who chance to read the

report of this convention, with the dignity of our calling.

When we speak of uniformity of accounting we quite naturally have in mind an authoritative and generally accepted system of accounts, but there are other parts of our work in which uniformity of method is just as desirable. A great many of the statistics which we compute from our bookkeeping are valuable only in comparison, not only with like statistics of our own road, but of other roads as well. It is important that accounts should be so kept that comparisons may be made between roads; just as important is it that the computations which are the basis of our statistics should be so made that comparisons may be accurate. This association, therefore, has as an important work the formulating of uniform methods of computing statistics—notably of car-miles and car-hours. In Mr. Rogers' suggestive paper, which is to be read later in the session, occurs this sentence: "It would clear up the situation considerably if some uniform plan of computing car-hours and car-mileage could be formulated and agreed upon by the Accountants' Association." With the sentiment so expressed I agree. Methods of computing these statistics have been under discussion at various times, but no steps have ever been taken looking to the formulation of exact rules and instructions which should be available to members and a guide to the electric railway accountant as our classification of accounts now is. This seems to me to be desirable.

In the interest of similar uniformity steps were taken at the last convention at the suggestion of Mr. Simmons of the Engineering Association, in his address before us, to formulate a plan of cost accounting for shop, track and power station work. Previous investigations had disclosed a woeful lack of uniformity in methods of keeping data for this purpose and our engineering brethren were right in calling our attention to their needs and demanding that figures of cost given to them should be comparable. Work had been done in previous years by joint effort of the two associations and a valuable start made. A committee of the two associations was formed by vote of the last convention and has made excellent progress upon the work which is one of great magnitude. I suggest that this important work be continued the coming year and be vigorously pushed to a final completion.

In the last few months there has come upon us a new development in corporation accounting—the corporation tax feature of the tariff law. So utterly have accepted principles of accounting and, in our industry, other Federal and State requirements, been set aside by this measure that confusion seems likely. I shall not rehearse the conditions of this act or the attempts which have been made, both before its passage and since, to reasonably modify it. With these you are undoubtedly familiar. In this instance the corporations of our industry are only a very small portion of those affected. So it would seem as though some general agitation would be undertaken to modify what have been called "the injustices and inconsistencies" of this law. In such action this association should have a potent influence. I recommend, therefore, that action be taken by this convention which shall at least authorize the executive committee to take action in case conditions warrant it.

I wish to call attention again to the fact that the main value to the individual in these convention sessions lies in a thorough discussion of the subjects presented. I hope that everybody will take part. It is not so much your duty as your privilege to do so and no one need be deterred from a feeling of modesty or from stage fright. You are not before a board of examiners, but among friends. Everybody has ideas which will be of value to the rest of us and we ought to get at them.

During the year C. N. Duffy resigned from the committee on a standard classification of accounts, on which committee he had performed yeoman service. Much to my regret it seemed inevitable that Mr. Duffy's resignation must be accepted. I appointed in his place F. E. Smith of Chicago, whose valuable services in the past had well earned this appointment. Following the instructions of your last meeting I appointed as a committee upon shop accounting for joint work with a similar committee from the Engineering Association C. L. S. Tingley, P. S. Young and F. N. Lasher.

Again I wish to express for you your indebtedness to your able classification committee. You probably have little idea of the amount of work which devolves upon them. Their only reward can be satisfaction in work well done and that reward can certainly be accorded them.

The spirit of willingness to respond to all demands for service which has been shown by all members of the association who have been called upon is remarkable and certainly indicates a healthy condition of our vigorous association.

REPORT OF THE COMMITTEE ON INTERLINE ACCOUNTING*

By Wm. H. Forse, Jr., Chairman; Irwin Fullerton and Chas. L. Wight

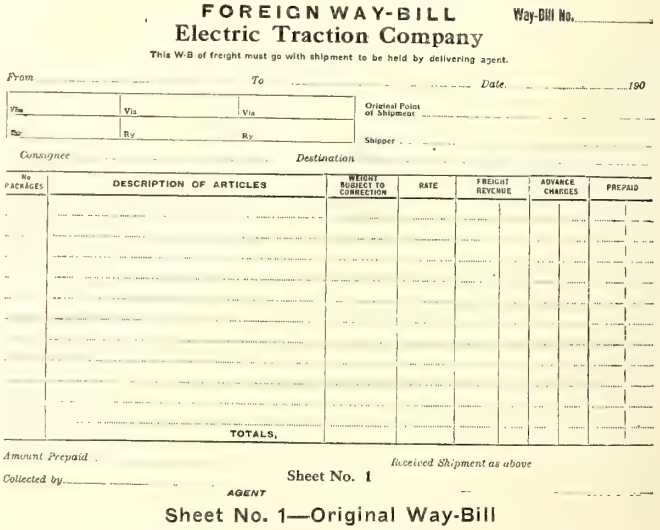
We have not attempted to cover the entire field represented by our subject, but rather to state a few general principles as a foundation upon which may be reared by future members of the committee a complete and serviceable accounting plan adapted to the needs of electric railways engaged in interline transactions.

Recommended Practice Governing Interchange Between Electric Railways

The following methods are recommended as rules of practice to govern the interchange of business between electric railways:

Passenger Accounts

Reports of ticket sales made by a railway during a given month should be furnished by the selling line to each line



FOREIGN WAY-BILL Way-Bill No.

Electric Traction Company

This W-B of freight must go with shipment to be held by delivering agent.

From To Date 190

Via Via Via Original Point of Shipment

Ry Ry Shipper

Consignee Destination

No. PACKAGES	DESCRIPTION OF ARTICLES	WEIGHT SUBJECT TO CORRECTION	RATE	FREIGHT REVENUE	ADVANCE CHARGES	PREPAID
	TOTALS,					

Amount Prepaid Received Shipment as above

Collected by Sheet No. 1

AGENT

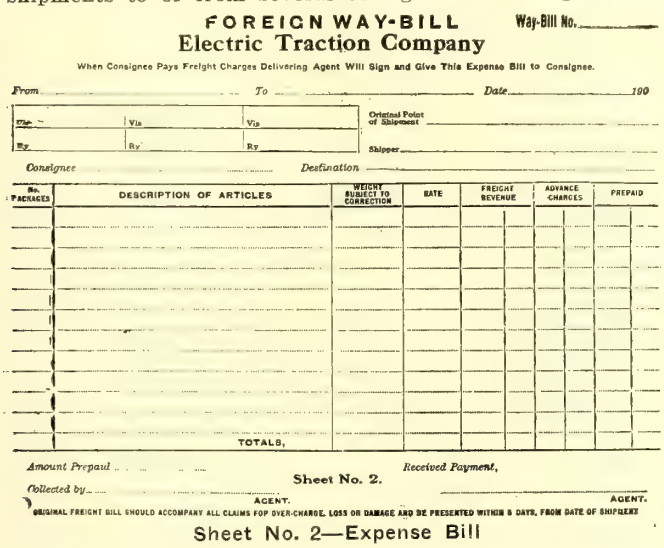
Sheet No. 1—Original Way-Bill

over which it has sold interline tickets. For example, if a ticket has been routed over four different lines each of such lines should be furnished by the road that sold the ticket with a report giving the date of sale, number, form, starting point, destination and selling price of each such ticket sold. In addition to the foregoing information the report should show the proportion of the revenue to which each road participating in the carriage of the passenger is entitled. These reports should be furnished for each calendar month as soon after the close of said month as possible and in no instance later than the 15th day of the month succeeding dates of sales.

*Abstract of report read before the American Street Interurban Railway Accountants' Association, Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

In making settlements for interchangeable mileage or coupon books an opposite course must necessarily be followed and reports (bills) be rendered by the road collecting the coupons instead of the road selling. The coupons collected by a railway during a given month are sent by it to the road which sold the coupons, together with a bill for the amount due therefor and settlements made in the same manner as for other interline transactions.

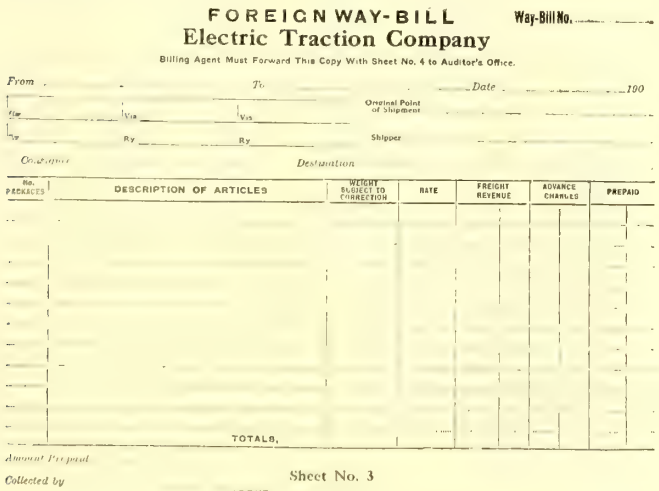
The blanket waybill, as is generally understood, lists the shipments to or from several consignees or consignors on


FOREIGN WAY-BILL Way-Bill No.
Electric Traction Company
When Consignee Pays Freight Charges Delivering Agent Will Sign and Give This Expense Bill to Consignee.
From To Date 190
Via Via Via
Ry Ry Ry
Original Point of Shipment
Shipper
Consignee Destination
No. PACKAGES | DESCRIPTION OF ARTICLES | WEIGHT SUBJECT TO CORRECTION | RATE | FREIGHT REVENUE | ADVANCE CHARGES | PREPAID
TOTALS,
Amount Prepaid Received Payment,
Collected by AGENT. AGENT.
ORIGINAL FREIGHT BILL SHOULD ACCOMPANY ALL CLAIMS FOR OVER-CHARGE, LOSS OR DAMAGE AND BE PRESENTED WITHIN 6 DAYS, FROM DATE OF SHIPMENT
Sheet No. 2.

Sheet No. 2—Expense Bill

the same sheet, while the so-called "unit" type of billing consists of a separate waybill for each shipment. The latter type of bill is one application of the loose-leaf idea, which has been adopted to such a wide extent in recent years. The electric railways doing an interline business have been quick to see the "unit" bill's advantage over the traditional "blanket" waybill of the steam railways. The unit bill, as used for interline shipments, generally consists of five parts, namely, original waybill, forwarding agent's copy, two audit copies and an expense bill, all of which may be prepared at one writing by the forwarding agent with his indelible pencil and carbon paper.

This type of waybill is used by the largest four interur-

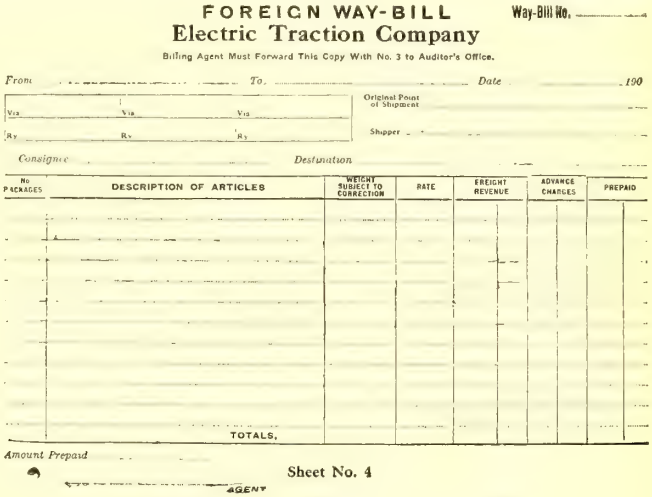

FOREIGN WAY-BILL Way-Bill No.
Electric Traction Company
Billing Agent Must Forward This Copy With Sheet No. 4 to Auditor's Office.
From To Date 190
Via Via Via
Ry Ry Ry
Original Point of Shipment
Shipper
Consignee Destination
No. PACKAGES | DESCRIPTION OF ARTICLES | WEIGHT SUBJECT TO CORRECTION | RATE | FREIGHT REVENUE | ADVANCE CHARGES | PREPAID
TOTALS,
Amount Prepaid
Collected by AGENT
Sheet No. 3

Sheet No. 3—Auditor's Copy

ban railways in Indiana and Ohio, aggregating about 1600 miles of trackage, besides a great many smaller lines in these and other States. It has also been adopted as a standard by the Central Electric Accounting Conference, whose membership embraces the principal electric railway lines of the Central States. For the various reasons stated your committee strongly recommends the use of the unit type of waybill.

Each railway receiving interline freight shipments should render reports of such shipments not later than the 15th day of each month to the lines which forwarded them during the previous calendar month. These monthly reports, itemizing the waybills, should be accompanied by sheets showing the total amount of business between the various stations and the proportion of revenue that is due each railway rendering service.

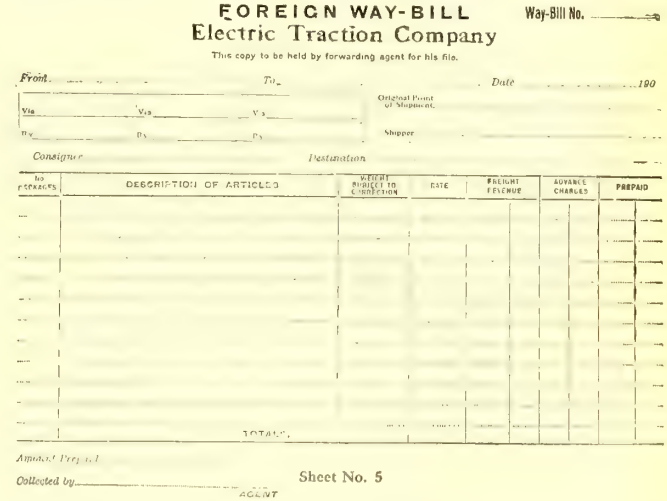
If freight traverses three or more lines enroute to destination each line that has participated in the haul should be furnished a report by the line upon which the final destina-


FOREIGN WAY-BILL Way-Bill No.
Electric Traction Company
Billing Agent Must Forward This Copy With No. 3 to Auditor's Office.
From To Date 190
Via Via Via
Ry Ry Ry
Original Point of Shipment
Shipper
Consignee Destination
No. PACKAGES | DESCRIPTION OF ARTICLES | WEIGHT SUBJECT TO CORRECTION | RATE | FREIGHT REVENUE | ADVANCE CHARGES | PREPAID
TOTALS,
Amount Prepaid
AGENT
Sheet No. 4

Sheet No. 4—Foreign Line's Copy

tion point is located. Under this plan the forwarding line is not required to make monthly reports of shipments sent over other lines. It should, however, furnish to each line interested a daily list (or carbon copies) of all waybills forwarded. The five-part unit type of waybill provides an extra audit copy for this particular purpose.

The foregoing plan governs the accounting for audit settlements only, or freight business settled through the auditors' office, as distinguished from junction settlements which are made between the agents at junction points daily or at periodical intervals. No plan of accounting is here outlined for junction settlements as they consist principally of payments and collections by the station agents them-


FOREIGN WAY-BILL Way-Bill No.
Electric Traction Company
This copy to be held by forwarding agent for his file.
From To Date 190
Via Via Via
Ry Ry Ry
Original Point of Shipment
Shipper
Consignee Destination
No. PACKAGES | DESCRIPTION OF ARTICLES | WEIGHT SUBJECT TO CORRECTION | RATE | FREIGHT REVENUE | ADVANCE CHARGES | PREPAID
TOTALS,
Amount Prepaid
Collected by AGENT
Sheet No. 5

Sheet No. 5—Forwarding Copy

selves and there is little or no interchange of reports by the accounting departments. The junction-settlement plan relieves the auditor's office of considerable work if competent agents are on duty at junction stations. For that reason and as this plan obviates the extension of monthly credits to connecting lines, it is sometimes considered better practice to make all settlements junction settlements.

Methods of Settlement

In order to avoid excessive delay the settlements between companies should be made upon the basis of the reports

that have been exchanged unless they appear to contain errors that are of importance relative to the total amounts involved. Ordinary corrections and the correspondence usually required in connection therewith should not be permitted to delay monthly settlements. The corrections required in the reports for one month may better be taken care of at the next monthly settlement date. The cash settlements for each month's business should be made not later than the 25th day of the succeeding month, and the company owing the larger amount should pay the difference between the amount it owes and the amount due it from the line with which it is making settlement, instead of each paying the other the gross amount due. The actual payment of cash may be made by drawing voucher or authorizing the use of interline bank drafts, as may be agreed upon by the companies participating in exchange of business.

EXPRESS AND FREIGHT TRAFFIC ON INTERURBAN LINES

By S. L. Vaughan, Traffic Manager, Grand Rapids, Grand Haven & Muskegon Railway

For convenience and to take up each phase separately, I have divided freight traffic into six subjects:

First.—Tariffs and Classifications.
Second.—Solicitation.
Third.—Overs, Shorts, Bad Orders.
Fourth.—Claims.
Fifth.—Revenue.
Sixth.—Accounting.

Tariffs and Classifications

The first step to be taken before you can handle a pound of freight, either State or interstate, is to file your tariffs and classifications. The Michigan Railroad Commission requires a tariff 10 days before effective and the Interstate Commerce Commission 30 days.

The road represented by the writer is engaged in both State and interstate traffic, being in direct competition with the Grand Trunk Railroad between Grand Rapids and Grand Haven, and a keen competitor of the Grand Rapids & Indiana Railroad between Grand Rapids and Muskegon.

Our freight rates are the same as our steam line competition. Class rates are as follows: First, 17 cents; second, 15 cents; third, 11 cents; fourth, 9 cents; fifth, 6 cents. (Mileage, Grand Rapids and Grand Haven, 34.6 miles; Grand Rapids and Muskegon, 39.8 miles.) It is necessary to carry a few commodity rates in order to compete with the steam lines. When the road was built in 1902, only four classes were published in our local tariff, but later it became necessary to carry five classes, which covers all less than carload shipments and some carload classes.

Our local tariff carries, under special commodities, flour and feed (carloads minimum, 35,000 lbs.) 4 cents per cwt.; beer (minimum, 30,000 lbs.) 6 cents per cwt.; hides (minimum, 20,000 lbs.) 6 cents per cwt. These rates apply from Grand Rapids to Grand Haven and Muskegon. The beer formerly was carried in refrigerator cars and in summer time was iced. We convinced the brewery people that we could handle their shipments in carloads and save them the ice on account of our ability to get the beer to destination two hours after loading. We are now handling two cars a week during hot weather. In the winter time we get the business because we can get the shipments to destination before they can freeze.

The Milling Company at Muskegon failed and that market was compelled to look elsewhere for its goods. The Grand Rapids & Indiana Railroad was favored with the business for a time. We explained to the shippers that we had 40,000 lb. capacity cars which could be loaded 10 per cent above their capacity, that we would unload our cars promptly on arrival, as we needed our equipment, and that we would have our warehouse force make delivery to various consignees on their orders, while the steam lines took a receipt for the carload lot as a whole and paid no more attention to it, each man going to the car and helping himself. This was a point in our favor and we have been obliged to increase our warehouse room at Muskegon. We are now handling two to five cars of flour and feed per week from five shippers in Grand Rapids, all located on steam road sidings.

Another commodity handled is wheat in carload lots from Berlin to Grand Rapids, a distance of 11 miles, at 4 cents per cwt. This business formerly moved via the Grand Trunk Railroad, but the shipper said he would sack the wheat if we would make the same rate as the Grand Trunk Railroad.

Our local tariff also carries a rate on milk of 1½ cents per gallon between any two points, cans returned free. The milk business is carried only in express cars and has never amounted to very much on account of creameries located at our best dairy stations.

The express business as handled by our lines is not very extensive, as we have only two combination cars and they are used mostly in the Chicago steamboat service. On any of our passenger cars, we charge 40 cents each for packages, the rate being made high to discourage the business. The agents make a regular freight waybill, add "express" after the number, and send a copy to the auditor's office. We have a contract with the American Express Company, covering our terminals and allowing privileges in our freight cars only.

Concerning tariffs for interstate traffic: We have tariffs in connection with the Goodrich Transit Company to and from Chicago.

Now comes the interesting part to you who have endeavored to have steam lines concur in your tariffs. We are in a position to handle all freight offered us consigned to all points beyond Chicago. Previous to the time the Interstate Commerce Commission required the filing of tariffs and concurrence by the lines party thereto, the various roads out of Chicago accepted our business and it looked good to them since we used the all-rail rates and the all-rail percentages. After conditions changed and tariffs were necessary, these lines, with one exception, filed non-concurrences with the Interstate Commerce Commission. Calling on the various general freight agents of the different lines out of Chicago, with our argument that our case was not similar to any other electric line condition in the country, inasmuch as all the business we gave them must be through a steamboat line of 112 miles with which they already had tariffs and from which they were glad to get business (the main argument of the steam roads that the electric lines had no equipment to exchange not applying in our case, Lake Michigan being between our terminals), I was told that I had a good line of argument but that the western trunk lines had agreed not to prorate with electric lines. Quick action was necessary. Grand Rapids, Grand Haven and Muskegon are all in the same rate group on business beyond Chicago—in other words, Grand Haven rates apply from Grand Rapids—so upon filing a free tariff covering movement from Grand Rapids to Grand Haven we were made party to all tariffs to which the Goodrich Transit Company was a party covering all lines south, west and northwest from Chicago. The Goodrich Transit Company filed a special division sheet allowing us the same proportions on western business as on Chicago proper. The Interstate Commerce Commission accepted both and placed them on record. We now have through tariffs with the Chicago & Eastern Illinois; Chicago, Cincinnati & Louisville and Chicago Great Western Railroads, and more coming in. Some of the larger lines are still holding out, but we are in a position to accept all business offered and protect the all-rail rates.

Our tariffs are governed by the official classification and exceptions as published. We have adopted this classifica-

tion on account of being in the Central Freight Association territory. The steam lines publish exceptions and we endeavor to adopt the same exceptions. I might add the troubles encountered in becoming a party to the official classification: We filed power of attorney with the compiler and were shown for several months in front cover with lines which are shown as parties, but when this was discovered by some steam road official we were notified that it would be necessary for us to do our own filing with the Interstate Commerce Commission and the Michigan Railroad Commission, which is now being done.

Solicitation

The solicitor is the live wire which connects his company with the shipper and must hear all complaints as to service, breakage, rough handling, etc., and give such complaints attention. He should be a man of good address, well posted as to rates and classification and the time he is making on most important points; time is a strong talking feature, as shippers desire fast service and prompt delivery.

The great disadvantage generally encountered by interurban lines in large cities is the location of the receiving station. Our receiving station in Grand Rapids is centrally located near the wholesale and retail district and near our competitors' main houses, although the steam lines have receiving houses for less than carload shipments at the north and the south end of the city, and even the factories located near these receiving houses draw to us on account of the time we can make on their shipments.

A solicitor has to overcome the so-called ferry or trap cars operated by steam roads which they place at factory doors for loads of 6,000 lbs or over for less than carload shipments taking the car to the freight house, where the shipments are transferred to cars loaded to various points. The Interstate Commerce Commission has ruled that the practice is the same as cartage. The steam lines now assess a small charge of $3 per car. With all these conditions, however, I note by our Grand Rapids freight agent's July comparative statement an increase of $1,245.32.

A local agent can be of great help to the solicitor by giving patrons courteous treatment on the telephone and giving correct information.

Our westbound business consists largely of furniture, carpet sweepers, candy, brass goods and embalming fluid; eastbound, all kind of grocery sundries, plumbing supplies, and articles not manufactured in our home city. We have all-rail lines "in the clear" when it comes to time having a car leaving Grand Rapids at 6:15 p. m., which goes directly to the dock at Grand Haven and is unloaded directly to the boat arriving at Chicago at 6:00 a. m. Freight for points beyond Chicago is transferred the same day, going directly to through cars for all points with no switching or terminal delays. On eastbound business the Goodrich Transit Company receives freight up to 6:00 o'clock in Chicago and we have two cars on the dock at Grand Haven every morning waiting for the Chicago boat. Freight is taken directly from the boat to these cars and arrives in Grand Rapids from 6:30 to 7:00 a. m. and is ready for delivery shortly after. This is a good talking point in solicitation. Another argument used is: "We are a short line; give us what we can handle; the steam lines cover so much territory you can favor them with business we cannot touch." Another argument and a good one is that if it were not for the interurbans the steam roads would raise their rates, and it is a fact that we have been approached on this subject by the Grand Rapids-Chicago lines.

Where an interurban line is compelled to rely wholly on local business, it behooves the traffic man to study local conditions as to soil, etc. In what can he interest the producers along his line that will give him business? What are his competitors handling that he can handle if he has equipment of the proper capacity? Our line runs through a country adapted to the raising of small fruits, and we have interested a canning company at Grand Rapids to solicit the farmers to raise peas, beans and such produce as is used in a canning factory. The grower is not confined to the Grand Rapids market alone, but is at the very door of Chicago and Milwaukee. We have two fruit loading platforms now and I think that within the next year or two we shall see a large increase in our fruit business.

The interurbans are the people's railroads and they expect much of you. One man for whom we erected a fruit loading platform eight miles east of Muskegon asked me if we could not bring his coal out to him. Another man, building a new school house at one of our smaller towns and close to our tracks, built a platform so that our crews could unload his freight.

We have three solicitors in Grand Rapids—one placed in the territory by the Goodrich Transit Company, one who works in our city ticket office forenoons (working on the street afternoons), and myself—looking after through, as well as local, freight business.

Proper Handling

After the business has been secured through solicitation the next important item is to properly handle it to the satisfaction of the shipper and consignee, giving prompt delivery after shipment has reached destination, proper weights and rates. Our system is the same as that of steam roads, the uniform bill of lading and the steam road forms of way and expense bills are used.

The first step between the shipper and the transportation company is when freight is delivered at the warehouse door. The receiving man should be careful to see that the marks on freight agree with the shipping order and that all old marks are obliterated. Enough care is not taken here, and I can trace numerous claims back to this point. The receiving man must be positive he gets all the goods receipted for, as his receipt is the vital point between the shipper and the transportation company. All exceptions as to condition upon delivery must be noted on the shipping bill to properly protect against claim, and check marks should be placed after each item to show that the goods were actually received and checked. After a receipt is given and the freight is piled in the warehouse and at time of loading, the shipment should be again checked into the car, thus verifying the receiver's check. The shipping order then goes to the bill clerk, who must use care and show each item on his waybill as it is shown on the shipping order, using correct weights and rates to avoid claims for overcharges.

At local stations we have the agent check his freight out of the car while the train crew unloads, and the conductor checks freight into the car while the agent and motorman load. If a shortage exists, both conductor and agent make reports. The agent should at once make out his expense bills and notify consignee promptly by telephone or post card of the arrival of his goods.

We are using three kinds of expense bills, two, three and four-way. The first is used only at stations where the agent is also the warehouseman, or in other words, a one-man station. The three-way is used where a teaming company draws freight, one copy being retained by the cashier, one going to the warehouse and the third to the teaming company. The last, or four-way, is used only in Grand Rapids where a collector is employed, the extra piece being for use of the collector.

Overs, Shorts and Damages

It is very important that agents and conductors make reports promptly on short, over and damaged freight. We have a system whereby overs, shorts and damages are numbered, booked and checked on tissue copies of waybills in the auditor's office, and all investigation made with this report so that when a claim is presented we have all informa-

tion at hand to make prompt settlement, which is very gratifying to claimant and is a business-getter.

Claims

When a shipper presents a claim properly supported by paid expense bill, shipping bill and original or certified copy of invoice, receipt of the papers should be acknowledged, giving him your claim number.

Claims are an important item in handling freight traffic and can be kept down to a very low figure if agents and train crews take proper precaution in handling and checking freight in their charge. Claims for loss are sometimes very mysterious, the records at the forwarding station indicating very plainly that the shipment was properly loaded, the car went through to destination and part of shipment was checked short—no change of cars en route. This can be properly laid to improper marking or wrong delivery.

Damage claims when freight is of a nature to be seen, and reports of conductors and agents verify, are more satisfactory to pay. Some transportation companies offer to compromise on concealed damage claims on a 50 per cent. basis, claiming damages may have occurred while freight was being drawn to or from the station. It generally makes claimants angry; sometimes they will settle and sometimes they will not. A good man at the receiving door, if a shipment is offered which has the appearance of being damaged or is rattling, should investigate before giving a receipt.

Prompt payment of claims is a great aid to a solicitor, and some steam lines allow their agents to pay all claims of $5 and under if their judgment deems such a claim just. I do not think I would recommend such practice for an interurban, for the reasons that it does not take long to get the information as to damages, under or overcharges, and there are not nearly as many claims handled as on a steam line; nevertheless, claims should have prompt attention.

Another important part in the handling of freight is clear receipts for goods at destination and date of delivery. Our agents at local stations are not allowed to extend credit to anyone, and it is the duty of the traveling auditor to see if their receipts are properly signed and dated.

We have adopted the card system in handling claims; each claim is given a number and a card is made out representing the claim and showing where the papers are sent; at least every 30 days we send a tracer after the papers. At the present time we have 68 unpaid claims, and only ten over one year old; this road has been in operation seven years.

Revenue

In looking over our statements for 1908, I find the following figures: Average receipts per freight car-mile, 43 cents, for which the cost of handling was 51 per cent. of the gross freight earnings. We have nine freight cars of 30,000 and 40,000 lb capacity.

The items charged to cost of handling freight are power, maintenance of equipment, wages of conductors and motormen, wages of station employes, whose services are required for handling freight, rent of tracks and terminals, rent of land and buildings, freight damages, printing and stationery.

We have a monthly statement showing exactly our revenue from freight and expense of handling it.

Accounting

We have a regular steam road form of waybill; our shipping bills are those adopted by the Interstate Commerce Commission. After the bill clerk makes his way bill it is copied in a tissue book and accompanies the freight to destination. The receiving agent gives each consignment a different pro number and enters the expense bills in his cash book; the waybill, after freight is unloaded and checked, is pasted in what we term a waybill paster, which is really a freight received book, carrying totals of weight, freight, advances, and prepaid at the bottom of the page so that the agent, at any time, by taking his last current month's debits, can deduct his outstanding balance.

We have tissue copies of all waybills sent to the auditor in order that overs, shorts, damages and claims may be checked thereon.

At the end of the month the agent abstracts his forwarded and received way bills and makes out his balance sheet, which is checked by the traveling auditor and a correction balance issued, if any errors are found; if no errors are found he is given a clear sheet. If an error is found in the previous month's bills the agent asks for station relief, and is not allowed to accept corrections after his monthly reports have gone to the audit office.

The foregoing is an abstract of a paper read before the American Street & Interurban Railway Transportation & Traffic Association, Denver, Colo., Oct. 6, 1909.

DISCUSSION ON PAPER 301—REPORT OF THE COMMITTEE ON WAY MATTERS

To the American Street & Interurban Railway Engineering Association:

Your committee on way matters has presented an interesting and valued report and it is hoped that the discussion will result in some action in recognition of advantages and adaptability of the use of T-rails in paved streets and for all classes of traffic conditions.

The companies and cities that have had the greatest experience with the use of T-rails in paved streets are the strongest advocates, and therefore their opinions must have the most weight. The question of the proper dimensions and type of rail has been heretofore so dependent on the types and kinds of paving that the two questions should be considered together, and as the question of economical maintenance is acknowledged by the committee of such serious importance it would seem most proper to consider the matter of economical maintenance concurrently with the question of the selection of the proper rail and paving.

Let us first consider briefly the question of paving.

Heretofore the belief of the necessity of granite block paving where heavy vehicular traffic occurs has dictated the use of a high rail, but to-day where a concrete paving base is used, it is acknowledged that a smooth type of paving surface is preferable to a granite block and this is equally true for both the railway company and the city.

Granite block paving is generally more expensive, is noisy, retains water in joints, and on the authority of the late Col. Waring, the greater cost of keeping clean such rough pavements would pay the interest and depreciation on the total cost of smooth surface pavements.

If we discard the general use of granite pavements and consider the question of types of rails and maintenance costs where modern pavements are used on a concrete base, we immediately find that the principal argument in favor of the use of a grooved or flanged section of girder rail disappears. It is quite safe to assume that if we had not started with the use of granite block paving we would now be using a very much greater percentage of T-rails in paved streets.

Where a suitable concrete base is used for both track and paving foundations, there is no difficulty in connection with the use of a standard section of T-rail, and if properly designed and constructed the pavement should not wear in ruts. T-rails present much less metal on the street surface and therefore are better for street traffic, and can be made satisfactory for all classes of street traffic by adoption of the proper type of paving. It is inadvisable to pave between the rails and the narrow strip outside where the balance of the street is unpaved, the cost of maintenance is always greater than in a fully-paved street, it encourages vehicular traffic on the tracks causing delays to cars, and it should not be difficult to convince the city authorities

of the bad practice of paving tracks when the remainder of the street is unpaved.

Regarding the type and size of the rail every encouragement should be given to eliminate and abandon the very large number of different sections that have been designed and heretofore used. There seems no good reason why the girder rail cannot be reduced to not more than two sections (with corresponding section of guard-rail) and to adopt the standard section of T-rail—of varying weights—with perhaps one section of high T-rail.

The height and weight of the rail should be selected with regard to the weight and class of cars to be operated and to-day the many interurban cars running over the city tracks and the noticeable general adoption of larger cars for the city service, there is not the great difference in the cars operated on the various city lines as formerly and therefore in most cases, one height and weight of rail could advisedly be adopted, but in no cases are more than two heights or sections necessary. The question of frequency of car service should not be the governing factor in the selection of rail section for in designing a bridge you consider the load to be carried and not the frequency of trains—but in designing your foundation, joints and special work you must consider frequency of service in reference to cost of maintenance.

Where it is now compulsory to use granite block paving, the track should be of high T-rail—but it is strongly recommended to discard granite block paving wherever it is possible to do so.

Companies now using the flange-tread type of girder rail would find that T-rail would be cheaper and more satisfactory, and the street traffic would not produce ruts along the rails if modern smooth paving on concrete base was used.

Where girder rail is demanded by city authorities, it is generally due to lack of appreciation of the advantages of the T-rail and of the practicability of paving up to the top of the rail. In every case that has come under my observation and experience, T-rail has been locally acknowledged as very much quieter, and its only objection is an assumed one of difficulty in paving up to a uniform surface, which does not exist in fact where pavements are properly laid on a suitable concrete base.

As to the necessity of advisability of using a high section of T-rail instead of the standard T-rail section, it should be settled by the question of the most economical design for strength considering weight of metal, other things being equal, therefore when satisfactory paving can be secured with use of standard T-rail, which can be done with rails weighing 90 lb. and over, this type should be adopted, being cheaper in construction and maintenance.

The open track construction used on interurban roads and steam roads should be designed for a certain amount of flexibility and cushioning effect, but tracks in paved streets should be built for solidity and to prevent movement of the rails or of the paving, and therefore a proper foundation is a large factor in reducing the cost of maintenance; a flexible track will quickly admit water between the paving blocks or between the rails and the paving, thus introducing a quick factor of depreciation and repair work.

The use of macadam pavement is generally expensive in maintenance where there is any considerable traffic, and it is not advisable in cities of over 50,000 population in streets having car tracks.

In Adelaide, Australia, the city records showed that macadam to the depth of 72 in. had been used in the maintenance of one of the principal streets during 10 years; tney afterwards adopted tar-macadam which gave a much longer life and not one-quarter the cost of maintenance.

In Manila on residential streets where macadam is used, the cost of maintenance exceeds that of maintaining hard wood block paving laid on concrete in streets having far greater traffic.

In England and on the Continent, also in New Zealand and in Manila, where girder rails have been laid in concrete with the use of cross-Ts 8 ft. to 10 ft. apart, it was found necessary and advisable to anchor down the track by the use of short pieces of the same section of girder rail riveted or bolted to the under side of the bottom flange at the joints, and at points midway, these anchors were buried in concrete which was also carried 2 in. over the base of rails. Without these anchors, the track would sometimes lift itself and break and crack the ordinary grouting over the rail base.

In Shanghai one section of the electric tramway was built without cross-ties, using girder rails and tie rods laid directly on crush-rock and filled to top of rail and rolled as macadam, no concrete was used; after two years it is now in bad line and surface as might have been expected.

Re The Use of Open-Hearth Steel Rails

You may be interested to know that the Chinese, after studying steel rail mills, have adopted the open-hearth process in their large steel plants operating at Hanyang, about 600 miles up the Yang-Tse above Shanghai.

To-day they are turning out a very good quality of open-hearth steel rails. They are rolling on 85-lb. English section for use on some of the steam railroads now building in China, but they have promised to adopt the American standard section as soon as templates can be furnished to them, which will be desirable, as by their present capacity they cannot produce the tonnage required for roads now under way. There are no electric railways now building in China.

In closing my remarks I desire to thank the committee for the extremely good work they have accomplished in their efforts to improve and standardize construction.

Respectfully submitted,

C. G. YOUNG.

EMPLOYEES' PAPER IN BERLIN

The employees' society of the Berlin (Germany) street railway system has been publishing successfully for the last eight years a fortnightly paper known as "Die Strassenbahn." This is the official organ of both the society and the Grosse Berliner Strassenbahn. Each issue is published as a form of 16 pages with one extra loose sheet of the same size on which are printed the official announcements of the company. The reading matter is of the most practical kind for both railway and family purposes as may be noted from the following titles in one number: Observations on the Behavior of Railway Men on the Witness Stand, by a Claim Agent; Private Insurance versus Society Insurance; The Society's Provisions for a Vacation Colony; How Can Conductors Keep Their Hands Clean During Service Hours?; Care of Children During the First Year; Scope of the Free Legal Aid Privilege; Summer Diseases, and Directions for Bathing.

The paper is free to all members of the society. The publication expenses are paid by the advertisements and a small annual subsidy from the company. All the advertisements refer to articles which are likely to be used by railway men and their families as no effort is made to secure complimentary announcements from the makers of electric railway equipment. An important branch of the society's activities as chronicled in this journal is the arrangement with various business and amusement enterprises to give certain discounts to members of the associations. It appears also from a recent issue that the company has made arrangements with cafés near the terminals of runs for the free use of their toilet facilities by railway employees. This consideration for their interests is greatly appreciated by the men as it saves them from spending money for drinks, tips and the like.

COMMUNICATION OF F. T. FULLER, VICE-PRESIDENT PORTLAND RAILWAY, LIGHT & POWER COMPANY

In discussing the tentative rules prepared by your committee it should be first stated that as prepared they show evidence of much thought and study and cover the ground generally in a very thorough and satisfactory manner.

In considering a set of rules which would be applicable to all city roads a great many points which could and should be included in the rules for a particular company must be omitted. At the same time a number of rules would naturally be included which would not be applicable to some special locations. For the above reason it seems to the writer that such rules can only be used as a basis for those of a particular company and that it will be practically impossible to obtain a set of rules which can be printed and used for all portions of the country. If this were attempted it would result in the number of bulletins issued outside of the printed rules being very large, when the better plan would be to incorporate them in the regular rules of the particular system.

To illustrate these points, I would say that the matter of restricting the conductors to making change for a sum not exceeding $2.00, while applicable to most of the country, would not apply at all to the Pacific Coast, where there are few bills in circulation. With us the coin next to a dollar which would be presented to the conductor would be a $5.00 gold piece. On our particular system we do not limit the conductors in the matter of making change at all.

As another illustration, on our system in Portland we operate across four separate draw bridges and it has seemed wise to make the rules relating to operation over these bridges a part of our regular rules rather than to issue bulletins covering the same. Also, the ordinances of our city provide that every street car shall come to a dead stop before crossing any other street railway track, and our rules regarding this compulsory stop and the giving of signals for starting are incorporated, of course, in our main set of rules.

Commenting upon the rules as drawn, from the standpoint of our conditions on the Pacific Coast, there is one point to which we should like to call special attention. The rules drawn are very concise and to the point, but there is little in the way of explanation or appeal to the men and no special reference is made toward the men working hand in hand with the management for the reputation and interests of the company. In dealing with the high class of men that we have been able to get in our city on the coast we have deemed it fair and wise to incorporate a few ideas of this nature in our rules. This can be illustrated by comparing the general notice of the tentative rules and the following extract from our general introductory notice to the rules:

The safety of passengers and of others on or about the cars is of the first importance, and all work on the road, including operation, repairs, or construction, must be subservient thereto. To this, with the regularity of the service, and the comfort and convenience of the passengers, all work must be entirely subordinate.

All employees are required to be polite and considerate in their intercourse with the public. The reputation and prosperity of a company depends largely upon the promptness with which its business is conducted, and the manner in which its patrons are treated by its employees.

For the effective operation of a street railway system the close observance of rules and the maintenance of strict and impartial discipline are necessary. The fact that any one enters or remains in the service of this company will be considered as an assurance of his willingness to obey its rules, render faithful service, and be loyal to its interests.

The ground covered is very much the same, but it seems to us that the effect upon an employee of reading the two notices would be entirely different. It may be that this different presentation would not be of any advantage in some cities, but we are satisfied in the past on the roads with which the writer has been connected, running from 100 to 1,000 platform men, that this idea of suggesting the co-operation of the car men with the company by numerous explanations and suggestions through the rules, followed by special efforts to accomplish this co-operation in practice has proved of great benefit to all concerned.

To further illustrate this point, under the head of "Prevention of Accidents," we close with:

Vigilance, the exercise of good judgment, avoiding risks, and a strict compliance with the rules and orders will materially aid in the prevention of accidents.

And under the head of "Looking out for Passengers" we close with:

The business of the company is to carry passengers and conductors are expected to use their best judgment and the utmost vigilance to the end that as many passengers may be carried as possible.

And under the head of "Lost Articles" it is stated that such articles remaining unclaimed after 30 days will be returned to the car man finding the same, all following the same idea that the employer and employees are expected to work together for their mutual benefit and the benefit of the public.

The following remarks and suggestions in regard to the tentative rules reported are made, not as criticisms, but as the result of experience in the operation of street railways on the Pacific Slope and what would seem advisable there. Whether any of the suggested changes would prove advantageous generally or in other sections would be best determined by those operating in such sections.

As a general principle it should be said that rules should be as simple as possible and be arranged in such a manner as to read from one subject to another as they would naturally occur to an employee, as for instance, the matter of appointment should come first. Knowledge of rules and report for work would perhaps follow in order.

In the tentative rules nothing is said about appointment. It is perhaps a question whether this subject should be explained in the application or in the rules, but as a copy of the rules and regulations are usually given a new man breaking in or receiving instructions, this has been the subject of our rule 1, which is as follows:

All car men are required to break in until fully capable of performing their duties in a thoroughly safe and efficient manner and when turned in will serve for 30 days on trial. If at the end of that period their services are satisfactory they will be placed on the list of employees. They will work as extras until for any reason they are advanced on the list to a regular run.

Our rules also include general rules pertaining to reporting for work, penalties for failure to report, laying off, and rules relating to uniforms and badges. While the matter of reporting and laying off would perhaps vary on different roads to such an extent as to render it impossible to prepare a set of rules which would be general in these matters, there would apparently be no question but that some rules regarding the wearing of uniform, caps and badges could be made general, somewhat as follows:

All car men after being placed on the list will wear a uniform, including cap, badge and company buttons while on duty and maintain a clean and neat appearance appropriate to their occupation. (Then follows a description of standard uniform, cap and location of badge, etc.)

No car man will be allowed to take his car without his badge, which must be worn on the front of the cap. Under no circumstances will any employee lend his badge to any person. The loss of a badge or register key must be at once reported to the superintendent or inspector.

Under Rule 5, "Habits and Personal Conduct," our experience suggests the inclusion among the prohibited acts, that expectorating tobacco juice on any part of the car would not be allowed.

Under "Accidents" there is no special rule or paragraph for the prevention of the same. We cover this with the following among other items covered by the tentative rules in various places:

To prevent accidents, request passengers to alight on the side nearest the sidewalk, and warn them to be aware of passing cars or vehicles. Caution passengers not to get off the car while in motion. Prevent ladies and children from doing so by placing your arm across the platform and grasping the rail next to the car, at the same time politely say: Wait until the car stops.

Small children must not be allowed to ride on the front platform, unless in charge of some grown person.

Children must not be allowed to take hold of a car to run, or ride bicycle beside it.

In the event of any immediate danger to the public caused by any of the company's apparatus such as breakage of over-head lines, holes in the street, bridges, etc., the first employee discovering same must arrange first to protect the danger point, and then notify the proper authorities by the first available means of the character and location of the trouble.

When the trolley leaves the wire the motorman will immediately throw off the current and stop as quickly as good judgment will permit, so that the pole will not strike the span wires or arms.

Never run down any grade without the trolley on the wire.

Under the rules for motormen we would suggest the incorporating of a rule regarding vestibules and curtains about as follows:

If for any reason motorman cannot get a clear view of the track ahead through the glass front of the vestibule he must open the front window until such time as it is safe to run with it closed. This is especially necessary at dangerous points, such as railway crossings, draw bridges, etc. Curtains between the front vestibule and the body of the car must always be drawn down after night fall. Never run with the rear curtains drawn down.

Also in regard to "Speed":

(a) Motormen must use good judgment in the matter of speed, and always tend to be over-cautious rather than a little reckless.

(b) Safety of life and property is the first thing to be considered. The running time is such as to be made without taking chances; but if from any special conditions it is impossible to make it safely the time will be a secondary consideration.

(c) They must conform to time table requirements as closely as possible, regulating speed in accordance therewith and with the limits of the time points. If a motorman should be delayed he will not undertake to recover the time lost in the minimum distance, but if it is entirely safe to do so he will run slightly faster, aiming to reach destination or end of trip as nearly on time as may be possible.

Also in regard to "Headway":

(a) When one car is following another under ordinary running conditions, the rear car shall keep at least 260 ft., or one block, clear of the car ahead, and when on grades great care must be used even at this distance.

(b) When regular running conditions cannot exist, as at transfer points, railway crossings, business centers and crowded streets, then this space can be reduced with the exercise of great caution on the part of the motorman. There is no excuse for a rear end collision.

Also in regard to "Right of Way," after a long list of rules we close with the general statement:

It must be distinctly understood that the right of way does not in any case mean that you have a clear track, the right to cross regardless of anything, neither does it do away with the rule for stopping at railway crossings or justify a collision with the car ahead.

Under the rules for conductors would suggest the addition of rules regarding the matters of ventilation and heating of the cars, something as follows:

(a) Conductors will have charge of the heating switches in the cars. They will turn on these only when necessary for the comfort of passengers, using the half or only one side of the car as much as possible. In a crowded car it is rarely necessary to have the heaters turned on.

(b) When the power is weak and travel is heavy, the current must not be turned on the heaters at all.

(c) When turning a car into the barn at any time conductors must make sure that the heaters are turned off.

Conductors will open or close the ventilators as required for the health and comfort of passengers, especially in crowded cars.

As an addition to Rule 10, "Signals," it has been found that five rings on the gong by the motorman as a signal to another car at a transfer point that he has passengers to transfer has been of great benefit.

Rule 21, "Standing on Steps," is a rule which in practice we have found impossible to enforce, as during the rush hours or crowded traffic persons will stand on the steps. It should be left out or qualified.

Under Rule 117, "Change," we suggest the addition "That conductors must never allow themselves to be without change," and "That they must know the amount of their own cash at all times."

In Rule 202, second paragraph, we suggest a change so as to read: "Cars must be run slowly and with great care in the vicinity of schools or any place where there are children on the street."

Rule 205. We have been unable to see the necessity for this rule.

Rule 210 makes it obligatory to use the emergency stop, that is what is called slugging of the motors, as the first step in case the brakes do not work. This act is one which cannot always be depended upon, and is, therefore, the last step to be taken under our rules after everything else has been tried, including reversing of the car. We have found many cars in which this emergency stop either fails to work entirely or is very unreliable, and after close inspection have not been able to locate the trouble. This applies only to two-motor cars, as we have never yet tried four-motor equipment on which the emergency would not work. We, therefore, consider it safer in case the car is beyond control, either going forward or backward to try to hold it with the power than to rely on the emergency. If they fail to stop a car with the power then try the emergency.

Rule 220 we think should be a little more explicit, so as to refer particularly to controllers. We can see how there might be some cases in which, if a car man was allowed to oil his trolley, or possibly a brake staff, it would be a decided benefit, especially on long runs.

Without going into details would say that detail rules on the following subjects have been found necessary with us:

Special Reports.
Running on Time.
Backing Cars.
Assisting Conductors.
Obstruction on Track.
Missing Fares.

There are many other points that might be brought up, but ideas as to rules are like ideas as to building of houses, they are of infinite variety, and while there can be no absolutely standard code of rules any more than there can be a standard house, yet the knowledge of each code helps in the preparation of a code for the particular conditions to be met.

The writer is a firm believer in making rules and bulletins as simple as possible in language, but full and explicit, as it does seem as if every order, however carefully drawn, will be misinterpreted by some one.

In going over the tentative rules we have found many points better covered than by our own rules and when it comes to a revision with us many of the tentative rules will be incorporated in ours.

Our company has been greatly indebted to this association for the standard rules previously prepared by them, which indebtedness we now acknowledge has been increased through the work of your committee.

The Denver Gas & Electric Company is one of the most enterprising public-service companies in the country. One of its stunts is an anual canvass of vacant houses. A report just issued shows that in September, 1909, there were 1479 vacant houses in Denver, which is 30 per cent less than the number reported last year.

The city of Denver was founded in 1858. The first horse car was run in 1871.

REPORT OF THE COMMITTEE ON POWER GENERATION*

By G. H. Kelsay, Chairman; W. S. Twining, A. S. Byrd, William Roberts, James D. Andrew and Fred Heckler

The committee investigated the following subjects: (a) Flue Gas Analyzers: (b) Steam Meters, and (c) Low-Pressure turbines. Meetings of the committee were held in Pittsburg on May 11, and in Philadelphia on July 19 and 20. Some very valuable information on the subject of low-pressure turbines is furnished by one member of the committee from his personal experience with one of the first low-pressure turbine installations made in this country.

(a) Flue Gas Analyzers

Your committee continued the investigation of this subject this year because last year's work indicated that a great deal of uncertainty existed as to the real merits of the CO_2 flue gas analyzer. The investigation showed that there were but few railway power-plant engineers who had attempted to make flue gas analysis, particularly with the automatic recorder.

Replies to inquiries sent to member companies this year recorded but 23 users of gas analyzers, this being an increase of only nine over last year's figures.

The practice of analyzing flue gases as a part of the regular routine in conducting boiler tests has been the rule with engineers for some time, and is prescribed in the code of the American Society of Mechanical Engineers for conducting such tests. In this code the determination of CO_2, CO and O is provided for, and the benefit that comes from such determination in all boiler tests is unquestioned, but the committee has endeavored to determine what value, for the purpose of developing and maintaining higher boiler efficiency, there may be in the practice of making either intermittent quantitative analyses of flue gases by the Orsat apparatus or continuous analyses with the CO_2 recorder.

The very thorough and valuable work which has been conducted for the past four years by the fuel-testing plant of the United States Geological Survey has had as one of its many subjects under investigation "the condition under which different coals may be most economically burned," and their work has stimulated greater interest in the subject.

For this reason any auxiliary device for aiding the proper handling of the furnace has been received with considerable enthusiasm by most engineers. Unfortunately, however, the advantages in economy to be realized by analysis of flue gases in the average plant have been largely overestimated, as replies received from engineers to inquiries sent out will verify.

Flue gas analyzers and CO_2 recording instruments and their value in the boiler room have, to a very great extent, been overdrawn by their agents. It is our opinion that a lack of progress and a great deal of discouragement have resulted on account of the average power-plant engineer expecting too much with too little effort in the use of such devices.

A large portion of the literature that has been distributed by the manufacturers of gas analyzers has contained too little of the real results and facts that may be obtained by the average engineer with the application of the gas analyzer in his plant.

Last year the committee thought it essential to publish in full practically all the replies as received from inquiries sent out at that time. Some of the questions asked this year were the same as asked a year ago. The replies to the most essential questions as submitted to member companies this year have been of such a varied nature that, in the opinion of the committee, they cannot be used to advantage.

From the results of last year's investigation, in one reply only was the opinion expressed that a record of other gases than CO_2 was desirable as far as ordinary operation was concerned, whereas, replies to the same question this year indicate that 13 of the 23 roads replying analyze their gases for other than CO_2, two of them regarding it an advantage and eight replying that they do not. The replies to the question therefore indicate that there has been considerable change of idea on this one important point.

Corrective Effects

It is conclusively shown from the many replies received that the efforts of engineers to make flue gas analyses have caused many investigations into the actual conditions existing in boiler rooms, resulting in much closer attention to methods of firing and a correction of many defects in boiler and furnace settings. Possibly the most noticeable change in this connection has been a general reduction in excess air admitted to the furnace by infiltration through boiler settings.

One of the companies to which the committee sent its questions, and which has had but little success with its CO_2 recorders, suggests a method of flue gas analysis in connection with evaporative tests that has proven quite successful. This method is as follows:

A large sampling bottle is attached to the flue at the point where the gases leave the boiler setting. The siphon of this bottle is so regulated that the filling of the bottle will require the full time of the test. Another sampling pipe is inserted over the bridge wall, and to this is attached the regular Orsat apparatus. Frequent samples are taken and analyzed during the test, care being taken to note the conditions of fire, draft, etc., and method of stoking, also evaporative results at time of taking samples. A comparison of these analyses and notes has proven of great benefit in improving methods of stoking, and a comparison of their average with the analysis of the continuous sample taken at the rear of the boiler gives a definite check on air leaks in the setting.

From the replies received this year it appears that opinion is divided upon the question of what benefit is to be derived from the practice of making flue gas analysis. Although a great many of the replies were quite full, and undoubtedly represented considerable attention on the part of the authors, the committee feels that, on account of the division of opinion, it cannot present definite conclusions, and thinks that the subject should be referred to next year's committee for further investigation, possibly to the extent of causing experiments to be conducted along definite lines.

(b) Steam Meters

This subject was before the committee last year. At that time it was found that there was but very little information of a reliable nature to be obtained. This year's investigation shows that there is quite an interest in the subject, and that many engineers are looking for a meter that is reliable for measuring steam when supplied to turbines or engines.

Last year's report was principally based on the description of the theory of the operation of various meters on the market and a tabulation of replies to inquiries furnished by 20 industrial concerns from whom considerable information was obtained. The data collected last year was of little value in showing the application of the steam meter in measuring steam supplied to the turbine and engine units. Therefore very diligent effort was made this year to obtain information from users of meters supplying steam to this class of service.

Manufacturers of steam meters state that there have been

*Abstract of report read before the American Street & Interurban Railway Engineering Association, Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

very few meters sold of 6-in. size or larger. Their principal difficulty in handling a unit of large size is their lack of facilities for calibrating it. Most meters that have been supplied in the past require individual calibration. The manufacturers have experienced great difficulty in making them operate accurately, because of the superheat and the presence of pulsations in the supply.

There have been two well-conducted attempts made in the past few months to make use of steam meters, the results of which have been freely given to the committee.

One case was the application of a steam meter to a 1000-kw low-pressure turbine. In this particular application it was found that, owing to the very unsteady flow of steam, the meter was unable to measure it accurately, and the results were so unsatisfactory that the meter was taken out.

In the second application the meter was installed for the purpose of measuring steam used for operating air compressors. This was a 3-in. meter, and the conditions under which it had to operate were very unfavorable, inasmuch as the quantity of steam taken by the air compressors was only a small percentage of the indicating capacity of the meter. The results of this test, however, which was very carefully conducted, demonstrated that the meter was quite satisfactory, and indicated that if it had been operating near its capacity the results would have been entirely satisfactory.

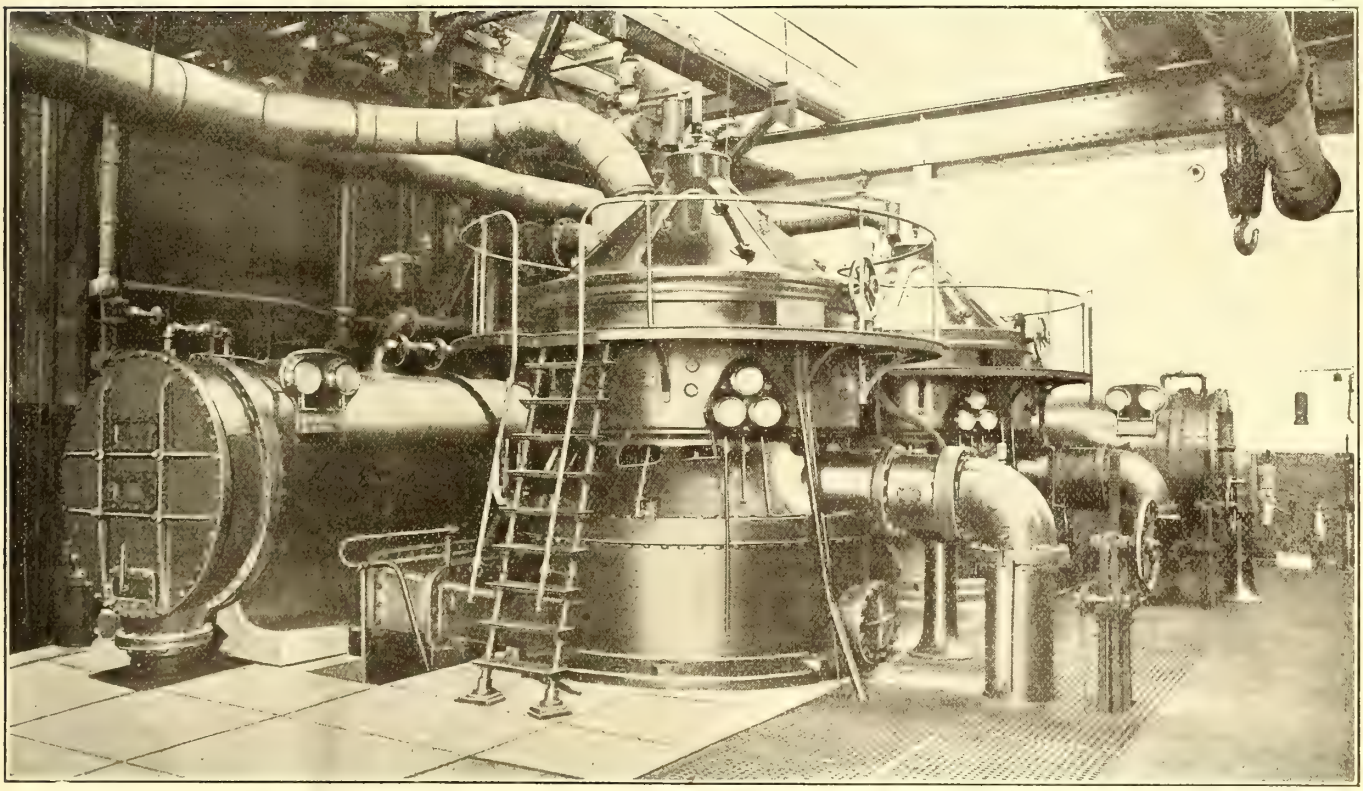
Such information as the committee has been able to obtain shows quite conclusively that the steam meter has not yet been developed to the point at which it may be said to be entirely satisfactory for measuring accurately the quantities of steam supplied to large units where the steam is superheated or of intermittent flow.

(c) Operating Features of Low-Pressure Turbine Plants

The first installation in this country of turbines operated by low pressure or exhaust steam took place about four years ago, and the operating results of these first installations have been carefully followed by engineers interested in improving the economy of existing plants. Three years' operation has demonstrated that the exhaust or low-pressure turbine has fulfilled very largely the expectations of the manufacturers and designers, and the past year has witnessed a number of installations, the most important being the large machines installed in the Fifty-ninth Street power house of the Interborough Rapid Transit Company of New York, to which reference is made later.

Your committee has investigated and obtained information as far as possible regarding all the installations that have been made up to the present time. Some of these plants, however, have been installed so recently that valuable operating data or tests are not available.

The low-pressure or exhaust turbine is an adjunct to the reciprocating engine, and performs the function of utilizing the expansion of the steam between the limits of 15 or 16 pounds absolute and one pound absolute. Since initial pressure for this type of apparatus is practically atmospheric, it is, of course, understood that the low-pressure turbine must be operated with a condenser, and that the higher the degree of vacuum that can be maintained on this machine (other things being equal) the greater the economy that may be expected from the unit. Reciprocating engines, on account of the enormous size of the cylinders required, do not lend themselves readily to large ratios of expansion. On the other hand, the turbine is particularly well adapted for handling the large volumes of steam which result from high ratios of expansion. This ability to handle the large volumes that result from the higher degrees of vacuum is one prominent characteristic of this type of machine, and the fuel saving obtained is the direct result of its utilization. The mechanical efficiency of these machines is also high, and the labor account for operating them has been found to be remarkably small.



Power Generation—Low Pressure Tur bines in Philadelphia Rapid Transit Plant

Your committee finds that these low-pressure turbines are being installed in two classes of plants:

(1.) In plants where the reciprocating engines have been operated for some years non-condensing, usually through lack of a sufficient water supply. In most cases these are plants which have been built for some years, and the exhaust turbine when used with cooling towers and condensers has proved a satisfactory means of increasing the output of the plant and improving the general economy of the station.

(2.) In connection with plants which originally were designed and operated with condensing reciprocating engines. In this case a large increase in output has been readily obtained, but the increase in economy is not so marked.

The earlier turbines which were installed in plants first noted above, were all connected to d. c. generators and were, therefore, of comparatively small size. The largest machines of this type that have been successfully operated are about 800 kw. The use of the low-pressure turbine, coupled with a.c. generators and operating in parallel with other machinery of the same class, has led to the building of these machines in much larger sizes within the last year, and one machine of 7000 kw is now in operation, and the manufacturers report that others are on order. Where the machine operates in parallel with other generators in the same plant, and is electrically interlocked, a safety governor alone is necessary, and the output of the low-pressure turbine is directly in proportion to the amount of steam coming to it from the other engines in the plant.

In this connection it may be stated that the turbine may be either piped directly to one engine so as to form, as it were, an additional cylinder for the unit, or it may receive its supply from a header or main into which all the engines about the plant exhaust.

For either "header system" or individual installation, the intermediate pressure between the engine and turbine may be allowed to vary with the load, or else be maintained constant, depending upon the conditions which obtain in each installation. There is considerable advantage in having the intermediate pressure fluctuate with the load, particularly on light loads. Here the back pressure on the engines would be reduced and their economy held up noticeably, while the turbine economy would not be materially affected over that of constant pressure supply. In this way the overall results of the combination may be greatly improved. The main abject in maintaining a constant exhaust pressure is to avoid air leakage where the pipe joints or the rod and gland packing on the engines are not sufficiently air tight. If allowed to fluctuate there would be air leakage when the pressure was below atmospheric, thus reducing the vacuum. Such leakage would occur only on light loads, and the air-pump capacity being then in excess of the needs is better able to care for the greater air leakage. Inquiries sent to the users of low-pressure turbines, elicited the information that no trouble was experienced from air leakage where the exhaust pressure varied with the load and fell below atmospheric pressure.

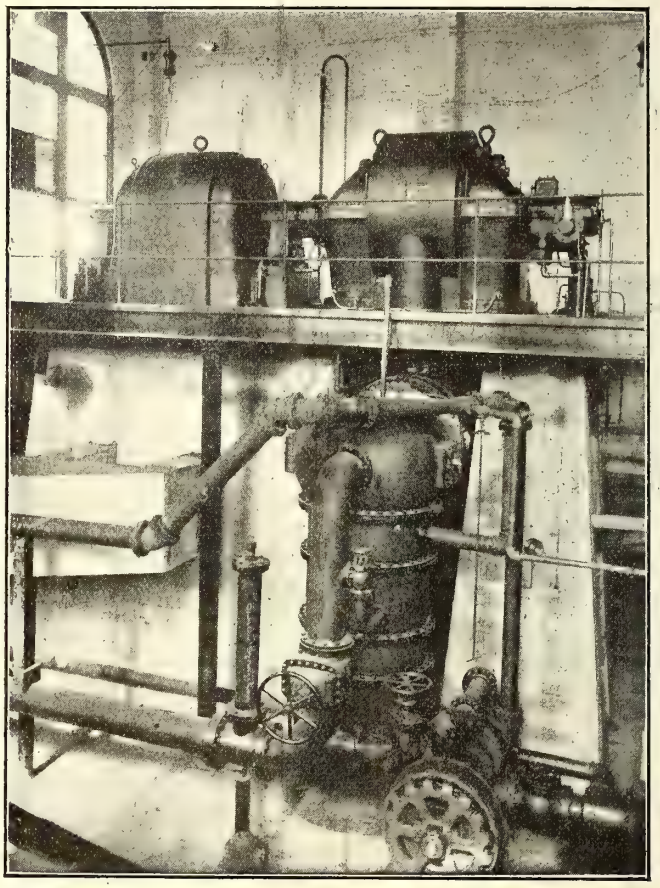
A modification of the low-pressure turbine, known as the mixed-pressure turbine, may be noted. In this type of machine provision is made for the use of live steam whenever the supply of exhaust steam is not sufficient to take care of the demands upon the electrical end of the machine. The addition of this feature, of course, will increase the cost considerably and is only warranted in special cases.

It is characteristic of these machines when operated with only a safety governor that with a fixed pressure in the supply pipe the load carried will be a fixed and predetermined amount. With a variable pressure in the supply pipe the load carried by the turbine will rise as the load rises on the reciprocating engine, since the increased output of the reciprocating engine increases the quantity of exhaust, and thereby raises the pressure in the supply pipe of the turbine, thus increasing its output. As stated earlier, the condenser is a very important part of a low-pressure turbine installation, and no particular type seems to have received the preference. Where the water supply for the operation of condensers is limited, and it becomes necessary to use artificial means for cooling the water, resort must be had to the use of either cooling towers, spraying ponds or other suitable means for dissipating the heat. While such devices are an absolute necessity, in many cases they tend to reduce the economy. Reports indicate that motor-driven fans when used on cooling towers will consume from 5 per cent to 8 per cent of the power of the machine, depending on the weather conditions. The total power consumed in operating condensers and cooling towers apears to run from 12 per cent to 18 per cent of the power generated.

Since the turbines should be supplied with clean, dry steam, an efficient oil and drip separator between the reciprocating engines and the turbine is considered to be an absolute necessity. An advantage arising from the use of this oil separator will be found in plants using surface condensers, since the condensed water being free from oil can be used for the boiler supply, and this greatly minimizes the amount of scale in the boilers.

Costs

Your committee has been able to obtain only fragmentary information as to the cost of low-pressure turbines and their installation. When installed as an adjunct to an old plant, as has been the case in most instances, the changes of piping and general alterations of the plant often involve a very considerable expenditure. The turbine will range in cost, say, from $35 to $40 per kw in the smaller sizes to from $15 to $18 per kw in the larger sizes, which, of course, in that case are understood to be a.c. generators. The complete installation, however, including all the auxiliary machinery, condensers, cooling towers, etc., if necessary, and including changes in building and piping, may run the cost up to from $80 to $100 per kw in the smaller sizes, although $40 to $50 would doubtless cover the entire expense in the larger sizes.



Power Generation—Low Pressure Turbine with Condenser and Ventilation Ducts

The replies received by your committee from users of turbines indicate that exhaustive tests of economy are not available.

It should be noted in connection with the following statistics of the Philadelphia Rapid Transit plant that during the greater portion of the day the turbines utilize only a fraction of the exhaust steam furnished by the reciprocating engines. In this plant the main exhaust pipe is open

to the atmosphere and the initial pressure is principally atmospheric. An abstract of the results is appended herewith.

Operating Statistics of Low-Pressure Turbines of Philadelphia Rapid Transit Company

800 kw Curtis exhaust steam turbine d. c.	
Duration, 8 hours—8:30 a. m.-5:30 p. m.	
Average load on Turbine (corrected)	805.85 kw
Total water from turbine per hour	31,918 lb
Moisture in steam, 0.3 per cent	92 "
Water used by step-bearing per hour	1,402 "
Net steam used by turbine (dry) per hour	30,424 "
Steam per kw-hour (dry)	37.75 "
Steam pressure	14.53 " abs.
Barometer	30.16 in.
Vacuum	27.50 "
Absolute pressure	2.66 "
Temperature of exhaust steam, 2.65 in abs.	110.8 deg. Fahr.
Swing of load	1,350-1,550 amp.
Power absorbed by motor-driven auxiliaries	158.02 e.hp.
Power absorbed by dry-vacuum pump	9.94 hp
Power absorbed by hot-well pump	0.73 "
Power absorbed by step-bearing pump	4.12 "
Total power absorbed by auxiliaries	172.81 "
Percentage of auxiliaries to total output	15.9 per cent
Average load on engine (8 hours)	4,075.7 kw
Percentage of turbine to engine load	19.77 per cent
Percentage net increased load to engine load	16.88 "
Condenser Results	
Temperature of air, U. S. Weather Bureau	78 deg. Fahr.
Temperature of injection water	87.6 " "
Temperature of discharge water	98.5 " "
Temperature of hot-well water	109.7 " "
Total head on circulating pump	57.92 ft.
Total head on hot well pump	34.07 "
Pressure of water on step-bearing	189.4 lb.
Speed of circulating pump	545 r.p.m.
Speed of dry-vacuum pump	69 "
Speed of step-bearing pump	162 strokes per min.
Speed of turbine	1,024 r.p.m.

The relative division of the output for a 24-hr. run is: Engine, kw-hours, 84,540; exhaust turbine kw-hours, 30,150, or a ratio of 35.6 per cent.

Total kw-hours, engines and turbines, 114,690.

Turbine output in per cent of total, 26.2.

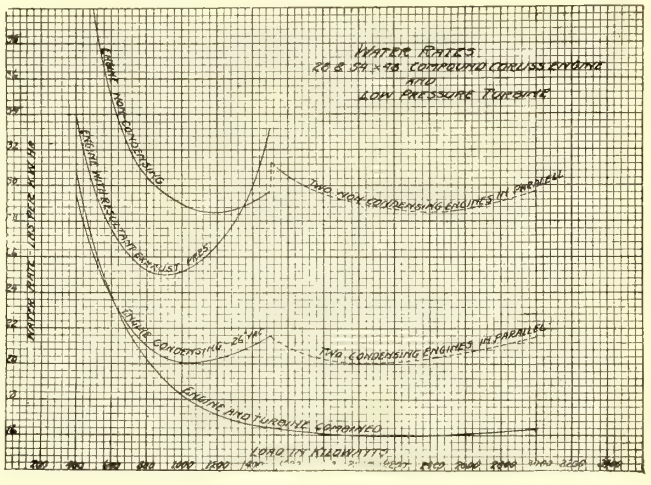
Kw-hours used by motors on pumps, condensers and cooling towers, 4436=14.7 per cent of power generated by exhaust turbines.

Net turbine output in per cent of net total, 23.3.

Appendix A—Engine Characteristics for Use with Low-Pressure Turbines

The following desirable information has been furnished the committee by a large manufacturing concern and is incorporated as an appendix to this report:

In the installation of a low-pressure turbine, particularly in condensing plants, it is necessary to operate the engine under conditions different from those for which it was designed. No difficulty should be experienced in the transformation of a simple engine from condensing to non-condensing, or vice versa, providing the proper range of valve travel can be obtained. In a compound engine the situation requires more attention. In changing over engines having a fixed ratio of high and low-pressure cylinder volumes, either from condensing to non-condensing, or operating a non-condensing engine on a fluctuating back pressure, modifications in the valve gear must be made to obviate expansion loops in the high pressure cylinder or over-compression in the low pressure cylinder, with the resulting annoying valve "pounding" and "slamming" and corresponding reduction in economy. In condensing engines of large ratio (exceeding 3¾ to 1), it is obviously necessary to reduce the back pressure on light loads to avoid looping. Therefore when the exhaust pressure varies with the load, an important feature is introduced. This applies mainly to the Corliss gear, but is true of other valves where unbalanced pressure will raise them off their seats. There is a variety of types of engines in service in railway plants, but the Corliss we believe is most generally used. As space is limited and this type will be a large factor in the combining or the engine and the low-pressure turbine, the discussion



Power Generation—Water Rate Curves for Corliss Engine and Low Pressure Turbine

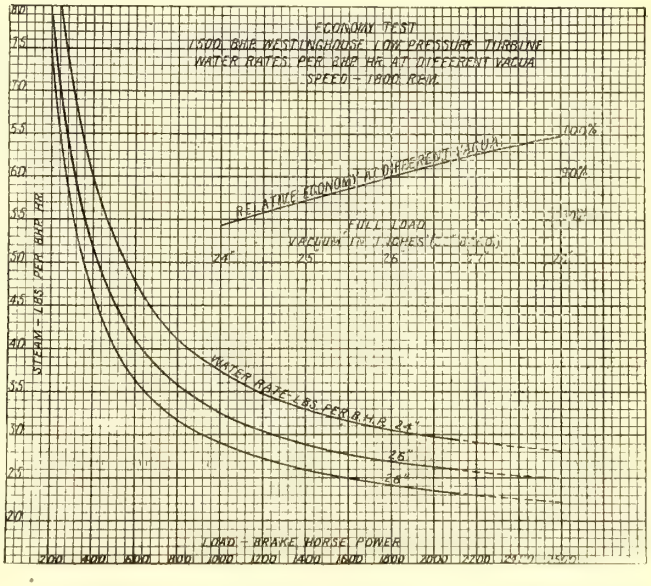
on valve gear will be confined to the features of the Corliss design. Different methods of governing compound Corliss engines may be classified principally as follows:

(1) High pressure cut-off variable; low pressure fixed.

(2) Parallel cut-off; both high and low pressure cut-off variable in the same direction, and cut-off advanced and reduced in both cylinders equally, or—

(3) Parallel cut-off with the range of travel of the high pressure cylinder greater than the low pressure cylinder; that is, proportionately.

At moderate expense these methods of governing can be



Power Generation—Economy Test Curves of 1500-hp Low Pressure Turbine

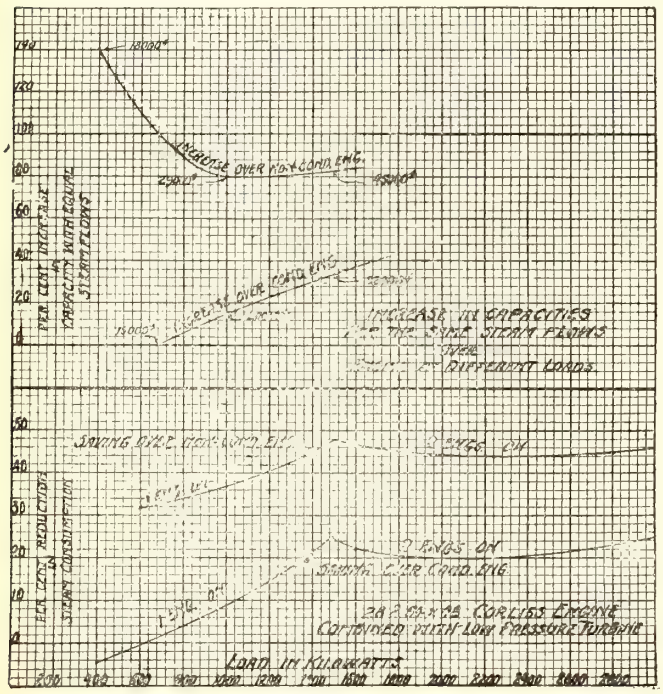
changed over from one to the other in most makes of Corliss engines. Then by careful study of the steam cycle in the two cylinders, the difficulties of looping can be anticipated, and the valve arrangement made to obviate the trouble. This can generally be done in cylinders of normal ratio for both condensing and non-condensing design. The necessity for changing the cylinder ratio can be regarded as very un-

likely. Where unusually high ratios are employed the problem in such cases becomes quite special.

It is also desirable in the contemplation of the installation of a low pressure turbine to determine approximately the clearance in the high and the low pressure cylinder in order that its effect on expansion and compression may be ascertained. As the condition of cylinder and receiver pressure may vary appreciably in making a radical change in the operation of the engine, the cylinder design and pin bearing should be properly investigated. With the advantages accruing from reduced receiver pressure on light loads the expense of providing steam packed, or double metallic packing on the low pressure rod may be warranted.

In order to double the capacity of an existing equipment by the installation of low pressure turbines, the reciprocating engine must be arranged with long range cut-off in the high pressure cylinder.

Complete expansion (i.e., expanding down to a toe, or point) in the engine cylinder, is not economical, even in connection with a low pressure turbine. A few pounds ter-



Power Generation—Curves Showing Increase in Economy and Capacity with Low-Pressure Turbines

minal drop, 2 to 4 at normal rating, non-condensing, is desirable. This not only avoids the possibility of loops at loads less than normal, but improves the engine economy and correspondingly the combined results of engine and turbine. Cylinder condensation increases with expansion, and the point can be approximately determined where any further increase in expansion is offset by increased condensation.

Results of tests of a 1500 brake hp Westinghouse low pressure turbine under varying vacuum are reproduced and show the influence of vacuum on economy. This performance is typical of the low pressure turbine economies for moderate size units under the operating conditions noted.

As indicative of the improvement of economy in the use of the low pressure turbine an example of combined operation is illustrated.

The relative gain in economy and capacity at various loads is shown. All engine economies have been selected from results obtained in well equipped and maintained plants, which is evident from the steam consumption given. Obviously, when the engines operate on greater steam consumption, the benefit from the low pressure turbine will be correspondingly greater.

Recommendations

Your committee recommends that next year's committee take up for its work consideration of the general subject of the economical generation of power. We do not think that it should be confined too closely by a definite assignment of subjects, but should be in a position to select subjects under the above classification that would be of vital interest to the whole association, after receiving suggestions from the executive committee.

1200-VOLT D. C. CAR EQUIPMENT*

By F. E. Case, Engineer of Railway Equipment, General Electric Company

Direct current of 1200 volts has been adopted in preference to 600 volts as the trolley potential of a number of interurban and other railways on account of lower first cost and lower cost of operation. That 1200-volt current can be more economically delivered to the car requires little argument. On a railway having a given size and length of feeder a car equipped with 1200-volt apparatus will entail a line loss of only one-quarter that of a 600-volt car of the same size operating at a similar speed. With dense traffic, where cars are required to run on a very close headway, consequently giving practically a uniformly distributed load, the substations at 1200 volts can be located twice as far apart as at 600 volts for the same maximum per cent line loss.

Under the other extreme condition of two cars or trains only between substations and passing midway the substations can be located four times as far apart as at 600 volts with the same maximum per cent line loss. The latter condition, however, is rarely practical for interurban operation on account of the great headway between cars. Under the usual prevailing conditions of interurban service it will be found that the substations at 1200 volts can be located from 2½ to 3 times the distance apart as at 600 volts to give the same percentage line loss.

The adoption of commutating poles has made the operation of 1200-volt generators entirely practicable. Where alternating current is better adapted to long-distance distribution, rotary converters in substations are also well designed to translate the alternating current to 1200 volts direct. No more complicated or less reliable pieces of switchboard apparatus are required in the power house or substation than for the ordinary voltages.

Either the third rail or trolley wire can be used for carrying current to the car. One road is now successfully using the former and there are several others using the latter. The third rail is of the under-running type and is installed in a similar manner to a 600-volt practice, but the insulators are of somewhat increased dimensions.

No radical departure from standard 600-volt practice is required in the line construction to ensure a safe insulation. Cross suspension, side bracket or catenary method of trolley wire support can be used, but additional insulation over that used for 600 volts is, of course, required. The catenary form of suspension is usually recommended, as not only does it require a minimum number of poles and insulators, but it provides the most flexible support, which is a great advantage for high speed operation.

The standard trolley base, pole and wheel give better results than with 600 volts, as the current to be collected for a given weight and speed of car is only half, which increases the life of the wheel especially.

The motors are similar electrically to ordinary 600-volt commutating pole motors, with increased insulation, and there is no departure in mechanical features from other

*Abstract of paper presented on Section (k) of the report of the Committee on Equipment of the American Street & Interurban Railway Engineering Association, Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

direct current motors for lower voltage. The brush holders are located in a similar manner and there are no more of them, so that inspection is just as readily made as in other direct current motors. The commutation of the motors is so good that no more attention to the brushes and commutator is required than with low voltage motors of similar capacity. As the motors have the same electrical characteristics as other direct current motors, the armature speeds are no greater and in consequence the bearings are equally long lived.

Some motors have been furnished by the General Electric Company for operating directly on 1200 volts and others two in series. With the former it is possible to operate at only half speed on 600-volt portions of the line, but the latter motors can be connected in multiple so as to give the same speed on the low voltage as the high, which in many cases is a great advantage.

The car equipment consists of apparatus similar to that used for 600 volts, many of the parts being identical. Cylinder platform controllers have not been used in any instance, however, as they require the motor current to be carried above the floor and we have considered it advisable for obvious reasons to keep the apparatus that breaks the main circuit, under the car, where it can be suitably isolated.

Sprague-General Electric Type M control, comprising electrically operated contactors, a reverser and a circuit breaker is used. These parts are practically the same as for 600 volts with additional insulation where required. Both automatic control as described in my paper of last year for 600-volt operation and hand, or non-automatic, control have been furnished. The circuit connections are identical, for both the master control and the motors, to that used for 600 volts.

Standard 600-volt contactors, operated by means of electro-magnets, are employed for making the motor and resistance circuits in the contactor box, a few extra contactors being used to provide the necessary breaks in series to safely open the circuit. Practice has shown that a 1200-volt current can be very satisfactorily interrupted by the contactors, and that the burning is not excessive.

Proper insulation of the reverser contacts is easily secured, owing to the motor fields being reversed, instead of the armatures when the direction of car movement is to be changed, and also because the fields are connected to the ground side of the armatures. This connection of the motors has been adopted both in new cylinder controllers and type M control for 600 volts. For commutating pole motors, it is desirable, in order that the commutating field winding, which is permanently connected to one side of the armature, may always be on the ground side of the armature. The connection has also the advantage that fewer of the contacts have a high potential between them as the drop across the exciting field to be reversed is only about fifteen volts.

A magnetic blow-out circuit breaker, located under the car, similar to the one generally furnished with type M control, is used for an overload protective device. It is, however, provided with a more powerful magnetic blow-out and has an increased opening and insulation. The circuit breaker is set and tripped from the motorman's cab by means of the ordinary double-movement switch which connects to the proper train wires.

A magnetic blow-out copper ribbon fuse box is provided as an additional protective feature for the main circuit. Standard 600-volt cast-grid rheostats are used for providing the necessary resistance steps in starting the motors. These rheostats are effectually insulated from the angle irons to which they are attached by means of large collars and tubes surrounding the supporting bolts. A new design of cast-grid rheostat, has recently been brought out.

When a car equipped with four motors is required to operate at the same speed on both 600 and 1200-volt sections, it is necessary to use a commutating switch for changing the connections of the motors. For 1200-volt operation this switch connects the motors in two groups with the motors in each group in series, each group being handled as a single motor. This commutating switch is arranged for operating either by hand or with air controlled by a valve located near the motorman. An interlock device is provided which prevents operation of the contactors if the motors are not properly connected for 1200-volt running.

On some roads the operating conditions are such that only on the interurban sections is it desirable to obtain the maximum speed. To meet these requirements the commutating switch is, therefore, not necessary, and having 1200 volts on the high speed section and 600 volts on the city division gives relative speeds of about 2 to 1.

Six hundred-volt current is used for operating the control and also for the car lighting. With the earlier equipments the air compressors are also operated at this voltage. This current is obtained from a dynamotor, or motor generator, of waterproof design for mounting under the car.

The new feature of the dynamotor is a series field winding which is connected between the two halves of the armature and is provided with a tap at its center. In starting up, line current passes through the first half of armature, series field, and second half of armature to ground, thereby strengthening the normal field, and the machine operates as a compound motor. When current is being taken from the tap in the center of the series winding for the control of lights, the two halves oppose each other, and there is no effect on the field strength. When the trolley leaves the wire with the dynamotor running, and the controller on, there is an immediate tendency of the dynamotor to deliver current to the motors, due to the momentum of the armature and the shunt field. The series winding now comes into play by demagnetizing, or beating down, the field, since the direction of the current has been reversed in the first half of the series field, and the two parts, therefore, no longer oppose each other. This action prevents an amount of current sufficient to blow the dynamotor fuse being taken by the motors.

The dynamotor is a very simple device, both electrically and mechanically. No mechanical load being driven by the armature, the strains on the bearings are negligible and the parts are long-lived. On recent equipments the dynamotor is started up automatically, when the car runs onto a 1200-volt section, by means of a selector relay. The light and control circuits are disconnected from both the trolley and dynamotor when the relay is not energized, the proper connections being made to correspond with the voltage applied. To insure correct operation of this relay, a short, grounded section of trolley wire is interposed between the 1200 and 600-volt portions.

The electric heaters can be operated either from the dynamotor or directly from the 1200-volt circuit. As the conductors in the heater are insulated from the frame by porcelain, the requisite insulation is easily secured for 1200-volt operation.

The air compressors on some recent equipments are wound for operating at 1200 volts, as there is no difficulty in obtaining good commutation and insulation for this voltage. When the car is running on the 600-volt section the compressor will, of course, be required to operate for a longer period if air is used to the same extent as on the 1200-volt portion, but this is easily taken care of in selecting the proper capacity of compressor.

Denver is known as the City of Lights. No other city of the same size expends so large a sum through public and private channels for illuminating its streets. On the principal thoroughfares new and artistic lighting features have been adopted.

CAR WEIGHTS AS AFFECTING OPERATING COST*

By M. V. Ayres, Electrical Engineer, Boston & Worcester Street Railway

When it is suggested that a decrease in the weight of cars might be brought about without sacrificing carrying capacity or safety, the question is at once raised: "Will it pay?" In other words, will not the increased cost of building such lighter cars more than offset any saving to be effected in operating expenses?

This investigation was undertaken with the hope of throwing some light on the question of the relation between the weight of cars and operating expenses. It has been conducted by means of correspondence with car manufacturing companies, operating companies, and various gentlemen who were known to be interested in the subject: also by the consultation of text books and authorities in the effort to obtain theoretical data applicable to the matter.

The effort to obtain information based on actual tests or operating data has been largely barren, and therefore the theoretical discussion occupies the larger part of the paper.

Probably no argument is needed to show that an increase of car weights will cause an increase in the following items of expense:

(1) Cost of power; (2) cost of car repairs; (3) cost of track repairs; (4) fixed charges of power plant, and (5) fixed charges of distribution system.

While it is evident that these items will increase with car weights, it is not obvious that they will increase proportionately thereto. An attempt has been made in the following discussion to show the manner in which these various costs vary with the weight of cars.

Power Consumption

In Fig. 1, O A B C D is a typical speed-time curve, figured for a car of 50 tons weight, making a schedule speed of 30 m.p.h., with a stop every 5710 ft., and stops of 10 sec. duration.

The slope of the coasting line, B C, is determined by the train resistance, taken in this case at 14 lb. per ton. If instead of weighing 50 tons the car were very much lighter, the train resistance per ton would be greater and the slope of the coasting line would be steeper, like the line B_1 C_1.

In the figure the areas under the curves O A L N D, O A B C D, and O A B_1 C_1 D are equal; therefore in each of these speed-time curves the car travels the same distance in the same time. In the computations which follow, when cars of different weights are assumed to be operated on the same schedule, the calculations are based on speed-time curves like O A B C D and O A B_1 C_1 D; that is to say, the curves of acceleration and braking are kept the same, but the slope of the coasting line is changed to correspond with the calculated train resistance.

The energy required to propel the car on the speed-time curve O A B C D is equal to:

(1.) The energy to accelerate to the speed at the point B.
(2.) The energy to overcome train resistance to the point B.
(3.) Motor and rheostatic losses, proportional to (1) and (2).

The energy used in accelerating from point L to point B is all used in overcoming train resistance to point M, at which the speed is the same as at point L. Therefore the energy required for this speed-time curve may be re-stated, as equal to:

(1). Energy to accelerate to point L.
(2.) Energy to overcome train resistance to point M.
(3.) Motor and rheostatic losses, proportional to (1) and (2).

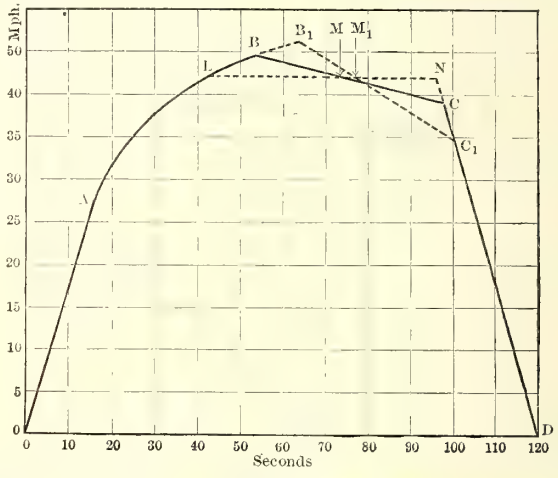
If we draw a series of speed-time curves for the same schedule, for cars of different weights, the point M shifts, as shown by the distance between M and M_1, but the total movement of this point is small, and in the computations which follow the point M is assumed constant for all cars on the same schedule. In computing the power consumption for cars of various weights, operating on the schedule, Fig. 1, the following quantities are calculated:

(1.) Energy required to accelerate one ton to speed of point L, 7 per cent being added to allow for the effect of rotating parts. The formula for this calculation is

$$E = .0205\ S^2$$

where E=energy in watt hours, and S=speed in miles per hour.
(2.) Distance traveled by car before reaching point M.
(3.) Average effective train resistance for the car in question. Then (2)×(3)×.000278=energy in watt hours to overcome train resistance. These figures give the energy per ton for the schedule in question, for the distance covered by the speed-time curve.

The curves of Fig. 2 are calculated for cars of various weights operating on the schedule of Fig. 1. Vertical distances correspond to watt hours per car mile and horizontal distances and to ton weight of cars. Curve A shows the energy required for acceleration only, for cars of all weights up to 50 tons. Curve B shows corresponding values



Car Weights—Fig. 1.—Typical Speed Time Curves for 50-Ton Cars, Speed 30 M.P.H., 10-Second Stops Every 5710 Feet

of energy to overcome train resistance only. Curve C is the sum of A and B. Curve D shows the total energy including motor losses to operate cars of all weights up to 50 tons on the schedule in question.

Curve B is calculated with the aid of Armstrong's formula for train resistance:

$$F = \frac{50}{\sqrt{W}} + .03\ S + \frac{.002\ a\ S^2}{W}$$

Where W = weight of car in tons; S = speed in miles per hour; a = area of car end in sq. ft. Throughout these computations a is taken at 92 sq. ft.

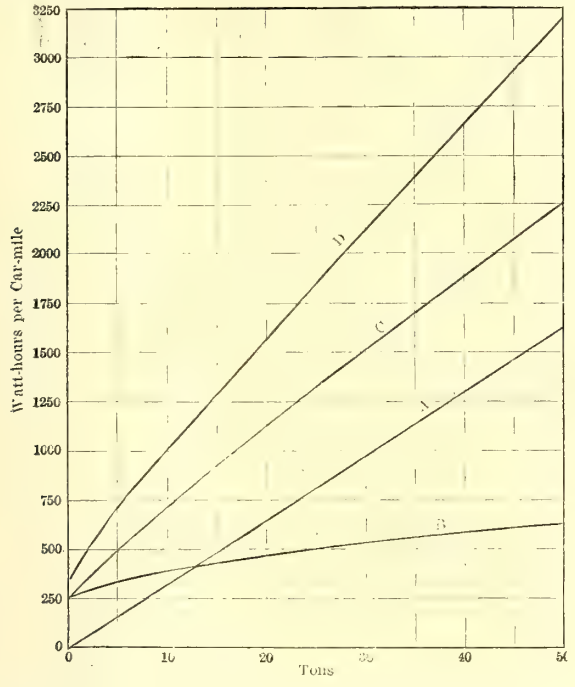
The important thing to notice about curve D is that it is substantially a straight line. If the energy were proportional to weight it would be a straight line through the origin, like line A. To show how closely this form of curve is followed under varying conditions, other schedules have been calculated.

Starting with Fig. 1 as a basis, other speed-time curves can be assumed, of the same shape, but of different sizes. Then all speeds and times will be proportional to the linear dimensions, and all distances to the squares of the linear dimensions. By the aid of this proportionality, and a special calculation in each case for the train resistance, energy curves can be calculated for other schedules, corresponding to speed-time curves of the same shape. By assuming new

*Abstract of paper presented as Section (B) of the report of the committee on equipment of the American Street & Interurban Railway Engineering Association, Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

speed-time curves of different shapes, further series of energy curves can be calculated in the same manner.

Such energy curves have been calculated for speed-time curves of the three shapes in Fig. 3. These were taken as illustrating widely differing characters of service, curve X requiring one stop every 3 minutes, curve Y one every 90 seconds, and curve Z one stop every 70 seconds, allowing 10 seconds duration for each stop. On the basis of these three



Car Weights—Fig. 2.—Energy Curves for Cars of Various Weights Operating on Schedules Shown in Fig. 1

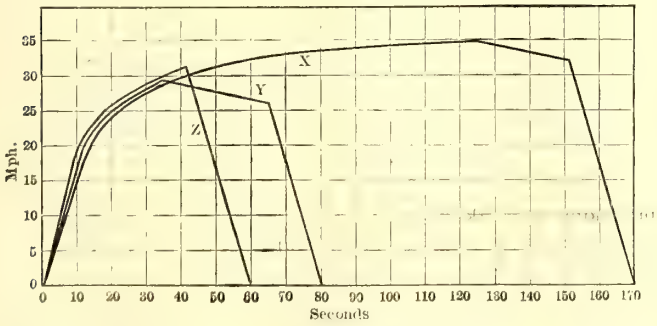
curves, changing the dimensions in the manner above described, the energy curves of Fig. 4 have been obtained. These show the energy in watt-hours per ton mile required for cars of various weights from 12.5 to 50 tons, operating on various schedule speeds, and on speed-time curves of shapes similar to the curves X, Y and Z of Fig. 3.

These curves are all very nearly straight lines represented by the equation

$$E=a+bW,$$

when E=the energy per car mile, a is the intercept of the curve on the Y axis, and b is the slope of the curve.

This equation will therefore be adopted as correctly representing the relation of weights of car to power consump-



Car Weights—Fig. 3.—Calculated Speed-Time Curves for Various Kinds of Service

tion in all cases of like schedule, the constants a and b being dependent upon the frequency of stops and schedule speed attained.

This formula may be expressed:

$$P=\frac{p}{n}(a_p+b_pW).$$

where P=cost of power per car mile in cents; p=cost of power per kw-hour in cents; and n=efficiency of transmission, power house to car.

For ordinary frequent stop service, when the schedule speed is forced up to about the highest point permitted by frequency of stops, probably conditions intermediate between those of curves Y and Z would obtain, and the power consumption would be about that indicated by the broken line on Fig. 4. The equation of this line is:

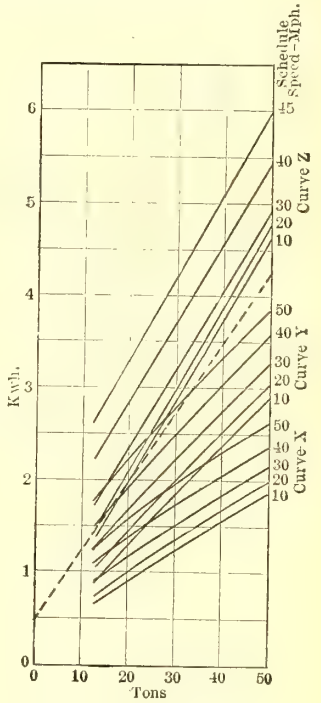
$$E=.500+.075\ W$$

If we assume that the cost of power per kw-hour is one cent, and the efficiency of transmission to the car 75 per cent, this becomes:

$$P=.667+.1\ W,$$

which is believed to fairly represent the cost of power in cents per car mile under average conditions.

These equations indicate that the cost of power is divided into two portions, one of which is independent of the weight of car, and the other proportional thereto. In the case assumed the cost is 0.667 cent per car mile, irrespective of weight of car, plus 0.1 cent per ton of car weight. The value of both the constants a and b in the general formula is dependent upon the formula used in calculating train resistance. If train resistance were proportional to weight the constant a would disappear, making the power cost exactly proportional to weight. The formula used is believed to represent average conditions, as near as present information will permit, but would not be correct in some special cases.



Car Weights—Fig. 4

The use of ball bearings, for instance, would give rise to a different formula, and would reduce the value of the quantity a. The figure 0.667 for a is undoubtedly too high for ordinary city conditions, which are more nearly represented by the line corresponding to the schedule of 10 m.p.h., curve Y, Fig. 4. This indicates but about 0.28 cent per car mile as the part of power cost indedendent of car weight. The curve chosen (the broken line) is more nearly that of elevated railway or frequent stop interurban service.

Cost of Car Repairs

An increase in car weight involves an increase in the weight and cost of all replacement parts, this cost being nearly but not quite proportional to the weight. If the increase of weight is accompanied by proportional increase of strength and bearing surfaces, the life of parts should not be decreased, the sole increased cost of repairs being due to the greater cost of replacement parts. However, such proportional increase is not possible in many parts, such as trolley wheels, gears, brakeshoes and wheels, all of which wear out much faster with heavy cars than with light ones. On the other hand, some items of car repairs are independent of weight, such as painting and replacing broken glass.

Data are lacking with which to make a close analysis of the variation of these factors of car repairs cost, but their nature, as above stated, points strongly to an equation of the same type as that given for power consumption.

If R=cost of car repairs in cents per car mile,

$$R=a_r+b_rW.$$

From data of the ratio of cost of repairs to cost of power

on a number of large systems, it is believed that values of a_r and b_r as given in the following equation, are about correct:

$$R = .46 + .07\ W.$$

Cost of Track Repairs

It is evident that a certain part of the cost of track repairs would be incurred irrespective of use, as decay of ties and corrosion of metals, and injury from teaming would go on just the same. Otherwise, wear is evidently about proportional to ton mileage. If track construction is much too light for the car weight, doubtless the wear would increase faster than the weight, but with tracks suitable to the traffic, it is probably closely proportional.

This evidently again calls for an equation similar to that for power consumption.

If T = cost, in cents per car mile, of track repairs,

$$T = a_t + b_t W.$$

The relative values of a_t and b_t will depend upon the proportion of natural deterioration to wear, a_t increasing with decreased frequency of service, and with increased use of the road-bed for other traffic.

Both a_t and b_t will vary with the weight of rail, quality of ballast, and other details of track construction.

It is believed that the following equation gives fair average values of a_t and b_t:

$$T = .43 + .026W$$

Fixed Charges of Power Plant

It is evident that the size and cost of the power plant will be proportional to the power requirements of the cars, and that, therefore, the equation connecting fixed charges on power plant with car weight will be of the same type as that connecting power cost with car weight.

If C = fixed charges on power plant in cents per car mile, then,

$$C = \frac{kp}{n}(a_p + b_p W).$$

where k is a constant connecting fixed charges with cost of power. Assuming fixed charges at one-half the power-production cost, we have as an average value:

$$C = .333 + .05\ W.$$

Fixed Charges of Distribution System

For any railway system, a certain minimum of investment in trolley wire and feeders is required, and in addition an investment nearly proportional to the power demand. Evidently this condition will be met by an equation of the same type.

If F = fixed charges in cents per car mile on distribution system,

$$F = a_f + b_f W.$$

The values to be assigned to a_f and b_f will vary enormously with different characters of road, being very much greater for the interurban than for the city system. For an interurban road it is believed that the following is a fair average:

$$F = .32 + .02\ W.$$

Total Costs Affected by Weight

We are now in a position to construct a formula expressing the total cost of operating cars, so far as that cost is affected by car weight. Let M = total of the following costs per car mile; cost of power, cost of car repairs, cost of track repairs, fixed charges of power plant, fixed charges of distribution system.

$$M = P + R + T + C + F, \quad \text{where,}$$

$$P = \frac{p}{n}(a_p + b_p W)$$

$$R = a_r + b_r W$$

$$T = a_t + b_t W$$

$$C = \frac{kp}{n}(a_p + b_p W)$$

$$F = a_f + b_f W.$$

This summation will evidently take the form:

$$M = a_s + b_s W.$$

If we substitute the average values as assumed above, this becomes

$$M = 2.21 + .267\ W = \text{cents per car mile.}$$

This evidently means that the five items of expense above enumerated cost 2.21 cents per car mile, no matter what the weight, and in addition 0.267 cent per ton mile.

Substituting different values of W we may obtain the cost of operating cars of various weights, under the conditions assumed, for the five items of operating cost above considered.

The following table is so compiled.

Cost in Cents Per Car Mile to Operate Cars

Weight Car.	Cost.		Total Cost.
Tons.	a_s	$b_s W$	M.
10	2.21	2.67	4.88
15	2.21	4.00	6,21
20	2.21	5.34	7.55
25	2.21	6.68	8.89
30	2.21	8.01	10.22
35	2.21	9.35	11.56
40	2.21	10.68	12.89
45	2.21	12.00	14.21
50	2.21	13.35	15.56

In estimating the expensiveness of car weight we should consider only that part of operating cost which is proportional to weight, or in the cast assumed, 0.267 cent per ton mile. If a car runs an average of 150 miles per day this amounts in a year to $150 per ton. That is to say, it costs $150 per year for every ton, or 7.5 cents per year for every pound of weight in a car.

If it costs 7.5 cents per pound per year to carry around weight it evidently is worth many times that much to get rid of weight. If the car were a permanent investment it would be worth, at 5 per cent, 20 times 7.5 cents, or $1.50 for every pound we could reduce weight. If, on the other hand, we suppose that at the end of 15 years the car will be scrapped, we can consider the 7.5 cents per year saving as an annuity to continue for 15 years, and then cease. A table of annuities shows the present value of 7.5 cents for 15 years at 5 per cent to be 78 cents. According to this we can afford to pay 78 cents per pound, or $1,560 per ton to reduce car weight.

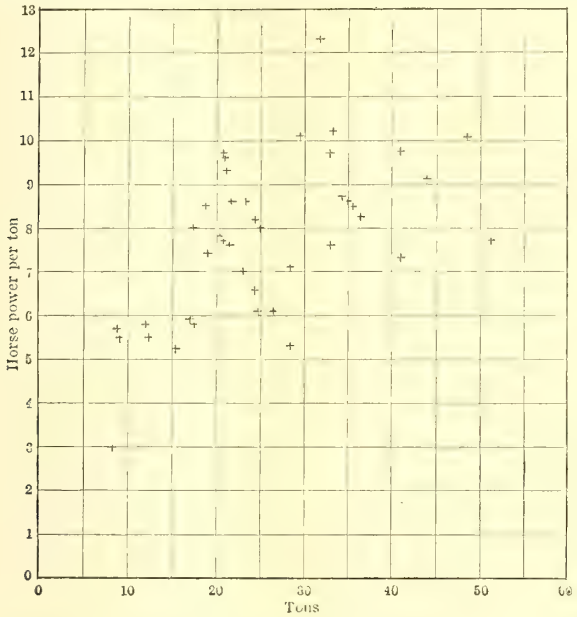
Of course these values will vary over a wide range.

The curves of Fig. 4 show how widely the power cost will vary with different schedules. All of the other costs will vary in a similar manner. Each case must be considered on its merits. It is believed, however, that the general form of equation of the straight line intercepting the axis of Y above the origin will very closely represent the actual conditions in all cases. There will always be a portion of the operating cost, represented by a in the formula cost = a + b W, which is independent of weight, and another part which is proportional to weight. The finding of any two points on the cost line is sufficient to establish the line. For instance, if it is found that under certain conditions the operating cost for a 40-ton car is $6,000, and for a 30-ton car $5,000, it will be safe to figure the cost per ton at $100, and the formula becomes, cost = 2000 + 100 W.

While, as above stated, the cost of carrying around weight will vary in each case, it is believed that the figure of 7.5 cents per pound per year is a fair average value and by no means an extreme case. An effort has been made to get data from various operating companies as to their estimate of this cost. Very little data have been forthcoming, but what have been secured show a general tendency in several

large city systems to estimate it at 5 cents per pound per year. This is not at all inconsistent with the figure of 7.5 cents above given, which corresponds more nearly with interurban conditions. Even at 5 cents per pound per year, we can afford to pay $1,000 per ton for a reduction in car weights.

At this figure, if we could reduce the weight of a 28-ton car to 14 tons, without reducing its carrying capacity, safety or speed, we could afford to pay $14,000 more for the lighter car. Even if a much lower figure than $1,000 per ton is

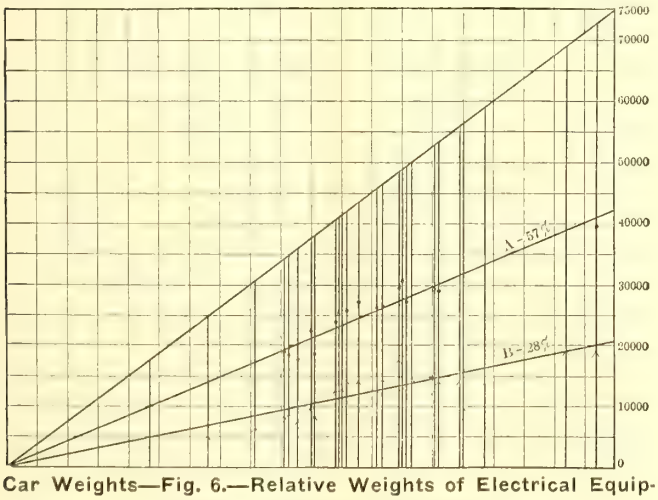


Car Weights—Fig. 5.—Motor Horsepower Per Ton for Cars in Actual Service

taken, it is evident that it will still be a good investment to spend a great deal of time and money in solving the problems of producing lighter cars.

Electrical Apparatus

The weight of any electrical car is partly due to its electrical apparatus. It is interesting to inquire how great a proportion of the total weight must be assigned to this purpose. If we assume that it is permissible to load a motor to 25 per cent over its commercial rating during acceleration, a formula for the motor horsepower required per ton would be:



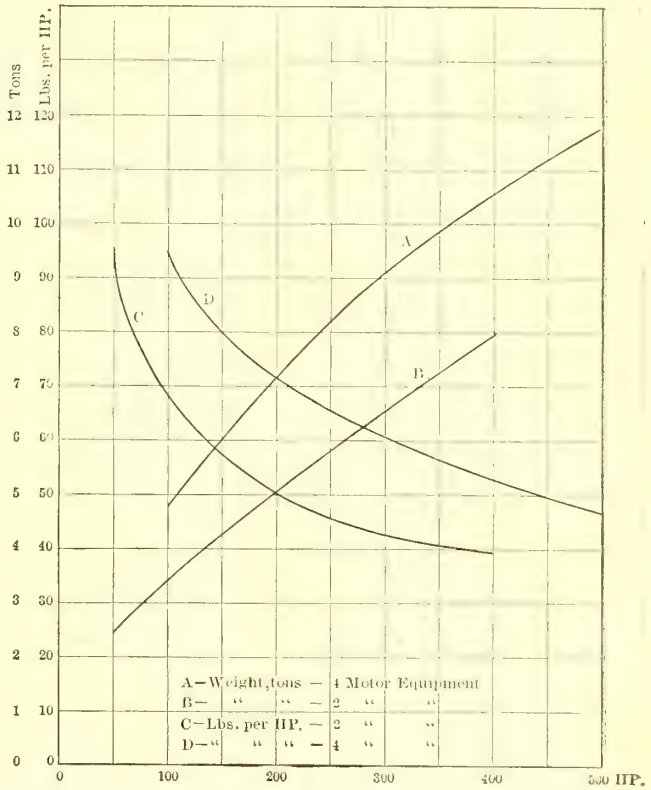
Car Weights—Fig. 6.—Relative Weights of Electrical Equipment, Trucks and Car Body

$$H.P. = .208\,AS.$$

where A = rate of straight line acceleration in miles per second, and S is speed in miles per hour at the end of straight line acceleration. Seven per cent is allowed for effect of rotating parts. For any given shape of speed-time curve, S is proportional to schedule speed, and therefore horsepower is proportional to schedule speed.

Fig. 5 shows the actual motor horsepower per ton in a number of cars in actual use, plotted with reference to weight of car. Evidently there is no relation between the weight of car and the horsepower per ton, but in practically all cases the horsepower per ton falls between 5 and 10.2. Of the two extreme cases, 3 and 12.3 hp per ton, the former is a light 16-ft. box car with one motor and the latter is an English tunnel car for train operation, probably intended to be used with trailers. No doubt interesting results could be shown by plotting horsepower per ton with reference to schedule speed for these cars, but the data are lacking.

Fig. 6 has been plotted to show the relation between the weights of electric equipment, trucks and carbody of cars in common use. Each vertical line represents a car, the height indicating the total weight of the car. The height of the arrow-head on each line indicates the weight of electric equipment, and the height of the dot indicates the combined weight of the electric equipment and trucks. Sloping



Car Weights—Fig. 7.—Relation Between Size and Weight of Electrical Equipment

lines A and B, drawn through the mean position of these points, indicate that, in general, electric equipment weighs about 28 per cent of the total and trucks about 29 per cent, or a total for electric equipment and trucks of 57 per cent. The other 43 per cent is apportioned to car body plus all other equipment.

Fig. 7 shows the relation between size and weight of electric equipment. The curves are plotted to give as nearly as possible the average weights of commercial equipments, the weights including motors, gears and all control apparatus. Curves A and B show the weight in tons of 4 and 2-motor equipments, and curves C and D show the weight in pounds per horsepower of 2 and 4-motor equipments. The 4-motor equipments are just about 40 per cent heavier than the 2-motor of the same power for the entire range from 100 to 400 hp. The 2-motor equipment is also cheaper in first cost and should be preferred unless more than 400 hp per car is required, or conditions of traction are such as to require 100 per cent of weight on drivers.

The fact that the average car body is only 43 per cent of

the whole weight of the car should not lead to the conclusion that a reduction in the weight of car body itself is comparatively unimportant, because that can and should be accompanied by a nearly proportional reduction in the weight of motors and trucks.

In the hope of getting some indication of the direction in which to seek for weight reduction, an effort has been made to get detail weights of component parts of cars. This has met with little success. One sheet has come to hand as follows:

Weights of Semi-Convertible Car

28-ft. body, 40 passengers, K-28-J control, 4 G E 80 motors.

Car body without seats	14,820
Seats	1,180
Trucks	14,200
Electric equipment	14,250
Air brake equipment	1,300
Hand brake	278
Wire	250
Conduit, pipe, etc.	652
Hangers, bolts, etc.	651
Heaters and switches	197
Snow scrapers, fenders, draw bars	580
Trolley base, etc.	190
Miscellaneous	152
Total	48,700

While of course no detail is too small to be of importance, it appears from the above list that miscellaneous fittings do not constitute a very large part of the weight. The car body itself is the best place to start to reduce weight. A lighter car body permits lighter trucks. Lighter trucks and car body require less power to move and therefore call for lighter motors.

Interest in the subject of reducing car weights seems to have been rapidly developing during the past year or two. A number of operating companies have been investigating methods of reducing weights and have made encouraging progress. One company has designed a malleable iron body bolster to take the place of a built-up steel plate bolster for its standard cars. The new bolster is shown by test to be much stronger than the old one, but is 109 lb. lighter, making a reduction of 218 lb. per car, which is a saving worth, at the average value above estimated, of 78 cents per pound, about $156 per car.

Another company has just contracted for new cars which are 2 ft. longer than their old standard, and 2000 lb. lighter, besides being undoubtedly stronger. This result is attained by a partial steel frame construction and the use of a turtleback roof in place of the monitor deck.

One large Eastern company has closed contracts for cars and trucks, after receiving bids upon specifications drawn to emphasize the importance of light weight. The contracts finally signed specify weight limits which must not be exceeded, and include agreements on the part of the builders to furnish the customer with detailed weights of each and every component part as actually constructed. As a result, the new cars are to be 4000 lb. lighter than cars of the same size now in use by the company.

The double truck car body may be regarded as a bridge structure supported at the bolsters and overhung at both ends. The two car sides can be designed as trusses, resting upon and connected together by the bolsters, which are themselves shallow trusses carrying the load to the center plates. This elementary truss frame can be designed so as to be extremely light and still be amply strong to bear its load. The simplicity of the problem is badly interfered with by the necessity for platforms, which are very awkward to attach and disproportionately heavy, and become more troublesome as their length is increased. The problem is still further complicated by the necessity of providing for draw-bar strains, and the uncertainty as to the strains set up by the motion of the car.

It is probable that the correct principle to work on in designing cars for lightness is to provide first a strong steel frame to take the known strains, and secondly to use the lightest possible material for all parts intended, either to separate the car interior from the outside atmosphere or to provide ornaments and conveniences.

It is noticeable that in every case brought to light in this investigation, where car weights have been reduced, this has been accomplished, at least in part, by the use of steel in place of wood. The fact is that weight for weight, in almost all forms, steel is stronger than wood, the superiority becoming very pronounced in some special shapes, such as I-beams, to which steel is especially adapted. This is true of ordinary structural steel, and some of the special alloy steels are even very much stronger and undoubtedly can be advantageously used in some places.

Hard wood is heavy material. For some purposes a light wood can be used equally well and probably some form of fiber in thin sheets can take the place of wooden panels with much saving of weight. Aluminum can be used in sheets for siding and as castings to take the place of bronze fittings. Common cast iron should be excluded altogether from car construction. It has no use for which some other material would not be lighter and better.

In the matter of truck construction, probably pressed steel can be utilized to reduce weight to a marked degree. Hollow axles of high-strength steel are also a hopeful possibility.

Electric equipment can undoubtedly be reduced in weight. Probably the greatest reduction can be accomplished by designing motors for large commutating capacity and using forced ventilation. It is possible that radically new designs may be made, permitting of lighter construction. Perhaps a combined motor and truck built as one machine may solve some of the motor and truck problems.

From an engineering standpoint, the problem of transportation is primarily one of moving certain weights from point to point on the earth's surface. In the ordinary electric passenger car, the dead weight is from three to ten times the live weight when all the seats are occupied, while the average condition of loading would show a much larger proportion of dead weight. In other words, the weight efficiency is not better than from 10 to 30 per cent, under the best conditions, and drops to nearly nothing under the worst.

The reduction of the proportion of dead weight to passengers carried seems to hold out greater promise of economy than any other line of improvement at present discernible in the field of transportation engineering.

GERMAN ENGINEERING TITLES

The engineering titles used in Germany are often confusing to the average American, so that a short explanation of some of them may be not only interesting, but instructive in the case of visitors from abroad. The length of the title in Germany often bears little relation to the responsibility of the office. Thus Regierungs-baumeister sounds important but it signifies only the lowest grade of bureaucrat. Even shoemakers often call themselves meister or master, the implication being that they are not apprentices. The ascending of dignities in the government service is something like this: Baumeister, Baurat, Geheimbaurat, Ober-Geheim-baurat, Wirklicher (or genuine) Geheimbaurat and at the top of the heap a very simple RAT!

The term Ober-Ingenieur, if literally translated, means chief engineer, but, in reality, it refers to the title of the head of any engineering department. The immediate assistants of such an official are designated by the title Ingenieur (engineer). The term Direktor means manager, but it is not exactly synonymous with the English term "manager" as a large electric railway company may have several Direktors, each in business charge of some part of the organization.

REPORT OF COMMITTEE ON EXPRESS AND FREIGHT TRAFFIC*

By P. P. Crafts, Chairman; A. Eastman, G. W. Parker, E. H. Hyman, Frank Walsh and C. V. Wood

The committee on express and freight traffic submits the following report, together with certain criticisms and recommendations, which seem appropriate to include herein.

Of the total number of member companies from which information was requested, 39 submitted data bearing on the subject of express and freight up to the date of this report, namely, Aug. 19.

Your comittee requested information of a very vital nature and covering considerable ground. Perhaps a natural hesitancy to give out information of this character, even with the assurance of your committee that it would be treated in a strictly confidential manner, accounts for the absence of reports from several companies.

The committee believes, however, that the information received indicates so clearly the manner in which express and freight traffic is handled by electric railways in various parts of the country that definite recommendations can be made by your committee.

The tables accompanying this report show in detail the manner in which the various member companies reporting solicit traffic, the proportion of express and freight earnings to total gross earnings, freight earnings per mile of road, the manner in which accounts of the express and freight departments are handled, and the various conditions under which the companies conduct their express and freight business.

Company	Passengers etc.	Mail	Express	Milk	Freight	Switching	Total Freight Revenue	Length of Line	Population Outside of Terminals	Population including Terminals	Passenger Revenue per Mile	Per cent of Total Revenue	Mail Express and Freight Revenue per Mile	Per cent of Total Revenue	Total Revenue from Transportation per Mile
1	$36,558.64	$395.52			$1,294.80		$1,690.32	6	20,000	35,000	$5,222.66	66.0	$241.47	4.2	$8,464.13
2	539,849.37	277.44	$200.00				477.44	75	105,000	853,000					
3	1,390,030.83	1,121.15	1,950.00		62,994.47	$2,036.30	68,101.92	91.4			15,244.19	95.3		4.6	16,380.44
4	255,510.41		12,822.27	$6,422.80			19,245.07	30.	50,000	550,000	8,517.01	93.0	631.50	7.0	9,158.51
5	683,191.00	2,700.11	33,165.47	28,639.20			64,504.78	169.	20,000	720,000	4,054.18	96.5	381.93	3.5	4,436.61
6	363,205.37		9,732.94		14,593.94		24,326.88	34.4	3,805	61,200					
7	90,186.49	150.00	1,359.05				1,489.05								
8	849,774.37	953.97	46,233.53	4,311.75			51,499.25	62.5	25,800	317,300	13,646.57	94.3	823.18	5.7	14,470.95
9	98,912.43	1,481.16	7,097.26		10,089.98		19,268.40	26.4	8,000	78,000	2,443.85	78.0	685.25	22.0	3,137.16
10	84,985.69	1,045.95		134.75	21,381.49	1,315.08	23,877.27	41.3		2,060.00	758.0		558.00	22.0	2,638.00
11	86,719.46			1,328.90	10,881.52		12,210.42	33.		80,000	2,800.00	87.0	400.00	13.0	3,200.00
12	319,210.67	787.97	14,033.02				14,033.02	45.7			6,984.91	93.0	567.00	7.0	7,070.07
13	387,371.25		8,140.14		42,416.47		50,556.71	139.0	40,000	100,000	2,756.84	88.5	303.72	11.5	3,150.66
14	1,080,241.88	950.52	23,382.36	2,970.76	135,001.28		162,904.92	305.0			4,004.38	91.2	146.32	8.8	5,049.68
15	110,331.75	717.56	3,069.67		16,596.88		20,384.11	36.1	7,000	90,000	1,056.27	94.4	561.60	15.6	1,620.63
16	315,575.86		14,201.99				14,801.99	34.8	5,000	385,000	9,660.00	95.7	307.00	4.3	9,468.00
17	44,601.19	399.16			14,395.90		14,795.20	14.6			3,050.70	75.6	1,005.82	24.7	4,056.73
18	949,543.93	732.80	5,306.42	7,322.45	28,624.20		41,985.93	116.	25,000	200,000	5,000.00	95.6	365.00	5.6	5,365.00
19	549,408.50	280.07	2,011.99				2,292.16	58.4	5,000	65,000	9,407.68	98.0	30.24	2.0	9,440.92
20	51,255.18	458.34			16,578.26		17,036.60	11.6	3,200	394,397	4,399.50	74.8	1,462.37	24.7	5,881.63
21	87,584.32				4,212.92		4,212.92	14.2			6,167.91	93.0	296.70	4.	6,464.61
22	402,432.78	978.00	3,225.46				4,203.40	34.7			11,597.49	98.7	121.11	1.	11,718.60
23	105,018.60	1,033.71	2,585.07				3,618.78	25.0	50,000	100,000	4,224.74	96.8	144.75	3.2	4,369.49
24	2,208,051.09	4,226.61	24,321.43	15,292.15	148,266.76		192,106.95	617.4	400,000	1,400,000	3,576.25	92.0	311.14	8.0	3,887.39
25	269,073.95				11,369.05		11,369.05	33.7	15,000	90,000	8,000.00	95.0	450.00	4.8	8,450.00
26	62,229.97	249.98	209.15		4,262.18		4,721.31	10.3	6,000	25,000	6,047.02	92.6	458.78	7.04	6,530.28
27	77,960.81		3,195.70		36,252.89	34,095.50	73,544.14	8.0	4,000	90,000	9,745.16	81.4	9,193.01	48.5	18,938.58
28	374,671.25	175.00	6,077.50		14,790.40		21,042.90	57.5			6,516.62	94.7	365.93	5.3	6,881.97
29	55,846.00	259.83			3,006.84		3,266.67	15.5	2,000		3,603.00	94.4	210.75	5.6	3,813.75
30	233,218.81	310.00	4,136.91		29,638.41		34,085.32	54.0	18,000	230,000	1,318.87	87.2	631.21	12.8	1,950.08
31	106,516.75		3,767.55	37.30	9,571.66		13,376.50	43.0	13,000	90,000	2,552.32	88.0	126.55	12.0	2,678.87
32	1,842,141.72	1,173.47	38,643.44				39,816.91	55.5			33,203.71	98.0	717.68	2.0	33,921.38
33	221,334.90				2,716.70		2,716.70	44.0	9,700	34,700	5,030.33	98.5	61.74	1.5	5,092.04
34	368,801.41	1,251.83			16,922.85		18,174.68	71.4	10,000	75,000	5,160.00	95.0	253.18	4.4	5,413.80
35	374,295.79				3,684.71		3,684.71	22.3		50,000	16,794.36	98.0	165.33	2.0	16,957.86
36	1,017,101.27	584.26	60,383.33	991.40	936.50		62,895.49	46.0	28,100	134,300	22,110.80	94.18	1,367.29	5.82	23,478.18
37	1,284,066.10	587.56	4,541.90	1,006.47			6,135.93	19.0	10,000	140,000	67,582.42	99.52	322.94	0.48	67,905.36
38	164,549.56	802.08	21,897.12	3,545.67	179.64		26,514.51	39.1	5,000	215,000	4,210.50	85.90	678.46	13.85	4,888.03
39	243,928.80		17,838.11	1,786.84		1,417.50	21,042.45	43.0	13,000	238,000	5,585.84	92.06	483.21	7.94	6,069.07

No. 10.

Freight and Express Traffic—Table I

Soliciting

It is evident that, compared with a few years ago, a majority of interurban railways have greatly increased their express and freight traffic, generally upon a profitable basis. A number of companies originally entering the business in a tentative manner have ascertained that in the absence of restrictive physical conditions and without stringent state or municipal regulations there is a reasonable profit in the business, if conducted in a conservative manner, particularly with regard to costly terminals and expense of solicitation, etc. Numerous companies have been able to obtain sufficient traffic to see the necessity of increasing terminal facilities and to enlarge their organizations in various directions.

Steam railways are built with the primary intention of handling freight, their terminals are arranged accordingly, and recent statistics have shown that about 70 per cent of the earnings of the steam railways of the United States are obtained from express and freight, and only 30 per cent from passenger traffic. Diametrically opposite, the interurbans in the past have been built to obtain their earnings from passenger traffic, the express and freight business being merely a means of increasing their miscellaneous earnings. The situation, however, is rapidly changing, and interurbans are now being financed on the basis that a considerable percentage of their earnings shall be obtained from express and freight traffic, their charters, franchises and terminals being arranged to cover the situation.

Five years ago there were very few interurbans whose mail, express and freight traffic per mile of road exceeded $100 to $150. Of the 39 member companies reporting, very few interurbans reported such earnings less than $150 per mile; 5 report earnings of between $150 and $300, and 24 report earnings varying from $300 to $1,000 per mile. A few companies reported earnings per mile considerably in excess of the meximum amount above mentioned, but the conditions under which these companies operate their express and freight business are exceedingly favorable; in fact, put some in the class of interurbans whose express and freight traffic is their greatest source of revenue.

Some of the companies reporting indicate that they do not conduct a general express and freight business, but merely carry packages on passenger coaches, and will probably never enter the express and freight field, owing to local conditions.

Recommendations

The majority of the reports received indicate that the development of express and freight traffic on the majority of interurbans is increasing at a reasonable rate. Your committee finds a general tendency to adopt the official classifications and tariffs used by the steam railways in the territory in which the electric railways operate.

Certain criticisms and recommendations are made, which

*Abstract of report read before the American Street & Interurban Railway Transportation & Traffic Association, at Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

the committee trusts will be received by the member companies in the intended spirit, and which recommendations we believe will be to their final benefit.

It is the opinion of the members of this committee that many companies do not pay sufficient attention to the matter of solicitation. The steam railways have ascertained from years of experience that even a small freight business requires the employment of an intelligent force of solicitors to obtain and properly increase the traffic coincident with the increase of business in the territory which they serve. We can well draw a good lesson from their experience, and conduct the solicitation for our express and freight traffic along similar lines.

Where the conditions do not warrant the expense, it is not necessary for a comparatively short interurban railway to engage the services of high salaried men. The employment of a good live man, who not only solicits traffic for his road in opposition to competitive railways, but who finds and makes markets for the various commodities originating in his territory, and who, for instance, induces the raising of crops or of market garden supplies, which can readily find a market in the terminals reached by his road, will greatly increase the freight handled by it, and at a very nominal expense. It is, of course, a well known fact that, in general, the greater the business transacted by any organization the less the unit cost becomes therefor. In many instances the employment of a good freight solicitor marks the line between an unprofitable and a very profitable freight business.

We also find that some companies are inclined to provide very expensive freight handling facilities before they know whether or not the revenue received will warrant the expenditure. In many cases it would be better to rent freight terminals and after the business grows to the proper point, to provide other terminals and facilities, which from experience would be properly located and the expense for maintenance commensurate with the revenue obtained. Many companies are deceived in the matter of expenses, and instead of keeping an accurate account of them, many of the items are estimated and the estimates in many cases are entirely too low. For instance, one large interurban company, reporting earnings of considerably over $100,000 per year, estimates its expense for blank forms, etc., at such a that figure that it is immediately apparent as being altogether too low. Other companies in their estimates of expenses place too high a figure on the cost of power, track maintenance, etc., charged to the freight department. Such a procedure may discourage a company from continuing in the freight business when a careful analysis of the situation, backed by accurate accounting, would show them beyond a doubt that they were operating at a profit.

Apparently very few companies charge interest against the equipment necessary for the conduct of their express and freight business, only two companies so reporting. Many companies did not report their investment in terminals, equipment, etc., and, judging from the earnings of other companies and their reports of investment, the former apparently do not know their investment, or have given the mater no atention. Some companies do not make any charges for track maintenance, and so on, indicating that they do not know the exact status of their express and freight business and the direct relation of earnings and expenses.

The committee recommends that some action be taken by this association to prescribe a standard method of express and freight accounting, which can be adopted in whole or in part by the member companies, according to the amount of business transacted or the local conditions under which the business must be conducted.

The commitee also urges upon the member companies the importance of adopting standard blank forms, namely, bills of lading, way bills, expense bills, etc., as nearly as possible like the forms now used by the steam railways, and which are prescribed by the Inter-state Commerce Commis-

Company	Rate Participation with Steam Railroads: Joint Rates	Rate Participation with Steam Railroads: Two Locals	Equipment Furnished	Electric or Steam Locomotives	Reason	Old Line Express Company	Does Express Company Handle Local or only Foreign Business	Basis of Compensation	Own or Rent Terminals	What Municipal or State Restrictions
1										
2	No.	No.		Electric	More economical	Yes.	Both.	10 cents per 100 foreign 45 per cent. local	Own	
3	No.	No.				Yes.	Foreign.	Tonnage basis		
4										
5	No.	No.		Electric	Better service	No.			Own	
6										
7	No.	No.				No.			Rent	
8	No.	No.				Yes.	Foreign.	Tonnage basis	Own and rent	
9	No.	Yes	7 box cars	Steam	Power house too small	Yes.	Both.	45 percentage on mileage basis.	Own except one	
10	No.	No.				Yes.	Both	1½ times 1st class freight rate.	Own and rent	None
11	No.	No.				No.				
12	No.			Electric	More economical	Yes.	Both	Percentage and guarantee	Own and rent	None
13										
14	No.	No.		Electric	System used	Yes.	Both.	Percentage and guarantee	Own most	None
15	No.	Yes.		Electric	More economical	Yes.	Foreign.	20 cents per 100 lb.	Rent	None
16	No.	No.				No.			Own	None
17	Yes.	Yes.	None	Electric		No.			Own and rent	
18	No.	No.				Yes.	Both.	Tonnage basis	Rent	None
19										
20	No.	No.		Electric	Electric road	No.				None
21	No.	No.								
22	No.	No.				No.		15 per cent. of express Company earnings.		
23										
24	Yes.	Yes.	Locomotives	Both		Yes.	Both.	Earnings and minimums	Own and rent	None
25	No.	No.				No.			Own	None
26	No.	No.								
27	Yes.		None	Steam		No.				
28	No.	No.				No.				
29	No.			Electric		No.				
30	Yes.	Yes.	None	Electric	Have no steam	Yes.	Both.	50 per cent. local, pro rated foreign	Own	Under special arrangements
31	No.	No.				Yes.	Both	Flat rate per 100 lb.	Own and rent	None
32	No.	No.				No.			Own	None
33						No.				
34	No.	No.				No.			Own and rent	None
35	No	No.		Electric	Have no steam	No.				None
36	No.	No.				No.			Own	None
37	No.	No.				No.				None
38	No.	No.		Electric	No heavy trains	No.			Own most	Cannot use streets between 6 a.m. and 8 p.m.
39	No	No		Electric	No heavy trains	No			Own most	Cannot use streets between 6 a.m. and 8 p.m.

Notes.—Some companies operating both city and interurban lines include passenger earnings of city lines, hence their reports are not strictly accurate. The majority of reports from interurban lines are correct and can be considered representative as to general practice in conduct of freight business. Blank spaces indicate that information was not given or placed under another head. No companies have reported payments to cities or towns for the privilege of engaging in express or freight business.

Freight and Express Traffic—Table II

sion. Many companies would, by the adoption of such blank forms, eliminate a great many claims for shortages and damages which now confront them, of which many are settled

Freight and Express Traffic—Table III

Company	Salaries of Stockholders	Salaries of Clerks	Salaries of Other Office Employees	Wages of Conductors, Motormen and Trainmen	Rent of Buildings, Etc.	Insurance and Taxes	Books, Forms and Stationery	Power	Basis Charged	Maintenance Freight Equipment	Maintenance Track Roadway, Etc.	Basis Charged	Damage Account	Per Cent of Revenue	Express Freight Delivery	Other Charges	Total Expense	Amount	Fuel. Rental Basis	Investment	Tariff and Classification
1	$20 84		$3 427 75	$1,728 76	$405 01	$447 36	$144 32	$4,293 89	Mileage	$3,056 60	$1,500 30	Mileage	$483 70	0 72		$19,159 98	$41,459 21				Southern.
2																					
3																					
4																					
5																					
6																					
7		$2,020 65	500 00	6,368 01	2,586 92	509 18	401 44	24,582 09	Mileage, charge includes tracks, etc				57 35	0 11	$6,454 02	4,610 26	52,810 43		40 cents per car mile	458,368 50	Own
8																		$550 00	25 cents per car mile	10,000 00	Own.
9	818 75	871 67	1,080 00	2,040 49														525 33	15 and 25 cents per car mile		Official
10																					
11	2 100 83	Foregoing Covers		1,921 38	234 09	335 00	173 74	1,335 58	Mileage		98 42		12 55	0 09		$28 28	6,080 15		25 cents per car mile		Own
12		868 56	44 02	7,140 85		900 04	562 25	3,631 66	Per car mile		2,821 04		596 10	1 4			7,077 06			98,000 00	Official.
13																					
14	2,800 00	13,814 40		18,501 22	588 00		650 57	9,618 45	Mileage	4,782 41	7,394 23	Mileage	3,000 00				19,301 84		Trip and mileage	200,000 00	Official
15	000 00	1,020 00		2,848 83	302 25	148 00	100 00	1,411 15	Per car mile, deducting power house labor	849 14	1,092 35	Car mileage	497 00	1 0		1,400 00	957 04	957 04	Per cent of earnings	14,000 00	Iowa
16																					
17																					Western Iowa
18	1,020 00			1,400 00				4,800 00		133 34	5,216 02		374 64								Official
19			4 800 00	4,800 00									200 00	0 5							
20																					
21	1,010 40	Foregoing Covers		4,181 64				928 02	4 cents per car mile							5,270 75	11,206 40				Own
22																					
23																				10,000 00	
24	1 000 00	1,200 00	2,000 00	20,588 46	1,725 00		427 00	24,634 50	Estimated per car mile	3,771 45	12,704 08	Estimated from car mile	1,258 93		3,000 00		23,500 72	1,000 00	Estimated per cent of wages		Own
25																					Official
26	840 00	540 00	300 00	925 00		500 00	100 00	799 98	Actual cost	305 00	537 00	Mileage proportion	200 00	1 75		600 00	5,646 98			3,000 00	Own.
27																	1,540 37				Own
28																			25 cents per car		Illinois
29		240 00	312 72	1,618 00			6 00			36 00					1,020 00						
30	300 00	1,065 85	1,500 00	6,411 86	1,200 00		92 66	2,525 35	25 cents per car mile	2,022 85	See before	25 cents per car mile	301 30	1 01	186 10	2,071 37	597 22			2,500 00	Own
31																	10,538 84		25 cents per car mile	25,000 00	Official
32																			Car mile and terminal charges		
33		1,705 24	1,200 00	1,274 41	5,845 72	211 91	209 73	726 43	24 cents per car mile	129 16	Included in rent of buildings, etc.		175 49	0 35	13,076 10		15,115 15			54,000 00	Official
34																					
35		7 75		422 12	334 88	18 00	13 87	1,517 26	Mileage	638 99	1,021 71	Mileage				470 52	7,059 68			10,000 00	
36				2,714 80																	Own
37	1,073 00	2,818 01	2,300 00	6,338 89	1,810 53		655 57	2,666 06	Car mileage	2,326 15			150 40	0 35	10,068 45	16,015 77	51,748 33	14,241 45		100,000 00	Own
38	184 75		275 00	1,820 16	61 22		66 78	488 81	Car mileage	34 74			14 73	0 27		2,604 30	5,630 31	2,671 71		000 00	Official
39	904 00	43 54	1,884 75	3,077 52	259 63	71 50	612 09	2,701 89	Cost per car mile	1,933 89	6,167 99	15 cents per car mile	1,000 00		1,440 00	1,000 08	20,260 42			10,000 00	Official
40	685 76	16 76	4,022 76	2,582 63	1,110 71	25 00	505 86	1,510 06	Cost per car mile	756 41	4,158 84	15 cents per car mile	102 37		1,428 90	417 15	17,760 04	900 00	11 16 cents per car mile	16,000 00	Official and Own

because of lack of proper information as to the disposition of such shipments while in their care.

The committee also recommends that careful attention be paid to the handling of claims for shortages and damages, many of which are excessive and fraudulent. Proper heed paid to this feature of the express and freight business, and the organization of a claim department, even if small, will greatly reduce number and amount of such claims.

THAT BARBECUE

Those who attended last night's wild-game barbecue at White City—and between convention and local street-railway people there were three thousand of them or more—came away with unbounded admiration for the Denver City Tramway Company, which leased the entire park, with all its attractions, and fed the multitude with wild game just to show what true Western hospitality is like. The whole affair was a tremendous success, and all the officers and men of the company, from President William G. Evans and Vice-President John A. Beeler down, were received with acclamations wherever they appeared.

A slight sprinkle of rain caused apprehension early in the evening, but it soon ceased. The affair was held at beautiful Lakeside Park, which is illuminated with 98,000 electric incandescent lamps and contains a lake 75 acres in extent with a row of lights all the way around it. The visitors were formed in a long line—so long that the people at the head of it were fed and having fun about the grounds before those at the end reached the serving tables. As each man or woman passed down the tables he received a plate and was served with a portion of venison, another of buffalo, a third of elk and still another of bear. He was also given a grouse sandwich, a baked sweet potato, butter, condiments, a pickle for a relish and a piece of pumpkin pie.

The scene was picturesque. The servers were genuine cowmen, with revolvers in their belts, and occasionally one would fire his gun (loaded with blank cartridges, presumably) just for fun. The skins of the slaughtered animals hung about, and the long trenches in which the animals had been cooked showed evidence of their recent use. The servers were a frisky lot; the dignity of President Shaw and his associates didn't awe them a particle. "Come on, men," they cried; "here's your coyote, your wolf—gray, timber or prairie—your cat meat and dog meat. Right this way."

Provided with their food, the tenderfeet passed into a spacious pavilion, where there were hundreds of tables, and waitresses served rolls, with hot coffee or cider as beverages. Everything was amazingly good, cooked just right, and the experts explained to the uninitiated, who hadn't systematized in receiving their pieces of meat, just what each one was. After supper there was all kinds of fun—dancing, roller-skating, boating, shooting the chutes, taking the "third degree," riding on the scenic railway and the Lake Shore miniature railroad, and many other amusements. Music was furnished by the Denver City Tramway Band. The visitors possessed the park, and it was the convention carnival. Grotesquely dressed merry-Andrews added their antics to the lively scene. Later in the evening the cowmen gave a "broncho-busting" exhibition with four untamed horses, which added a touch of real excitement. It was a late, or early, hour before the last of the merry-makers left the park.

For this complete relief from convention responsibilities for a night every visitor felt deeply grateful to everybody connected with the Denver City Tramway Company. Perhaps no entertainment feature connected with a street-railway convention has been so thoroughly enjoyed.

A "wishbone" or "seeing-the-foothills" trip of 51 miles was the entertainment feature for the ladies yesterday afternoon. Special "sight-seeing" trolley cars, in charge of W. K. Beard and other members of the entertainment committee, took the ladies to Golden and, returning, left them at the barbecue, where the evening was spent as related above.

The Royal Gorge, 166 miles from Denver, forms the narrow mouth of the Grand Cañon of the Arkansas. The walls range from 1000 ft. to 3000 ft. in height and at one point the gorge narrows to a width of 30 ft. at the bottom.

CLAIM AGENTS' ASSOCIATION—CLOSING SESSION

The closing session of the Claim Agents' Association was called to order in the Metropole Hotel at 9:30 a. m. Wednesday.

Papers on the subject, "The Unreported Claim; Its Evils and Remedy," were read by C. A. Avant, claim agent, Birmingham (Ala.) Railway & Light Company; W. Robinson, claim agent, Cincinnati Traction Company, and W. O. Stout, general claim agent, Minneapolis Division, Twin City Rapid Transit Company. Following the reading of these three papers the members engaged in a full discussion of this vital subject.

Reports were received from the committees on employment and ways and means.

Election of Officers

The nominating committee presented the names of the following gentlemen to serve as officers of the association for the ensuing year:

President, E. C. Carpenter, claim adjuster, Indiana Union Traction, Anderson, Ind.

First vice-president, J. S. Harrison, claim agent, Jacksonville (Fla.) Electric Company.

Second vice-president, J. Handlon, general claim agent, United Railroads of San Francisco.

Third vice-president, H. K. Bennett, claim agent, Fitchburg & Leominster Street Railway, Fitchburg, Mass.

Secretary and treasurer, B. B. Davis, claim agent, Columbus (Ohio) Railway & Light Company.

These officers were unanimously elected, after which the new president, Mr. Carpenter, was escorted to the chair and made a short address. He was followed by the other new officers, who spoke briefly.

Appointment of Committees for 1910

The following members were appointed by President Carpenter to serve on the executive committee for the coming year:

J. R. Pratt, assistant general manager, United Railways & Electric Company, Baltimore, Md.

H. V. Drown, general claim agent, Public Service Railway, Newark, N. J.

E. R. Roberts, claim agent, Knoxville Railway & Light Company, Knoxville, Tenn.

W. P. Spillane, claim agent, Boston Elevated Railway, Boston, Mass.

The committee on employment appointed by the president consists of the following members:

William Tichenor, claim agent, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

C. A. Avant, claim agent, Birmingham (Ala.) Railway Company.

A. G. Mitten, claim agent, Chicago (Ill.) City Railway Company.

The committee on ways and means for 1910 includes:

S. W. Gonsalus, claim agent, Southwest Missouri Rail road, Webb City, Mo.

W. S. Heaton, claim agent, Pacific Electric Railway, Los Angeles, Calif.

A. E. Beck, claim agent, British Columbia Electric Railway, Vancouver, B. C.

B. F. Boynton, claim agent, Portland (Ore.) Railway & Light Company.

The committee on subjects for discussion at the 1910 convention consists of the following members:

H. V. Drown, claim agent, Public Service Railway, Newark, N. J.

W. P. Spillane, claim agent, Boston Elevated Railway, Boston, Mass.

C. B. Hardin, claim agent, United Railways of St. Louis, Mo.

General Business

A recess of 5 minutes was taken while the new executive committee retired to consider and adopt an amendment to the constitution making past presidents of the association ex-officio members of the executive committee. H. R. Gosborn, Philadelphia Rapid Transit Company, president in 1908, and C. B. Hardin, the retiring president, were therefore elected to the committee.

A plan was outlined at the conclusion of the meeting which will be submitted to the executive committee of the American Street & Interurban Railway Association for adoption. If the plan is adopted, it will assist every street railway company in the United States in detecting fake claimants. Under the proposed plan, the records of the index bureau will be kept on file in the office of the American Association in New York City, where they will be available for consultation at any time by member companies.

A vote of thanks was given to the retiring officers, to the daily press of Denver for the considerate and cautious reports printed of the meetings, and to the management of the Metropole Hotel for the use of the meeting room and the social dinner served in the banquet room of the hotel on Tuesday evening.

The meeting then adjourned.

TUESDAY MEETING OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

(Continued from Page 728)

steam roads. He had to contend the other way, and produce facts that would bear out that contention. To do this he investigated the cost of power, among other things. At that time they were hauling their own coal a distance of 28 miles to their power house. The difference in rate from the mines to the power house, in comparison with the steam roads, was 25 cents in the company's favor, and the company was making 10 cents a ton, at a cost of 15 cents per ton for handling the coal. A power test of car consumption was made and the result was that today they find it cheaper to send the coal over the steam road and pay the railroad for hauling it. He thought next year the committee should go into the question of cost very carefully and, if possible, arrive at a basis by which to determine the cost.

H. S. Cooper, Galveston Electric Company, said that during the last six years, while Galveston has been under reconstruction, it has been necessary for the company to keep a motor car and five double-truck trailers merely for construction work. They had been trying to get at the cost of operating the cars. But although the cars have been in operation sometimes 12 to 18 hours a day steadily all the year round, the company has absolutely been unable as yet to determine on any basis as to what the operating cost was. They had tried to reduce it to a ton-mile or a car-mile basis, but had finally been obliged to make an arbitrary charge. They could get certain specific charges as regards employees, maintenance, repairs and renewals, but not as to the use of the track, overhead line, and even power.

Mr. Crafts thought it might be somewhat different on an interurban line.

F. I. Fuller, Portland (Ore.) Railway, Light & Power Company, said they had purchased a road which had a freight and passenger line about 40 miles long and another one 16 miles in length, which had a regular freight business. They had about 140 freight cars, and handle a great deal of timber, general merchandise and agricultural products. The cost between the freight and passenger business was divided on a car-mile basis, and he thought that a fair arrangement. The passenger cars run faster than the freight cars, but possibly average a little lighter. On this basis the freight operating expenses amounted to about 60 per cent.

The chairman then announced that owing to the small time left of the morning session the paper of Mr. Vaughan of Grand Rapids, Mich., would be read by title only. He then suggested that the committee on express and freight for the following year might go into the matter of operating expenses very carefully, and he hoped that the companies would respond freely and carefully to all questions which would be asked by the committee.

Report of City Rules Committee

President Allen then asked D. A. Hegarty of Little Rock, Ark., to submit the report of the committee on city rules. He also announced that Mr. Fuller of Portland would read a communication on this subject. This communication is published elsewhere in this issue. President Allen also read the following communications from E. E. Danforth, chairman of the committee, and J. L. Quackenbush, general attorney, Metropolitan Street Railway, New York.

Communication from R. E. Danforth, Chairman City Rules Committee

Sept. 29, 1909.

C. Loomis Allen, President,
American Street & Interurban Transportation & Traffic Association, Syracuse, N. Y.

Dear Sir:

The report of your committee on city rules, copy of which I herewith enclose, represents a great deal of earnest effort. In addition to the meetings held by the committee at the association headquarters, Engineering Societies building, New York City, on Mar. 27, June 7 and Aug. 27, a considerable portion of the committee work has been done by correspondence because of the difficulty of getting the widely separate members of the committee together at one point.

At the March meeting a general plan of work was outlined, each committeeman submitting to all the others his suggestions for additions, alterations and amendments to the existing code.

At the June meeting all members, having had ample opportunity to thoroughly canvass the proposed changes, a tentative code was drafted, printed and mailed to all member companies, a circular letter accompanying asking for criticism of the tentative code and suggestions for its improvement. Replies were received from a number of railway managers, nearly all being favorable to the code as drafted.

At the August meeting changes suggested by member companies, as well as by members of the committee, after legal advice, were carefully considered and a final draft of the committee's report was prepared for publication.

It is not claimed for this report that the rules are always expressed in the most elegant English, nor that the phrases are in every case strictly grammatical. The committee has, as far as possible, confined itself to the use of terms and expressions in a measure legalized by long usage in the street railway industry. It was not deemed advisable to make radical changes in the phraseology of a rule which had become thoroughly familiar.

A number of gentlemen have expressed their intention of discussing the report of the committee upon the floor of the convention, including H. S. Cooper, manager, Galveston Electric Company, who has prepared a very able and exhaustive analysis of the rules, together with timely suggestions on the subject. The other gentlemen are:

A. L. Kempster, superintendent of transportation, Seattle Electric Company.

Charles N. Black, vice-president and general manager, United Railroads of San Francisco.

C. B. Wells, Denver City Tramway Company.

F. W. Passailaigne, superintendent railway, Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C.

W. J. Kelley, general manager, Oakland Traction Company, Oakland, Calif.

F. I. Fuller, vice-president, Portland Railway, Light & Power Company, Portland, Ore.

W. A. Smith, Omaha & Council Bluffs Street Railway Company, Omaha, Neb.

You will note also comment of J. M. Quackenbush, general attorney, Metropolitan Street Railway Company, New York City. I would also call your attention to the general criticism of the rules contained in a letter addressed to you dated July 28, and attached thereto an attorney's comment thereon.

Believing that the above is sufficient to indicate the care with which the committee has performed its duty, and expressing the sincere regrets of the various members of the committee who have found it impossible to attend the convention at Denver, I am, Very respectfully,

(Signed) R. E. DANFORTH,
Chairman Committee on City Rules.

Communication of James L. Quackenbush, General Attorney, Metropolitan Street Railway, New York

As to the effect of such rules from the legal end of the business, I wish to advise that I have carefully read this book, and in my opinion, their adoption will not in the least affect the defense of cases. I desire to call your attention, nevertheless, to Rule 110, which refers to the assisting of elderly and feeble persons, etc., from the cars. It has been decided in our highest court in the case of Hanlon vs. Central Railroad Co., 187 N. Y. 73, that where you assist a passenger from a car you impose a duty upon the company of doing it carefully, and if the employee is careless and a passenger falls by such carelessness and is hurt, the company is liable. There is no duty which requires the assisting of passengers from the cars, so that this law has the effect of making the company liable for a gratuitous act. I, nevertheless, believe that as a business proposition the rule should be continued. Cases where the conductor would permit such persons as are inclined in the rule to fall while assisting them would be very few, whereas if such persons were not assisted they would in many instances fall and the reason given in court for such an accident would be defective steps, sudden starts, ice, etc., which would make a question of fact for the jury. It is hard to convince a jury that people fall without cause where the railroad company is the defendant and they would be inclined to show by their verdict that the company's servant should have assisted the passenger and avoided the accident.

It is not new to have cases decided by juries from the human standpoint rather than the legal. The omission of this rule from the book would not affect the liability if the conductor, nevertheless, assisted the passenger. To avoid the effect of the law it will be necessary to have a prohibition in the form of a rule to our employees not to assist passengers. This, I believe, would be unwise and if it became known would be harmful in the defense of suits.

President Allen then said that with the permission of the delegates, he would rule that amendments relating only to grammatical or typographical errors of the rules would not be considered in the discussion, but that they should be submitted to the 1910 committee for their consideration. The rules would be considered in sections, and amendments to them should be presented in writing.

The rules were considered in this way up to and including rule No. 123. Those upon which amendments were offered are given below and those amended are marked with an asterisk.

General notice*, 1, 2*, 5, 6, 10, 14, 18*, 21*, 22* (changed in position), 23, 26*, 27, 30, 33*, 101*, 103, 115* (omitted), 116*, 117*, 119*, 121.

The rules for motormen, beginning with 201, will be taken up this morning. The revised rules will be published in an early issue of the **Electric Railway Journal.**

The meeting adjourned about 1:15 p. m.

PRISON CARS IN BERLIN

Some years ago when the City of Berlin, Germany, wished to erect a jail for confining short-term prisoners in the suburb of Tegel, the latter municipality agreed to its construction only on condition that the prisoners should be brought in without attracting attention and that discharged inmates should not be released in Tegel. The police department settled this question by making a contract with the Grosse Berliner Strassenbahn whereby the street railway company furnishes a motor and crew to haul from one to three prison trailers every day between Berlin and Tegel. The cars were built by the police department and contain 30 cells each. As they are brought directly into the prisons at each end over special sidings, the public never sees the unwilling passengers. The entire run is 12 km (7.4 miles) and the street railway company receives 1 mark per car km or about 40 cents per car-mile for the service.

The Grosse Berliner Strassenbahn is seeking permission from the municipal authorities to increase the distance between specified stopping points from 250 m (820 ft.) to 300 m (985 ft.). This uniform spacing of stops is possible in Berlin as the stopping points are not fixed at cross-streets as in American cities. The Berlin practice has made it possible to attain schedule speeds up to 25 km (20 miles) an hour, which will be exceeded if the new proposal is approved.

RECENT DEVELOPMENTS IN RAILWAY MOTOR CONTROL*

By Clarence Renshaw, Westinghouse Electric & Manufacturing Company

The control of railway motors, as practised to-day, depends upon some half a dozen or more fundamental principles, such as the magnetic blow-out, the series-parallel connection, the power-operated switch with indirect control, and so on, and during the period which may reasonably be included in the scope of this paper, there have been no new developments of this sort for me to chronicle. In the perfecting of details and the production of new forms, sizes, and modifications of apparatus, however, many things of interest and importance have been done.

Unit Switch Control

The most important developments of the latter sort have been in the unit switch system of train control. Designed originally for elevated and electrified steam railroad service, this control has heretofore been made for use with automatic acceleration only, and with the power for operating the control circuits derived from a small storage battery on the car.

In this system of control it is only necessary for the motorman to place the handle of the master controller in the series or the parallel position and the switches will then close automatically, under the direction of a current-limit switch in the motor circuit, and cut out the resistance until the full series or full parallel position is reached. This effect is accomplished by making the master controller merely close the magnet valve circuit of the switches required for the first step, and arranging other circuits so that the closing of these switches establishes new circuits to the magnet valves of the switches for the second step, and so on, by means of auxiliary contacts or interlocks mounted on switches.

This system of control is remarkably simple, considering the results that it accomplishes. About 1,000 or more of these equipments are in use on a number of large roads throughout the country, where they are giving excellent satisfaction. Many operators, however, have hesitated in adopting the system for use on single cars or two-car trains, with equipments of moderate size, because of the apparent complications due to the automatic features, and on this account a much simpler form of unit switch control has recently been developed for use in such cases.

In the simplified form of unit switch control, the various connections between the motors and the resistances are made by means of seven or more (according to the size and number of the motors) pneumatically operated switches assembled together in a "switch group," and one pneumatically operated "reverser." Each switch is connected to the piston of a pneumatic cylinder, and normally held open by means of a powerful spring. The opening or closing of the switch is regulated by means of a magnet valve, connected to the cylinder, which admits compressed air when the circuit of the magnet is closed, and releases it when the circuit is broken. The reverser is moved to one or the other of its two positions by admitting air to one or the other of two cylinders similar to those on the switch group.

The supply of air for closing the switches is obtained from the main reservoir of the brake system, which is piped to an air chamber in the switch group, through suitable cocks and valves, together with an emergency storage tank for operating the car in case of failure of the compressor. The small amount of power which is required for operating the magnet valves is obtained from the trolley through a "control resistance," and its application is governed by a master controller at each end of the car. A direct wire from the magnet valve of each switch, or combination of switches, is carried to the master controllers, and these are so arranged that when the handle is moved to any notch, the circuit of the magnet valves of the several switches corresponding to that notch is closed and the switches are thus operated. By moving the master controller from notch to notch, therefore, the motorman starts and controls the motors in exactly the same way as with the ordinary hand-operated controller, except that instead of being mechanically connected to a revolving drum, located on the car platform and carrying the various contacts, the handle which he turns is connected by means of the magnet valves and pneumatic cylinders to much more powerful contacts close to the motors and underneath the car. It will be readily appreciated that such an arrangement is much simpler to understand than the automatic form, and as a matter of fact, the various circuits with this form of control can be as easily traced out as those of the ordinary drum-type controller.

The various circuits are carried to a multi-point train line receptacle at each end of the car, so that the circuits on two or more cars can be connected together by inserting a suitable jumper between adjacent receptacles, and the corresponding switches on each car can then be operated simultaneously by moving a single master controller.

Instead of the usual circuit breaker above the motorman's head, a small plunger is so arranged on the side of the switch group that when the current exceeds the desired amount the plunger is drawn in by the magnetic action of the blow-out coil at the end of the group, and by its movement opens the circuit to the magnet valves of the various switches, thus opening the switches. After having been opened in this way, the switches cannot be closed again until the master controller has first been returned to the "off" position. All of the main circuit contacts, therefore, corresponding to both controller and circuit breaker, are removed from the platform and located beneath the car.

The return of prosperity to the country after the recent period of depression is bringing to both city and interurban railway companies serious traffic problems which can best be solved by operating trains at certain times, instead of single cars. This matter was treated from an operating standpoint in a paper presented before the Transportation & Traffic Association last year by D. F. Carver, in which the advantages of train operation are clearly brought out.

Such trains could, of course, be made up of a motor car and a trailer, but at what expense to the equipment is indicated in the accompanying curve. This embodies the results of tests made by the writer a few years ago, and shows that the addition of a trailer (with the same seating capacity as the motor car, but somewhat lighter body and truck) for only one round trip of approximately one and one-half hours raised the temperature of the motors from its ordinary value of 75 deg. C. to about 100 deg. C., and that over two and one-half hours were required, after the removal of the trailer, for the motors to cool down again to the 75 deg. point. Had the trailer been kept in service for a longer period, it is probable that a temperature of at least 110 deg. C. would have been reached, in spite of the cool October weather during which the test was made. With multiple unit trains, consisting of two or more motor cars, however, the load on the equipment is even less when the cars are coupled in trains than it is when they are run singly, and it was with the idea of providing suitable apparatus, of the simplest and most reliable character possible, to enable such trains to be operated that the simplified form of unit switch control has been laid out.

Nearly all of the essential features of the switches, magnet valves, etc., employed in this form of unit switch control, are not new, but have been in use for a number of

*Abstract of paper presented as Section (L) of the report of the Committee on Equipment of the American Street & Interurban Railway Engineering Association, Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

years. We feel, however, that the simplification of the control circuits, and the general reduction in the number of parts required to make up a complete equipment, has now placed the apparatus on an entirely different basis, and opened up a new and wider field for its application than was ever before thought possible.

General experience shows that the introduction of a new method of accomplishing a given purpose always leads to improvements in the old method, rather than to its abandonment, as might be expected. As a result of this principle, the more common use of indirect control has led to various improvements and special features in the direct or hand-operated controllers.

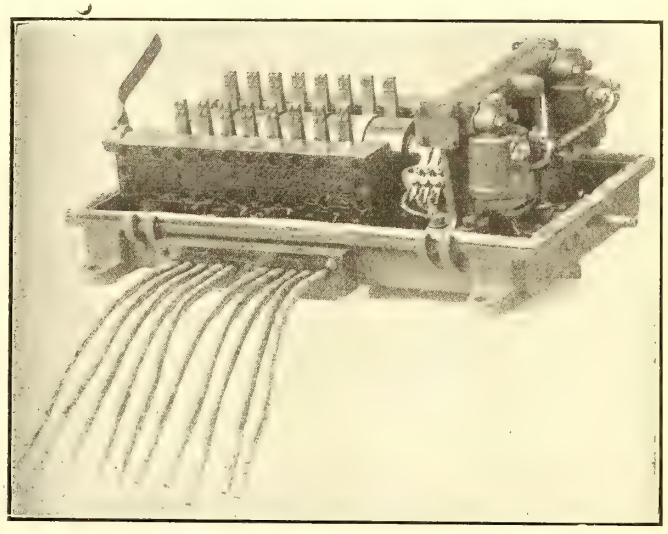
One of these improvements is the use of an auxiliary unit switch contactor in connection with the controller, for reinforcing and protecting it. To accomplish this purpose a single pneumatically operated switch is mounted beneath the car, and the circuit to its magnet valve closed or opened by means of a pair of auxiliary contacts, operated by the main controller drum.

Multiple Unit Operation with Hand-Operated Controllers

In cases where double motor equipments are used instead of quadruple, and especially with single-end cars, two-car multiple unit train operation may readily be arranged for with ordinary hand-operated controllers. To secure this, it is merely necessary to use a four-motor controller and resistance on the cars instead of a two-motor one, together with suitable receptacles and jumpers for connecting the two motors on the rear car to the controller on the forward one. When this is done the two-car train then consists of a standard quadruple equipment with two of the motors on one car, and two on another, or, to use a term which is now becoming common in connection with electric locomotives, the two-car train really consists of an "articulated" car.

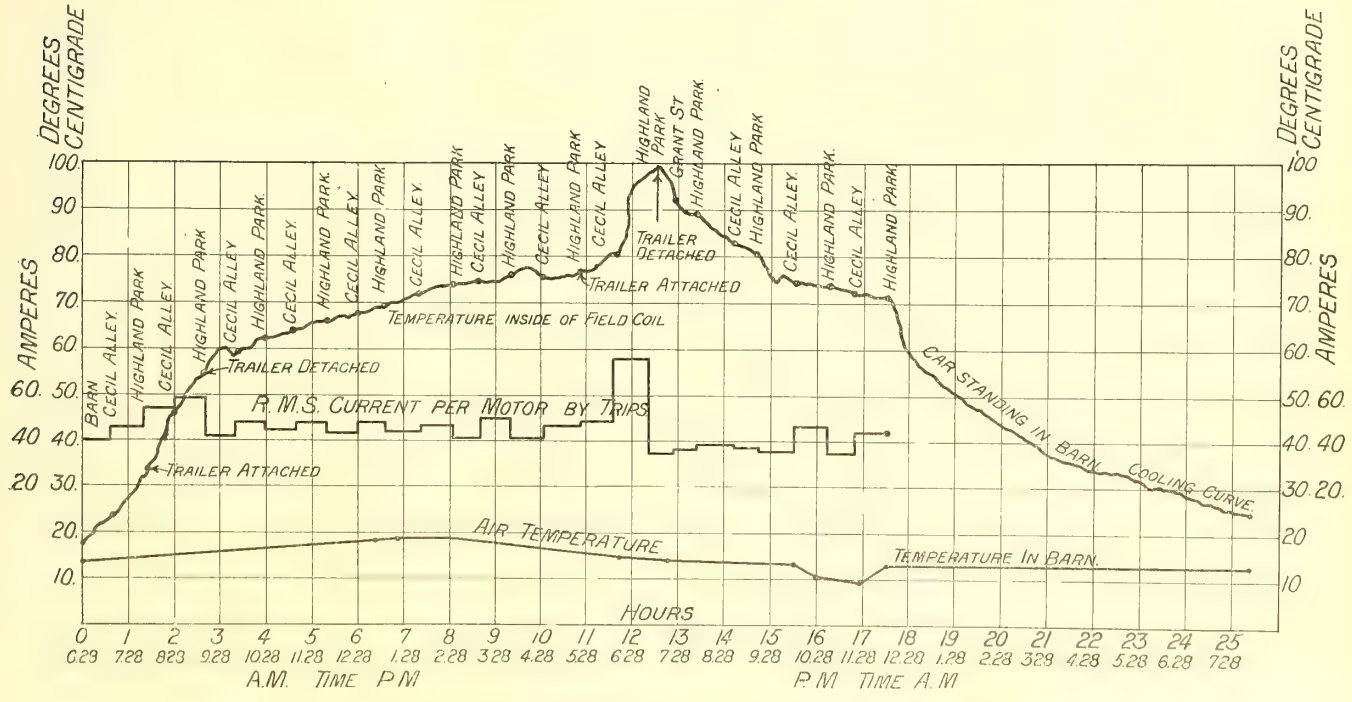
With double-end cars no simple arrangement can be made so that the cars will be interchangeable, but similar operation can be secured by providing a certain number of head-end cars and a similar number of rear-end cars, in which case only the former need have four-motor controllers. This latter arrangement, or one very similar to it, has been used in several places.

The use of a transformer on each car, from which any desired voltage, or number of voltages, for application to the motors can be easily obtained, makes the single-phase system as ideal from the control standpoint as it is from that of power supply. Variable connections from series to parallel are entirely unnecessary in this system, and the motors may be permanently connected in parallel, in series, or in series parallel, as desired, and simple and economical control secured by merely connecting them to different voltage taps on the transformer. Owing to the self-induction of such motors, also, which tends to minimize the current fluctuations, smooth acceleration can be secured with comparatively few notches, a total of five being usually sufficient even with equipments aggregating 400 hp or more.



Pneumatically Operated Reverser

All of these various control schemes as applied to different sizes of motors have been used in service on various roads, and all have been remarkably successful and satisfactory. As an instance of this, the master mechanic of one of the large single-phase roads stated not long ago that he believed he was having less than one-half of the trouble with his control apparatus than he would have had with hand-operated, direct-current controllers.



Curves Showing the Effect of Trail Car on Motor Equipment

HEAT-TREATED CARBON STEEL AXLES*

By J. S. Doyle, Superintendent Car Equipment, Interborough Rapid Transit Company

The following experiences with motor-car axle failures, together with some data and opinions collected for the purpose of correcting these failures, may be of interest:

The original motor-car axles installed on the Manhattan divison in 1902 have been in process of failure. Failure began at approximately 250,000 miles, and would have been complete at about 350,000 miles if not detected by inspection and removed. The filter stress was normal. The failure is characterized is "fatigue of metal," and in appearance is a "detail fracture," or a gradual separation of particles of steel. Standard locomotive driving-axle material was used on these motor cars, and although this material performs satisfactorily in steam railroad service, it has proved to be a failure in this and other electric traction service. The vibration set up in axle structures through the medium of the spur-gear method of power transmission may be the principal cause for these failures, which were detected by a system of inspection before breakage occurred, and the axles replaced by heat-treated material.

The use of heat-treated steel was decided upon after careful study of the subject, and, inasmuch as this feature of axle standardization has not been considered in the past, it is believed that the practice of the Interborough Rapid Transit Company, together with the data and technical opinions contained herein, may be of value to this committee in considering the advisability of adopting heat-treated materials for axles and shaftings performing arduous service. The specifications for heat-treated axles installed on the Manhattan division of the Interborough, it is believed, are rather rigid, and it was thought might prove too expensive and difficult of manufacture for general practice. A conference was held at the Engineering Societies Building on Thursday, July 22, 1909, for the purpose of obtaining a unanimous opinion on a form of specification that would best be suited to meet the general requirements of electric traction service on equipments with motors of 100 hp or more. The principal metallurgical engineers and representatives of the steel industries of this country attended the meeting and agreed upon a form of specification for heat-treated axles, and submitted a written opinion on the value of such materials, both of which are submitted herewith for your consideration.

A description of heat-treatment was contributed for the committee report by Dr. G. W. Sargent, of the Carpenter Steel Company.

W. P. Barba, of the Midvale Steel Company also contributed a rather full description of the manufacture and treatment of axles and shafts.

It should perhaps also be stated that wherever it is found necessary to improve carbon steel for use in gearing or for other purposes, the importance of the methods of heat-treatment should be borne in mind.

As previously stated, it was anticipated that the Interborough Rapid Transit Company's form of axle specification might possibly prove too rigid for general use, so it was considered advisable to hold a conference on this subject. The meeting was held at the association headquarters, Engineering Societies Building, New York City, and the following representatives were present:

George W. Sargent, Carpenter Steel Company; F. W. Weston and A. A. Stevenson, Standard Steel Company; W. A. Bostwick, Carnegie Steel Company; E. A. C. Acker, Bethlehem Steel Company; H. L. Waterman, Cambria Steel Company; R. Hitt, Electric Railway Journal; J. S. Doyle and Norman Litchfield, Interborough Rapid Transit Company.

The object of the meeting, it was explained, was to decide upon the development of a specification for heat-treated carbon-steel axles for use on electric motor cars equipped with motors of 100 hp or over, which would cover the material use in axles EC, EC-1 and ED-2 adopted as standards at the 1907 convention.

The following points were opened for discussion:

Process of Axle Manufacture

It is unanimously agreed that all axles for the class of service under discussion should be forged of open-hearth steel, either acid or basic, and that a treated axle is far superior to the untreated type. A heat-treated axle is one which is allowed to cool after forging, is then reheated to proper temperature, quenched in some medium, allowed to cool, and then re-heated to the proper temperature for annealing.

As to impurities, the maximum limit of phosphorus is to be 0.04 per cent for basic open-hearth steel and 0.05 per cent for acid open-hearth steel. It was agreed that the sulphur content affected the manufacturing processes only and was not deleterious to the consumer.

Messrs. Acker, Bostwick and Sargent all felt that 0.80 per cent would be a good maximum limit for manganese, Dr. Sargent stating that, in his opinion, this would give a stronger steel than one having a higher per cent. of carbon and lower percentage of manganese. (Compare recommendations of the American Society for Testing Materials.)

All present recommended not specifying the exact amount of discard and that the specifications should make this feature automatic. It was agreed that the specifications should read as follows: "Sufficient discard must be made from the top of the ingot to insure freedom from piping and undue segregation."

Physical Properties

After some little discussion all of the steel manufacturers present agreed that the following specifications would be satisfactory:

Tensile strength .....80,000 lb. per sq. in.
Yield point by drop of beam...45,000 lb. per sq. in.
Elongation in 2 in. .....22 per cent
Reduction of area .....40 per cent

In concluding this article the following original Manhattan motor-truck driving axle specification that failed in service is compared with the present Interborough specification and the recommended practice of the steel companies' engineers for a general specification for heavy electric traction service; also micro-photographs 4 and 5 of axle materials that have failed on large traction systems, together with the new heat-treated material manufactured in accordance with the Interborough Rapid Transit Company's latest specification, micro-photograph 6.

The comparison is as follows:

	SPECIFICATIONS.		
	Old Manhattan.	I. R. T. Co.	Proposed.
Carbon.....	0.40 to 0.55	As low as possible.	
Manganese.....	Not above 0.70	Not above 0.60	Not above 0.80
Phosphorus.....	Not above 0.05	Not above 0.04	Not above 0.04 for basic and 0.05 for acid.
Silicon.....	Not above 0.25		
Sulphur.....	Not above 0.04	Not above 0.04	Not above 0.06
Ult. strength, lb per sq. in.....	80,000		80,000
Elastic limit, lb per sq. in.....	40,000	50,000	45,000
Elongation in 2-in., per cent...	20	22	22
Reduction in area, per cent.	....	45	40
Discard per ct..	30	30	Made automatic by location of test pieces.
Treatment.....	Slow-cooled by burying in dry ashes when hot from hammer.	Quenched in oil and annealed by reheating.	Quenched in some medium and annealed by reheating.
Location of test piece	Midway between center and outside.	Midway between center and outside.	Midway between center and outside.

*Abstract of paper presented as a part of the report of the Committee on Equipment, at the 1909 convention of the American Street & Interurban Railway Engineering Association, Denver, Colorado, Oct. 4, 5, 6, 7 and 8.

REPORT OF COMMITTEE ON EQUIPMENT*

By L. L. Smith, Chairman; J. S. Doyle, W. H. McAloney, L. W. Jacques, H. A. Benedict and M. V. Ayres

The scope of the committee's work for this year, having been enlarged owing to the rearrangement of committee work at the beginning of the year, embraces that covered by the former committees on maintenance and inspection of electrical equipment, control, and economical maintenance. Its duties also include suggesting to the committee on standards any new and appropriate standards or desirable changes in existing standards relating to equipment. Within this broad range of topics your committee has endeavored to cover the following subjects separately prepared:

(a) Economical Maintenance—By W. H. McAloney.

(b) Car Weights as Affecting Operating Costs—M. V. Ayres.

(c) Carbon Brushes—Compiled from data sheets by L. W. Jacques.

(d) Steel Tired vs. Rolled Steel Wheels—Compiled from data sheets by L. W. Jacques.

(e) Proposed Standards for Rolled Steel Wheels.

(f) Proposed Change of Flange Contour for Interurban Wheels.

(g) Proposed Gage for Mounting Car Wheels.

(h) Heat Treated Carbon Steel Axles—J. S. Doyle.

(i) Knife vs. Snap Switches for Car and Carhouse Light Circuits.

(j) Impregnation of Field Coils.

(k) 1200-Volt D. C. Car Equipment—Prepared at the request of the committee by F. E. Case, General Electric Company.

(l) Recent Developments in Railway Motor Control—Prepared at the request of the committee by Clarence Renshaw, Westinghouse Electric & Manufacturing Company.

(m) Conclusion.

(n) Appendix—Summary of Recommendations.

(a) Economical Maintenance

Economy avoids all waste and extravagance, and applies money to the best advantages. Any improved method that will reduce the time that cars are in the shop and increase the period of service is direct progress and economy.

The subject of arriving at a fair unit of work for a basis of comparing maintenance costs for such principal items as wheels, brakeshoes, bearings, carbon brushes, trolley wheels, armature and field coils, etc., on a basis of 1000 car miles, has frequently been advanced; however, it will be foreseen that variations in grades, curvatures, weights of equipment, speeds and real work accomplished make it difficult to arrive at a fair general unit. Yet if this could be arrived at through broad, concerted action and real facts covering a period of years, the recommended unit of value would no doubt be helpful in securing the highest grades of material and supplies and be of general value as a reference.

While it is presumed that most companies follow closely the association's standard method of accounting, yet variations in detail no doubt exist, and for this reason and because local surroundings and service conditions vary so extensively, the question of actual cost will not be taken up. Because this condition prevails and we recognize that gathering statistical data for comparison is prohibited, it has been very difficult to obtain material for the subject of this paper, and so definite recommendations are not warranted.

The Denver City Tramway operates about 200 miles of track, 50 miscellaneous work cars, sweepers, plows, etc., and 314 passenger cars, and for the purpose of calling attention to those items of material that involve the greater outlay of money in the three standard expense accounts, Nos. 6, 7 and 8, we have secured the total amount expended for material in dollars and cents during the year 1908 in the maintenance covered by these accounts, and under 31 classified headings show what proportion each classification bears to the total amount expended.

In making up this statement no allowance has been made for scrap recovered, and the proportion must therefore be considered as gross. It will readily be understood that had the amount of scrap recovered been secured and credited under the proper headings, the items showing the higher proportion—such as "brakeshoes," "magnet wire" and "wheels"—would, from the nature of their value as scrap, have received the greater credit; however, while in our records we charge "material and stores" with all material and scrap recovered, applying credit to the account against which it was originally charged, we find it difficult to obtain, and do not in all cases require, identification by name of original items comprising such scrap. These proportions to the gross total material used will serve to call attention to those items which require the greater outlay of money and which should call for a like proportion of consideration. While conditions vary in different localities, it is considered that these proportions to the total of gross material used as shown by the following statement will prevail to the extent that the figures will be of value.

Material Charges

Standard Accounts Nos. 6 and 8.	Pr. Ct.	Standard Account No. 7.	Pr. Ct.
Axles	2.04	Armature shafts, sleeves, and keys	0.26
Brake shoes	9.12	Bearings and babbitt metal	4.81
Brake appliances (all apparatus connected with brakes except shoes)	3.34	Brush holders and parts	1.28
Car trimmings	1.81	Commutators and parts	3.78
Drawbars and coupling pins	0.47	Controllers and parts	2.74
Fenders and parts	0.83	Fuse boxes, circuit breakers and lightning arresters	0.29
Glass	2.03	Gears	2.81
Gongs and bells	0.15	Gear cases and parts	2.15
Journal boxes and brasses	1.11	Insulating material (electrical varnishes, fibers, mica boards, etc.)	1.84
Lumber	1.69	Magnet wire, including armature and field	20.18
Paints, oils and varnishes	5.03	Pinions	2.45
Steel	1.34	Rheostats	1.87
Seat covering	0.06	Trolley poles and fittings	2.54
Springs	0.39	Wire (other than magnet wire)	0.54
Truck frame castings and forgings	1.33	Miscellaneous electrical supplies	1.55
Wheels (car)	15.23	Other material	2.26
Other material	2.68		
Total	48.65	Total	51.35

Brakeshoes

When it is realized that the outlay for brakeshoes is practically 10 per cent of that for all material used on a car, the importance of giving this one subject a great deal of attention is apparent. The question of securing from the original casting the maximum wear consistent with safety and a reasonable consideration for "pull-ins," is recognized as a very important factor in economy, and it is suggested that very close attention be given scrap shoes recovered, that they be weighed carefully and that each foreman in charge be advised of the proportion of wear that should be secured. In advising foremen of the results secured, it is suggested that each be furnished with a comparative statement giving the results from all houses. This will no doubt serve to stimulate competition and will tend to promote economy. To the end that the least amount of stock be carried and the greatest proportion of wear secured, it is strongly urged that the adoption of the association standard brakeshoes will prove economical.

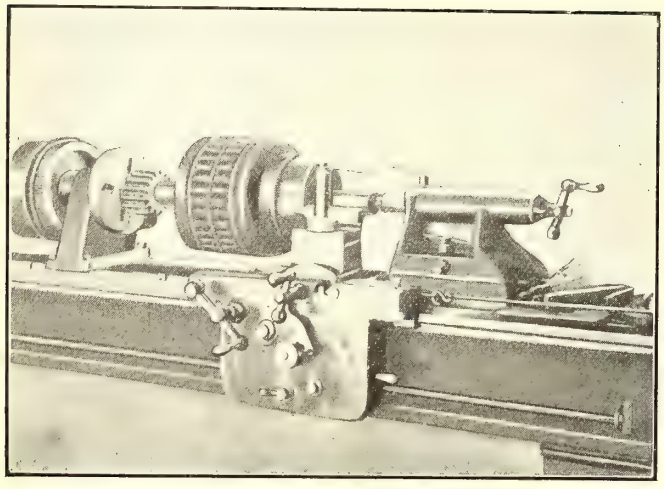
The great multiplicity of truck designs and the probable difficulty of getting manufacturers to agree, is no doubt the reason why the standardization committee has not recommended a distance from the rail at which the brakeshoe should be carried. It seems to be generally recognized that shoes on street car trucks have, in the past, been carried too low, and that especially where shoes are hung from the

*Abstract of report read before the American Street & Interurban Railway Engineering Association, at Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

frame adjustment is difficult for the varying loads; moreover, the proportion of scrap is greater than would be the case if the shoe were hung nearer to the horizontal center line of wheel.

As the time which the repairmen must give to this material is a considerable item, it is important that castings be clean and free from rough and uneven places, so that the least possible time is taken up in changing shoes; also, as brakeshoe mixture has a direct bearing on braking powers and on wheel wear, it is considered important that shoes be made by foundries making a specialty of this class of work.

This question is receiving a great deal of attention at present, and all are anxious to know of the best practical



Rolling Stock Equipment—Grooving Commutator on Lathe, Denver City Tramway

method of checking shoe wear and arriving at a unit cost. The following form is suggested for use in advising foremen of the percentage of shoe wear secured:

Brake Shoe Wear

Car house or Division	Number of shoes	Total wgt of original shoes	Total wgt of scrap shoes	Total wgt of metal worn	Per cent of metal worn

Braking pressure must vary directly with the weight of the car. Brakeshoe wear will vary directly as the braking pressure and the work accomplished, and therefore it is not considered as important for purposes of comparison to know the cost per 1000 car miles or ton miles, as it is to know the "per cent of metal worn." The following form is suggested for arriving at, as nearly as possible, the density of metal in shoes and the costs:

Wheel and Brake Shoe Test.

Wheel No.	Circumference of wheel	Circumference at end of test	Circumference wear	Original weight of shoe	Weight of scrap shoe	Per cent of metal worn

Total weight of new shoes at....per lb.....$
Total weight of scrap shoes recovered at....per lb. (scrap value) . . . .$
Net weight of shoes worn and cost.....$
Car mileage.. . . ..
Cost of shoes (8) per 1,000 car miles.....$
Kind of service....Weight of car....Schedule of speed....

Brake Appliances

Brake appliances which include shoe heads, pins, hangers, levers, chain, handles, staffs, ratchets, etc., on hand brakes, as well as all apparatus appertaining to air brakes, while amounting in outlay to only about one-third that of shoes, obviously are the most important features of a car and the more congested the traffic the greater the loss in all things if the brake and its operation is not modern.

To a very great extent it has become the practice to case harden all wearing parts of hangers, and where shoe heads are suspended by hangers, to bush the head when worn with case hardened steel tubing. It is also quite general practice to bush cylinder levers with case hardened steel tubing, and to case harden all brake rigging pins. This is an important factor in economy and is recommended for general practice.

As an example, the average malleable shoe head is worth when new about 48 cents, and when worn (if the beam is suspended from the head by the hanger) can be redrilled and bushed with case-hardened steel tubing at a cost of about 16 cents, or one-third the most of the head when new. It will then have a life possibly exceeding that of the original head.

Commutators

Commutators have an important bearing on expense. It is possible that the original size of commutators could be greater than it now is on many types of motors. This would result in a longer and safer period of wear before scrapping. To determine the limit of wear would be difficult, and no doubt it is often the case that in our eagerness to secure the longer life we frequently bring about other troubles more serious and expensive. The following table shows the types of motors in use in Denver with the original and the scrap diameters of commutators:

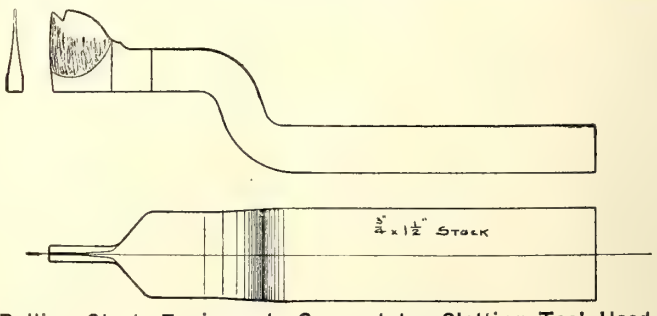
Type of Motor.	Commutator Dia. New.	Commutator Dia. Scrapped.	Remarks.
G. E. 53	12 in.	10¼ in.	Increased ¾ in. dia.
G. E. 58	10¾ in.	8½ in.	over factory size.
G. E. 800	10⅛ in.	7½ in.	Increased 1 in. dia.
W. P. 50	7 in.	5¼ in.	over factory size.
West. 101F	10⅛ in.	8 7/16 in.	
West. 3	8½ in.	6¾ in.	

Types of motors of an Eastern city, showing original and scrap diameter of commutators:

Type of Motor	Commutator Dia. New.	Commutator Dia. Scrapped.
G. E. 57	10¼ in.	8⅝ in.
G. E. 67	9⅛ in.	7⅛ in.
G. E. 74	11 3/16 in.	8¾ in.
G. E. 80	9⅝ in.	7¼ in.
G. E. 800	9⅛ in.	7¾ in.
G. E. 1000	8⅜ in.	6⅝ in.

It is suggested that the factory practice of machining, heating and pressing should be followed. A good mechanical commutator is an important factor in economy. Undercutting of mica commutator segments about 3/64 in. often increases the life of the commutator several hundred per cent, resulting in carbon brush economy, less carbon dust, etc., and a general reduction in troubles from "flashovers."

In the Denver shops commutators are slotted on a lathe which is also used for turning. The slotting tool is set at the proper depth and the stop is fastened to the slide rest of the lathe to insure a uniform depth of 1/15 in. in cutting



Rolling Stock Equipment—Commutator Slotting Tool Used by Denver City Tramway

the mica. The carriage is worked by the lead screw. The armature is left loose on the centers to take care of any untrue segments which are looked after by the operator. By this method commutators are slotted in the following time after having been set in the machine:

G. E. 53 armature, 99 bars, 12 to 15 minutes.
G. E. 58 armature, 99 bars, 12 to 15 minutes.
G. E. 800 armature, 105 bars, 15 to 20 minutes.
West. 101F armature, 111 bars, 20 to 25 minutes.

It is suggested as a good practice to slot commutators of all motors of over 25 hp capacity.

Control Apparatus

Control apparatus has been one of the weak parts of car equipment, but with the advent of the new K-34-5-6 type it is claimed by the manufacturers that considerably less trouble with platform controllers will be experienced.

In Denver, on the old K-6-10 and 11 types, we have reduced the troubles by being careful to get terminals on the blow-magnets as far as possible from the controller wires, and also we have reduced the number of blow-magnet burnouts by winding the coils with flat copper ribbon. This practice also shows an economy where burn-outs do occur, because repairs can be made by scrapping only a small portion of the coil.

The economy effected by the use of current limiting relays and grooving the commutator mica is shown in the accom-

	1907			1908			1909		
	Car Miles	Armatures Removed		Car Miles	Armatures Removed		Car Miles	Armatures Removed	
Feb.	128,443	33		140,333	15		170,917	17	
Mar.	141,575	27		152,510	17		182,265	14	
Apr.	147,051	36		150,599	18		192,380	20	
May.	142,695	36		162,693	18		211,418	11	
Total	559,764	132		606,135	68		756,980	62	
	Total Motor miles 4 months		Motor Miles per armature removed.	Total Motor miles 4 months.		Motor Miles per armature removed	Total Motor miles 4 months.		Motor Miles per armature removed
	2,239,056	132	16,962	2,424,540	68	35,655	3,027,920	62	48,837

Rolling Stock Equipment—Table Showing Economy from Practice of Grooving Commutators

panying table for cars on the Chicago & Milwaukee Electric Railroad, which are equipped with 65-hp and 76-hp motors and multiple unit control.

During the summer and fall of 1907 current limiting relays were installed, all commutators were grooved and various minor improvements were introduced, resulting in a two-fold improvement in 1908, increasing to nearly three-fold in 1909. The operation of the relay is such that when a greater amount of current than the relay is set for is fed to the motors, the relay will open the master control circuit

of the contactors and cut the power off the motors until the controller is thrown off and speed again built up in the proper manner.

The current limiting relay recently used in Denver in K-10 type controllers is shown. The armature is pulled toward the star-wheel on the controller roll when the current limit is reached, thus checking any further feeding until the momentum of the car allows the current to drop, when a further advance of the controller is permitted. This current limiting relay is connected in series with the controller trolley finger.

Carbon Brushes

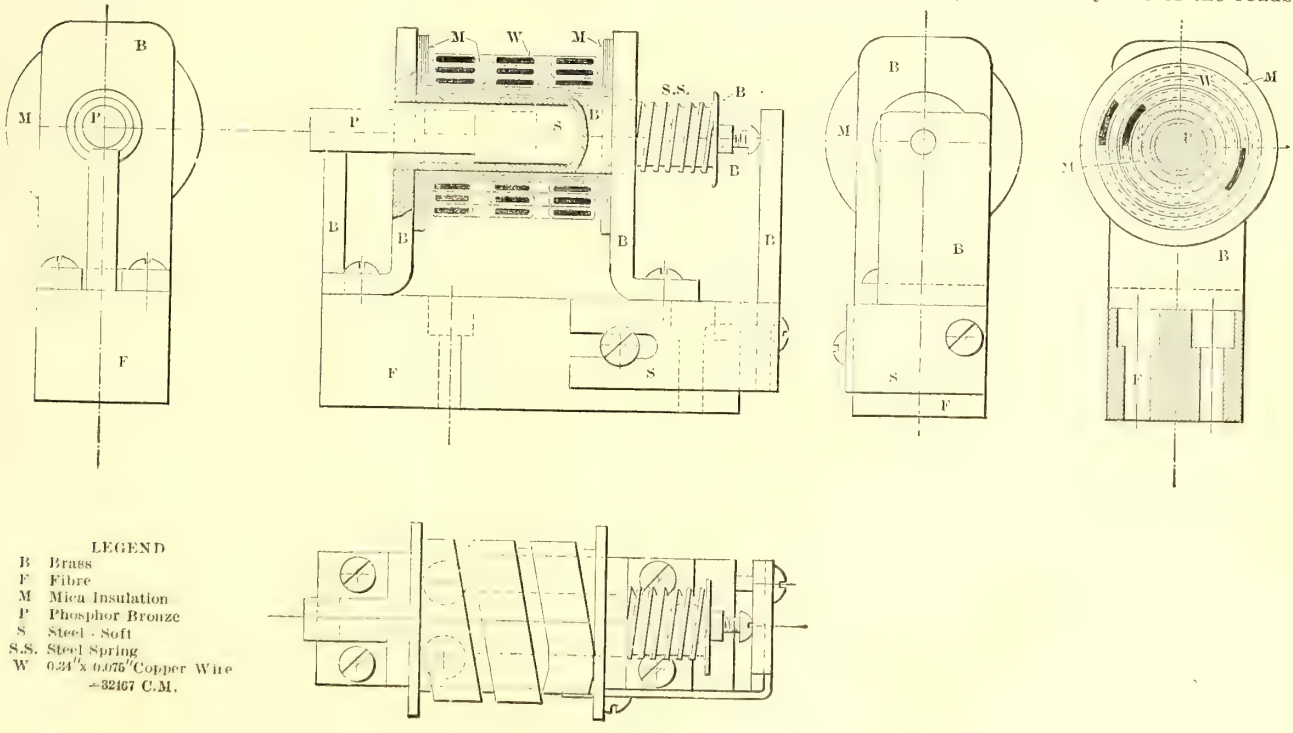
With the generally adopted method of slotting or grooving commutators and the use of higher grade brushes, troubles formerly experienced with carbon brushes have been reduced several hundred fold. The Fort Wayne & Wabash Valley Traction Company has a novel and economical scheme for utilizing large size brushes, where of uniform thickness, in motors using brushes of smaller dimensions. When a carbon has been used to its limit for the larger dimension, it is cut down by a substation attendant and then is used in a motor fitted with smaller brush-holders.

Painting and Cleaning Cars

Painting material is an important factor in car maintenance and in cities of moderate size where congestion has not reached the stage at which the further soliciting of business seems necessary, this part of the work must no doubt receive 5 per cent of the management's attention. On this question a quotation from a recent editorial in the Electric Railway Journal is worthy of notice: "The responsibility in car painting rests between the painter and the manufacturer. Good paint improperly applied gives no better results than poor paint, and even the best workman cannot get good results and long life from cheap and inferior mixtures."

The accompanying table, furnished by one of the roads in the Middle West, shows a saving both in time and money favorable to the method of using compound for cleaning cars preparatory to painting or revarnishing:

Cost of scrubbing the outside of an interurban car preparatory to revarnishing or repainting, including doors and inside vestibules:



Rolling Stock Equipment—Current Limit Relay Used by the Denver City Tramway

	Not Using Compound.	Using Compound
Days required to scrub.....	3 Days.	2 Days.
Scrubbers' labor 120 hours @$0.17½..$21.00		
80 hours @$0.17½.....		$14.00
Compound: 3 gallons@$0.75		2.25

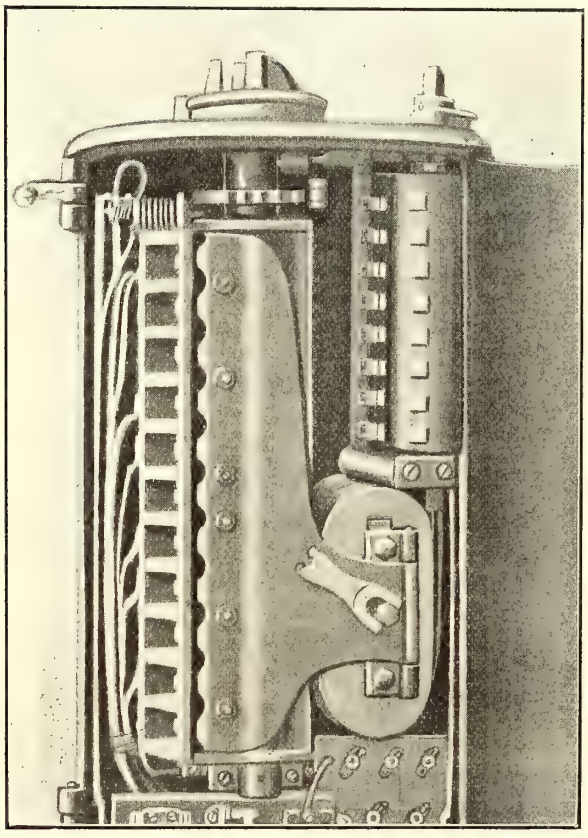
Economy per car in favor of Car Cleaner.

Cash.....	$4.75
Time.....	1 day
Other.....	Less damage to paint

The value of one day's time of a car out of service is perhaps anywhere from $2 to $20, depending upon cost and capacity of car and such local conditions as density of traffic and whether the railroad company possesses a shortage or surplus of available cars.

Magnet Wire

Magnet wire, which has the distinction of representing one-fifth of all the purchases for material used in maintenance of cars, continues to be one of the weakest items of material used. While conspicuous improvements have been made in many other directions, magnet wire, from the very nature of its delicate make-up, still calls for the closest inspection and the greatest of care in handling. Many cases of troubles and breakdowns yet owe their beginning to the weakness of insulation on wire. The report of last year's committee on maintenance and inspection showed very conclusively that the system of impregnating coils has grown in favor during the past two or three years and that economy has followed this method. It has also been demonstrated that immersing armatures that have exposed windings such as W. P. 50's., Westinghouse 12's and 68's, etc., and those of air compressor motors has proven decidedly beneficial.

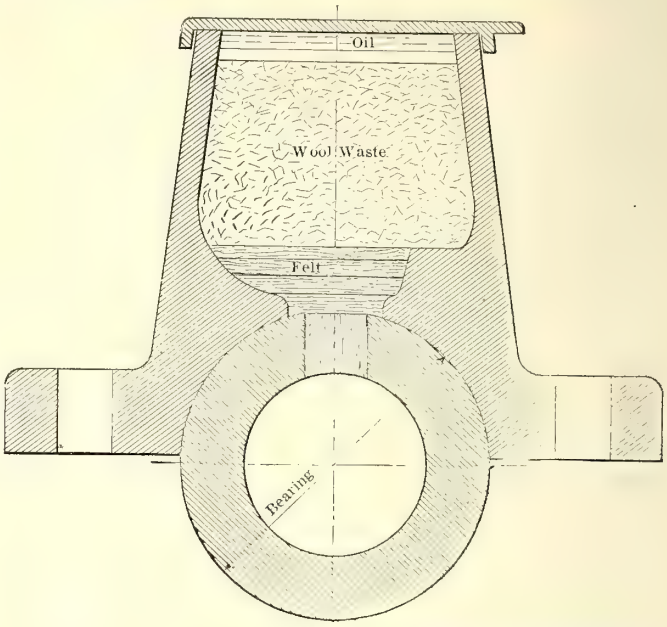


Rolling Stock Equipment—Current Limit Relay Installed in Controller Top

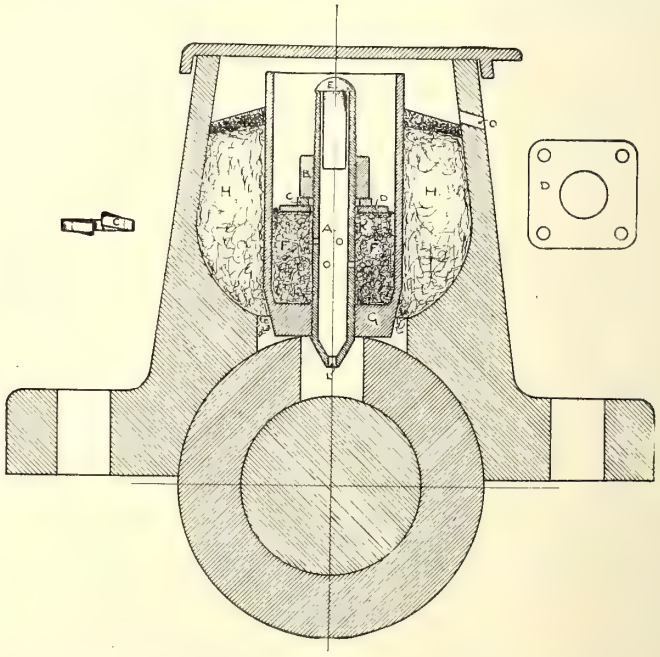
Trolley wheel economy has been obtained by using wheels 6 in. in diameter, and, after getting 3000 or 4000 miles wear, on interurban lines, placing them on cars in city service at slower speeds. In this way 6000 or 7000 miles of wear is secured, whereas it would only be possible to secure not more than 5000 miles in the faster service alone.

Lubrication

Lubrication has a direct bearing on expense, as unreliable methods seriously affect armature conditions. In last year's report of the committee on maintenance and inspection will be found some successful methods of applying oil to the older types of motors, originally intended for grease. In this paper two additional designs of oil cups used by the United Railways Company of St. Louis and the Denver City Tramway, are shown:



Rolling Stock Equipment—Oil Cup Used by United Railways of St. Louis



Rolling Stock Equipment—Oil Cup Used by the Denver City Tramway

The specifications for oil used are as follows:

Gravity.....	23½°	Beaumè
Flash.....	410°	Fahr.
Fire.....	480°	Fahr.
Cold.....	30°	Fahr.
Viscosity.....	420	

Wheels are shown to require an expenditure for main-

The cup used in Denver is made from a good grade of gray iron and put together as shown. Each individual cup is put on a testing rack with a cup known to be correct. A gas burner is placed between the two cups, so adjusted that when the temperature, close around the cup, is about 110 deg. Fahr. the oil will feed at the rate of one drop every 12 minutes. Whether fitting up new cups or testing old ones, this method is always followed.

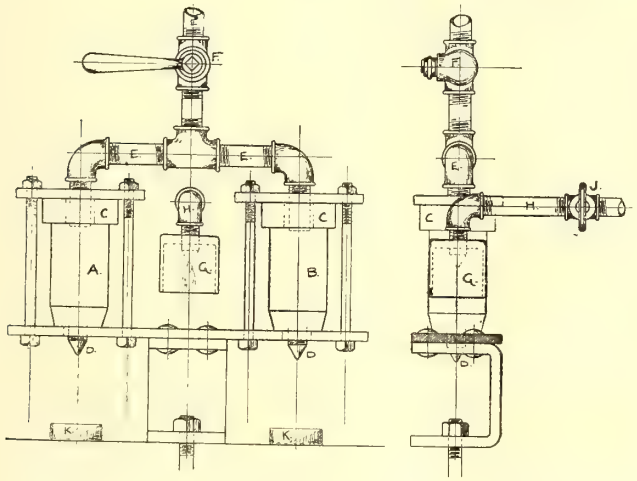
The rack with two cups on it and with an enclosed gas burner between them for regulating temperature, is shown.

Specification of oil used in the Denver cup is as follows:

Gravity	21.4° Beaumè
Flash	485° Fahr.
Cold test	35° Fahr.
Viscosity	149 at 212° Fahr.

With all oiling systems it is essential that the oil should run uniformly, but with the Denver type cup it is vital that the grade be uniform, especially as to gravity and viscosity. The Denver City Tramway Company has no laboratory, but on the test rack illustrated a sample cup is kept by which all other cups, new or old, are tested, and thus any great variation in oil can be detected.

It is poor policy to restrict any lubricating system in order to secure low costs for oil, because this saving will be



Rolling Stock Equipment—Oil Cup Testing Device, Denver City Tramway

secured at the expense of some other items. No doubt frequent so-called failures of lubrication are due to other causes; excessively hard work sometimes makes it impossible for any oiling system to keep its equipment out of trouble.

Wheels

Wheels which by the above statement are shown to call for an expenditure for maintenance material of more than 15 per cent of the total, and therefore offer a most important subject for study.

For city surface cars, up to the present time, cast chilled wheels have been most generally used, the rolled steel wheel probably not having been in use a sufficient length of time to demonstrate what service may be reasonably expected; however, with either kind of wheel the elements of careful manufacture rounded out with the most rigid inspection from the time material is charged in the cupola until it reaches its finished state, is vitally important.

As the energy stored in a rapidly moving, heavy car is absorbed in a few seconds through the wheel, by the use of the modern brake, brakes and wheels are commended seriously for consideration.

In mounting wheels it is important that great care be taken to see that the same tape sizes and shrinkages go on the same axle, and in the case of the two-motor equipments, it is no doubt equally important to see that the higher tape sizes be used as drivers. Only within the past year has the rule of using X to 3 tape for drivers and any wheel of lesser chill for idlers been closely followed. Results seem to more than warrant the trouble and extra care. Wheels with different shrinkages on the same axle no doubt are frequently the cause of the ever-present thick and thin flanges which sometimes are charged to the "out-of-square" truck. A large percentage of "slid flats" result from using the reverse when making emergency stops, and we would recommend as a feature of economy and the abolition of a public nuisance, that on all cars having power brakes, reversing of motors should not be resorted to except in case of defective brake rigging.

Inspection Work

Inspection work if slighted will cause serious interruption to traffic. Worn and flat trolley wheels cause arcing that burns the overhead wire; dry trolley wheel bearings cause cutting and shorten the life of the wheel; a pole put in with the wheel set at an angle causes the trolley to jump at the switches and may pull the trolley base off the car or pull the overhead wire down and, in addition to the damage caused, endangers life.

Poles not properly fastened in their bases may be the cause of accidents, and if the spring tension is weak it causes undue arcing and increases the wear on both wheel and wire. If a base is neglected and becomes dry, the trolley will run hard, causing jumping at switches and trouble without limit. Poor contact at the base causes the wire to burn off and means that a dead car must be pushed in off the line. Leaky roofs ruin car ceilings, are bad for seats and generally uncomfortable for passengers. Broken glass frequently is the cause of accidents. Bolts, nails and screws, if projecting from floor or any part of woodwork, sometimes result in torn clothes and falling passengers. Extended step treads sometimes strike vehicles, resulting in splinters and sharp edges and their accompanying dangers.

If cars are allowed to go into service with dirt or grease somewhere on the inside, the company may have to pay a bill.

Controller rolls, contacts and bearings if allowed to become dry will cut and cause short circuits; the roll will work hard and the motorman may not be able to tell distinctly whether or not he is stopping on the points; contact fingers may be set too low, and sometimes the set nut, if left loose on the adjusting screw, works out and the finger drops down and jams on the roll contact. Controller handles if neglected become worn and may not turn the roll to the last point, then running on the resistance, burning out a rheostat, and danger of fire may follow.

Oiling of motor bearings as well as car journals, when neglected, is probably the most expensive of all slighted inspection, because it causes the bearings to heat and the armature to go down on the pole pieces.

Motor terminals not being carefully inspected when connecting up is direct cause for broken wire in short time.

Bolts are left loose in the armature and axle caps; cotters are left out of bolts and hinge pins; brush holder hammers are left up; carbons are not cleaned and stick in their holders; weak springs; failure to tighten bolts and screws at yokes; oil and dust accumulated on brush holders and yokes until they short circuit and ground; neglect to oil and pack truck journals; brasses allowed to wear down, causing hot journals; and bolts in the trucks, when not kept tightened, wear face and holes so that later they cannot be kept tight. All these are points that must be carefully watched to insure the best results.

Brakes too tight frequently cause the loss of armatures, which may be laid at the door of the lubricating system. Improper adjustment and setting of shoes causes them to flange and lose a large per cent of their wear. Hangers worn and neglected cause brakes to shudder and chatter. Cotters left out of shoe-pins, and lever pins allowed to go without inspection may cause serious damage and accident. Leaks in the air system not discovered result in overwork-

ing the compressor. Neglected brake valves cause the seats to cut. Brake cylinders not cleaned and oiled, etc., and a thousand and one or more, little jobs, if neglected, are all serious, and many of them dangerous and have a direct bearing on expense. Quite a common practice among repair men is to patch up trouble and fail to give car and motors a careful inspection, so that further early trouble may be avoided. Lack of inspection is decidedly detrimental to best economy.

Education

The Bureau of the Census gives a total car mileage for all electric railways in the United States for the year ending Dec. 31, 1907, as 1,618,343,584, and gives for the year ending June 30, 1906, for steam roads, passenger train miles 479,037,553 and freight train miles 594,005,825, making a total of 1,073,043,378 train miles, showing the electric railway car miles for a year to exceed the total steam train miles (both freight and passenger) by 545,300,206. These figures are copied for the purpose of calling the attention of managers of electric railways to the millions and millions of details which must be worked out by probably millions of employees to produce the enormous mileage shown, such mileage naturally representing a corresponding volume of business and work.

Having called attention to a greater volume of work and an increased number of details beyond any suggestion of comparison, and fully realizing that our work calls for closer application than any other transportation work, it is strongly urged that more money and effort be expended in educational work.

[An article on "Car Weights as Affecting Operating Costs" presented as Section (b) of this report will be found elsewhere.—Eds.]

(c) Carbon Brushes

The data on carbon brushes have been compiled from data sheets sent out to the different street, interurban and elevated railroads and from answers to questions that were sent out to the manufacturers and engineering companies who have been interested in the performances of carbon brushes. A great improvement in the manufacture of motor carbons within the last year has been very noticeable. It is also noticeable that electric railways have given the matter of proper commutation considerable thought. The evidence of this is the extension of the practice of grooving commutators and the more general use of high grade carbons.

In answer to the questions submitted to the electric railways 64 of the data sheets were returned and most of those were from the larger companies that operate more than 100 cars.

Three stated that they had brush specifications. One larger company specifies, besides the dimensions, that carbons must have a carrying capacity of 100 amp per square inch of cross-section without heating, and that the coefficient of friction should be 0.2 at low speed and 0.3 at high speed. The second and third of these companies use the specifications recommended by the American Street & Interurban Railway Engineering Association last year. The balance of the companies answered "No."

One railway company gives the breaking test; 2 companies give the dimensional test; 21 companies give the service test; and the balance give no test whatever.

One company states that the manufacturer put 5 per cent of all carbons that are sold it through the test recommended by the association last year. One large company states that it has not as yet made a chatter-wheel as recommended by the association last year, but thinks that test is a long step in the right direction.

In regard to using a better grade of brush during the past year 32 companies answered that they had changed from a low grade to a high grade brush and found the results extremely satisfactory. Twenty-three companies have made no changes and the balance of the companies were still testing and had not as yet decided.

Seventy-five per cent of the companies stated that they were grooving their commutators, using a high grade brush and the average mileage was all the way from 15,050 to 43,000 miles. Practically all of the larger companies are using a high grade brush and grooving their commutators.

Twenty-three of the companies stated that they had noticed during the past year a decided improvement and a greater interest taken by the manufacturers in improving brushes. Twenty-three also had not noticed any improvement, but over 50 per cent of the companies are using a high grade brush of foreign make and state that these come very uniform and standard.

Seventeen of the larger companies state that they have obtained satisfactory results as to commutator and brush wear by grooving the commutators and by using a high grade brush, especially with the older types of motors. Several of the companies state that there is little commutator wear when using grooved commutators and soft high grade brushes, and that the brush tension can be reduced greatly by so doing. Several companies also called attention to the fact that a standard cannot be used on all types of motors, but that a series of tests should be made in order to determine the proper carbon that should be used with each type of motor. Two of the smaller companies are boiling their brushes in cylinder oil and are still using the old low grade brush. One large company states that it is better to use soft mica in commutator construction and the hard brush rather than groove the commutator.

Taking the reports of the companies collectively it is a noticeable fact that 75 per cent are following the recommendations of the American Street & Interurban Railway Engineering Association that were adopted last year; that there has been a decided improvement in brush quality, and that the railways have shown great interest in studying the subject of proper commutation. Many of the roads state that they have reduced their commutator and brush troubles 50 per cent during the last year.

Data on Carbon Brushes from the Manufacturer's Standpoint

A set of seperate questions was mailed to the different carbon brush manufacturers, that data might be obtained as regards specifications and the manufacture of carbon brushes for the several types of motors used both in city and high speed service. It would seem, according to all reports, that there can be no set specifications drawn that will cover all kinds of service. The conditions vary to such an extent that at the present time the only way to obtain a proper carbon for any motor is by making a running test. Certain conditions, such as the grooving of commutators, the hardness and thickness of mica used in the commutator, the speed, and the grades encountered, etc., are not always the same, therefore the specifications could not necessarily apply to all conditions. However, the manufacturers are always willing to meet these conditions, if explained to them by the railway companies, by sending several types of carbons for a running test for any motor, under any conditions.

In answer to a question regarding manufacturing improvements since the last convention, all of the American manufacturers answered that they had made many improvements, these consisting of changes in methods and processes of making that had eliminated to a great extent the segregation and shrinkage cracks that were formerly so common and that caused the breaking and chipping of the carbons, and consequently very poor commutation. Ingredients used have also undergone many changes and new mixtures have been added to make grades of carbons to meet the requirements of the different typs of motors oprated under the various conditions. Nearly all of the manufacturers are using the tests recommended last year by the American Street & Interurban Railway Engineering Association. The foreign

companies have made no change in the manufacture of their carbons, stating that they are standard.

Give specifications for a carbon brush to be used on a 100 hp to 125 hp motor with ungrooved commutator, in high speed service.

All of the companies agreed that the ingredients of a carbon for a 100 hp to 125 hp motor with ungrooved commutator in high speed service must be such as to give it the power to cut the mica insulation between the commutator bars and prevent high spots. The carbon should be hard, but not brittle; should be free from cracks and laminations, and should have a carrying capacity without heating of 125 amp per square inch of cross section on a running commutator.

In reply to questions 3, 4, 5, 6 and 7, in which the manufacturers were requested to give what they considered the best specifications for the various classes of service, the manufacturers stated that last year's specifications as proposed by the committee on maintenance and inspection of electrical equipment are entirely satisfactory.

The manufacturers did not seem to be able to state the increase in brush wear brought about by commutator grooving, but one of them gave an estimate that grooving increases the life of the carbon 12½ per cent. Several of the railway companies have expressed the opinion that it increases the life of the carbon at least from 25 to 100 per cent.

All stated that a test is given from their stock or from each lot of carbons manufactured and if the brushes do not stand this test the material is subject to re-burning or is scrapped, and all use the Association tests, which they approved and indorsed.

It is the opinion of the committee, arrived at from the study of data sheets submitted, that as a result of the stimulus given by the specifications of last year's committee and the standards set by a brush of foreign manufacture, the American manufacturers have so improved their product as to equal or excel any other made.

(d) Steel Tired vs. Rolled Steel Wheels.—Steel Tired Wheels

The information from which this report has been compiled was taken from data sheets sent to the different companies and from information received from the manufacturers. Data sheets returned on steel tired wheels show that many of the smaller roads are still using chilled cast wheels even in interurban service. It also shows that many of the larger companies are coming to the use of the rolled steel wheel, deeming it safer and more economical. One large company has entirely eliminated the use of steel-tired wheels and substituted rolled steel wheels. Thirty-five companies returned data sheets on the subject that could be used.

In answer to the questions submitted them, the data show that the average tire is about 3 in. thick and that they obtain about 2 in. wear. In doing this the wheels are given from two to four turnings and the approximate mileage between each turning is shown to average about 40,000 miles. Some roads allow the tires to run to a thickness of ⅞ in. before considering them unsafe, but the majority consider 1¼ in. as the limit of wear. It is noticeable that those who use ⅞ in. as a limit of wear have had considerable trouble with loose tires. This refers to fused tires with retaining rings and not to the bolted type.

Fifty companies returned data sheets on rolled steel wheels. The answers show that wheels vary in diameter from 30 in. to 37¼ in. New rims are from 2 in. to 3¾ in. thick. Some roads use them down to a limit of ¾ in., while others are using only to about 1½ in. This, however, is in the case of some of the smaller roads.

A great many state that rims were worn to a thickness of ¾ in. while several companies have a limit of ½ in. With the exception of a few smaller roads, the others use 1¼ in., the same as has been customary with the heavier type of steel tired wheel. The average shows that ¾ in. in thickness with the rolled steel wheel seems to be considered perfectly safe.

Three turnings are given by all roads except one of the larger companies, which gives 10 turnings. This large company gets 10,500 miles between each turning. The rest of the companies give their wheels from three to four turnings and obtain an average of about 30,000 to 35,000 miles between each turning. Nearly all stated that they find the last turning the softer and that they considered the rolled steel wheel the safer, and the majority thought it the more economical.

The diameters of the hub face which bears against collar of axle liner were given as follows:

For motors not over 45 hp, 9 in.; over 45 hp and less than 100 hp, 10 in, and 100 hp and over, 10½ in.

Rolled Steel Wheels vs. Steel Tired Wheels from the Manufacturer's Standpoint

A separate set of questions was sent to the several tire and wheel manufacturers, and questions and answers are as follows:

1.—Give specifications best suited for rolled steel wheels for street and interurban use.

One manufacturer gave the following formula:

Carbon	0.65 to 0.85 per cent
Manganese	0.60 to 0.90 per cent
Phosphorus	0.06 per cent
Silicon	0.15 to 0.35 per cent
Sulphur	0.05 per cent

2.—Describe the manner in which your wheels are rolled.

A long ingot is cast vertically, then sliced cold, and all segregation and shrinkage defects are discarded. The billet is then roughly pressed into shape under a 12,000-ton hydraulic press, which gives it a diameter from 6 in. to 10 in. less than the finished wheel. This blank therefore has all of the solidification defects, shrinkage, pipe, etc., entirely confined to the portion of the wheel occupied by the bore, out of which is then punched a piece weighing 18 lb. and upward, depending on the size of the wheel. A wheel so made is, therefore, very superior to one made from rolled steel, in which the pipe and segregation run through the wheel from face to face. This blank is then rolled in a specially constructed very heavy mill in which the work is done on the plate and rim, expanding the diameter and circumference until the finished section is obtained, the rim being entirely surrounded by rolls except the portion of the rim covered by the web. A second answer was similar to the above.

3.—Give thickness of web necessary for the several different diameters.

There was considerable variation in the answers to this question, but it would seem that from ¾ in. to ⅞ in. is the practice for street and interurban wheels. Approximately 1 in. is used for M. C. B. standards.

4.—Give approximate weights of the several different diameters, giving thickness and width of rims.

This was answered by the table of diameters and thicknesses of wheels and rims with the approximate weights as shown below:

Diam. of Wheel	Thickness of Rim.	Weights			
37 in.	3 in.	975	785	695	590
36 in.	2½ in.	875	710	625	540
34 in.	3 in.	900	715	630	540
33 in.	2½ in.	800	640	565	480
31 in,	3 in.	800	635	555	480
30 in.	2½ in.	700	570	500	425

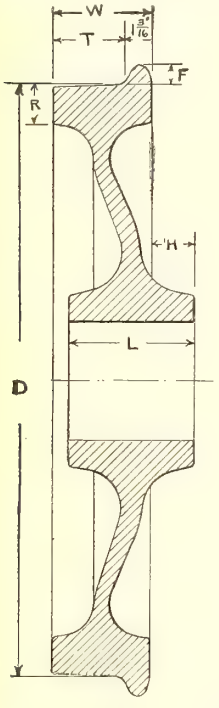
Answers to other questions were as follows in abstract: All companies stated that the material was homogeneous

throughout and contained somewhere between 0.65 and 0.85 per cent of carbon, but they all recommended about 0.70 per cent. It was stated that the rim of a rolled steel wheel could be made as homogeneous and even tempered as a steel tire. One company claimed that the rolled steel wheel was safer than the steel tired wheel. The interior flange bolted or riveted was considered the best fastening for steel tires.

Some manufacturers state that there is no difference and that both types of wheels can be worn practically to the same thickness, while others favor the rolled steel wheel.

Comparison of the Steel Tired Wheel with the Rolled Steel Wheel

Your committee does not believe it practicable at the present time to make any recommendations regarding which of the above types of wheels would be preferable, but desires to call attention to a few of the facts as regards both types, which should lead to a lively discussion of the subject.



ROLLED STEEL WHEELS
PROPOSED STANDARD SIZES.

D	T	R	H	L
33"	2½" or 3"	2½"	1 15/16" or 2 15/16"	5½"
34"	2½", 3" or 3½"	3"	"	6"
35"	3" or 3½"	3"	"	6"
36"	3" or 3½"	2½"	"	6"
37"	3" or 3½"	3"	"	6"

RELATION OF TREAD WIDTH TOTAL WIDTH AND FLANGE HEIGHT.

T	W	F
2½"	3 11/16"	¾"
3"	4 3/16"	⅞"
3½"	4 11/16"	⅞"

Rolling Stock Equipment—Rolled-Steel Wheels Recommended as Standard by Committee on Equipment

It would seem reasonable, especially from a safety standpoint, that a one-piece wheel would be preferred to a wheel made from several pieces or assembled sections. On the other hand, while the manufacturers contend that the rim of a rolled steel wheel is as homogeneous as a steel tire, the data, from the railroad companies shows that they find the last turning of these rims slightly softer than the first. It also shows that these rims can be worn to a greater amount with safety than can the steel tire.

The shop conditions in this case should also be taken into consideration, as many of the smaller roads are not equipped for removing and resetting the entire wheel, but can readily remove and reset a steel tire. Owing to the considerable amount of machine work that is required on steel tires, it would seem that the cost of a rolled steel wheel would not greatly exceed that of a steel tire, while the scrap value is all in favor of the rolled steel wheel.

It would seem that in the rolling of a tire the metal would be more homogeneous and evenly tempered throughout, as the rolling can be applied both to the inner and outer sections as well as to the sides, while with the rim of a rolled steel wheel this cannot be done. In comparing mileages, however, the data show that as to wearing qualities, the wheels are about equal and that the limit of wear of the rolled steel wheel rim can exceed that of a steel tire safely. This would offset the softness of the last turning, as before mentioned.

Shop Practice in the Maintenance of Wheels

In the maintenance of wheels, both for efficiency and economy, there are several points which might be considered which would increase the mileage or the life of the wheel. In selecting a pair of wheels to be mounted on an axle, the first thing to be taken into consideration is the diameter, in order that there may be as little variation in the wheels as possible. In boring the wheel, it should be bored absolutely true and it should be known that the axle is perfectly straight. The wheels after being pressed on should be gaged properly at several different points on their circumference so as to be absolutely certain that the flanges run true to the rail at all points. A gage should also be furnished the wheel inspectors whereby they could determine the exact wear of the tread and flange before the wheels are removed for returning.

It is very common practice for the interurban companies to allow the flanges to run until they are dangerously sharp. This is false economy, as, in this way so much metal has to be removed in turning to again bring the tread and flange to its proper shape, that the loss of metal is much greater than would be necessary were the wheels turned at the proper time.

Trucks should also be considered an important feature in the saving of wheel flanges. While from ordinary inspection it might appear that the truck was in fair condition, the placing of a tram diagonally across the truck from center to center of journal boxes will show a great many of them to be out of square. This also has a great deal to do with sharp flanges or the crowding of wheels.

Any of the above defects, to say nothing of bad track conditions, is an important factor in the life or mileage obtained from wheels.

(e) Proposed Standards for Rolled Steel Wheels

It is the belief of the wheel manufacturers, and of your committee, that certain representative dimensions of wheels can be adopted which will meet practically all requirements.

Manufacturers advise that much of the multiplicity of designs arises from differences in dimensions which are trivial for the most part and if the consumer had a proposition put to him in this way, by the manufacturers: "We can give you just the wheel you are ordering, but if you find yourself able to use an Association standard, which differs only slightly from your own, we will be able to sell this wheel to you for three or four dollars less per wheel than the one you call for," there is little doubt that the customer would waive any minor differences in size or design to take advantage of a pronounced economy.

A conference of wheel manufacturers was held in Chicago early in June, and the matter of standards was thoroughly discussed. This preliminary report was duly considered by the committee on equipment, and the committee recommends the sizes shown in the opposite column.

The fact that standard axles and standard height and thickness of flange as well as width of tread have been adopted by the Association simplifies materially the task of proposing standards for rolled wheels. There is nothing in the committee's recommendation which conflicts in any way with previously adopted standards of the Association, except that your committee suggests a change of flange contour which will be described in the next section of this report, but in either case the height and thickness of flange and width of tread remain the same.

(f) Proposed Flange Contour

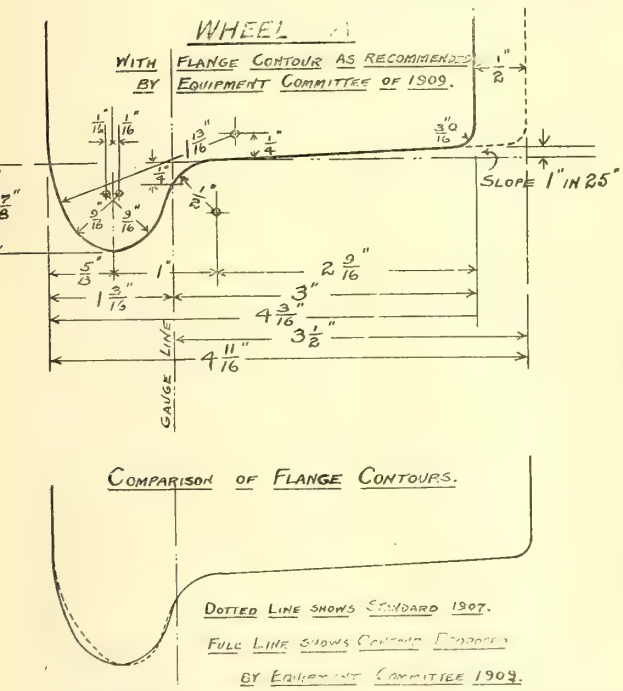
The standard flange and tread section adopted in 1907, wheel "A," shows a flange cut away on the outer face. This feature, your committee recognizes, may be necessary under certain conditions of city special work, but the general opin-

ion of both manufacturers and consumers, with whom this matter has been discussed, leads your committee to believe that a longer lived and more efficient flange can be secured. The flange section here shown is one which has given very good performance in actual service, and it is the opinion of your committee that this section will be found more satisfactory for the use of the average combined interurban and city road than the standard adopted in 1907, and hence this contour is respectfully submitted as a substitute for the one adopted in 1907. The diagram at the bottom of the illustration shows the relative shape of the two flanges.

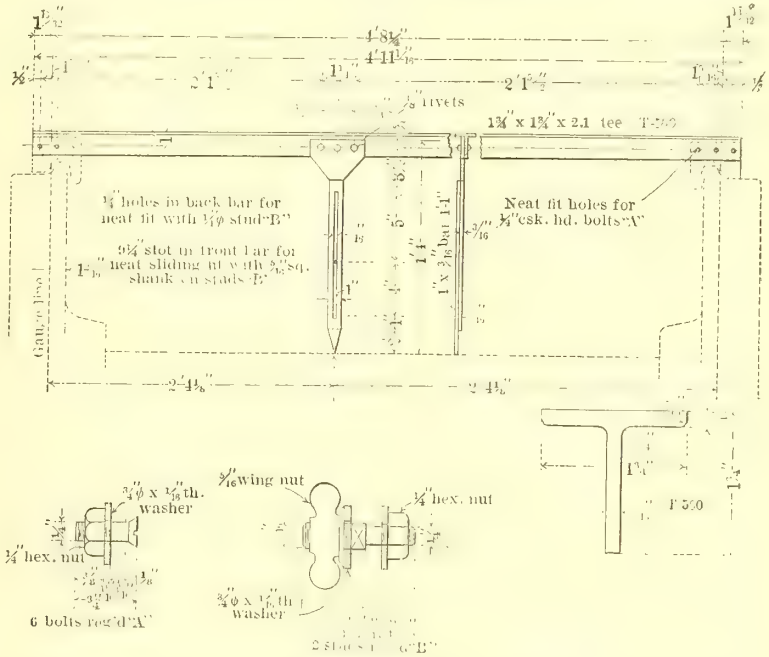
Your committee has no change to propose in wheel "B" adopted in 1907.

(g) Proposed Gage for Mounting Wheels

It is becoming recognized generally that where rapid wear or flange occurs, the rapidity of wear may not necessarily be due to any inherent defect in the wheel. If improper truck conditions exist, such as truck out of square, or truck not curving freely, these may produce bad flange wear. Also the same result may be experienced with mismated wheels



Rolling Stock Equipment—Flange Contour Recommended by Committee on Equipment



Rolling Stock Equipment—Gage Bar for Mounting Car Wheels

on the same axle, and from wheels not mounted centrally on the axle. In order to avoid this last condition it is proposed that a gage for mounting wheels will insure pressing the wheels on at exactly equal dimensions from the center of the axle be used. A good design of gage for mounting wheels is illustrated.

The center punch mark is made at the exact center of the axle, and as the first wheel is pressed on its location is proved up by the pointer with reference to the center punch mark. When the first wheel is properly located, the other can simply be mounted by reference to the mounting gage and flange of the wheel.

This gage for mounting wheels is proposed by your committee to be adopted by the Association as recommended practice.

[Section (h) on Heat-Treated Carbon Steel Axles, by J. S. Doyle is presented elsewhere.—Eds.]

(i) Knife vs. Snap Switches for Car and Car House Lighting

Letters of inquiry were sent out to manufacturers and insurance representatives and abstracts of their replies are as follows:

From the engineering department of a large electrical company: * * * "Except in the case of large cars where regular switchboards having slate or marble bases are used, the snap switches are much to be preferred for lighting and heating circuits, as compared with knife switches.

The same principle holds true in the case of car houses.

The above is true on account of the fact that knife switches for 600 volts have to be made with so long a distance between studs that unless a blade of very much heavier cross section than is necessary for carrying the current be employed, the switch is apt to be mechanically weak and flimsy. Thus, a 100-amp single-pole switch is about the smallest size that can be made with proper mechanical strength for such work, and a switch of this size is usually very much larger than the current requirements would call for.

Reliable snap switches can be made much more reasonable in size for 600-volt circuits, and, in addition to being covered and thus protected from accidental contact, are neater and less bulky.

A switch, the entire body of which is made of porcelain, offers an advantage over a metal-covered snap switch from the fact that there is no danger of the operator receiving a shock due to the switch becoming grounded in any way. On locomotives we had considerable trouble with metal-covered snap switches from this cause, and the engineers were subjected to considerable annoyance by receiving shocks from the switches. This difficulty was overcome by the use of porcelain cased switches which have proven very satisfactory.

Other large electrical companies wrote substantially as above.

From a New York underwriter's representative:

* * * We have had a great deal of trouble with snap switches owing to the fact that they are made too flimsy, and there has not been enough separation between the live parts.

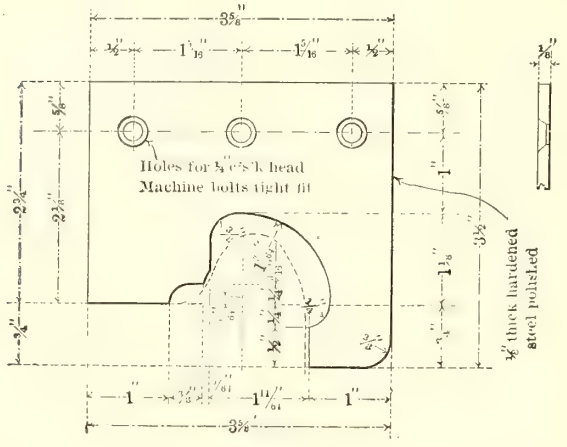
The mere fact that the parts of a switch are of sufficient proportions to carry the current necessary is a matter of little importance as compared with the amount of metal necessary for mechanical strength. These switches are used so continuously that the strongest we can get is none too strong for our purpose. Then, too, they are frequently misused by being so carelessly handled that their life is shortened.

The light flimsy construction of various snap switches, has, in the past, been generally and justly criticised, and the same objection holds true of the smaller forms of the baby knife switch. One of the principal advantages of the porcelain enclosed snap switch is that the live parts are protected. A great advantage of the knife over the snap switch is that the observer can tell at a glance whether the circuit is open or closed. It is evident that manufacturers of

switches realize that a more rugged and serviceable construction is demanded, and your committee is informed that designs of snap switches are being brought out to effect a material improvement in these respects.

Pending the service demonstration of the merits of these new designs no general recommendation on one form as against another will be made, but your committee would urge that designs of snap switches are being brought out to effect a material improvement in these respects.

Pending the service demonstration of the merits of these new designs no general recommendation on one form as



Rolling Stock Equipment—Gage for Use with Gage Bar in Mounting Car Wheels

against another will be made, but your committee would urge that in designs of porcelain enclosed snap switches the indication off and on be made as prominent and as nearly unmistakable as possible.

(j) Impregnation of Field Coils

The committee on maintenance and inspection of electrical equipment in 1907 recommended that all field coils be impregnated with solid compound. The following year the same committee ascertained, by data sheets, that the attitude of member companies toward the process was as follows:

7¼ per cent approve and follow to full extent.
40 per cent approve and follow partially.
31½ per cent approve but do not follow.
1¼ per cent do not approve.
15 per cent are non-committal.
5 per cent are experimenting.

Instead of sending out data sheets on the subject of impregnation of coils, your committee, this year, has written to various railways using this process, and they are unanimous in their approval of impregnated field coils both for new and second-hand coils.

One large Eastern company that operates its own impregnating plant writes as follows:

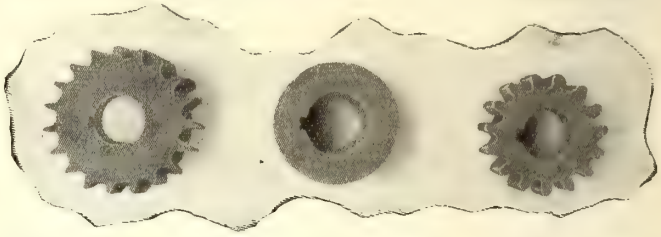
> We have had an impregnating plant in use for the past two years, and it is used only in connection with field coil work, as we have been unable up to the present time to find a compound that would stay in armature coils. During the years 1905 and 1906 we purchased for field work 109,700 lb. of copper wire. This was before we had installed the impregnating plant. For the years 1907 and 1908 we purchased 2143 lb. This is during the two years that we have had the impregnating plant in use.

Your committee wishes to re-affirm the recommendation of previous years in favor of impregnating, both for new and second-hand field coils.

[Section (k) on the 1200-Volt D. C. Car Equipment, by F. E. Case, engineer of railway equipment, General Electric Company; and Section (l), Recent Developments in Railway Motor Control, by Clarence Renshaw, Westinghouse Electric & Manufacturing Company, will be found elsewhere.—Eds.]

RECUTTING PINIONS IN DENVER

The accompanying illustration showing the three stages in recutting a railway motor pinion as done in the shops of the Denver City Tramway Company is presented through the courtesy of W. H. McAloney, superintendent of rolling stock. A 19-tooth steel pinion which has been worn out in service is shown. The middle view shows the same pinion after

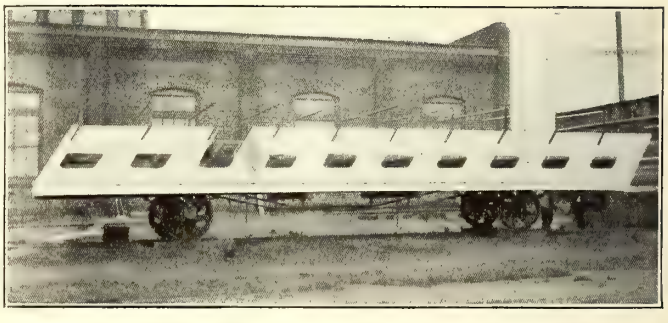


Denver City Tramway—Three Stages in Recutting a New Pinion from an Old One

the wornout teeth have been machined off, and a third view shows a new pinion which has been cut and finished on a milling machine, using the body of the old pinion as the blank. The small pinion cut from the old one has 15 teeth. Mr. McAloney states that the cost for recutting pinions is 90 cents, a small amount when compared with the original cost of a new 15-tooth pinion, which is given as $2.24.

CARS FOR MT. MORRISON CABLE RAILWAY

Ten miles west of Denver a cable road is being constructed up the steep side of Mt. Morrison. From the summit of this road a magnificent view of the Rocky Mountains to the west and the plains of Colorado to the east may be had. The construction of the roadbed up the side of the mountain which, in some places has a rise of 70 ft. in 100 ft., has called for careful engineering work. Passengers will be



Open Car for Mt. Morrison Cable Road

carried up and down this incline cable road in two large open cars, one of which is illustrated. These cars, it will be noted, are provided with cross seats built in an inclined position so that they may be easier to sit upon when the car is negotiating the steep grades. These cars were built by the Woeber Carriage Company of Denver, and will be operatd through the medium of a cable with one car at either end, thus balancing the load.

The city and interurban carmen of the Detroit United Railway who have been in service for two years or more have received voluntary increases in wages as follows: Two year men from 24 cents to 25 cents an hour; three year men or over, 25 cents to 27 cents an hour. The one year men will continue to receive 23 cents an hour as heretofore.

John S. Kennedy, secretary of the Public Service Commission of New York, Second District, contributed to the Saturday Evening Post of Sept. 25, 1909, an article on the work of the commission, entitled "Safe-Guarding the Public Services."

Among the Exhibits

The attention of those interested in overhead line equipment is called to Spaces 624-626, where the Electric Railway Equipment Company has on exhibit its Universal hangers. This is a new device which greatly simplifies overhead construction.

* * *

At Space 620 can be seen the reason why the Denver City Tramway Company has treated 200,000 ties with the "C. A." wood preserver. A number of sample treated ties were taken from a piece of track in Denver, and presented to the "C. A." Wood Preserver Company of Austin, Tex., for this exhibit.

* * *

The Vacuum Car Ventilating Company, Chicago, Ill., is represented at the convention by D. T. Cooke, the patentee of the system of ventilation which the company has just placed on the market. The company has recently received an order from the Chicago Railways Company for equipping 350 of its P-A-Y-E cars with this system of ventilation.

* * *

The Western Lumber & Pole Company, Denver, Colo., has an exhibit in Space 701. The name of this company did not appear in the list of exhibitors as published in the **Electric Railway Journal** for Oct. 5, 1909. B. F. Vreeland, W. H. Lewis and M. G. Graft, representing the Western Lumber & Pole Company, are showing genuine Idaho cedar poles, treated fir ties and paving blocks.

* * *

The Railway Materials Company, Chicago, Ill., has no exhibit at the convention this year but is represented by F. C. Folsom. This company manufactures brake shoes and has recently placed on the market the RYMCO automatic high-speed trolley switch for interurban railways. This switch is a mechanical device operated in unison with the track switch which when desired automatically shifts the trolley wheel from the main line wire to the siding wire. During the past six months this switch has been adopted for use on more than 25 high-speed interurban lines.

* * *

John F. Scott Company, Highland Park, Ill., shows in Space 723 the Scott combination hanger and ear and other line material. Mr. Scott was formerly superintendent of construction for the Chicago & Milwaukee Electric Railroad Company and is a man of wide practical experience. His combination hanger and ear is a single casting taking the place of the old-style separate hanger and separate ear connected with a bolt, thus replacing the two-piece or three-piece suspension by a single casting. The device is composed largely of copper and has been tried out successfully for over seven years in high-speed interurban service. Mr. Scott also shows the H. B. Clarke section breaker skate. This device is said to more than double the life of the circuit breaker, due to the fact that the skate has a flexible end to take care of all line motion. This device is made from an alloy consisting of 85 per cent copper.

* * *

The Ohio Brass Company occupies Spaces 47-59 inclusive, and is exhibiting its overhead trolley fixtures including those used for catenary construction, "One Piece" rail bonds, third-rail insulators and high-tension insulators. Of particular interest is its electrically-illuminated classification and marker system shown in operation. The new No. 1 Tomlinson coupler for city service is shown in operation and in such a manner as to demonstrate its intercoupling features. The Tomlinson M.C.B. automatic coupler is also shown. Pneumatic sanders are shown in operation and in the high-tension insulator portion of the exhibit is shown the 110,000-volt suspended type of insulator as used by the Hydro-Electric Power Commission of Toronto, Ont. This insulator was adopted as standard by the power commission after an exhaustive series of insulator investigations were conducted. A model of the tower as used on this notable transmission system is also on exhibition. An automobile carrying pennants displaying the Ohio Brass Company's monogram in orange and black is at the entrance to convey delegates to and from their respective hotels.

* * *

Meyer Safety Guard Company is demonstrating the prevention of boarding and alighting accidents, on all types of cars, through the use of its safety guard. Street railway men from all over the country are investigating this invention and it is said a number of companies are considering the adoption of this device.

* * *

The Automatic Fusible Lightning Arrester Company has an interesting exhibit in its booth at the south end of the annex. This arrester is practically designed for trolley line and feeder protection and has established a unique record for protection in Colorado Springs, where electric storms are very severe and where cars have been stopped during storms.

* * *

George Wilson of Pasadena Cal., has on exhibition at booth 401 in the main Auditorium a model of the Wilson continuous rail joint. The outer plate of the joint is rolled to fit flush with the tread of the rail at the top and extend under the base. The outer plate serves as a rider over the joint by means of which the wheel is carried over the joint without the usual hammering. The inner plate connects with the lower part of the outer plate and thereby assures a perfect alignment of the rail ends.

* * *

The American Wood Preserving Company, Chicago, Ill., Space 245, is distributing copies of the analysis of "Antiseptine," which is an improved carbolineum-type of wood preservative. According to the analysis made by Prof. Gellert Alleman of Swarthmore College, "Antiseptine" is shown to be more powerful and permanent than any other preservative now on the market. The company guarantees that all shipments will conform strictly to specifications. The company is represented at the convention by J. R. Bird and H. W. Weihe.

* * *

The Allen street railway switch, now on exhibition in Section 719, is attracting wide attention on account of its simplicity and adaptability for the work intended. It is automatic, operated by the motorman from the vestibule by foot pressure. The pressure may be applied 10 or 15 ft. before reaching the switch plate, which is in the center of the track on the ground level and distant from the switch rail 15 ft. or more. The advantages claimed for this device are that there is no apparent friction or grinding sound, no expensive outlay and no maintenance expense; no machinery to protect from dir; that it will work under all conditions. If a car on the track is not provided with the switch-throwing device the switch can be thrown with a switch rod in the old way. A. B. Allen, the inventor, lives in Pueblo.

* * *

The Nichols Street Car Signal Company is exhibiting a working model of its signal in Space 417 and also on the pay-as-you-enter cars in Spaces 180 and 184. A sample is also shown at the Western Electric Spaces, 118-124. This new signal is devised to save life and prevent injury to persons, and it appeals both to the layman and the practical street railway man. It is intended to prevent accidents caused to pedestrians passing back of one car, but in front of another approaching on a parallel track. An electric gong placed on the rear dash, operated by the motorman from trolley current, gives alarm when a car is approaching on the other track. Electric lights are used with the gong and illuminate words of warning at night. The signal is positive in opera-

tion, and the inventor believes that it cannot fail to answer the purpose for which it is intended.

* * *

The Star Brass Works of Kalamazoo are exhibiting their well-known line of trolley wheels and harps.

* * *

F. N. Root of Kalamazoo, Mich., is showing Root track scrapers at the booth of the Star Brass Works.

* * *

J. R. Wiley is the only representative in Denver for the Standard Underground Cable Company, Pittsburgh, Pa.

* * *

H. A. Corell, Buffalo, N. Y., representing the Corell Railroad Tie Company, Mt. Jewett, Pa., spent Wednesday at the convention.

* * *

A. A. Wagner and E. D. Batchelor are attending the convention in the interests of the Jones & Laughlin Steel Company, Pittsburgh, Pa.

* * *

Harold J. Wrape of the American Carbon & Battery Company, East St. Louis, Ill., has headquarters at the Standish Hotel. His company is not exhibiting this year.

* * *

The American Car & Foundry Company has no exhibit but is represented at the convention by C. P. Dickerman, W. C. Dickerman, W. A. Williams and Thomas Plunkett.

* * *

The Hudson & Manhattan Railroad, New York, is continuing to order Karbolith car flooring of the American Mason Safety Tread Company, specifying a carborundum-sprinkled surface.

* * *

The Baldwin Locomotive Works, Philadelphia, Pa., is represented by C. F. Dodson, Charles Riddell and Carl H. Peterson, who are making their headquarters in the booth of the Standard Steel Works Company.

* * *

The Wheel Truing Brake Shoe Company of Detroit, located in Space 229, reports that a good deal of interest is being shown in its abrasive shoes, which are adapted for service on both chilled iron and steel wheels.

* * *

The interests of the Niles Car & Manufacturing Company, Niles, Ohio, are being looked after at the convention by J. A. Hanna, sales manager, and F. C. Robbins. This company makes a specialty of large interurban cars.

* * *

For the first time in several years the Joseph Dixon Crucible Company, Jersey City, N. J., is not making an exhibit at the convention. The company, however, is represented at Denver by its St. Louis representative, Charles D. McIntosh.

* * *

E. H. Sniffin, second vice-president and head of the sales department of the Westinghouse Machine Company, is attending the convention in the interests of his company. Mr. Sniffin is known among electric railway men from Maine to California.

* * *

F. F. Stockwell and H. R. Luther of the Barbour-Stockwell Company, Boston, Mass., arrived on Monday to attend the convention. Although they have no exhibit, there will not be many railway men to whom they will fail to extend their cordial greeting.

* * *

The Tool Steel Gear & Pinion Company is showing a number of specimens of its hardened steel motor gears and pinions. These products are made of an extra grade of steel and it is claimed are practically indestructible.

The representatives of the Electric Storage Battery Company, Philadelphia, Pa., are making their headquarters at the Savoy Hotel. The party includes Godfrey H. Atkin, manager of Chicago office; H. B. Marshall, St. Louis office; George H. Morris and R. L. Lunt.

* * *

The Wyoming Yarn Company, New York, is showing at Booth 514 samples of its Wypak journal packings. This is an all-wool product that retains the oil in the journal box and properly lubricates the bearing. The company is represented at the convention by E. M. Tillinghast.

* * *

The Nachod Signal Company of Philadelphia is showing its Type C signal for trolley roads by means of a miniature track plan connected up to a pair of signal boxes. This demonstration is eliciting a good deal of interest, as any operating condition can be produced and the effect immediately noted.

* * *

Delegates attending the convention have an opportunity to look into the merits of the Rooke system of fare collection at Space 140. The Rooke automatic fare collector and the Rooke fare box for pay-as-you-enter cars are there on exhibition with R. S. Rooke in attendance to explain their operation.

* * *

The Electric Service Supplies Company is showing as part of its exhibit in Spaces 270-276 and 321-327, a new type of automotoneer. A number of improvements have been made in this device which will be found of interest. This company has recently completely equipped some of the largest railway systems with the automotoneer.

* * *

A railway crossing alarm is shown at the American District Telegraph office in the basement of the Colorado Telephone building. This alarm is noteworthy on account of its simplicity and low price. It ceases to ring when the train is on the crossing. Mr. Alexander, the inventor, is on hand to explain the workings of this new device.

* * *

As usual, the booth of the Taylor Electric Truck Company, Troy, N. Y., is a center of interest to railway men. Photographs of over 30 types of trucks are shown as well as photographs of springs and wheels. This company manufactures the Taylor malleable center steel-tired wheels known as T. M. C. wheels. The exhibit is in charge of John Taylor and C. H. Dodge.

* * *

For special use on cars where the regular style of tip does not permit the curtain to be raised sufficiently high, the Curtain Supply Company has designed a short tip fixture embodying the same principles and mechanism as the Forsyth No. 86 fixture, and is exhibiting it at the convention this year. This short tip fixture is especially desirable for use in connection with a narrow curtain box.

* * *

For several years past the Massachusetts Chemical Company has made a practice of distributing at the street railway conventions valuable souvenirs, and this year is no exception. The representatives of the company have announced that purchasing agents and master mechanics in attendance at the convention will find it a paying investment to visit the company's booth, No. 114, in the Auditorium annex. The company's representatives state that its past record for giving souvenirs of value is being surpassed this year. A special invitation is extended to all railway men to visit the booth today.

* * *

The Standard Brake Shoe Company, located in Space 400, are represented by F. C. Peck and C. P. Wright, president.

Owing to the fact that every available foot of floor space in the company's roomy plant is at present filled with rush work it was impossible to get out a satisfactory line of sample brake shoes for the exhibit. Either Mr. Peck or Mr. Wright will be glad to give full information regarding their special mixture cast iron brake-shoes.

* * *

The Chicago Car Heating Company in Spaces 170-172 has an exhibit of a new hot-water heater in operation. This heater embodies a number of new features and it is claimed will reduce the fuel consumption 50 per cent. It also eliminates the annoyance of frequently refilling the heater system with water necessitated by frequent opening of safety valves to relieve the pressure. The system is also adapted to heating residences as well as cars. It is shown in operation and W. P. Cosper is in charge to explain any points.

* * *

E. W. Furbush, L. O. Duclos and A. E. Duclos are busy at Booth 114 explaining the merits of the various products manufactured by the Massachusetts Chemical Co. They have in charge a varied exhibit of insulating specialties, including Armalac insulating compound, Neponset, Walpole, No. "264," Norfolk, Re-insulating, and Dryfield insulating rubber and friction tapes; insulating paints, Enamelac, baking japan, asphaltum varnish; Neponset, Walpole and Union splicing; compound insulating cement, cable wax and filling compound.

* * *

McGuire-Cummings Manufacturing Company, Chicago, is distributing at the convention an attractive folder calling particular attention to the single and double-truck types of snow sweepers and snow plows manufactured by the company. The folder is several feet long when unfolded and contains besides half-tone illustrations of the various types of snow-handling cars, a list of the cities where its cars are in use and a few letters from railway officials who have had experience in fighting snow with this company's equipment.

* * *

The Avery Scale Company of North Milwaukee is demonstrating in Spaces 616-618 a patent automatic track scale for weighing coal or ashes in power houses, mines, gas works, etc. This scale automatically weighs and registers the number of loads passing over it. It shows the net weight of each load and integrates the net weighings for the day. The company also demonstrates an automatic continuous weigher for handling coal to boilers. The company is represented by N. C. Webster, manager, and Ben E. Ordway, southwest representative.

* * *

The representatives of the Buckeye Electric Company are busy this week explaining the value of tantalum lamps for street car lighting. This company has developed a metallic filament incandescent lamp which when connected in series for car lighting provides excellent interior illumination. It is claimed the lamps have an average life in service of 1700 hours and that their use makes it possible to save from $80 to $100 per year for every 1000 lamps installed. The company has equipped about 300 of the cars of the Denver City Tramway with these lamps.

* * *

Traffic managers insist that if you advertise a high-speed service you must maintain it. Bearing this fact in view it is interesting to note that a damaged pole or wheel may be changed in 20 seconds by using the high-speed trolley equipment exhibited by the Bayonet Trolley Harp Company of Springfield, Ohio. This prevents loss of time and obviates accidents. Mechanical men also will be interested in the Bayonet line of self-lubricating wheels and axles. No bushings need to be renewed. The Bayonet people are comfortably located and they especially invite those who are interested in rapid transit to inspect their exhibit.

William Wharton, Jr., & Company, Incorporated, Philadelphia, Pa., is exhibiting, besides its standard manganese steel special work, a number of unique track devices, including tongue locks for switches, clamps for guard rails, switch stands and a new rail joint that has met with great favor abroad. An interesting booklet, giving records of service of Wharton manganese steel track work, is being distributed to callers at the booth. One of the most interesting parts of this company's exhibit is a diagram showing the comparative wear of a Bessemer rail and a cast manganese steel rail.

* * *

This year the Curtain Supply Company is showing at its booth something entirely new in the shape of a full size section of a Brill open car constructed with enclosed grooves and equipped with Ring No. 089 Curtain fixtures. This fixture embodies the same principles as the Ring No. 89 but is larger and of heavier construction and is especially designed for open car use. The Ring No. 089 fixture is always used in connection with an enclosed groove, which makes it absolutely impossible for the fixture to escape from the groove when in service.

* * *

The Public Service Commission of New York, First District, demonstrated by the extensive tests held at Schnectady and Pittsburg in 1908 that wheel guards are practical and efficient devices to protect the public from serious injury. The H. B. life guard secured the highest award in these tests both for efficiency and economy of maintenance. As a result of the tests the H. B. life guard was placed on the market in the United States last February, since when its progress has been remarkable.

It has been adopted recently by some of the largest roads in the country in less than nine months. Some of the systems using this life guard are: Third Avenue Railroad Company, New York; Metropolitan Street Railway Company, New York; Richmond Light & Power Company, New York; New York City Interborough Company; Union Railway Company, New York; Westchester Electric Railway, New York; Tarrytown (N. Y.) Electric Railway; Long Island Railroad; Montreal Street Railway Company; Savannah Electric Railway Company; Chicago City Railway Company.

* * *

Not a single fatality has been reported with the life guards in use. The following record gives a few of the recent pick-ups made on the Third Avenue Railroad: April 27, man picked up on Pearl Street uninjured. May 5, girl 15 years of age picked up on Seventy-ninth Street, unhurt. August 11, boy picked up on fender. August, 18, boy 10 years old picked up unhurt. August 19, colored woman picked up, not injured in the slightest. August 22, man and bicycle picked up, bicycle lost one pedal. The construction and operation of the life guard is simple and cannot get out of order. When once properly fitted to a car, the instantaneous operation makes it impossible for any person to pass under the wheels of the car, no matter at what speed the car may be traveling at the time of the accident. The life guard is operated by means of the person or object coming in contact with an apron or gate suspended from the car body. Immediately this gate is thrown out of the vertical position, the tray or scoop dropped to the ground, and held on the rails with a pressure of considerably over 100 lb., so that it is impossible for a person to become wedged under the carriage. To reset the life guard the motorman has merely to depress a foot pedal, which is forced through the floor of the car when the guard is tripped.

* * *

Electric railway engineers will be interested to learn that Wm. Wharton, Jr., & Company, Incorporated, will distribute a new catalogue in a few weeks. This catalogue is to be in the shape of lettered sections, each section being

confined to some specialty or subject. Thus, Section "A" will deal with records made by Wharton work; Section "B" with girder-rail work; "C" with T-rail work, and so on. These sections will be combined into loose-leaf binders, into which any additions may be inserted with little trouble. While the entire book is not yet ready, Sections "A" and "B" are, and the Wharton representative will be glad to furnish them to those interested.

* * *

Among the souvenir booklets distributed at the convention the handsome pamphlet on "Water Treatment" of the Dearborn Drug & Chemical Works deserves especial mention. In this book the history of the company is given from its small beginning, and all departments of the present extensive establishment are described and illustrated. The laboratory service for the clients of the company is carefully described, and the water treatment necessary for locomotive, stationary, marine and other boilers is discussed. Space is also devoted to the lubricating department of the company's business. The book contains a great deal of valuable information attractively presented.

* * *

At the exhibit of the Coin Counting Machine Company is shown for the first time the improved Johnson registering fare box. This box automatically counts coins of any denomination inserted in it, and at the same time sorts and deposits pennies, nickels, dimes and quarters in separate compartments of a drawer provided for the purpose. At the same time the coins are registered. If a nickel is deposited one fare is recorded; if a dime is deposited two fares are recorded, etc. If five pennies are deposited only one fare is recorded. The fare box is constructed along durable lines and occupies only a small space. W. P. Butler is in charge of the exhibit.

* * *

The Ohmer Fare Register Company of Dayton, Ohio, has an interesting display in Spaces 15-27. It is showing many types of register that record from 1 to 30 classes of fares. It also has many new devices, among them a 14-fare register, and also one for 60-fare operation. Four types of Ohmer operating registering devices, admirably arranged for pay-as-you-enter cars are exhibited. They provide for the collection of 2, 3 or 6 fares. A novelty about this exhibit is that the booth is decorated with silver and gold shields and a large flag. The seal of the State of Colorado covers one shield and the seal of the State of Ohio the other.

* * *

The H. W. Johns-Manville Company in Space 152 is showing a complete line of overhead trolley material and high-tension transmission material, including both suspension and pin type porcelain insulators for all voltages. In the State of Wisconsin alone more than 35,000 units of J.-M. suspension type insulators are being installed on the transmission lines of The Milwaukee Electric Railway & Light Company, the Southern Wisconsin Power Company and the Northern Hydro-Electric Power Company. A full line of electrical insulating material is shown, including "Vulcabeston" special moulded pieces, "Electrobestos" fireproof insulation, indurated fiber controller covers, oil switch tanks, conduit, third-rail protectors, ebony-asbestos wood in sheets and special moulded forms. "Linolite," the new system of lighting, is in operation in both tungsten filament and carbon filament lamps, demonstrating the latest types of "Linolite" reflectors for show-case and show-window lighting, picture, desk and table sets and weather-proof "Linolite" for outlining purposes. "Noark" fuses and the latest types of "Noark" car and service boxes are on display. In addition to the electrical products of this company is shown a full line of asbestos steam pipe and boiler coverings, asbestos roofings, packings and fireproof building materials of every description.

One of the interesting exhibits of the convention is that at the booth of the Felt & Tarrant Manufacturing Company, Chicago, touch operating on the Comptometer, adding and calculating machine, is demonstrated. This machine not only adds but subtracts, multiplies and divides. In fact, any business calculation may be figured on it. It holds the world's records for speed in adding 500 checks and affords an absolute method for checking the accuracy of the results. All prizes ever offered for speed and accuracy on addition and multiplication, in contests open to all machines, have been won by the Comptometer, and it is said it has now been barred from all contests as it is in a class by itself.

* * *

One of the innovations shown at the convention this year is the hot air, forced circulation, car heater which the Peter Smith Heater Company, of Detroit, Mich., is exhibiting. This heater is designed particularly for uniformly heating city cars of every type. The heater occupies a floor space only 17 in. square and is about 42 in. high. It is arranged to take cold air from the outside of the car into an air chamber and allow it to pass upward into an intake of a motor-driven blower. The blower forces the air into an inner chamber surrounding the fire-box where it is heated. The air then passes through a duct running along the floor of the car and is distributed uniformly throughout the car through openings in the duct under the seats.

* * *

Near the Champa-Street entrance to the Annex, a conspicuous feature of the car exhibit is the handsome car shown by the Cincinnati Car Company. This is one of five double-truck, semi-convertible cars built for the Ogden Rapid Transit Company, Ogden, Utah, and was intercepted on its way to its destination to be exhibited at Denver. The length of the car body over corner posts is 33 ft., and there are 6½-ft. platforms which are suspended by built-up girder trusses which form a special feature of all equipment of the Cincinnati Car Company. The car will seat 50 passengers. Its chief feature is its light weight, the car body alone weighing but 16,000 lb. This minimum weight has been obtained without in any way sacrificing the stability of the car. The company is represented by Henry C. Ebert, president of the company, who will be glad to explain to visitors the distinguishing characteristics of his exhibit.

* * *

It is seldom that a device exhibited before the convention for the first time has aroused the wide interest that has been shown in the Jones beveled rail joint exhibited by Duncan Bond, of Denver, in Spaces 621 and 623. Its features are simplicity and efficiency. The rail ends instead of being cut off vertically are cut off at a slight angle, making a bevel. The beveled ends of rails are placed firmly together in the track, and the end of one rail then supports the other. The feature of cutting the rail ends at an angle out of the vertical is patented, and a royalty charge is made for its use. The rail ends are cut to the Jones patent bevel by the rail manufacturer. Neither the rails, splice plates, bolts nor nuts are covered by patent; these may be purchased in the open market. The joints are bonded by any standard type of plastic or copper bond, no special tools or appliances are required and no allowance is necessary for expansion or contraction except where the base of the rail is exposed. This joint was thoroughly tested for five years in Denver before being offered in the market, and has now been adopted as standard by the Denver City Tramway Company. The joint is equally feasible for laying a small or large number of rails. A large number of delegates who examined the tracks of the Denver City Tramway Company found it almost impossible to detect the joints, as the equipment passes over the track without a jar. Owing to the interest shown in this joint, the Pennsylvania Steel Company and Harold P. Brown exhibited samples also.

Day's guard-rail lubricator is one of the newest inventions for lubricating the guard-rail on curves. The device saves labor, reduces the cost of the grease and also provides lubrication, thereby saving wear on both wheel and rail. It insures cleaner crossings, as the oil is evenly distributed, and it practically eliminates the disagreeable feature caused by particles of grease being carried over the rail by the wheel first coming in contact with it. The cost of operation is negligible as the work is done by the pressure of the motorman's foot without interfering with his other work. The amount of oil can be perfectly controlled, the outlet opening being regulated according to temperature. This invention is shown by William L. Day of Weldona, Colo., and is exhibited in Space 419.

* * *

Over 50,000 miles of railway equipped with the Continuous, Weber and Wolhaupter types of rail joints is the record of the Rail Joint Company. This is equal to approximately 12 per cent of the total steam and electric railway mileage in the entire United States and is enough to construct a double track road encircling the globe. The company has abundant evidence to prove that the factors of safety and economy in track maintenance have been immensely enhanced by the installation of its base-supported rail joints. The company is constantly adding improved machinery to its facilities for the manufacture of its base-supported rail joints. In its exhibit at Spaces 156-158 various types of standard T and girder rail sections are displayed, as well as different types of insulated joints. The interests of the company at the convention are looked after by F. C. Webb, J. A. Greer, W. T. McCaskey, W. E. Clark, E. L. Van Dressar and P. D. Watson.

* * *

The exhibit of Cortlandt F. Ames of Chicago in Space 713, contains many novelties of interest. One of these is an automatic lock nut, which will not rust on the bolt, but can be taken off at any time. It is practically indestructible as well as fool-proof and is adapted for motor, truck and track work. A compound manufactured by the Ohio Filler & Shield Company, for lubricating gears forming a shield or coating over the teeth of the gear and pinion, eliminating noise and the metallic contact, saving wear on the teeth and lengthening the life of the gear is also shown. Similarly, rope shield, axle shield, roof shield and metal shield compounds protect the apparatus for which they are designed. The Hercules pumping post, one of the Ames specialties, is made entirely of steel and malleable iron. It is said that it will stand more abuse than anything made for this purpose. Trolley poles, steel poles for all purposes, babbitt metals and bronze bearings are shown by Mr. Ames.

* * *

One of the exhibits which is attracting a great deal of interest is the 70-ft. McKeen motor car designed and built by the McKeen Motor Car Company of Omaha, Neb. W. R. McKeen, Jr., formerly superintendent of motive power and machinery of the Union Pacific, is president and general manager of the McKeen Motor Car Company and has been one of the first mechanical engineers to realize the great possibilities of the gasoline engine. The car consists of a passenger compartment seating 54, a smoking compartment seating 10, a 9½-ft. bagage room, 7-ft., railroad postoffice and the engine room.

The car is propelled by a 200-hp 6-cylinder internal combustion engine built by the McKeen Motor Car Company, which is mounted on the front truck independent of the car body, thereby relieving the car of all vibration. The power from the engine is transmitted direct to the main axle by means of a Morse silent chain transmitting power at 96 per cent. efficiency.

The car is of all-steel construction and is handsomely finished in Cuban mahogany and lighted by the Commercial acetylene system. One of the unique features is the ventilating system, fresh air being delivered to the floor of the car and the foul air exhausted to the roof. Other novel features are the round windows, giving a wind, rain and dust-tight window, and the center entrance which does away with the step box. In the winter the steps are free from ice and snow. The round windows and center entrance design also permit of a much stronger frame construction than would be possible otherwise, the sides of the car forming a combination truss and plate girder.

The car is 70 ft. long over end sills, 9 ft. 8 in. wide inside and 7 ft. 5 5/8 in. high from floor to ceiling. It weighs 68,000 lb. in working order.

The McKeen Motor Car Company now has 53 cars of this type in service or on order by 25 railroad companies.

* * *

The bonding tools exhibited by the American Steel & Wire Company always attract the attention of practical railroad men. The single-end four-spindle drills, both hand and motor driven, are unique and simple in design, remarkably efficient and are admirably adapted for quick and accurate drilling of rails for bonds. A very interesting rail bond testing equipment made by this company is shown for the first time. The measurements of rail-joint resistances are read off directly from self-winding tape lines in feet of rail. The instrument differs in design from anything heretofore shown and is well worth seeing. Bonds of various types are shown, among them those adopted in the electrification of the New York, New Haven & Hartford Railroad, New York Central Railroad, Pennsylvania tunnels in New York City and the feeder rail bonds for the Detroit River Tunnels. Paper and rubber insulated lead-encased cables are shown, also springs, wire rope and American right-of-way fence, and other materials of interest to railway men.

* * *

In Space 413 in the Auditorium Building will be found the attractive exhibit of Invincible renovators, manufactured by the Electric Renovator Manufacturing Company of Pittsburg. This exhibit is in charge of C. P. Fenner, sales manager of the company, and Mr. McCauley, the local representative. The exhibit includes the Commercial and Domestic models of the Invincible machines, which are suitable for the cleaning of the interior of cars, including upholstery, curtains, etc., and also for the blowing out of generators, car motors, and other inaccessible parts of the equipment. These machines are also very largely used by hotels, theaters, churches, lodge-rooms, apartment houses, etc. A new production is the Invincible Junior machine, which is light and easily portable, but at the same time has a degree of efficiency approximating the larger models. This small machine uses only a ¼-hp motor, and weighs only about 65 lb.

* * *

The Electric Service Supplies Company, Philadelphia, Pa., has a large booth in the Auditorium opposite the convention hall entrance where it is exhibiting a number of new specialties and a full line of standard apparatus. Among the new devices shown are the improved St. Louis trolley wire pick-up which is adjustable to take any size of wire; a double air valve for operating a Keystone pneumatic sander and Keystone gong ringer; an improved design of Automotoneer and controller handle with adjustable lock on the controller shaft and a new type of line lightning arrester. Lyon reinforced steel gear cases, Keystone trolley material for ordinary and catenary construction, protected rail bonds, bell cord and other standard apparatus are included in the exhibit. In the center of the booth is a full-sized operative section of a "Pay-Within" car. This feature of the exhibit has attracted attention from nearly every railway man present at the convention. A number of large orders for cars of this type are in prospect as a result of the convincing demonstrations of this sample equipment.

EARLY HISTORY OF CARBON BRUSHES IN THE UNITED STATES

The following interesting review of the history of carbon brush manufacture in the United States has been prepared from notes furnished by J. S. Speer, president of the Speer Carbon Company, St. Marys, Pa.:

Carbon brushes were first manufactured in the United States in 1887 by James Partridge and Robert Loughlin. The factory was located in Mahoning, Pa. After considerable experimenting these two pioneers in the field succeeded in producing motor brushes which operated very satisfactorily on old Sprague motors which were among the first commercial dynamo-electric machines on the market. In 1890 Mr. Partridge and Mr. Speer organized a company and built a factory for the manufacture of carbon brushes at Sandusky, Ohio, where the famous Partridge self-lubricating carbon brush was made for many years. In 1899 the National Carbon Company bought the Partridge Carbon Company's factory and Mr. Speer went to St. Marys, Pa., and organized what is now the Speer Carbon Company. The carbon brushes made in 1893 to 1895 gave a mileage in service of 5,000 miles, which was considered phenomenal at the time. The brushes made by the Speer Carbon Company at the present time give records of from 50,000 to 60,000 miles.

EXHIBIT OF THE LORAIN STEEL COMPANY

The Lorain Steel Company is showing an approved form of tongue switch. The main structure is of open hearth steel. The wearing plate, which extends beyond the tongue both at the point and heel and the tongue proper are made of the well-known "Guarantee" brand of superior, high quality managanese steel. The inherent feature of this switch is in the broad bearing given to the tongue at the heel. The diameter of the tongue heel is 9½ in., assuring a solid bearing equal to 60 sq. ins., or five times the support accorded in ordinary street railway practice. Almost this entire area is found in the base of the wearing plate, which is ground to a perfect bearing for the full length of the tongue, only a small portion in the center being cored to admit the lug which is cast fast to the base of the tongue. This lug is not depended upon to center the heel of the tongue, this office being performed by the sides of the cylinder which are ground to a perfectly true circle to receive the heel of the tongue in an absolutely perfect mechanical fit. The lug is provided as a means of retaining the tongue on its perfect bearing under conditions of snow, ice or mud. By applying pressure through the small lever shown, the tongue is held securely on its bed with a pressure of over 2 tons, and yet may be thrown with the ordinary switch iron, and if required to be removed the operation is one only of a few minutes. Provision is made to attach a box to either side of the switch, containing spring or locking mechanism, and all tongues are provided with a small lug on the lower side, near the point, for attaching to spring locking device or electrical equipment. The mechanical features are such as will appeal to all users of special track work material, viz., simplicity and fewest possible parts. The switch is furnished in 7 and 9-in. girder guard rail sections, or with ends to match 6, 7 and 8-in. high T-rail sections. The main structure is not less than 7 in. in depth even when the ends are made to match 6-in. high T-rail.

In steam railroad crossing construction is shown a solid manganese steel crossing. This type is fast replacing the "built-up" type made of rolled rails, fillers, brackets and bolts, as these are almost entirely eliminated by casting the structure in one solid piece. The use of bolts, etc., is absolutely dispensed with excepting at the outside joints connecting with the main tracks.

Railroad frogs for main line use with manganese steel centers, frogs for sidings or extra heavy yard service with wing rails only of manganese steel, and various railway track specialties where the use of manganese steel has become an important feature in railway service are exhibited in various forms.

Specimens of electric welding of tracks are also shown in all stages of this interesting process. The Lorain Steel Company is represented by a number of officers of the company and the exhibit is in charge of A. S. Littlefield and S. P. McGough of Chicago.

THE RECOMMENDED RAIL SECTIONS

C. W. Gennett, Jr., calls attention to a statement in section 1 of the concluding recommendations of the committee on way matters, which presented a report on Oct. 5, as published in abstract in the Electric Railway Journal for Oct. 6, 1909, page 698. The report read that the committee remommended the use of "T-rails weighing not less than 80 lb. per yard, adopted as 'recommended practice' by the American Railway Engineering & Maintenance of Way Association, April 22, 1908." Mr. Gennett, who is engineer in charge of rails and rail fastenings for R. W. Hunt & Company, Chicago, and has closely followed the development of rail rolling, has noted that the section which should have been mentioned in the report was recommended originally by the American Railway Association and not by the American Railway Engineering & Maintenance of Way Association. Anyone interested in the details of this rail may obtain from Mr. Gennett, who is stopping at the Shirley, a pamphlet which presents complete drawings and dimensions of the 80-lb. rail section as adopted by the American Railway Association.

The Atlas Railway Supply Company of Chicago is showing a full line of Atlas rail joints, tie plates and rail braces.

* * *

H. B. Logan, president of Dossert & Company of New York, reports the receipt of an order from the Milwaukee Railway & Light Company for 1000 new type cable tap connectors to take a 400,000-cm copper branch cable off of 800,000-cm aluminum feeder cables. The device is a variation of the standard Dossert cable tap connector, giving aluminum contact where the tap is taken off the aluminum feeder cable and copper contact where tne copper branch cable enters the connector. H. B. Logan is showing the new connector at the convention.

* * *

Representatives of the Kerite Insulated Wire & Cable Company, while being shown a view of the city from the roof of the Boston Building by E. E. McClintock, superintendent of the Mountain Telegraph Company, observed a coil of about 50 ft. of telegraph cable lying on the roof. Upon investigation it was found to be Kerite. When asked about it Mr. McClintock stated that the coil had been lying on the roof for a year and was a section of a piece of cable which is in use and had been purchased by the telegraph company some eight or nine years ago. The cable was tied up with a piece of Kerite wire and both the tie wires and the cable were in good condition. Mr. McClintock has presented Mr. Miller of the Kerite Company with a piece of the section of the cable and of the tie wire, with a letter stating the circumstances.

* * *

The Utah Light & Railway Company, Salt Lake City, Utah, has a delegation of seven of its representatives in attendance at the convention, as follows: Joseph Wells, general manager; R. E. Hunt, assistant general manager; Will Brown, auditor; L. L. Dagron, engineer; E. E. Franklin, master mechanic; A. E. Baum, superintendent of construction; W. Scott, superintendent of overhead construction.

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Experience with the Low-Pressure Turbine

The report of the committee on power generation deals largely with the low-pressure steam turbine, which seems now to be coming into extensive use as an auxiliary in railway and other power plants. The philosophy of the use of this device is very simple. Working steam at high expansions is known to be necessary to economy. If this is attempted by multiple-expansion engines much better results can be obtained than with an ordinary compound engine, but as a mechanical fact the low-pressure cylinder of a triple-expansion engine is somewhat clumsy and owing to its great bulk offers considerable added friction. Now the use of a low-pressure turbine in connection with a compound engine merely transfers to the turbine the function that otherwise might be fulfilled by a third or fourth low-pressure cylinder. The turbine, having less friction, is more efficient than the added cylinder for expansion, and also having a higher rotative speed is far less bulky and inconvenient. Its higher speed leads to a lower generator cost so that by adding a low-pressure turbine unit to a compound engine and coupling it merely electrically, there is secured at once advantage in space, advantage in efficiency and advantage in generator cost. Installing such a turbine merely converts a compound engine into a triple-expansion engine of particularly good working properties, and to judge from the committee report the result in economy is just about the same, with great mechanical advantage added in case of working under a highly variable load. There is some additional gain thereto from the fact that with the introduction of the steam turbine has come the use of higher vacua than used to be customary, so that with the improved apparatus now available there has come also improvement in practice and results.

We need not go here into the comparison of various types of turbines for indeed the data for proper comparison have not yet been obtained. It is sufficiently evident from the data given in the report that the practice of installing low-pressure turbines is productive of very material gains both in capacity and in steam efficiency, so that we can confidently look forward to a larger and larger use of this type of combined plant. Just how the efficiency of such a plant compares with that of an ordinary steam turbine plant is a matter not yet determined. The difference, however, cannot be considerable, the point of the whole matter being that existing plants with compound reciprocating engines can be improved in efficiency and economy to a very important extent.

Uniformity in Interurban Statistics

The subject of "Interurban Statistics," discussed by Mr. Rogers in his paper before the Accountants' Association yesterday, has engaged an increasing amount of serious attention during the last year. This is due in part to the accounting requirements of governing commissions and in part to the greater understanding on the part of operating officials as to the value of statistical information of this nature in the regulation of operating schedules and the study of opportunities for the development of special traffic. Mr. Rogers has enlarged upon the possibilities of the topic he discussed by presenting an unusual collection of material gathered by correspondence with accounting officials of various interurban lines. The expressions of opinion make it appear that inquiries were made of both large and small properties concerning the preparation and treatment of traffic and unit statistics, and especially regarding the vital question of whether the importance of the results is commensurate with the time and labor required to produce them. The conclusions of Mr. Rogers that the situation is a complex one and that no unit of comparison exists "that can be applied with equal force and value between companies" bring before the Accountants' Association a problem which it will undoubtedly work out with the same care that it has given to other important questions which have arisen as the art has developed.

Standardizing Rolled Steel Wheels

The first rolled and forged steel wheels were manufactured in 1903 and their first application to electric railway service was in 1904. Their many advantages were quickly recognized and at the present time they are extensively used under both high speed interurban cars and light city cars. As they were made to compete with cast iron wheels, it was natural that the manufacturers at first offered to duplicate the dimensions of any design of cast iron wheels which they were to replace. The result has been the production of a multiplicity of patterns, each differing from the other only to a small degree, yet requiring for its production a separate set of rolls and dies. Needless to say, the cost of these dies and rolls is added to the selling price of the wheels. The value of standardization in this detail of car equipment has been evident for some time to the manu-

facturers and to many of the largest users of rolled steel wheels, but they have been unable individually to bring it about. The committee on equipment in planning its work for this year undertook to bring the manufacturers and users together and to decide, if possible, on a limited number of designs and sizes which would fulfill all of the ordinary requirements of service.

The table of proposed standard dimensions of wheels, which forms part of this section of the committee's report, shows five diameters and a total of 22 different patterns. Wide and narrow treads and extreme or moderate dish of the web is provided for in each diameter of wheel. Except for very unusual conditions this range of designs should meet every real need, but not, of course, every whim. The committee infers that the general adoption of these standard designs would result in a saving in the first cost of as much as $3 to $4 per wheel. It is doubtful if standardization of any other part of car equipments could be shown to result in such a large and immediate saving for practically no trouble or supplementary expense on the part of the companies.

Power Distribution

The report of the committee on power distribution is of admirable thoroughness. It covers first and last a large range of pertinent topics. From the standpoint of the interurban operator, at least, as well as that of the general engineer, the most interesting section of the report is that dealing with the installation and care of high tension lines. It seems from the committee report, as well as from general experience, that in most sections of the country the steel line construction is preferable to the old wooden pole line, and particularly so as the working pressures and the conductors increase. The steel tower line is subject to troubles of its own, but upon the whole they seem to be less severe than those that afflict wooden construction. High cost, which incidentally rather tends to discourage the use of duplicate lines, is the chief practical objection to the steel construction. It is quite customary to run two circuits on steel towers, but as a matter of experience it is too often found that any serious line troubles involve both circuits. This danger is probably lessened by the employment of the suspension insulators, strongly recommended by the committee. Such insulators can readily be given a much higher factor of safety than is practicable with the pin type of insulator, and the circuits carried by them are less likely to be interfered with.

Another very valuable feature of the suspended insulator construction is that the line is comparatively free to yield longitudinally and consequently the strains upon the towers which must be allowed for in design are very much less than in the ordinary pin insulator construction. If a wire breaks or burns off when firmly fastened with pins, it puts a twisting strain upon the supporting tower, which is liable to do damage, just as in the case of a pole line such a strain may even bring down the pole itself. Very many recent lines, even with pin insulators, have been protected against this particular danger by using lightly tied wires, so that the conductor can slip and relieve the strain. With the suspension insulator the wire either slips entirely freely for a few spans, or if more thoroughly secured to the insulators, merely pulls them out of line to drop the catenary and relieve the strain. Moreover, it is possible to obtain with the suspension insulators a factor of safety which cannot in any feasible way be reached by the pin type. If three or four insulators suspended in series are not enough, then five or six will do the work, and so on. Of course, the towers have to be higher with the suspension insulators than with the pin type, assuming the same minimum allowable distance above the earth at the center of the spans. On the other hand, as we have just pointed out, the longitudinal strains are considerably reduced and the lateral strains are rather reduced than increased, owing to the flexibility of the suspension, so that on the whole it should be possible to design a somewhat lighter structure for the suspension insulators than for the pin type, enough lighter to compensate for the increased height necessary.

A high factor of safety in the insulation is a very important matter indeed in designing the high tension transmission line. There have been many errors made in the past through false economy on this score. With suspension insulators and steel construction it ought to be possible to get the necessary factor of safety, greater or less, according to the conditions under which the line must operate, at a moderate expense compared in detail with that of the older construction. Where the utmost reliability of service is imperative it would seem that perhaps further improvement in steel construction might be made by using a suitable steel pole adapted to carry suspension insulators, and so lightened for the reasons we have previously mentioned as to permit an actual duplicate pole line at an expense little greater than that of tower lines as ordinarily constructed. In the last resort it is better to have two circuits on separate poles than on the same structure, especially when the dangers of lightning are considered.

We have touched upon one point only in the report under consideration, but it covers a variety of topics and is a valuable contribution to the literature on the subject.

Threats to a Trespasser

That an electric railway company is not liable for the act of its conductor towards a trespasser, unless the act was improper, unnecessarily dangerous, the proximate cause of the injury and done to remove the trespasser, is the gist of a recent decision in New York. At the time of the accident the plaintiff was nine years of age and was stealing a ride on an open car between Brooklyn and Coney Island. Before the car had started plaintiff had climbed upon the running board, which was not in use, as it was on the left hand side of the car. He stood on the edge of the upturned board, holding on to the rail, but had not gone far when he fell off and was injured. The boy's version of the accident was that the conductor came towards him very fast, between the seats of the car, with both hands extended towards him, in consequence of which he became frightened and fell. He testified that the conductor did nothing except advance towards him in the way described, that he said nothing and had nothing in his hands to throw at him.

At the trial the counsel for the company contended that no negligence on its part had been shown and that the complaint ought to be dismissed because there was no proof of any act of the conductor which would justify the boy in assuming that he was about to be assaulted or which justified him in attempting to jump from the car. The Appellate Division in New York upheld this view, ruling that there was no assault and no order to get off the car. As the decision was by a closely divided court a portion of the opinion delivered by Judge Rich might be quoted:

> The conductor had not spoken to plaintiff, and, so far as the evidence disclosed, had not by act or word indicated that he knew the plaintiff was on the car, or that he had any intention of putting him off. This was insufficient to justify a belief on the part of the plaintiff that he was about to be injured, and he does not testify that he had such belief. He simply says he "got frightened and fell off." Plaintiff's conduct was voluntary and intentional. He released his hold upon the bar for the purpose and with the intention of jumping off the car, and his foot tripped or slipped on the running board in the effort. It was a conscious and voluntary act, and there was no evidence which would call for the submission to the jury of the question as to whether there was such a wilful and wanton disregard of human life and personal safety on the part of the conductor as to make defendant liable to the plaintiff, who was a trespasser, knowing and appreciating the danger he was subjecting himself to when he boarded the car, and a non-suit ought to have been granted.

The reasons for the dissent of two judges do not appear, as no dissenting opinion was written by either of them.

Conventionalities

One of the "Don't Forget" things is the Sons of Jove rejuvenation at El Jebel Temple to-night.

With a cash balance of over $7000 the finances of the Manufacturers' Association are in a very satisfactory condition.

H. C. Eddy, secretary of the District Electric Railway Commission of Washington, D. C., is among the visitors at the convention.

At noon today, but not before, the Denver street railway convention will come to an end. Packing of exhibits may be begun at that time.

While exact figures are not available, it is probable that the total attendance is about 2,800, which is very gratifying. The attendance of ladies is notably large.

In his annual address President Shaw took occasion to pay a deserved tribute to the "magnificent, comprehensive and valuable exhibit" of the manufacturers.

Sightseeing automobiles are kept busy in carrying the swarms of convention "tenderfeet" from the East who want to see all of Denver while they have a chance.

Choice carnations were given away yesterday and the day before by the Carnegie Steel Company. That explains many of the dainty buttonhole floral decorations sported at the convention.

Young in years but an old convention hand, S. W. Mower, general manager of the Southwestern Traction Company, London, Ont., was a member of the Canadian contingent who was warmly welcomed.

Supplementing the efforts of Messrs. Evans and Beeler, Superintendent of Transportation Cantril of the Denver City Tramway Company has been indefatigable in looking after the wants of convention visitors.

Not waiting for visitors to call at their booths, the Massachusetts Chemical people distributed among the booths acceptable souvenirs consisting of rubber—or something that looks like rubber—mats for ink-wells.

Mr. B. F. Boynton, chief claim agent of the Portland Railway, Light & Power Company, Portland, Ore., announces that the next meeting of the Pacific Claim Agents' Association will be held at San Francisco, on Feb. 11 and 12, 1910.

Some one has noticed that the Stout Street cars are marked "Stockyards," and has expressed the hope, prompted, perhaps, by memory of lusty odors of the old-time "Bridgeport" in Chicago that "Stout" does not mean "strong."

Curtis P. Brown, manager of the Fargo & Moorehead Street Railway Company, Fargo, N. Dak., is apparently the only representative at the convention from the State he represents. Mr. Brown arrived early and will stay until the exhibits are dismantled.

Edwin L. Reed of Chicago, expert in the handling of labor troubles, is renewing old acquaintances among the delegates at the convention. Mr. Reed has in the past few years been at the helm in the settlement of many of the railway labor disputes throughout the United States.

Visitors to the convention are again reminded that the trouble of arranging their Pullman reservations will be taken off their hands by the obliging George E. Armstrong, business manager of the American Railway Guide Company (Western Section). Mr. Armstrong is always on duty at Booth No. 106.

Among the Pooh-Bahs of the convention few represent public service utilities of a more varied nature than Samuel J. Dill, general manager of the Elmira Water, Light & Railroad Company of Elmira, N. Y. This all-embracing company operates the city railway lines, the interurban road to Watkins, the electric light and power service of Elmira, artificial gas, natural gas, the city water works, two theaters and a driving park. Can you beat it?

George B. Tripp of Colorado Springs was circulating about the premises yesterday, mainly interested in the convention of the Colorado Electric Light, Power & Railway Association, of which he is an officer. Mr. Tripp had "blood in his eye" when he showed up, but the troublesome optic readily yielded to Denver treatment.

While particularly active at the National Electric Light conventions, the National Electric Lamp Association does not neglect the street railway conventions. S. E. Doane of Cleveland, chief engineer of the association, arrived on Wednesday evening and hurried over to the barbecue, which pleased him as much as it did everybody else.

Denver is the home of the famous old horse-car in which the horse rides, or did ride, as a passenger on a down-hill trip. A picture of the antiquated vehicle, with the horse and a gay bunch of conventioneers, was taken in front of the Annex yesterday noon. The horse wore a slightly bored expression.

W. H. Heulings, Jr., sales manager of The J. G. Brill Company, has fully recovered from an operation which he underwent in July, but is still at his seashore cottage, where he will remain for the rest of this month. He will resume his duties shortly in better health than he has enjoyed for a number of years past. This will be gratifying news to his many friends in the electric railway field.

The following is an exact copy of the statement made by the son of Joseph Kazak, living at 2828 Elliott Street, Baltimore, Md., who made claim for a dog killed by a car of the Pennsylvania Avenue line at Elliott and Patuxent Streets on Aug. 23, 1909, at 10:50 p. m.: "Claims a dog owned by Mr. Kazak was crossing from south to the north side of the street, and the dog stopped and looked both ways before crossing track, and when it saw no car approaching started across the track, when the car came along without ringing the bell and struck the dog and killed the back part of the dog. The S. P. C. A. came next day and killed all the dog. It was a Newfoundland dog, 8 or 9 months old."

A. L. Humphrey, general manager of the Westinghouse Air Brake Company and Westinghouse Traction Brake Company, calls attention to the interesting fact that the three larger Westinghouse companies are under the management of three men who were, at one time, prominently connected with the business interests of Denver. E. M. Herr, vice-president and general manager of the Westinghouse Electric & Manufacturing Company, was at one time connected with the Denver office of the Chicago & Northwestern Railway; his brother, H. G. Herr, general manager of the Westinghouse Machine Company, was also at one time located in Denver, and Mr. Humphrey made this beautiful city his home for many years.

The Colorado Springs & Interurban Railway has a bunch of "live wires" in attendance at the convention. J. N. Henry, assistant superintendent; Andrew Reid, electrician and shop foreman; William T. Richards of the air-brake department, and J. H. Eastwood, master mechanic, showed up on Monday morning. President D. H. Rice and William Lenox and B. M. Lathrop of this company are also in Denver to-day, and A. A. Hawk, storekeeper; George Reid, machinist; Thomas McDonald, line foreman, and Mr. Elliott, track foreman, came up in the middle of the week, accompanied by Superintendent Lathrop, the original bearer of the Colorado Springs invitation, as mentioned in Tuesday's daily. Mr. Lathrop dropped in on Saturday but returned home over Sunday.

AUF WIEDERSEHEN!

The sentiment of the "Mizpah" sign at the Union Station will be sincerely echoed by every departing railway and supply man. Denver will ever have a warm place in their hearts.

They are still talking about that barbecue of Wednesday evening. Was it appreciated? Well, to judge by the way some of the "live wires" at the convention gathered about Mr. Beeler of the Tramway Company and cheered him to the echo, it was, most decidedly. The "bunch" joined hands and danced about the modest general manager, singing "For He's a Jolly Good Fellow!" Mr. Beeler tried to escape, but could not. A. L. Whipple, the singularly capable chairman of the entertainment committee, and a broad-minded chap, too, led the cheering.

FROM THE EXHIBITORS' POINT OF VIEW

"Well, we will be ready to close our account tomorrow morning," said Joseph R. Ellicott, president of the Manufacturers' Association yesterday afternoon. "Nearly everything is cleaned up and we are getting ready to close up shop in fine shape. In my judgment the Denver convention has been one of the best we have ever had. The railway men, particularly the engineers, have taken an especially noticeable interest in the exhibits. I have talked with a number of exhibitors, and they all agree that it has paid them well to come to Denver. We made no mistake, I think, in journeying to the shadow of the Rocky Mountains to hold our 1909 convention. The memory of this year's meeting will long be a pleasant memory."

PROPOSED PLAN FOR CO-OPERATION BETWEEN THE STATE RAILWAY ASSOCIATIONS

On Wednesday morning, Oct. 6, a meeting was held in the Brown Palace Hotel, at which 12 state railway associations had representatives to discuss ways and means for securing co-operative action of the state bodies with one another and with the American Street & Interurban Railway Association, especially in reference to matters of legislation. The conference appointed R. P. Stevens, president of the Lehigh Valley Traction Company, as president and J. H. Pardee, operating manager of J. G. White & Company, as secretary of a committee which will work out the details in harmony with the executive committee of the American Street & Interurban Railway Association. One suggestion that will be proposed in this connection is that a certain period should be allotted at the annual national conventions for discussions on inter-state legislative questions by representatives of the state associations.

PRESENTATION TO MR. WHIPPLE

At a time when, as chairman of the entertainment committee, he appeared before the executive committee of the Manufacturers' Association to present a matter of business which engrossed all his thoughts at the moment, A. L. Whipple was taken completely by surprise yesterday noon by the presentation of a token of esteem from the members of the executive committee. President Joseph R. Ellicott made the presentation and expressed the high esteem in which all the members of the association hold "Al" Whipple. With his mind full of plans for convention entertainment, Mr. Whipple was entirely taken back, and he could only express his thanks in halting words. The gift, so cleverly timed, is a handsome diamond ring with a blue-white stone in a tight setting. Mr. Whipple has had wide experience in convention entertainment, both at street railway and steam railroad conventions, and he has acquitted himself admirably. The sentiment that prompted the gift is heartily indorsed by every convention adherent.

MOFFAT EXCURSION TODAY

The official excursion over the Moffat Road to Corona, "the top of the world," and return, will take place today. Special trains will leave the Moffat Station, Fifteenth and Bassett Streets, at 8:30 a. m. returning between five and six o'clock. Basket lunches and hot coffee will be included in the price of the round-trip ticket, which is $3. A feature of the day will be the taking of a photograph 6 ft. long and 8 in. high of the whole party amid the rugged snow-clad mountain scenery at Corona. A reliable photographer has been engaged by the entertainment committee, and he will collect $2 in advance from those who wish the pictures. The arrangement is that a print of the photograph shall first be submitted to a disinterested representative of the committee, and if it is not satisfactory it will not be mailed, but the subscribers will receive their money back instead.

A birthday dinner was given at the Albany on Wednesday night in honor of R. C. Cram, assistant engineer of the Connecticut Company, by Fred Weston and H. De Haven Bright.

The Tramway Bulletin, organ of the Tramway Mutual Aid Association of the local street railway company, issued a special handsomely illustrated souvenir edition, and a copy was presented to all delegates. The courtesy was appreciated.

Waldo E. Berry, the only representative from the New York office of the Carnegie Steel Company in attendance at the convention, was glad to find that his cards of admission to the Denver Country Club did not contain any prohibition against starting to play golf with the sunrise.

Yesterday was "Denver Day" at the exhibition, and the people of the city came in large numbers to see the exhibits. Men, women and children were greatly interested in the varied machinery and appliances on display. Tickets were sold at 25 cents, and the proceeds will be given to Denver charities.

An enjoyable dinner party was given last night at the Metropole to the staff of the National Brake Company by its president, G. S. Ackley. In addition to Mr. Ackley, those present included F. D. Miller, W. D. Brewster, Alphonso Wigmore and J. C. Raymond. A number of close personal friends of Mr. Ackley were also present. Mr. Wigmore acted as toastmaster. His playful humor and ready wit enlived the party and helped to make the occasion a most enjoyable one.

The side-entrance cars of the Denver City Tramway Company are of especial interest to visitors. The car is of the all-the-year-round type, and the seating arrangement is popular with passengers. Non-smokers have the forward closed end and smokers the rear end, which is more nearly of the open-car type. On a 43-ft. car the seating capacity is 53. The cars are not double-ended, having entrance only on one side, and are turned on loops or wyes at the ends of routes. The percentage of accidents is low.

One of the most distinguished of foreign visitors at the convention is Sir James T. Ward, of Belfast, Ireland, indirectly connected with the municipal tramways of that city. Sir James is the guest of A. W. Ballard, manager of the General Electric Company's office at Los Angeles. He says that the Denver electric railway exhibition is a wonderful show and that he is fairly astounded at the arrangements for entertainment, both by the Manufacturers' Association and by the local street railway men. There is nothing like it in his country, he says.

REPORT OF THE COMMITTEE ON TRAINING OF TRANSPORTATION EMPLOYEES*

By J. W. Brown, Chairman; W. R. W. Griffin, C. D. Emmons, C. E. Learned, W. H. Douglass and G. O. Nagle

The operation of electric railways throughout the country during the year which has elapsed since the last report of this committee has emphasized the necessity of more thorough training of the transportation employee. A number of serious accidents have been chronicled, investigations of which have developed facts which point in some cases to lack of sufficient time for training.

The work assigned to the committee appeared to be of such importance and of such wide scope that only a portion of it could be taken up in this report, and the subjects considered follow:

(a) The Necessity of Careful Selection of the Employee

The need of a more intelligent class of men in the electric railway service is apparently due to the increased speed at which cars are operated, the increased complication of equipment and the increased number of cars which are moved against each other, together with the ever-swelling traffic density as the territory adjacent to the various lines becomes more closely built up. It is of the utmost importance that the physical condition of the men be determined, together with sight, hearing and color perception, and that this information be made a matter of record. It does not appear desirable to employ men of too immature age, as few have the necessary judgment to correctly deal with the many critical situations which arise. Neither does it seem wise to employ too old men, whose habits of life are firmly fixed and in whom there exists that lack of co-ordination between mind and muscle necessary to instantly grasp the situation and act accordingly; men who, aside from their lack of ability to take up with facility a new line of work, will certainly confront the management within a few years with the problem of what is to be done with the superannuated employee; this situation arising with the employee hired at such an age makes it impossible for him to give many years of service to the company before retirement. Each individual case of selection of an employee bears with it the possibility of bringing within the organization an agitator, and one dissatisfied, agitating employee may produce more trouble and nullify more work on the part of officials to produce a loyal and contented organization than might be thought possible. The importance of this particular phase of selecting employees is vital. The value of having married men in the service is worthy of consideration, as in perhaps 90 per cent of comparative cases they are bound to be better settled, more contented and giving more loyal service than the unmarried employee, who feels no responsibility after his week's board is paid. Getting the proper material for transportation service is undoubtedly of first importance.

(b) The Necessity of Careful Training of the Employee

The problem of obtaining a sufficient number of well-trained employees is the question which confronts the transportation official throughout his working hours and haunts him in his dreams. Time was when conditions were simple, equipment light, and traffic also, and the traveling public took a trifling accident as a matter of course, instead of immediately placing the matter in the hands of an attorney, as at present; speeds were lower, and the education of the employee was not nearly so serious a matter as it is to-day. To elevate to a higher plane and make more dignified the calling of motormen and conductors is one of the best ways of attracting to the service men of higher moral and mental standard. Too often is the position of motorman and conductor viewed as only a temporary position, and to be occupied only until a better opening appears in some other line of employment, which in itself breeds lack of interest in the work. Anent the statement that more time should be given to the training of employees comes that plea of the transportation official, who has to greatly augment his schedule during certain months of the year, that it is impossible to give to the employee the amount of training which he should have. This condition, while unfortunate, does not seem to be easily surmounted. Frequently, however, more training can be given by anticipating the season somewhat. The great amount of work done, however, is by the regular employees on duty throughout the year, and with a well-trained force of all-the-year-round employees, the short-term men are more likely to give good results.

One of the important points in the training of transportation employees is in giving a clear understanding of what their conduct toward the public should be. Too much care cannot be exercised in instructing men who come in contact with the public of their obligations to the patrons of the road. The conductors, and to a somewhat less extent the motormen, are generally considered the true exponents of the policy toward the public of the corporation they serve. The old adage, "A man is known by the company he keeps," has been aptly reversed by some one to read, "A company is known by the men it keeps." While the management comes in direct contact with the public officials and the policy of the corporation may be known by such public officials to be the broad policy of recognition of the public's rights and an earnest desire to discharge its public obligations efficiently, the treatment accorded to the individual passengers and the personality of the employees have a far greater influence in forming public opinion than can be exercised through any other channel. Once thoroughly established, this impression, whether for good or bad, is of lasting duration and may be the cause, one way or the other, and in many different ways, of working to the benefit or detriment of the company. In the training of the employees this feature should not be overlooked, but to the contrary should be given considerable importance, both in the selection and training of the employee.

The value of both oral and written examinations is recognized by most successful operating men, and has very considerable value from the fact that while many first-class employees do not have the power of expression in a very great degree, it encourages them to further self-education, and is a step toward putting the service on a higher level.

(c) Comparisons of Various Forms of Discipline

The question of discipline is so closely allied with training that it is evident that a man not properly trained cannot in justice be properly disciplined. It does not seem just and right to attempt to educate a man in the duties of trainman in a few days and then treat him in discipline with the full merits or demerits of the case as though he were an experienced employee. Consequently, no matter what the form of discipline used, there should be greater attention paid to the education of the man, and the discipline meted out accordingly. There is no doubt that discipline can be administered to the very best advantage to the men on the property where the superintendent is personally acquainted with each and every man. Knowing his good and bad qualities, the superintendent frequently, and perhaps unconsciously, does more in the way of education than he does in the way of real discipline. His knowledge of the man's personality gives him the opportunity to correct that man's mistakes in a manner which will in the majority of cases do more real good than the simple imposition of a suspension or other penalty. Too frequently, however, there is not sufficient history or record kept of the different individual cases to thoroughly mete out justice in the event or change of management, or change of superintendent. Men educated and disciplined under the personal touch method

*Abstract of report read before the American Street & Interurban Railway Transportation and Traffic Association, at Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

as a rule become contented and valuable men to the company. On the other hand, properties employing hundreds of trainmen make this method practically out of the question. However, the same policy, as far as possible, should be carried out by placing "follow-up" men or instructors on the road to look after the new men, reflecting as far as possible the personality of the superintendent, giving the new man the advice which he needs and keeping the superintendent fully acquainted with the progress made; all of which should be carefully recorded in the man's record. In this way the superintendent has a thorough way of judging the man's shortcomings. One large company adopting this method and following it closely, showing the following:

The average number of men for four years prior to this period who were in the employ of the company less than one year was 40 per cent of the total number of employees. Eighteen months' work has brought that average down to 30 per cent for the past year, while the total number of men in the service has increased 10 per cent.

These figures show that the methods adopted have bettered the personnel of the men.

Forms of discipline whereby men are laid off from work are open to the criticism that the families and not the men are the real sufferers; also it is a well known fact that the majority of men live very closely to their incomes and when cut off they are very apt to contract debts that are hard to wipe out, and they become discouraged, disheartened and at war with their jobs. It also tends to dishonesty.

One of the points in favor of the merit and demerit system of discipline is that it does not deprive the man of work, and it gives a far better history than any other system of the man, and furnishes the superintendent with a knowledge concerning the man that he lacks if not able to form a personal acquaintance.

One large road using the merit and demerit system states that at least 90 per cent of its men are striving for merit marks and take a lively interest in their standing. There seems to be no good reason why a railroad should not be operated, as far as discipline is concerned, on the same basis as any other large employer of labor, and factories and mills do not suspend men for violations of rules.

While this committee as a whole is not prepared to unanimously recommend the installation of the merit and demerit system of discipline, it is recommended that the workings of this system, which is now in force on a number of large properties, be closely followed by the member companies in order that the results obtained be fully understood and its value as a means of discipline completely determined.

Under any system of discipline the heart-to-heart talk with the employee seems to be one of the most valuable features, as it gives the opportunity for education which is always lost when the discipline is simply a notice of is lost when the discipline is simply a notice of suspension.

(d) Relief and Pension Work

At the present time with the tendency to reduce hours of labor and increase the cost of service, it may appear quite enough to many operators to contend with these facts, without adding such an expensive feature as a pension system, and that it is not up to them to provide for the future of an employee when the wage paid was sufficient to permit him to take out insurance for his own protection, and that it is asking too much to allow for one's future in their daily wage and at the same time provide for it by the way of pension.

However, the value of the pension system is not only in the benefits which accrue to the employee, but also it is a means of directly benefiting the company. A company providing for disabled and superannuated employes has a much better standing with its employees, and causes a real return by means of the contented spirit with which it imbues the employee. The sober, thinking class of men are loath to leave the service of a company which assures them support in their old age. There is also that question of moral responsibility, if not legal responsibility, to the employee who has given the best years of his life to the service.

The fact that a large number of the best operated steam railways have a pension system for superannuated employees, and also from the fact that a number of prominent electric railway companies are now working toward this end, indicates the value of the system.

Relief associations have become part of the organization of a great proportion of the companies to-day, and are undoubtedly, where properly administered, a great help in maintaining the standard of employees by means of the assistance rendered.

In order that your committee might know to what extent the practice of the member companies coincided with the recommendations made last year, and which features of the report it seemed best to recommend for adoption as standard, the committee sent out data sheet No. 39. One hundred and ten companies replied, either fully or in part.

Various answers were made. A large number of companies agree with the committee that meetings with the men, conducted by the transportation department, at which talks should be given by the master mechanic, claim agent, auditor and others, on different subjects pertaining to their respective departments, with which the transportation department has to co-operate, are of considerable value, and while a large number of roads report having no instructions of this nature, recommend it and in many cases indicate that they expect to put such a plan into effect in the near future. One manager pertinently suggests that success is through "living close to the men." The committee feels that one of the greatest means of reaching and maintaining high efficiency among employees is through "follow-up" work along educational lines, and that the mental and moral development of the men should go hand in hand with their training as transportation employees, and the committee recommends that this subject be given serious and careful consideration as one of the most important parts of the transportation work.

To the question, "What method of discipline do you recommend?" the answers were varied.

Fifty-four companies favored suspension and discharge, while 43 companies recommended the merit and demerit system.

Among the companies favoring the merit and demerit system there seem to be various methods used in its administration. This is also true of the answers from companies favoring suspension and discharge. In both cases the value of personal talks with the employee under discipline was considered important.

A Texas delegate brings news of a refreshing reversal of form in the matter of damage claims. An interurban work train of the Texas Traction Company killed Henry Greer's dog near the village of North Richardson. As soon as Henry heard the sad news, instead of calling on the claim agent with a long face and telling him how valuable the animal was and asking the price of a horse for it, he journeyed to the railway office in Richardson and paid the agent a quarter, asking him to forward the money to the interurban people with his thanks. The honest Mr. Greer said that he had been trying to get some one to kill the dog for a year, offering as high as 50 cents at times when he was vexed to a greater degree than common. He experienced a feeling of genuine relief when the animal went to the "dog heaven" via the Texas Traction.

TRANSPORTATION & TRAFFIC ASSOCIATION---CLOSING SESSION

The meeting was called to order by President Allen at 10 a. m., and the discussion of the reports on city rules again taken up, beginning with rules 201 to 221.

The rules upon which amendments were offered are given below, and those rules to which amendments were made are marked with an asterisk:

201*, 203, 205*, 208, 214*, 221, 225.

H. S. Cooper, manager, Galveston Electric Company, offered the following resolution:

"Whereas, The committee appointed at the last meeting of this association has prepared and reported a certain code or set of rules governing operation of city cars, which code is intended to include such general rules as represent the best and most modern practice in electric railway operation, and

"Whereas, This association has duly and carefully considered and amended the same in some particulars, and

"Whereas, It is for the interests of the members of this association that the association adopt, approve, promulgate and recommend a code of rules which shall be considered the standard code, except insofar as it may in specific instances be necessary to omit, add to, or change the rules in order to conform to state or municipal laws and regulations or to local conditions.

"Now therefore, be it resolved that the rules reported by the committee and as changed, omitted or amended at this meeting be the standard code of rule of this association, for the operation of city cars, until such rules may be duly amended, or changed at a meeting of this association, and

"That this association request its members to adopt this standard code of rules for the operation of city cars on their respective railways except insofar as such rules may conflict with state or municipal laws or regulations, or be unwise or inapplicable on account of local conditions, and

"That the committee on city rules be continued, to report at the next meeting of the association such proposed changes or amendments as may seem wise or necessary."

Transfers and Transfer Information

President Allen announced that J. V. Sullivan, Chicago Railways Company, was unable to be present to read his paper on "Chicago's Transfer Crusade," and it was read by Mr. Brush. A. A. Ballantine, Boston Suburban Electric Companies, owing to lack of time, was unable to prepare his paper on transfers, and President Allen said it would be taken up at the 1910 convention. The whole question of transfers and transfer information would be taken up again in 1910.

Mr. Sullivan's paper will be found elsewhere.

C. C. Learned, superintendent of inspection, Boston Elevated Railway, said that in Boston, also, the misuse of transfers has caused considerable loss. About a year ago a law was enacted which protected the railway company in the misuse of transfers, but the law was not as broad as the one in Chicago. He thought it would be an easy matter to make as many prosecutions as Mr. Sullivan had given in his paper, provided the same law was in force in Boston as in Chicago. The Massachusetts law did not make it an offense to give away a transfer, or solicit one, but made it an offense to offer a traded transfer for use. The Boston Elevated Railway had probably handled 40 or 50 cases of prosecution for the misuse of transfers, and in every case had been obliged to obtain sufficient evidence to satisfy the judge that the accused person approached the transfer point, not from a car but from some other direction. Then the inspector had to follow him on the car and take note of the fact that a transfer had been presented. They were not permitted under the law to make an arrest. The offense was not considered a misdemeanor serious enough to warrant arrest and imprisonment until bail could be secured or until court convened. In consequence of this the inspectors simply took the names of offenders and had a summons issued to appear in court the next morning. In some instances the names given were fictitious, and also the addresses; therefore, in every case of attempted fraud, a man on the car followed the offender after he had left the car and ascertained who and what he was. When a fictitious name was given the judges were extremely severe, as it was considered self-evident that the offender intended to defraud and deceive. He thought that a law might be enacted in the different cities or states which would cover all the necessary points. He knew of but very few cases where transfers were sold in stores, but had great difficulty with newsboys who would stand in front of the transfer stations and solicit transfers or pick them up after passengers had dropped them. They gave the transfers away to persons who bought papers of them and in that way many people who worked in stores and who were not patrons of the road would go to a transfer point, purchase a paper, obtain the transfer and ride to their homes. In prosecuting these cases almost invariably the defendants would offer in rebuttal testimony that they had just left a car and entered the store to make a purchase, and that the fact that they were seen to come from the store was not sufficient evidence of intent to defraud, as they were patrons of the road and had just left the car. The company was able to show by its close scrutiny, by a number of men stationed at the transfer point, that the offender had approached the transfer station from a distance of from half a block, and that he was not a patron of a car. There were many instances in Boston also where men came from different directions to factories and exchanged their transfers in the shops; men from the north giving their transfers to men from the south, and vice versa. The men would board a crowded car at night and the conductor would be unable to scrutinize the time limit. These factories were located and watched very closely and the men were followed from the factories to the transfer point. When they presented the transfers their names were obtained and prosecution followed. Very few instances of misuse of transfers were now brought to his attention. A notice was posted, as suggested by Mr. Sullivan, at all transfer points, so that persons could be well informed of the law.

Matthew C. Bush, Buffalo & Lake Erie Traction Company, referred to the pamphlet which the association sent out last winter discussing the fare question. A very large percentage of this pamphlet was devoted to the increase in fares on the Newton & Boston Street Railway and other properties in Massachusetts with which he had been connected. The fare was increased from 5 to 6 cents on all their properties except one, which charged one cent for all transfers issued. This increase was approved by the Massachusetts Railroad Commission for a trial period of one year. Within the last three weeks a petition was presented for an extension of that privilege for another year. The extension has been granted by the commission without any opposition. The transfer for which 1 cent is charged reads: "This transfer is issued with the approval of the board of railroad commissioners to the passenger desiring transfer privileges, only upon payment by such passenger of 1 cent additional fare." This move increased the revenue about $8,000 during the year. The transfer was issued by the conductor at the time of payment of fare, exactly as all other transfers are issued, but in addition the passenger had to pay 1 cent additional for it. These transfers were issued to the conductor in blocks of 50 or 100, and they were charged for the number of transfers taken out. Conductors usually were given one package without charge, but if they took two packages they had to pay for the second package before taking out their car. They got their money for this second package back from the passenger. In addition to this his company took from conductors all transfers collected at the end of every half trip. As far as the conductor knew, the company inspected every single transfer taken up; but not all were inspected, as this was inhibitive on account of the expense. Transfers on each line were inspected practically every fourth

day. At the end of the trip the conductor deposited in a large envelopes all transfers and ticket fares, and one the face of this envelope was a printed form containing name, space for entering the conductor's number and the number of the next succeeding transfer that he was going to issue. The envelope showed the number of tickets and the number of transfers enclosed, and at the terminal the envelope was inserted in a time stamp and deposited in the box. Every fourth day all transfers were carefully gone over to see the hour at which they were issued, that is, if transfer No. 27 was issued at 3 o'clock and No. 26 at 3:30 o'clock something was wrong. As a result of this method of collection and checking he believed they had absolutely eliminated the exchange of transfers by conductors at junction points.

C. D. Emmons, Ft. Wayne & Wabash Valley Traction Company, said that Ft. Wayne was a much smaller city than Boston or Chicago, but they had the usual trouble with exchange of transfers at transfer points. The cars all came together at one center, which was known as the transfer corner. The old system was to issue transfers at that point to the passengers desiring to go to other lines. It was found that in the stores adjacent to this corner people were trading transfers. They therefore made the rule that they would only give transfers at the farthest junction points of transfer lines; that it, in the case of lines that passed the transfer corner followed the same route for some distance before branching, passengers would be transferred only at the branching points. The result was that within a year, while the number of passengers carried had increased 100,000 per month, they were now issuing 20,000 less transfers per month. It might be objected that they ran the risk of issuing transfers on transfers by doing this, but the result showed such a material gain that they could run the risk of doing that.

R. I. Todd, Indianapolis Traction & Terminal Company, said his system was practically the same as the one followed by Mr. Brush, with the exception that they only required conductors to turn in transfers once every round trip and not every half trip. The transfers were checked up about once a week. He did not follow Mr. Emmon's system of honoring transfers only at the farthest point, but honored them at the nearest or first transfer point.

S. W. Cantrill, Denver City Tramway, called attention to the transfers used in Denver. It stated on the back of each transfer, the exact transfer point at which the transfer was acceptable and it was not acceptable at any other place. At the bottom of the transfer it was also stated that in case of a controversy, the passenger should pay the fare and apply within three days for redress at the office of the company. In the central loop, where some 24 lines pass is a box for the deposit of an envelope containing all paper fares collected. These are checked up at such times as were seen fit, but so far as the conductors knew they were checked up every day. He liked the idea of a time clock and wanted more information about its use.

Training of Transportation Employees

J. W. Brown, West Penn Railways, read the report.

Charles B. Wells, Denver City Tramway Company, read a paper which will be found elsewhere discussing the committee's report.

N. W. Bolen, Public Service Railway of New Jersey, presented the following written discussion:

Communication on Report of the Committee on Training of Transportation Employees by N. W. Bolen, Public Service Railway Company, Newark

The committee on the training of transportation employees has presented a report which clearly indicates conscientious work on the part of its members and leaves but little to be said on the subject covered. I am sure that no fault can be found with the statements made by the committee upon the selection, training and discipline of employees, nor upon the value of relief and pension work as an aid in raising the standard of men. After a quarter of a century spent in the street railway service, and all of this time spent in personal contact with a large number of employees, I can but heartily endorse the recommendation of the committee. I have seen carelessness in the selection of employees result in labor agitations and strikes. I have seen both the result of personal contact and of impersonal methods of administering discipline and take this occasion to emphasize the value of the former. As stated by the committee, it is extremely difficult on large systems for the superintendent personally to administer all discipline and to know the individual characteristic of the employees. He therefore must depend upon the good judgment of his subordinate officials and in their selection lies the key to his successfully administering his department. I can see no reason why the transportation superintendent operating in a given city, 500 or 600 cars, cannot personally know all his trainmen. If, however, the superintendent has other duties than those directly connected with the operation of cars he may properly delegate the administration of minor discipline to one or more assistants. If he is wise he will see that these assistants are in all respects qualified for the position of superintendent and that they are thoroughly alive to the importance of properly dealing with the employees and are thoroughly in accord with their superior's policy. The division superintendent who does not personally know every employee in his division, who has been in the service of the company more than four weeks, is not worth his salt. In recommending the employment of instruction or "follow up" men, I would advise that the greatest care be used in the selection of such instructors, and that a very able "follow up" system of following up the instructors be kept in force. It is highly important for the welfare of the company that the operating head be at all times thoroughly familiar with the actions of his subordinate officers as well as the actions and general topics of conversation of the mass of employees, to the end that incompetents may be weeded out, that acts of unfairness or injustice may be promptly remedied, that all cause for complaint on the part of trainmen be reduced to a minimum.

In conclusion I recommend that the report of this committee be carefully studied when the members of this association reach their homes and the facts as brought out by the report of the committee and discussions be placed before the subordinate officials for their inspiration and guidance.

Mr. Learned described the system used in Boston in handling men. He used the follow-up system, as recommended by the committee. The men were carefully selected, their references investigated, and the conductors had a bond furnished for them. He had regular instructors to whom he paid 10 cents per day extra the year round whether they had men under their instruction or not. In that way he encouraged these instructors on their part to give the students all the careful instructions that were necessary. After a student had served a number of days, if the instructor thought he was all right, he was turned over to the assistant superintendent of a division who went over his work carefully, and assured himself that the new man was familiar with the rules. He was then sent out over the different routes, after which he was sent back to the superintendent of employment, who carefully reviewed all his work and knowledge of the rules. When a man was put back on a car after this training he was as conversant with the rules and requirements of the company as it was possible to make him in the speaker's opinion. The new man then served 60 days on probation, after which he received permanent employment. Mr. Learned found that the bonus of 10 cents per day to instructors increased the desire on the part of employees to advance to the rank of instructor. He thought it was a small compensation for the services performed, as it took at least half or three-quarters of an hour extra time every day for the first six or seven days with a new man to go over his work. His company employed some 1500 or 2000 new men a year. The instructors were known to the other men by the letter "I" which was attached to the lapel of their coats. Students were paid a $1 a day. They were formerly given $1.50 a day, but now they were paid on a weekly basis of not less than $7 a week.

W. R. W. Griffin, Rochester Railway Company, referred to the recommendation of the committee of last year to adopt standard forms, blanks and methods whereby the

W. R. W. Griffin, Rochester Railway Company, referred to the recommendtion of the committee last year to adopt standard forms, blanks and methods whereby the different companies could get information quickly in regard to the men who leave one city to seek employment in another. One of the greatest difficulties in trying to find out about a man who came in, was to get information from the other companies for which he had formerly worked. He hoped the association could get together on a standard information blank form.

Mr. Bolen said the Public Service Railway had a school of instruction near Camden, one in Newark, and a third is in Hudson, in Hudson county. An instructor and an assistant instructor were employed in each school under the direction of the superintendent of transportation. Recently he had asked the claim department to give him a man from that department who had had experience in the transportation department, for the purpose of taking up with the students the method of making out accident reports, and also in going through the details of handling accidents.

C. J. Franklin, Portland (Ore.) Railway, Light & Power Company, referred to recommendations on the merit and demerit system, under which his company had been operating for several years with very satisfactory results, especially in the prevention of accidents. They were more generous in giving merits to the men, particularly when good accident reports were made out, and when they secured a larger number of witnesses than was required, and for many other things relating to the claim department in which they figured. He found that when a man had received a large number of demerits he took advantage of the fact that he could work them off with credit or merit marks much easier by paying particular attention to the rules of the claim department, which were also the rules of the operating department. He had found cases where motormen and conductors had brought in the names of witnesses to accidents in which they in no way participated. He had in mind one case where a conductor was attending a card party and during the conversation heard that an accident had occurred to which some of those present, whom he had not met before, were witnesses, and they were discussing it in a general way. He was very sharp, and without their knowing anything about it, secured their names and addresses and brought them to the claim department the next morning, for which he received a very generous award of merit marks. He recommended the merit and demerit system very heartily as a means of giving information to the claim department and also bringing the accidents down to a minimum.

Dana Stevens, Cincinnati Traction Company, said his company had a school of instruction for motormen and conductors. A school room was fitted up with cars and trucks and various types of brakes and controllers. It was in charge of a regular instructor, who gave the students a general insight into the mechanical and electrical equipment on the cars. In addition to this, blackboards on the wall contained some of the printed forms of accident reports used and also the form of a trip report used. The men were given hypothetical accidents, and instructed to draw up and make a report of such cases on the board. In that way the men got a good idea of the way to do the work required in actual operation. It also gives the conductor a good idea of how to fill out trip reports. The men were kept in the school of instruction for six or seven days, as the necessity demands. Then they were sent out to break-in on the cars under old and trained motormen and conductors. They were kept on a certain division until the motorman or conductor, as the case might be, who was assigned to the car on which the man was learning, considered him fit to operate a car, or that he understood transfer regulations and other rules in connection with that particular line. The man then went to the division superintendent and was allowed to work on that particular line. In the meantime, during his spare time, he was allowed to break-in on other lines of the same division, and when he had been certified to as being qualified to operate cars on any other line of the same division, then he was allowed to operate cars on that line. That plan was followed until he was broken in on all the lines of any one division. After that he stood on the extra list, and was given work on the cars of any line of that particular division. The speaker found that in this manner he had been able to secure a better class of employees, because a man who was not willing to go through this training and had not the stamina to stick to the end, dropped out, and the company was better off without him. The man who was finally broken in on all the lines of the division, as a general rule, made a valuable employee. His company did not pay the students while under instruction. That had been a matter which had been given serious consideration, and it was something he believed they would have to come to. Especially during prosperous times it was naturally more difficult to secure competent men. When a man took a position of that sort he probably could not afford to wait two or three weeks before he was able to earn anything. He needed substinence money at least, and in prosperous times he would take some other position rather than wait that long.

P. P. Crafts, Iowa & Illinois Railway, said that about seven years ago he adopted the merit and demerit system on his road. He was trying to combine the systems at that time brought out by Mr. Satterlee of Kansas City, and also the Brown system. Although he had departed occasionally from certain portions of the original scheme, he found it a very good way to discipline the men, on a small property at least. The men seemed to like it, and they were more afraid of its consequences than they were of the lay-off system. They were very proud of their record, and wanted to keep as high a standing as possible. He thought that it had a great effect in the prevention of accidents. He did not employ men less than 25 years of age. Possibly that might be done successfully on a road operating slow-speed equipment, but he found on a high-speed line that a man under 25 rarely had the brain development to give him the necessary amount of judgment, even in ordinary emergencies. As to the instruction of men, he endeavored to instruct men both as motormen and conductors. That was necessary because of the few cars he operated. An extra man who was broken merely as a motorman or conductor did not receive enough pay on the extra list to allow him to subsist. As soon as a man got a regular run he was given either end of the car to which he seemed best adapted. A few months ago he inaugurated a system of having one motorman and one conductor picked out as instructors. These men receive about $6 or $7 a month in excess of the regular pay, and they not only break in the new men, but it is their duty to make trips over the road every now and then, sometimes at night, and make runs with a new motorman or new conductor.

At the Atlantic City convention last year the committee on training of employees submitted a report with an appendix showing Form A, application for appointment; Form B, reference inquiry; Form C, reference inquiry; Form D, record of examination of sight, color, and the sense of hearing; Form E, surgeon's certificate of examination; Form F, instruction to surgeons. It was moved that these forms as suggested in the report of 1908, be adopted, as the best practice in the state of the art at the present time. The motion was carried.

The recommendation of the merit and demerit system, as being the best form of administering discipline was referred back to the committee for further consideration.

A number of communications making suggestions for the work of 1910 were referred to the incoming officers for their consideration.

Mr. Cantril asked the president to appoint a committee to take up the matter of stopping of cars, so that the members of the association could standardize this practice

as much as possible, this committee to communicate with all organizations to get at the concensus of opinion and report at the next meeting. The motion was carried unanimously.

President Allen appointed Mr. Emmons, Mr. Hegarty and Mr. Brown as a committee to present to the American Association in the afternoon, suitable resolutions stating that the Transportation & Traffic Association had adopted the report of its committee on interurban rules, the report of its committee on city rules and the partial report of the committee on training of employees. The parent association was to be asked to ratify the adoption of these rules by the Transportation & Traffic Association, in order to make them the standard of the association.

Election of Officers

The nominating committee presented the following report:

Denver, Col., Oct. 7, 1909.

The American Street & Interurban Railway Transportation & Traffic Association.

Gentlemen:

Your committee on nominations, after careful consideration, begs to submit the following nominations:

President, Robert I. Todd, vice-president and general manager, Indianapolis Traction & Terminal Company, Indianapolis, Ind.

First vice-president, Henry C. Page, general manager, Springfield Street Railway Company, Springfield, Mass.

Second vice-president, N. W. Bolen, superintendent of transportation, Public Service Railway Company, Newark, N. J.

Third vice-president, George Whitfield Parker, general express and freight agent, Detroit United Railway Company, Detroit, Mich.

For members of the executive committee:

J. N. Shannahan, vice-president and general manager, Washington, Baltimore & Annapolis Railway Company, Baltimore, Md.

Dana Stevens, vice-president and general manager, Cincinnati Traction Company, Cincinnati, Ohio.

J. W. Brown, superintendent of transportation, West Penn Railways Company, Connellsville, Pa.

A. H. Mackay, general traffic agent, Puget Sound Electric Railway Company, Tacoma, Wash.

(Signed) E. F. PECK, Chairman
F. I. FULLER,
H. A NICHOL,
E. C. FOSTER,
Committee on Nominations.

On motion the secretary was instructed to cast one ballot for the election of officers, as proposed by the nominating committee.

Mr. Crafts read the following report of the committee on resolutions, which was received and adopted by unanimous vote:

Denver, Colo., Oct. 7, 1909.

The American Street & Interurban Railway Transportation & Traffic Association.

Gentlemen:

Your committee on resolutions submits the following report:

I. Whereas, the Denver City Tramway Company, through its officers, particularly its president, Mr. William G. Evans, and its vice president and general manager, Mr. John A. Beeler, and the Denver Convention League, have extended to the members of this association an unstinted amount of hospitality and attention during their stay, and have therefore added greatly to the pleasure and profit of the visit of the members of this association to Denver during this convention; now, therefore, be it

Resolved, That the American Street & Interurban Railway Transportation & Traffic Association expresses its thanks and appreciation for the invitation to the members of this association to locate the convention this year at Denver, for the cordial manner in which the members of this association have been received and the pleasure which they have enjoyed while here.

II. Whereas, the officers, the executive committee, entertainment committee, exhibit committee and all of the individual members of the American Street & Interurban Railway Manufacturers' Association have made the visit of the members of this association to Denver most agreeable and instructive, not only by arranging many enjoyable entertainments and trips, but also by providing an extensive, elaborate and interesting exhibit of electrical appa ratus, much of it brought a great distance; now, therefore, be it

Resolved, That the American Street & Interurban Railway Transportation & Traffic Association extends to the Manufacturers' Association, its officers, various committees and members its thanks and appreciation of all these attentions and services and expresses its hearty appreciation of them.

III. Whereas, the officers and members of the executive committee, standing committees and special committees of this association have given most steadfast attention to the affairs of this association during the year, often at great sacrifice of time, and have provided this association with a most instructive program and series of reports; now, therefore, be it

Resolved, That the members of the American Street & Interurban Railway Transportation & Traffic Association extend to these officers, members of the executive, standing and special committees and the authors of the papers presented at these meetings, their thanks and appreciation for their faithful work and valuable reports and papers submitted.

(Signed) P. P. CRAFTS, Chairman
J. H. PARDEE,
H. W. BLAKE,
Committee on Nominations.

The meeting then adjourned.

TURBINE-BLADE GUESSING CONTEST

At 4 o'clock yesterday afternoon the guessing contest on the number of turbine blades in a glass case in the booth of the Allis-Chalmers Company came to an end. The correct number was 6199. J. T. Ross, of the Northern Ohio Traction & Light Company, Akron, Ohio, guessed the correct number and won the first delegate's prize. The second delegate's prize went to Edwin C. Faber of the Aurora Elgin & Chicago Railroad. Milwaukee souvenir spoons were awarded to F. M. Ellis, Rockford & Interurban Railway, Rockford, Ill.; Sydney M. Bamburger, Salt Lake & Ogden Railroad; J. H. Pardee, J. G. White & Company, New York; A. E. Hook, Colorado Springs & Interurban Railway; Thomas A. H. Hay, Northampton Traction Company, Easton, Pa.

In the ladies' delegate class the first prize went to Mrs. W. M. Quakenbush, Mt. Clemons, Mich. Mrs. Ernest Gonzenbach, Sheboygan, Wis., won the second prize. Souvenir spoons were awarded to Mrs. W. H. Collins, Schenectady; Mrs. H. G. Vordenmark, Ft. Wayne, Ind.; Mrs. Thomas Hawkin, Rockland, Me.; Mrs. Russell Howard, Green Bay, Wis.; Mrs. George Radcliffe, Schenectady.

In the manufacturers' class, the prizes were awarded as follows: First, George H. Berg, Illinois Stoker Company; second, A. A. Gray, Electrical Review, Chicago, Ill. Souvenir spoons went to J. C. McQuiston, Westinghouse Companies, Pittsburg, Pa.; Percy Houts, Brecht Company; H L. Munroe, General Electric Company, Chicago, Ill.; W. M. Lawyer, Whitmore Manufacturing Company, Cleveland, Ohio; H. J. Summers, Planet Company.

The ladies of the Manufacturers' Association secured prizes as follows: First, Mrs. J. M. Griffin, Wheel Truing Brake Shoe Company; second, Mrs. E. D. Batchelor, Pittsburgh, Pa. Souvenir spoons were awarded to Mrs. W. H. Stieglett, John A. Roebling's Sons Company; Mrs. Rollin Gerry, Jones & Laughlin Company; Mrs. E. H. Hammond, American Electrical Works; Miss M. Sampson, Denver, and Miss Helen T. Fuller, Denver.

Those who have not claimed their prizes may secure them this morning by applying at the booth.

Major Evans says none will know that the Mrs. Henry Clay Evans who won the second prize at the bridge-whist party at the Denver Country Club is his wife. He says "Mrs. Harry Evans" might be better, but he really believes the only real way to establish her identity is to describe her as "Major Evans' wife." It would be interesting to know what Mrs. Henry Clay Evans thinks of that.

THURSDAY MEETING OF THE AMERICAN ASSOCIATION

The last meeting of the American Street & Interurban Railway Association was held at Auditorium Hall yesterday afternoon.

The committee on compensation for carrying United States mail presented its report which was approved. The subjects of insurance and public relations were also considered. Paul Winsor of Boston then presented the report of the committee appointed last year on an electric railway dictionary to be published by the McGraw Publishing Company. Mr. Winsor said that the committee had held several meetings with the editor of the dictionary and had decided to confine the subject matter of the volume to rolling stock, including equipment. Progress was being made with the work and before the next convention it was hoped to conclude the compilation and publication of the volume.

Secretary Swenson then read a letter from Samuel M. Curwen, vice president of The J. G. Brill Company, announcing that the committee appointed to award prizes offered by The J. G. Brill Company for the best essay on the subject of "Design of an Electric Railway Car for City Service," had awarded the prizes. The names of those to whom the prizes were awarded are published elsewhere in this issue. Secretary Swenson also said that the three essays which had been awarded prizes had been sent to the convention by Mr. Curwen and were there in the room and could be inspected by anyone present.

The report of the committee on nominations then presented its report, which was as follows:

President: James F. Shaw, chairman board of directors, Boston & Worcester Electric Companies, Boston, Mass.

First vice president: Arthur W. Brady, president, Indiana Union Traction Company, Anderson, Ind.

Second vice president: Thomas N. McCarter, president, Public Service Railway Company, Newark, N. J.

Third vice president: George H. Harries, second vice president, Washington Railway Electric Company, Washington, D. C.

Fourth vice president: Charles N. Black, vice president and general manager, United Railroads of San Francisco, San Francisco, Cal.

The committee presenting the report was as follows: E. C. Foster, New Orleans, chairman; R. T. Laffin, Boston; H. A. Nicholl, Anderson, Ind.; W. G. Ross, Montreal; John A. Beeler, Denver.

These officers were unanimously elected.

The executive committee of the association consisted of these gentlemen and the presidents of the four affiliated associations who were elected as follows:

H. S. Swift, secretary Toledo Railways & Light Company and president of the Accountants' Association.

F. H. Lincoln, assistant general manager Philadelphia Rapid Transit Company and president of the Engineering Association.

E. C. Carpenter, claim agent, Indiana Union Traction Company, Anderson, Ind., and president Claim Agents' Association.

R. I. Todd, vice president and general manager, Indianapolis Traction & Terminal Company, Indianapolis, Ind.

During the election of the officers, the chair was occupied by Charles N. Black. After the election Mr. Shaw was escorted to the chair and was greeted with applause. After a short speech in which he expressed his appreciation of the honor conferred upon him by re-election, he called upon the four vice presidents for remarks, and each of them gracefully responded.

The report of the committee on resolutions was then presented by Gen. George H. Harries (chairman), H. C. Page of Worcester and P. P. Crafts of Clinton, Ia. The committee presented five resolutions.

They first extended the thanks of the association to the Denver City Tramway Company, its president and vice president and every employee with whom the committee had come in contact, for their generous goodness and effective, yet unassuming courtesy, typical of such an effectively maintained and operated public service corporation.

The second resolution placed on record the grateful appreciation of the association for the deeds done by the Manufacturers' Association which through its spirit of helpfulness and good fellowship and entertainment had more than maintained its high repute for thoroughness and had contributed beyond measure to the success of the convention.

The third resolution expressed the cordial thanks and warm expressions of regard of the association to its co-laborers in the great works of transportation, improvement and public education, the technical press, which had rendered invaluable assistance in the broad field of electric endeavor and had aided materially in this work by its unswerving loyalty to the principles governing the American Street & Interurban Railway Association.

The fourth resolution expressed the gratitude of the association to the mayor of Denver, the city officials, Chamber of Commerce, Convention League and the citizens of Denver generally for the welcome extended and for the many graceful acts "to the strangers within their gates," and also expressed the wish that the city of Denver and her people may have all manner of long-lived happiness and prosperity.

The fifth was an expression of thanks tendered to the members of the American Association and its affiliated associations which had devoted during the last year so much time and highly intelligent energy to the compilation of reports and papers and which had contributed in such practical manner to the efficiency of the association.

After the presentation of these resolutions the following communication from the Transportation & Traffic Association was presented by D. A. Hegarty of Little Rock:

To the American Street & Interurban Railway Association:

Gentlemen: We, the undersigned committee, duly appointed by the American Street & Interurban Transportation & Traffic Association at its meeting held this morning, beg to advise you that at the various meetings of the Transportation & Traffic Association the reports of the committee on interurban rules and the committee on city rules were duly considered and after some slight amendments were, by proper resolution, adopted as the standard rules of that association for the operation of interurban and city cars.

We also desire to report that the report of the committee on training of employees was adopted insofar as it pertains to the adoption of standard forms.

The American Street & Interurban Transportation & Traffic Association therefore respectfully requests the ratification of its work by the American Street & Interurban Railway Association.

Respectfully submitted.

C. D. EMMONS, Chairman.
F. W. BROWN,
D. A. HEGARTY.

The American Association accepted the resolution and approved the rules suggested by unanimous vote. The meeting then adjourned.

PRESENTATION TO MR. ALLEN

C. Loomis Allen of Syracuse, N. Y., retiring president of the American Street & Interurban Transportation & Traffic Association, was presented a set of diamond cuff buttons and a set of diamond studs by the officers and executive committee of the association at a luncheon which was given yesterday at the St. Francis Hotel. R. I. Todd, the incoming president, made the presentation speech. Mr. Allen has in many ways endeared himself to his fellow officers, and they seized the opportunity presented by his retirement to demonstrate their esteem in this tangible fashion.

Colorado produced 9,773,225 tons of coal and coke in 1908

ENGINEERING ASSOCIATION---THURSDAY SESSIONS

President Winsor called the meeting to order at 9:50 o'clock. Before Mr. Heywood introduced the report of the committee on standards, the president said that the recommendations for specifications were placed before the members more for their information than anything else because it would be impossible, probably, to get a committee actually to agree on every item of a specification. It was not like a standard dimension for one would not be likely to agree absolutely to every item; although he would consider them good in general.

Mr. Heywood said that the executive committee had laid out certain work for the committee on standards, as follows: (a) Gears and pinions; (b) standard dimensions with particular reference to standard taper for pinions; (c) standard gear ratios; (d) iron for brake riggings; (e) axles; (f) rubber covered wire. At the meeting which was held in Atlantic City it was quite definitely decided that this committee did not have the proper matter before it to make definite recommendations on these subjects, it being the ruling of last year's convention that matters for consideration by the committee should come from one of the other standing committees. It was found that the committee on power distribution was considering the subject of rubber-covered wire, and hence that matter was referred back to the power committee. The manufacturers' representatives were present to give their opinions on the standardization of taper and gear dimensions. The consensus of opinion among them seemed to be that it was practically impossible to standardize the distance between axle and armature shaft centers at the present time. They were also at odds on standard tapers but they thought they could get together on that subject later. The manufacturers said that the standards which had been adopted already were not being used quite as extensively by member companies as they would like to see them used. It was then resolved at that meeting that this matter be brought to the attention of member companies through a circular letter from the president of the engineering association and endorsed by the president of the main association, with the view of getting the member companies to pay more attention to the standards already adopted.

President Winsor praised the standardization efforts of The J. G. Brill Company and then introduced W. G. Gove, superintendent of equipment, Brooklyn Rapid Transit Company, as a man who had done an immense amount of standardization on his system. Mr. Gove said that the Brooklyn Rapid Transit System has approximately 4000 cars for surface, freight, mail and express, elevated passenger and freight service, of which about 3400 cars are on schedules. After describing the improvements in traffic which followed the rehabilitation of the surface and elevated equipments, Mr. Gove spoke on the meaning of standardization. Standardization should not refer to equipment only, but to every detail of organization and management. Much of the success in Brooklyn had been due to the encouragement of the president and vice president who had prevailed upon the directors to spend about $40,000,000 in the last five years in rebuilding the property. As to standardization, he would cite one instance on the elevated lines in reference to brake shoes. Six years and a half ago, they had on the entire system no less than 29 different patterns, seven of which were on the elevated division. The elevated brake shoe heads were reduced from seven to three. Within the last six months he had arranged to change every brake shoe on the entire system to four different patterns, two on the elevated lines and two on the surface. Only one would be needed on the surface if it were not for the maximum traction trucks, one of the patterns being for the pony wheel.

Mr. Gove said he did not believe that the best standardizing results can be obtained by the head of the mechanical department being the sole judge. The consequences of any step must also be judged from the standpoint of the management and the transportation departments. There may be little question about the transportation department's standpoint, but the management will not fail to remember that some of the best things in the world are very expensive. Reverting to the surface cars, Mr. Gove quoted one other instance of the kind of work done in the general overhaul. For instance, the detail of window glass had been standardized to such a degree that it is necessary to maintain very few sizes. Brake pins and bolts are standardized and recorded on diagrams for the shops which order them by number and not by size. Double doors that were giving trouble with certain fixtures have been replaced by single doors with one standard fixture. The door locks on the elevated division are the same throughout. As to gears, the question of pitch, etc., was not considered, practically, in the Brooklyn standards, except those that have been adopted in the last year or so, as the others were adopted before any recommendations were made in this respect. The company has adopted such features as a standard wheel and gear that can be used economically with different motors and with different trucks.

Mr. Gove said the co-operation of the manufacturers was essential in the development of standards. He was also a believer in contracting for material on a mileage basis wherever practicable. In conclusion, he mentioned the beneficial effect on the Brooklyn Rapid Transit System of plotting and disseminating all the costs and results in operation through curves. They do not expect everyone of the men to be an engineer, but do believe that even the men in the pits, the trackmen and linemen become interested in these curves because they can quickly tell whether the curve is going up or down, even if they can do no more. Besides that, all instructions of a general nature are issued as bulletins from headquarters. A division shop foreman goes around to the different shops from time to time to check up adherence to standards and determine why any departures were made. Mr. Gove then mentioned the practice of shop gardens as instituted by his company, although that would hardly be called standardization.

President Winsor said in relation to flower beds that the arrangements of the shops are as much a matter of standardization as the equipment. Getting the men interested in the business, in one way or another, is of the greatest value. If the men are given the neat flower beds outside of the shops and interested to keep the shops clean inside, their quality will surely improve. Referring to the report of the committee on standards, he said it related largely to specifications, and he would like to hear from some of the purchasing agents on this subject, as it was interesting to them as well as to engineers. He then called upon P. J. Honold, purchasing agent of the Oneida Railway Company, to give his views.

Mr. Honold said he did not believe that purchasing agents with common sense intend to antagonize their engineers or attempt to dictate to them what they ought to use. They are perfectly willing to work in co-operation with the engineers, but believe the latter ought to furnish specifications covering their requirements exactly so that the manufacturers are placed on an equal basis, thus giving the buyers a chance to get rock bottom prices.

President Winsor then called for discussion on that part of the standards committee's report relative to "Gears and Pinions." (That this subject be continued for another year.)

On motion of Mr. Heywood, the subject of gears and pinions was referred to the committee on equipment for consideration for another year.

The next recommendation was "Standard Taper for Pinions: The adoption as a standard taper for pinions, the proportion of 1¼-in. in diameter to 1 ft. in length." In reference to this Mr. Evans said that it is quite well agreed between the Westinghouse Company and the General Elec-

tric Company that the dimension given is a desirable taper.

President Winsor noted that the proposed taper is very close to 1 in 10. If it is made 1.2 in 12 inches, instead of 1.25 it would be 1 in 10.

Mr. Evans said the committee had no desire to express itself in favor of either the General Electric Company or the Westinghouse Company's methods, although the standard is the same as that of the General Electric Company except that the same taper seemed to be agreeable to the Westinghouse people, and also that Mr. Storer of the Westinghouse Company did not seem to be satisfied with the taper his company was using.

J. L. Evans of the Westinghouse Electric Manufacturing Company thought his company would be willing to adopt any taper recommended by the association, but did not exactly understand the advisability of adopting any standard pinion or any standard taper that might better be left to the motor designers. It seemed sufficient if the axle and the axle layout, the position of the gear on the axle and the pitch of the gear are standardized, but he thought the association should give more attention to the adoption of a standard for the axles and gears and particularly the length of the bearing pin, which had been overlooked and not given in connection with the standard axle. He thought it would be wise to adopt a standard make of bearing pin because with old and worn axles, where the diameter has been decreased by 1-16 in., it would be impossible to interchange motors for different bearings unless one standardized the length of the bearing on the axle. The fit of the pinion, however, should be left to the manufacturers because it cramps the motor design very largely. One motor manufacturer would like to run with a larger shaft in the pinion fit, while another may want to use a special steel in the shaft and a small pinion fit.

The motion was then carried that the question of the standard taper for pinions be referred to the committee on equipment. The next recommendation was on continuing the subject of standard gear ratios for another year. This subject was passed without comment and was followed by the question of "Specifications for Wrought Iron Bars and Limit Gage with Table of Sizes for Round Iron," covering the adoption as standard of the specifications for wrought iron bars, as given in the report; also the adoption as recommended practice of the limit gage for round iron and the table of sizes of limit gages for round iron as given in the report.

Mr. Davis said in regard to the standard axles adopted by the association that both the General Electric Company and the Westinghouse Company have adopted these as their standards and have built and designed their motors to conform to the standards. Of course the companies thought that the American Street & Interurban Railway Association would immediately conform to these standards wherever they possibly could, but in nearly every case where they have brought motors so designed to the operating men they have required some alterations in various details. He felt that the operating end of the American Association should adhere more closely to these standards. The manufacturers have met the association more than half way, not only in fixing the standards, but also in adapting the motor design so as to meet them, and they felt that the association ought to meet them half way. Possibly the matter of standard axles had not yet soaked very deeply into the appreciation of the master mechanics, but it was a step in the right direction. To make two different motors interchangeable on the same gear and on the same axle ought to be sufficient in operation. He hoped that the association would stick more closely to the standard axle lay-outs because the makers were prepared to furnish motors designed along these standard lines.

President Winsor then asked for expressions of opinion as to "iron for brake rigings," and "specifications for wrought iron bars." He thought the specifications would be of value even if they were not adopted. After some desultory discussion on this subject, it was decided that the specifications for wrought iron bars and for axles be referred to the executive committee for its special attention and further report.

Referring to the specifications for rubber-covered wire, President Winsor said that the recommendation of the committee on power distribution favored the adoption of the standard specifications of the Railway Signal Association as suitable for this association. This subject would be in the province of the power distribution committee.

Mr. Evans said that in order to secure a more general recognition of the association standards and also to have them more carefully considered and to give them more weight, the committee had decided on the plan of submitting them to letter ballot as a motion to make a standard or not make a standard at a convention session would not have very great weight as representing all of the member companies. It did not seem that there would be anything to submit to letter ballot this year. Consequently this recommendation would not become effective anyhow until after the next convention.

Mr. Heywood said that the large steam railroad associations followed the letter ballot plan. Each company has its own representative at the convention, but all recommendations for standards are voted on by letter. In this way companies not having representatives at the convention have a voice in the adoption of standards. As he understood the matter, it would require not only a revision of the by-laws, but the concurrence of the parent association to carry out the letter ballot. He therefore suggested to the executive committee that during the coming year it prepare a definite plan for the adoption of standards, and if possible, come to the next convention prepared to present that plan as nearly complete as possible.

Mr. Evans said that in talking with Secretary Swenson on the final adoption of standards the plan would be something like this: A member of the engineering association desires a certain thing to become standard. He communicates with the committee which has charge of that department. The latter investigates it, and in the annual report recommends that the subject be reported to the committee on standards, provided the committee finds the subject sufficiently important to merit an investigation. During the next year the committee on standards would investigate that topic farther. The committee on standards as now organized consists of representatives of all departments. For instance, one might recommend a standard wheel which would not be at all desirable for the track department. Mr. Ackerman, as a member of the committee would be there to see that the car equipment men do not recommend a thing undesirable from the rail standpoint and so on. If the standardization committee approves the wheel for a standard, the subject is recommended back to the association which will then by resolution at the convention recommend that it be submitted to letter ballot. It appears entirely proper that these recommendations which have been thoroughly threshed out should be submitted to the main association for their approval previous to the time that they are submitted to letter ballot. By other methods it might be possible to submit something to letter ballot which was not desirable from the viewpoint of the main association. If the main association approves the recommendation to submit to letter ballot, the ballot would be prepared by the secretary, and sent to all the member companies. The engineering officers in charge of the various departments would mark the ballot which would be approved finally by the executive officer of the company. Mr. Evans anticipated that it would not be so easy to adopt standards under the proposed plan as it has been in the past, but he believed that the standards once adopted would be very much more effective.

Mr. Evans said that since investigating the matter, they found that the constitution and by-laws of the association are based on one vote for each active company; consequently the committee has agreed to eliminate the paragraph which indicates the number of votes to which each company shall be entitled "based on one vote for each million car-miles or fraction thereof made by the cars operated during the fiscal year previous to the convention of the association at which such standards are recommended to be submitted to letter ballot for adoption as the standards of the association." At this time they were decidedly opposed to the plan of one vote for each million car-miles, from the fact that it is contrary to the by-laws of the association and that its use would require an amendment to the by-laws.

The association then approved Mr. Winsor's motion that the subject of the proper method of securing approval of standards be referred to the incoming executive committee, it being the opinion of the meeting that the method proposed is acceptable and should be carried out so far as possible.

Mr. Evans, quoting from the committee's report, called for the acceptance of the following suggestions read by President Winsor:

"Your committee would also recommend the reprinting of the standards and recommended practices in the annual report of the association, * * * and would recommend as a further means of bringing the standards of the association into general use and that the information may be readily obtainable, a reprint of all the standards, recommended practices and specifications that have been adopted up to the time of each convention, together with proper notations as to the time adopted, with any additions or alterations made, all to be embodied with each annual report of the American Street & Interurban Railway Engineering Association as an appendix."

Upon motion by Mr. Heywood, the foregoing recommendations were adopted.

The next paper was the report on power distribution by Mr. Heywood, the chairman of the committee on that subject.

He said the report was classified according to the outline adopted at the last convention but somewhat elaborated. Appendix A had specification for high tension underground cable which was offered simply as a suggested specification which may be of benefit to some members. It was not a perfect specification but the committee should be pleased to have it criticised for the benefit of its successor. The executive committee had asked for an opinion in reference to rehabilitation versus scrapping of under ground cables. This opinion was crystallized in the curve Fig. 1 of its report. The gist of that curve is that it is cheaper to scrap all cables smaller in area than 600,000 circ mils. Fig 2 of the same report shows a furnace which had been used to separate the metals and insulation in under ground cables. Other subjects treated in this report are the joint occupancy of poles, supplementary copper and the abolition of wire gages in connection with which a new wire table was given in Appendix "H." The committee offered two recommendations for adoption as standard, one an improved trolley wire section, and the other the new wire table.

President Winsor asked for an opinion on the first recommendation, namely, that the association adopt the American standard section of grooved trolley wire for 211,600 circ. mil wire. Mr. Lincoln moved that the shape of the conductor shown in the report be adopted as standard. The motion was adopted.

President Winsor stated that the other recommendation was the adoption as standard of the copper wire table contained in Appendix "H." In explanation of this, Mr. Lincoln said that the various manufacturers who make material where varieties of gages have been used, have lately requested purchasers to give the micrometer gage dimension instead of any fixed gage. The Philadelphia Rapid Transit Company is now using that in the size of wires and sheet stock. He believed that if something of this character was taken up by the copper manufacturers it would do away with the considerable confusion now caused by the multiplicity of gages.

Mr. Heywood said that the proposed table is the B. & S. gage with the three significant digit diameters only. The fourth and fifth figures as contained in the American Institute table have been struck off, which of course would change the area, weight, length and resistance to a certain extent. The point was that manufacturers as a rule do not draw wire to a closer dimension than the third decimal place. Consequently the table which gives five decimal places is purely theoretical and not a practical one. The same recommendation had also been made by Committee W of the American Society for Testing Materials, but the latter has not gone so far as to recompute the table, simply recommending the dropping off the last two figures. The relationship between the sizes is practically maintained the same as it is in the B. & S. table, with the exception of the fourth and fifth decimal places.

Mr. Roberts asked whether it would be wise to put down a column for the old sizes as they are familiar to railway men, and then a column of the thicknesses of materials alongside.

Mr. Heywood said the committee thought it wise to leave out the parallels, as this plan had been tried out by some roads, which found that although they had given orders to their men to order wire by decimal diameter, the latter still keep the B. & S. gage in their minds. The only way to get the men accustomed to using the decimal diameter alone was to give them the decimal diameter table without the wire gage, so that they would use diameters and not wire gage. Thus, if a man wanted to get resistance of .162 wire he would have to look up a decimal table and not a B. & S. table for it.

On motion of Mr. Lincoln, the wire table recommendation was referred to the committee on standards in the regular way.

President Winsor then requested H. H. Stannard of the New York Pole Company to take the floor on the subject of reinforced poles.

Referring to Mr. Heywood's report, Mr. Stannard thought it was wrong in stating that steel necessary to reinforce a pole was so great as to be prohibitive. The report said further that the concrete takes a long time to set and in the meantime if the pole is corroded, the corrosion goes on all the time and increases on the outside until the pole is liable to bend or collapse; further, that swaying and vibration of the pole is liable to loosen the bond between the concrete and the metal, thereby greatly decreasing the strength. Mr. Stannard did not know any cases where the vibration of the pole had worked any damage to the reinforcing method. One would hardly expect to find a pole bend or collapse under the conditions cited. Further the report says: "To avoid this wires must be disconnected, thus throwing out of service the poles for a long period of time." His company never had to take off more than one or two span wires in the thousands of poles which it had reinforced. His method is simply to take out the plug at the top of the pole and insert a steel cage with sufficient steel in it to reinforce the pole. It is unnecessary to take off the span wire to reinforce the pole because the steel cage is inserted without removing the plug. As to the statement that "It has also been found from actual experience that in the winter time, when the metal of the pole shrinks, the inside plug of concrete does not permit of such a shrinkage, and the pole splits." Mr. Stannard said he had seen cases where the poles have opened up, but such poles were usually defective poles at the start. He did not believe that the cost of the external method is less than that of the internal method.

because it is necessary to disturb the sidewalks to reinforce externally.

Martin Schreiber, engineer of way, Public Service Railway Company, Newark, N. J., spoke on timber preservation. In treating poles with brushes quite a good deal would be saved by just treating the portions of the pole which absolutely need it; for instance, a 3 ft. band for a 22-ft. pole, starting the band 2 ft. from the bottom, 5½ ft. from the bottom for a 50-ft. pole and 8 ft. from the bottom for an 80-ft. pole. As to the open tank method there was not sufficient data at hand exactly to classify this treatment along the pole line. The greatest trouble is that the last foot of the pole will absorb the greatest quantity of the preservative while the conditions require a lateral penetration. A permanent treatment would be one that would penetrate all of the sap wood in the case of wood like cedar and chestnut. The tests recently carried out by his company to overcome the absorption of a great quantity of preservative in the lower foot of the pole convinced it of the necessity of placing some material on the foot. The company used cement which was permitted to set in 24 hours and also applied some boiling pitch but was unable to solve the difficulty. It might help the situation by putting some sort of copper plate or cup on the bottom of the pole before placing it in the tank. This method is used in Germany and he believed it would work well here. The cost of the brush treatment is about 5 cents for labor and 20 or 30 cents for material so that an additional year or a year and a half of life would pay for the treatment. The cost of the tank treatment as carried out by his company seems to be $1.50 to $2 a pole and it would be necessary for the pole to last six years to pay for this treatment.

F. E. Case of the General Electric Company referred to the subject of rail bonds as mentioned in Mr. Heywood's report. The committee favors the use of under-the-fish-plate bonds for T-rail construction as well as for girder rails. He heartily endorsed that suggestion as the concealed type of rail bond has several superior points as it is much shorter than the bond which passes through the web outside of the fish plate and is protected from injury and theft. Unfortunately, however, there is an insufficient amount of room for the bond with an adequate clearance to prevent injury in many instances. A great many roads are satisfied to use a single No. 0000 bond per joint for rails of 80-lb. or 90-lb. weight. A bond of this size has approximately 20 to 25 per cent carrying capacity of the rail. When a road wished to use a greater capacity it would double sizes and bond on each side of the rail. If the railway wished to go still higher, it took up some of the clearance, so that the fish plate actually rested against the bond and was liable to injure it. With all this clearance taken up in the average size of rail, say 70 lb. to 90 lb., it is possible to get from 75 per cent to 100 per cent of the capacity of the rail but at the risk of injuring the bond. He endorsed the suggestion that this matter should be the subject of joint consideration. He hoped that some committee will take action to see that the fish plates are designed to give greater amount of clearance. Many roads do not care to get more than 50 per cent conductivity, but on many other lines like reconverted steam roads or third-rail roads, it is desired to get full capacity. He had collected a considerable amount of data on rails, both of the present standards and one proposed by the American Railway Association. The proposed rail gives a clearance of about 10 per cent greater for the bonding space than is usually obtained but he believed this would still be inadequate.

James Heywood said the committee had suggested that the bond matter be referred for joint consideration to the next committee and the committee on way matters. He thought this subject important enough for the appointment of a special committee, which would have the power to confer with committees of the other associations as to what this association can do on the subject would hardly influence matters unless it had the co-operation of the American Railway Association. He therefore moved that this matter be referred to the executive committee for special attention. Mr. Heywood's motion was carried.

Mr. Heywood said that the committee had started out with the object in view of trying to arrive at standards for some classes of line material. The time which it had at its disposal was only sufficient to allow it to go as far as shown in this report. He wanted to say for the benefit of the manufacturers that there was no intention in making these tests of trying to show which manufacturer supplied the best class of material. The object was to arrive at a fair average from which standards could be derived. He thought that next year the committee could probably take from the results of these tests enough data to start the standardizing of line materials. None of the manufacturers knows the test sample numbers which were assigned to another manufacturer, but the committee is willing to tell each his own number.

W. G. Matthews, superintendent of line, Denver City Tramway Company, said that, commencing in 1904, his company treated its poles with carbolineum, or the brush treatment. He painted 30-ft. poles with a 6-in. brush, commencing 4 ft. from the ground and painted 3 ft., getting anywhere from ⅛-in. to ¼-in. penetration. His company did not start treating these poles until the local telephone company had built a 20-mile line and had treated each alternate pole in the manner described. After five years the telephone company took up these poles to find out how they were behaving. It was found in most cases that the poles laid in concrete had a dry rot anywhere from ¼ in. to ¾ in. on the outside all around, whereas the treated poles had not started to rot. The railway company started to treat poles in February, 1904, since which time it has treated something like 1300 poles for renewals and new construction, aggregating about 40 miles in all. The company tried two other ways to find out if there was any better method.

It has several miles of heavy feed line with 40-ft., 45-ft. and 50-ft. poles. It put 6 in. of concrete around the pole the entire depth of the hole and crowned on top to throw the water away. These poles are as good as the day they were set in 1902. To find out whether it is necessary to go to that expense it has set another line of poles where the hole is made only large enough to get the shovel in, with concrete 3 ft. below the surface and built up with a concrete cone around the pole. The rotting is usually from 2 ft. below to 6 in. above the ground. With these three different methods applied, the company hopes to draw some conclusions in two or three years. The Denver company has not taken out a treated pole and has only taken out the poles laid in concrete when it had to renew them.

W. M. Scott, superintendent of electric lines, Utah Light & Railway Company, said he had made some treatments from which he expected within the next year or two to gather some valuable data as to results. His method is to treat with hot carbolineum paint. As they are located near Great Salt Lake, he has also experimented to some extent with salt, but did not know whether salt would be a good preservative in their soil. He had inspected poles treated with salt near the top of the ground and found after their being in the ground six years that they showed very little decay. Other poles that were left free and not treated were very badly decayed. He had a mile of poles, the first pole of each trio being treated with carbolineum, the second pole with salt and the third left untreated. From this test he looked for substantial results in a few years.

E. J. Dunne, superintendent of distribution, Public Service Railway Company, said that on that system the overhead line was supported by 30-ft. chestnut and iron poles,

raked about 8 in., and set 6 ft. in the ground in a 6-in. shell of concrete. The standard iron poles were 5-6-7 in. sections and were provided with an extra 30-in. sleeve at the ground line. Poles were spaced 110 ft apart for both double and single track. They used a 5-16-in. double-galvanized steel wire for spans hung with at least a 12-in. sag to get the utmost flexibility. A gage pole with a hook at one end and a weight attached, equivalent to that of the wire to be suspended, was used to get the spans the right height when first putting them up. The pole was simply hooked over the slack span wire, the proper weight was then attached, and the wire drawn up until the weight left the ground. In this way the span wires were at an absolutely uniform height and tension, the tension was never excessive, and the whole job was completed without leaving a single detail to the judgment of the lineman. The spans were insulated with giant or wood strain insulators, and caps and cones were used for primary insulation. The company's standard trolley wire was round No. 00, suspended by 14-in. clinch ears at a height of 18 ft. 6 in. from the top of the rail. The trolley was hung with a 3-in. sag in 110 ft., as the company believed in a tight wire.

Mr. Dunne, continued by saying that in most cases the placing of the wire on the curve seemed to present new difficulties at every location, owing to the difference in car lengths, placing of trucks, placing of trolley, etc., on cars that have to be operated around the curve to be wired. All these factors have been taken into consideration and a simple standard layout with a table of radii was given to each foreman. This print simply showed the distance off-center of the wire on all common radii of curves and contained note that a 4-in. off-set must be added for each inch of elevation of the outer rail. For example, if the foreman found that he had to build a curve on a 50-ft. radius, he would turn to the blue-print which would call for a 9-in. off-set. The outer rail was elevated 1 in., so he must add 4-in. more, or a total off-set of 13 in. That was the extent of the mathematics necessary and nothing was left to the judgment of the lineman. Trolley switches or frogs were located entirely by the track frog, which, of course was located by the radius of the curve. This reduced the location of the trolley frog to one simple measurement, which was the same in all cases. The linemen were told to place the switch so many feet back from the track frog on the line of the straight wire. One degree of frog was used for all curves and only one measurement had to be taken. It should be readily apparent, he thought, that any lineman could do the work without any necessity for using his own judgment and without assistance from an engineer.

Most of the Public Service Railway system, Mr. Dunne said, was arranged for single-end operation and it was found almost impossible to back the cars safely into a "Y" without turning the trolley pole. This meant a great loss of time. To meet this difficulty a flat bronze spring was added to the company's standard trolley switch or frog. This gave exactly the same effect as a spring track switch. In this way the trolley did not have to be turned in backing up and the only thing required of the car crew was for the conductor to see that the trolley rope was free. The operation of the trolley was absolutely positive. All of the company's trolley frogs and acute angle crossings were made with an integral boot-jack or bridge which absolutely prevented the trolley hooking into the frog and pulling down the line. All frogs, crossings, section insulators, etc., were equipped with flexible approach ears, thus preventing the crystallization of the trolley wire at the end of the ear and doing away with the necessity for preventer ears. The company used a special cast steel cross-arm chair for supporting cross-arms on iron poles. This was made up in two halves and bolted around the pole. Two supporting members were used for double-arm construction and one supporting member and a strap when only a single arm was to be placed. There were chairs on the market, Mr Dunne said, but he thought they were defective in that they did not offer sufficient surface or resistance to a pull in the direction of the lines supported. The company's special chair had a supporting surface of 2 5-8 by 15 5-8 in., and the bolts fastening the cross-arms to the chair were independent of the bolts fastening the chair to the pole. This wsa found necessary in preventing the chair slipping under heavy load.

A. T. Clark, superintendent of shops, Baltimore United Railways & Electric Company, asked Mr. Dunne how he took care of curves where they have single truck cars and double truck cars with the trolley pole sometimes in the center and sometimes over the trucks?

M. Dunne said he put on a curve for the ordinary car. For the cars where the trolley base is in the center of the car, he introduced a second switch on the straight wire, about 9 ft. ahead of the other and put in a short piece of wire to connect up with the curve wire.

S. M. Coffin, master machanic and electrical engineer of the Mobile Light & Railroad Company said he was pleased with the remarks of Mr. Dunne regarding tight span wires and also as to allowing a given sag, for he had been much amused at times to note trolley men putting on a pair of double sheave blocks and pull tight with all the men at hand, regardless of the length of span or height of pole, and then with a second pair of blocks put the pole in place with the result that the smallest pole or the one in the softest ground gave up the most set. He believed a tight trolley with slack span much the more satisfactory to all interested.

A motion was made and carried that the committtee on power distribution take up the question of standardizing overhead material.

Mr. Matthews of the Denver Tramway Company asked if anyone could state prevailing practice regarding the protection of high-tension wires from foreign wires, such as telephone leads, etc., with potentials of say 1300 volts up.

William Roberts, master machanic of the Ohio Traction & Light Company said they used baskets on their 13,200-volt and 20,000-volt systems. Five or six wires are strung across in the form of a basket, with the corner looped over and in every case carried from the wires where his company croses over. They have had some trouble but not very much. They were ordered from one street altogether because of the telephone wires coming close to, though not touching, the trolley wires. The public in his neighborhood are entirely satisfied with the basket construction adopted. On one property they spread 60 ft. and that basket cost about $16.00 to put up, but ordinarily a telephone wire can be crossed for $4.00 to $5.00

Mr. Matthews said that in Denver they have about 400 crossings of high-tension lines, and in nearly all cases use cradles.

Mr. Dunne then submitted a copy of the agreement on the joint occupancy of poles as made by the Public Service Railway Company of New Jersey and the New York & New Jersey Telephone Company.

W. J. Harvie, chief engineer of the Utica & Mohawk Valley Railway Company, moved that the executive committee be requested to appoint a committee to consider the subject of joint use of poles and to consult the agreement which Mr. Dunne had submitted, together with all other data that is obtainable, and to give this subject special attention during the coming year. The motion was carried.

Mr. Roberts suggested that the incoming executive committee take up the advisability of collecting contracts of this kind from as many points as possible. He then quoted the terms of the agreements his company had with other companies that occupy the poles with them. He thought, however, that it would be a difficult matter to make any standard with reference to the joint occupancy of poles.

Mr. Scott said that in his case, if the pole was owned

jointly, the cost was divided in half and each company paid for its own attachments and maintained them. Where one company rents space from the other, it pays 60 cents per annum for a 10-pin cross arm. Each company has blue-prints showing the location of the wires of each, and the spaces between, and the spaces between the tail pins. There was a clause in the agreement that neither company would make attachment to the other company's pole without first having a written permission from the other company. If the pole was not of sufficient strength, and the line belonged to his company, it would not permit the telephone company to make the attachments to it, and vice versa.

THURSDAY AFTERNOON SESSION

President Winsor called the meeting to order at 2:30 o'clock and said that the first business on the program was the report of the joint committee on shop accounting. This committee was appointed by President Winsor last year to consult with a similar committee of the Accountants' Association to take up the question of shop accounts. The purpose was to see what the operating men wanted in the form of shop accounts and to get the accountants to formulate such accounts. The scope of the work of the committee was consequently extended to cover power stations accounts and forms.

The secretary then read a communication from W. G. Gove of Brooklyn, chairman of the committee, that the committee had considered the subject and had made progress, but as yet had no definite conclusions to report.

On motion of Mr. Lincoln the report was accepted and the committee was continued.

President Winsor then called attention to the question box. Upon motion of Mr. Harvie the question box was accepted and the thanks of the association were tendered to the secretary for compiling it.

Secretary Corning then announced that the following resolutions had been authorized by a vote of the executive committee at its meeting on Monday:

"Whereas, the Engineering Association recognizes the affiliation between it and the American Street & Interurban Railway Association and the hearty co-operation which has been extended to it during the past year; therefore, be it

"Resolved, That the Engineering Association tenders to the American Association an expression of its keen appreciation of the great assistance and co-operation accorded its officers, and the aid rendered its committee in preparing and compiling its reports by the different departments during the past year; and be it further

"Resolved, That we look forward with pleasure to the continuance of these very friendly relations."

Upon motion the resolution was adopted, to be transmitted to the proper officer of the American Association.

The secretary then offered the following resolution:

"Whereas, the exhibits are always an education to delegates, particularly to those of the Engineering Association, the executive committee believes that an expression from the Engineering Association to the Manufacturers' Association should be made.

"Therefore, be it resolved, that the Manufacturers' Association is to be especially commended for its efforts in bringing the exhibits to the usual high standard of these conventions, because the location of the convention city required the shipment of a large portion of the exhibits a greater distance than usual and makes the results shown in the exhibition hall especially gratifying to this association."

Upon motion the resolution was adopted, to be transmitted to the proper officer of the Manufacturers' Association.

The secretary then presented the following resolution:

"Whereas, the city of Denver, has through its citizens clubs, civic organizations and transportation companies evidenced the broadest and most liberal spirit of good fellowship and hospitality;

"Therefore, be it resolved, that the Engineering Association unanimously tenders its sincere thanks for the splendid reception accorded it, and the many courtesies so freely extended; and, be it further resolved, that it make acknowledgment of the universally gentlemanly conduct and unvarying courtesy of the platform man."

This resolution was also adopted to be transmitted to the proper persons.

The president then called for the report of the nominating committee. The report was submitted by the committee, consisting of W. H. Evans, chairman; W. S. Twining, M. G. Ayres, A. D. Campbell, S. M. Coffin. It nominated for office the following gentlemen:

President, F. H. Lincoln, assistant general manager, Philadelphia Rapid Transit Company, Philadelphia, Pa.

First vice-president, W. J. Harvie, chief engineer, Syracuse Rapid Transit Company and Utica & Mohawk Valley Railway Company, Syracuse, New York.

Second vice-president, E. O. Ackerman, engineer maintenance of way, Columbus Railway & Light Company, Columbus, Ohio.

Third vice-president, J. S. Doyle, superintendent of car equipment, Interborough Rapid Transit Company, New York.

Secretary-treasurer, John W. Corning, electrical engineer, Boston Elevated Railway Company, Boston.

Executive committee:

Martin Schreiber, engineer maintenance of way, Public Service Railway Company, Newark, N. J.

W. H. McAloney, superintendent of rolling stock, Denver City Tramway Company, Denver.

John Lindall, superintendent of rolling stock and shops, Boston Elevated Railway Company, Boston, Mass.

Thomas Elliott, chief engineer, Cincinnati Traction Company, Cincinnati, Ohio.

Upon motion the secretary was authorized to cast one ballot for the officers nominated.

The president then appointed Hugh Hazleton and R. C. Taylor a committee to conduct the new president to the chair.

President Lincoln upon taking the chair said that he accepted the office with the hope that he would be able to carry on the work in the same thorough manner as it had been carried on by ex-President Winsor and that he would endeavor, while holding the office, to do what he could to advance the interests of the association.

Vice President Harvie, the only vice president-elect present, was also escorted to the platform. He extended his thanks to the members for the honor of his election.

Upon motion Mr. Winsor, the retiring president, and Mr. Corning, the secretary-treasurer, were then given a vote of thanks for their work during the past year.

The meeting then adjourned.

LUNCHEON OF AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

To meet Secretary Ralph W. Pope, who has been in Denver for several days, about 40 members of the American Institute of Electrical Engineers sat down to luncheon together yesterday noon at the Brown Palace Hotel. W. E. Goldsborough, who was active in arranging for the luncheon, which was attended by a number of convention visitors, acted as chairman, and introduced as the first speaker Mr. Pope, the guest of honor. Speeches were also made by Charles Hewitt of Philadelphia, J. F. Dostal of Denver, O. B. Coldwell of Portland, Oregon, and James H. McGraw of New York. The speakers reviewed the development of Institute branches. Some of them emphasized the importance of engineers taking a more active part in civic affairs, where their technical knowledge should prove valuable.

THURSDAY SESSION OF ACCOUNTANTS' ASSOCIATION

The concluding session of the Accountants' Association was called to order by President R. N. Wallis at the Hotel Savoy on Thursday morning.

N. E. Stubbs, auditor United Railways & Electric Company of Baltimore, read his paper on "Payrolls and Timekeeping," an abstract of which is published elsewhere.

F. E. Smith, comptroller Chicago Railways Company, asked Mr. Stubbs how long it took him to pay off.

Mr. Stubbs replied that three days were needed.

Mr. Smith said that the company with which he was connected paid twice a month, but every man was paid in one day if there. The money of the men who were not on hand was turned in to the unclaimed wages department. The company had 4400 trainmen. The conductors secured their money and identified their motormen and the employees at the car houses were paid there. Receipts were taken on the payroll sheets from everybody who could write.

H. E. Weeks, secretary and treasurer, Tri-City Railway, had found that in the smaller companies an individual payroll receipt facilitated the work of paying off.

Mr. Stubbs said that the only objection he had to receipts was that he was afraid they would often be lost, mislaid or stolen, and that he could not be certain that a man handed in his own receipt.

Mr. Weeks had been using the receipt system for over three years, and had not had one lost, stolen or mislaid. The receipts were checked the same as a check would be checked. He had them audited periodically to see that they were filed.

Mr. Smith asked Mr. Stubbs how he reached the men on runs.

Mr. Stubbs replied that as the cars reached the various car-houses the men were paid off. The track gangs went to the car-houses located nearest their work.

Will Browne, auditor, Utah Light & Railway Company, brought up the question of the feasibility of a pay-check system such as was used by the steam roads throughout the West. The envelope system had been abandoned very generally on Western steam road properties. On the Utah Light & Railway a pay-check system was in use. The pay-checks were drawn on the auditor by the treasurer and were delivered to the men by the treasurer, who required a receipt in each case. This was a very good way of delivering to each man the token by which he could secure the amount due him from his grocery man or his banker. It also kept in the bank a balance that otherwise would be withdrawn.

H. S. Swift, secretary, Toledo Railways & Light Company, asked if Mr. Browne had any trouble with lost pay-checks.

Mr. Browne issued a duplicate after three months had elapsed from the day on which the notice of loss was filed. Payment was stopped at the treasurer's office and the depositary banks. There were very few lost checks.

William E. Humphrey, auditor, Pueblo & Suburban Traction & Light Company, asked if Mr. Browne required a bond from employees receiving a duplicate check issued in lieu of a lost one.

Mr. Browne required a bond with a surety. The checks were generally cashed at savings banks, grocery stores and department stores. The latter made a specialty of cashing such checks to attract trade. Certain savings banks provided themselves with the necessary cash to pay the checks.

H. L. Wilson, Boston Elevated Railway, said that some years ago when he was in the West the road with which he was connected had that system and it was found that most of the cash went to the saloons.

Mr. Browne said that some of the checks were cashed in saloons. This phase justified criticism of payment in cash. Before he was connected with the traction company he was with large railroads in the West and introduced the pay-check system on several of the properties. On the Southern Pacific road there were 45,000 pay-checks a month, and although some objection was met at first, it very quickly died out, and everyone was extremely well satisfied, and he thought now that this system was very generally used throughout the West.

Mr. Wilson had found it very much better to pay in cash than by check. The statute provided that workingmen were to be paid weekly, and there was no question about the man receiving his money. He signed for it then and there. There were 5000 employees, and he did not think there had been five complaints in a year with that system.

Mr. Stubb's experience had been that where a man could get a check cashed at a store he was allowed to keep an account. Sometimes the account would be overrun and if it was not paid promptly on the next pay-day the store took the matter up with the office.

Mr. Browne had not experienced such difficulties where he was now. On the steam roads there used to be trouble with boardinghouse keepers, but they soon learned that the matter of a man's account was one between them. If a company's representative guaranteed a board bill in any way, they had their remedy by turning in an order on the company at a certain time, whereby they would have the amount due them deducted from the employee's pay.

W. F. Ham, comptroller Washington Railway & Electric Company, said it might be interesting to know that efforts were being made, when payments were made in cash, to reduce to a minimum the time lost by the employee who was to be paid. At the Washington navy yard when several thousand employees in the navy yards were paid, they were divided into squads, so that a certain squad should appear at a specified hour, and then another squad, a few minutes later, and so on, and a man did not lose more than two or three minutes from his work. The track employees formerly had to go to the pay master's office for their pay and lost from one to two hours. Now the paymaster went to the men. As Mr. Stubbs had said, the larger companies used the cash system and it seemed to him that the question of economy alone was a sufficient answer, because the economy of time in paying off in cash was a pretty important consideration. It was very much easier to pay $10 in cash than to draw a check for $10, sign the check and then put the employee to the annoyance and trouble of cashing the check, when it could be done in one transaction. He thought the employees rather considered it a favor to be paid in cash. It was undoubtedly true that there were certain employees that could not be reached in cash payment except at considerable trouble, and exceptions were made of those men. At remote points the men who were on a specified weekly or monthly payment wrote out their own receipts and went to the cashier's office. Men of a little higher rank, who were considered absolutely responsible, were allowed to write out their own receipts, which were cashed at the depot, and then turned in to the cashier as cash.

Mr. Wilson asked if Mr. Ham had discontinued the system of having the conductors and motormen pay themselves.

Mr. Ham said the system was still continued and he felt that it was a great time-saver. But that was not the motive which influenced this practice so much as to have the men have a regular daily income. The business was largely a ticket business. The conductor, in going to work in the morning, was furnished with $25 worth of tickets, for which he was responsible. When he come in at night he turned in to the depot clerk either the $25 worth of tickets or its equivalent in cash and then the depot clerk gave back to him the amount of his own pay and that of the motorman, and the conductor handed the motorman his share. The amount to which they were entitled was known by the depot clerk, and was carefully audited in the office.

President Wallis said that the same system was used in Denver.

W. A. Doty, auditor, Denver City Tramway Company, said that the conductor noted on his sheet at night the number of hours run and 10 minutes' time off was allowed for taking a car out of the car-house. The sheet showed the number of the conductor, his name and the rate he was entitled to draw and the same information for the motorman. At the end of his day's work the amount due was deducted from the cash receipts, and the balance turned in. One man in the auditors office checked those sheets with the train dispatcher's sheet, and, in general it was found that this system worked admirably.

Mr. Ham thought the system worked out very satisfactorily. Part of it ran practically automatically, because the depot clerk was the one who was the timekeeper, and he and the man came to an agreement as to the amount.

A. L. Linn, Jr., general auditor, New York State Railways, asked Mr. Doty if he checked his time with the use of the Ohmer register.

Mr. Doty said he did.

Mr. Swift asked Mr. Ham how he accounted for the money. Mr. Ham replied that the dispatcher's sheet, or the depot clerk's sheet, showed the exact amount paid for each run each day. It was simply what would be a daily timekeeper's report. Any variations from the schedule must be fully accounted for by the depot clerk. It was audited by the schedule each day.

Mr. Swift asked wnether a pay-roll was made up every day.

Mr. Ham answered that the amount of the deposit in the bank was the net amount between the cash collection and the pay-roll.

Mr. Stubbs asked whether members in larger companies who paid off by cash and did not take receipts from their men had any difficulty from men who claimed not to have been paid, and also how many men they could pay in an hour by the cash system.

J. J. Duck, auditor, Chicago City Railway, said that on one steam road running into Danville, Ill., about 4000 men were paid in cash in about three hours. These men came in the order shown on the pay-roll, and were identified by their foremen.

Mr. Stubbs thought that was a splendid system.

J. M. Smith, comptroller, Toronto Railway, said that company had been considering the question of using checks, but it was found that the men took exception; they raised various objections so that the company paid by the envelope twice a month. The day before the envelope was delivered, identification cards were issued. These cards were sent out from the office to the various car houses, shops, etc., the day before, and as the men were leaving they received the identification cards which simply had numbers corresponding with the pay-roll numbers. In the morning the paymaster was sent to the various shops, and the car starters went to the cashier's office and received the wages for their divisions all arranged in the order in which each route ran out. The conductor presented his card, signed it, and the number on the envelope was then identified with that on the pay roll. The men were paid twice a month. The arrangements were all made in the afternoon and the men were all paid during the runs of the next day.

W. H. Forse, Jr., treasurer, Indiana Union Traction Company, remarked that the arguments for payments in cash seemed to predominate, but he wanted to state a few of the advantages of paying by check, particularly in the case of interurban lines. This company formerly paid in cash, but for several years had paid by check. The employees were pretty well scattered over the central part of Indiana, and numbers of men were stationed at the car houses and shops, and when the pay car was used it was found that considerable time was needed. It required trouble and expense to cover the entire system, and the men lost considerable time in meeting the pay car at various points. Since using the check system there had been no complaints from the men with regard to the cash on their checks. It was true that a good many were cashed in saloons.

Mr. Wilson said that if some of the companies having trouble because employees' checks were cashed in barrooms were to adopt the system followed in Boston, namely, that any man that went into a bar-room with his uniform on was discharged, there would be less trouble in this direction.

B. E. Bramble, general auditor, Illinois Traction System, said that for the past four years and a half that company had paid in checks. The signature on the checks was sufficient evidence that the money nad been received. There had been no trouble with outstanding checks or on account of checks cashed in saloons. Most of the pay-rolls were made up by the different departments. It required very little time for a couple of clerks to write the checks. They were signed by the auditor, not by the treasurer, although the disbursements rightly came under the jurisdiction of the latter.

J. C. Collins, secretary and auditor, New York State Railways, used the check system and had found it very satisfactory; there had been very few complaints from the men and quite a few comments from the wives of those men who were inclined to spend their money in other than a right and proper way.

Mr. Ham was satisfied that in a large property everything in the way of economy was in favor of the cash system. As smaller bodies of men to pay were reached, the argument was more in favor of the check system; but if there were several hundred men that could be paid at one place, they could be paid more quickly in cash than in envelopes.

Mr. Browne asked whether the Washington Company required a receipt from the men.

Mr. Ham answered that each employee turned in a ticket showing the time he had worked, and that acted as a receipt, and when signed was an indication that this man had received his pay.

E. S. Pattee, secretary and comptroller, Twin City Rapid Transit Company, used the check system, and had found it very satisfactory.

C. S. Mitchell, auditor, Pittsburgh Railways Company, said that that company had about 5000 employees, and they were paid in cash excepting the general office men. They were paid twice a month and a separate receipt was taken from each employee. These receipts were prepared in the auditor's office and sent out the day before the pay-car went around and were distributed by the foremen, so that the men generally had their receipts signed before the pay-car reached the car-house or shop. Motormen and conductors were paid over the counter in the pay car. The shopmen and car-house men were paid in envelopes, which, as a general rule were carried through the shops by the paymaster.

H. E. Vordermark, auditor, Ft. Wayne & Wabash Valley Traction Company, had used the check system for about four and a half years, and found it superior to the cash system. The track and section men all along the line were paid by check.

Mr. Wilson took a receipt on the original pay-roll. These pay-rolls were bound each week with the proper classification, so that there was a complete statement of what every man had done every day of the week. Not over five complaints had reached the office in a year.

P. V. Burington, secretary and auditor, Columbus Railway & Light Company, asked how receipted pay envelopes were accounted for.

Mr. Linn said that no two of the companies with which he was connected used the same plan. Where the individual

receipt was used and made out and signed by the conductor or motorman, the paymaster on his return was checked up. The envelopes were turned over to the cashier and held by him 30 days, when he was checked up and the money redeposited in the account to which it was originally credited.

The receipts were not taken on the envelope. A blank receipt was furnished to the employee and on the back of it there was a space for a statement of his time. He filled out the receipt himself, and when he went to the pay car window received his pay. Mr. Linn did not believe in the envelope and would like to see the employees paid in cash. It was a check against the timekeeper for errors. If the employee's receipt called for more time than was shown on the pay-roll he was paid what the receipt stated and was sent to the office.

President Wallis asked if there was anyone who did use the receipted envelope system referred to by Mr. Burington. No one responded.

M. R. Boylan, general auditor, Public Service Railway, said that company had 7000 men and paid weekly. The system outlined by Mr. Linn was followed.

W. H. Burroughs, secretary and treasurer, Memphis Street Railway, had found that the system of paying in cash facilitated matters; the men liked it.

Mr. Forse said in answer to a question of Mr. Wilson that one of the rules of his company was that employees should not assign wages, and that such assignment would be cause for dismissal, consequently there was no trouble with this condition.

Mr. Wilson said the legislature of Massachusetts had passed an act providing that no assignment of wages was legal unless it was accepted by the employer, and if the man was married it must always be signed by his wife.

President Wallis added that the act provided that an assignment must always be accompanied by a statement of the account, so that it showed whether it was bona fide or not and for what purpose.

Mr. Mitchell said he had noticed from the discussion on this subject that in a good many cases the auditing was done after the employees were paid. With his company all auditing was done before the money was disbursed.

Robert Morrison, Jr., secretary and auditor Michigan United Railways, paid twice a month by pay-roll, using a special form check limited to $100 and payable "to order" consequently it required the employee's name on the check to be cashed. The officials of the company preferred to have the employees sign the pay-roll. There was just one endorsement on the pay-roll.

Mr. Forse moved that the recommendation in the paper be referred to the executive committee for further consideration. The motion was adopted.

The paper of W. B. Brockway, general auditor, Birmingham Railway, Light & Power Company, on the subject of "The Electric Railway Auditor, His Duties and Relation to the Organization," was then read, in the absence of Mr. Brockway, by Mr. Ham. An abstract of this paper is published elsewhere in this issue.

After the reading of the paper, President Wallis stated that he had asked Gen. George H. Harries, second vice president, Washington Railway & Electric Company, and third vice president of the American Association, to discuss the subject.

General Harries said that when he accepted the offer to discuss the paper he did so without realizing that the convention would call for from 18 to 20 hours' work daily, necessarily leaving but little time to discussion of papers, but he had read the paper with a great deal of interest. He endorsed very heartily the conclusions reached in the paper and was in accord with all the suggestions made. It seemed to him that the paper must have been framed under conditions with which he was familiar. The views expressed were so couched that it was extremely difficult to criticise the paper. If the principles as laid down could be really made effective—and he had no doubt there was a pretty strong movement in that direction—the auditing department would then take its proper place. He did not know that he could do any more than recommend to the association the views contained in the paper.

Mr. Forse believed that the duties of the auditor in his relation to the organization depended largely upon the personality of the man himself. A successful accountant should keep his brain clear and free from cobwebs, and have a mind that worked as fast as a piece of well-oiled machinery. The Interstate Commerce Commission had promulgated classifications and then promulgated rules regarding the tariffs of interstate railroads, and the auditor of an interstate railroad must keep posted on these in order to be familiar with the rates. An accountant who was valuable to his organization must be thoroughly familiar with the affairs of the company, and should be familiar in generties.

In the Indiana Union Traction Company meetings were held twice a month in the general manager's office, and attended by department heads and the active operating officials. After several meetings had been held it was found that the chief accountant had made some good suggestions about operating matters. The operating officials were rather surprised, of course. One day an accounting officer may be working at a plan connected with the safeguarding of the company's pay-roll, and perhaps the next day on stores accounts, and then again on bonds of the company.

Mr. Linn said the roads with which he was connected operated approximately 669 miles of track, and he could give a rough sketch of almost every building embraced within the properties. He always managed to find some time to look over the properties and see if something new could not be learned regarding them.

President Wallis also read a letter addressed to him by J. F. Calderwood, vice president and general manager, Brooklyn Rapid Transit Company, on the subject of Mr. Brockway's paper. Mr. Calderwood said:

"I have read this paper with a great deal of care and as it will not be possible for me to be present at the convention, I wish to acknowledge receipt, heartily approve of it and add a word.

"I have been on the accountants' side of the question and from that viewpoint fought with original quota of street railway accountants for a proper recognition of accounting and also for an intelligent, honest and uniform system of accounts, but I am sorry to say that in those days we did not receive the hearty support and co-operation of many of the street railway managements of this country. But conditions have since changed; the men who recognized the accountants of 10 years ago and the necessity of a proper system of accounting have the successful properties and are the successful managements of today. Whatever has been the outcome of my opportunity as an operating manager, I attribute it primarily to my early appreciation of accounts and of the cordial and harmonious relations necessary between the accounting and operating departments.

"If you will study the street railway managements of the past decade that have been unsuccessful you will readily see that their difficulty was their failure to undertand, intentionally or otherwise, the condition of their accounts."

Mr. Pattee then read his paper on "Stores Accounting and Inventory." This paper is published elsewhere.

F. E. Smith asked Mr. Pattee whether, if he made trolley wheels, he would charge them to equipment of cars with an overhead charge.

Mr. Pattee said he would. It made no difference whther the company did the manufacturing or the material was bought manufactured. If the company could not manufac-

ture as cheaply as it could buy, it would not manufacture.

Mr. Smith asked whether material should be charged out at the last purchase or manufactured price instead of the price at which it was actually bought.

Mr. Pattee said he had no sympathy with the lot-number system.

Mr. Weeks said that although his company did not handle as many stores as Mr. Pattee, it handled between $150,000 and $200,000 worth, and had the lot number, or the bin number, and the folio number. He found that it saved a great amount of confusion in charging out.

Mr. Mitchell used the lot number system throughout all store rooms, whether in street railway, electric light or gas entries, and found it a great convenience. The material was charged out at the cost price in order to get away from shortages at the time of inventory. He had what was called a perpetual inventory. Two men connected with the auditing department were furnished each morning with cards for a certain store room. On those cards appeared the lot number of each article of which they were to take inventory on that day. Their cards, handed in at night, were compared the next day with the records on the books. If there was any shortage or overage it was taken up at once. The storeroom books were balanced every month, and must balance to the cent with the general ledger.

President Wallis announced that the paper on the program by W. M. Stewart on "The Census and Electric Railway Statistics" would not be presented. Mr. Stewart had promised to present the paper, expecting that the census would be out by this time. As it was not, he felt it would be improper for him to write the paper and make the address.

President Wallis said that action upon the report of the classification committee had been left open until this session..

Mr. Swift moved that the report be accepted and the recommendations adopted. The motion was carried.

President Wallis then read the report of the joint committee appointed as the result of action at the last convention on shop accounting. The report was signed by William G. Gove, chairman of the joint committee on shop accounting of the Accountants' and the Engineering associations and said in part:

"Upon a preliminary discussion of the subject at issue it was decided that before further action could be taken it would be necessary to obtain the existing classification of accounts from various street railways of the United States and to this end B. V. Swenson, secretary of the Engineering Association, was communicated with and a proper circular letter signed by the chairman furnished him for printing and to be sent to the various street railway companies, requesting that eight copies of their schedules for operating expenses be forwarded to the office of the secretary.

"To facilitate matters, the chairman appointed a subcommittee, consisting of Messrs. Lindall, Hewitt and Gove, to consider the question of 'shop work, power-house and track work' from an engineering standpoint and in their relations to the standard classification of accounts.

"More delay was encountered in obtaining schedules of operating expenses than had been expected, and it was not until July 10, 1909, that all street railway companies had been heard from, and on July 20 the eight copies of these schedules were forwarded from the office of the secretary to that of the chairman, properly classified, and on that day were sent therefrom to each member of the committee with a notice stating that another meeting would be held.

"However, as the chairman of this committee was unable to continue at his office after July 31, 1909, until Sept. 1, it was found necessary to postpone the meeting indefinitely and to refrain from considering the report of the sub-committee upon shop and power-station practice which had been received.

"The chairman is keenly disappointed at the unsuccessful termination of such preliminary work as has been done, but the time remaining makes further investigation with the few remaining weeks impossible and more time must be had for this work."

Mr. Linn moved that the report be accepted and the committee continued. The motion was carried.

W. J. Thorp, auditor, Little Rock Railway & Electric Company, chairman of the committee on resolutions, reported a resolution "that the hearty thanks of this association be extended to the Manufacturers' Association and to the officers and employees of the Denver City Tramway Company for the many courtesies extended to us and our guests; to the Denver & Northwestern Railway Company, the Denver & Inter-Mountain Railway Company, the Denver & Interurban Railway Company and the Denver & South Platte Railway Company for free transportation over their lines; to the Denver Country Club for the privilege of its club house and grounds; to President R. N. Wallis and Secretary H. E. Weeks, to the executive committee and to the committee on standard classification of accounts for their faithful and efficient work, and to the authors of the valuable papers read before the association." The report was accepted and placed on file.

Mr. Wilson presented the report of the committee on nominations, as follows:

President, H. S. Swift, secretary and auditor, Toledo Railways & Light Company. First vice-president, A. L. Linn, Jr., general auditor, New York State Railways. Second vice-president, A. S. Michener, comptroller, Stone & Webster Management Association. Third vice-president, N. E. Stubbs, auditor, United Railways & Electric Company of Baltimore. Secretary-treasurer. H. E. Weeks, secretary and treasurer, Tri-City Railway. Executive committee, Robert N. Wallis, treasurer, Fitchburgh & Leominster Street Railway; W. J. Thorp, auditor, Little Rock Railway & Electric Company; R. Morrison, Jr., secretary, Michigan United Railways; D. S. Mitchell, auditor. Pittsburgh Railways.

The secretary was instructed to cast one ballot for these officers.

After acknowledgment of their election by the new officers the meeting adjourned sine die.

FIRST DAY OF STATE CONVENTION

The first day's sessions of the Colorado Electric Light, Power & Railway Association were held yesterday at the Hotel Auditorium, Denver. Beginning thus on the closing day of the national street railway conventions, reciprocal courtesies were extended between the national and state organizations. J. F. Dostal, Denver Gas & Electric Company, president of the state association, was in the chair. None of the set papers of the convention applied particularly to street railway operation. The association devotes much of its attention to the question box, and in this there are departments on "Boilers and Engines" and "Cars, Railways, Motors, etc." The latter department was not reached yesterday, but the former was taken up in the morning and discussed at some length.

President Dostal stated in his address that practically every railway and lighting company in the State is a member of the association. Frank W. Frueauff, president of the National Electric Light Association, gave an outline of the work of that association as taken up by the present administration. J. R. Cravath, Electrical World, Chicago, gave a talk on "Recent Progress in Illuminating Engineering" at the afternoon session.

The Big Pool at Glenwood Springs is 750 feet long, from 65 feet to 110 feet wide and from 4 feet to 6 feet deep.

The State Capitol in Denver is built of native Colorado granite and cost $2,500,000.

COMPLIMENTARY SUPPER TO DENVER CITY TRAMWAY TRAINMEN

A most impressive demonstration of the high standard of loyalty and earnestness of the employees of the Denver City Tramway Company was shown at the complimentary supper given to the Tramway Band and Minstrel Troupe on Tuesday evening after the vaudeville performance. This year when the entertainment committee made its plans for the vaudeville performance, which has come to be an annual feature of the conventions, some fear was expressed that, owing to the long trip to Denver, any of the star performers of previous years would not be in attendance to take their usual places in the program. It was sugested to Mr. Whipple, chairman of the entertainment committee, that the Denver City Tramway Company Band and Minstrel Troupe would provide an attractive feature. Mr. Whipple took the histrionic ability of the street car men on faith and molded the program around their act as the central feature. The wisdom of this move was apparent on Tuesday night, when the street car men distinguished themselves by performing with unusual ability to the great satisfaction and amusement of all those present. It was indeed a surprise to see such a finished performance from men who are not usually considered to have any other ability than to ring up fares or turn a controller handle. As a small token of appreciation of the excellent work of the members of the Denver City Tramway Company Band and Minstrel Troupe Mr. Whipple arranged for a Dutch supper at the Kaiserhof after the performance. The selection of this hostelry for the supper was particularly appropriate because Mr. Openheim, the proprietor, was formerly an employee of the Denver City Tramway Company.

After the vaudeville performance was over and the burnt cork removed from the countenances of the amateur actors the entire company, numbering 68 in all, adjourned to the Kaiserhof and partook of a generous Dutch supper with all the trimmings. Mr. Whipple as chairman of the entertainment committee acted as host of the evening. With him, representing the Manufacturers' Association, were Charles J. Peirce, vice president; James H. McGraw, vice president, and George Keegan, secretary and treasurer of the Manufacturers' Association. After the substantial repast had been served and cigars lighted a number of toasts were proposed.

P. E. Beuhler, a clerk in the auditor's office of the Denver City Tramway Company, who was formerly a motorman on the road, responded to the toast, "The Boys." He spoke feelingly of the loyalty of all of the employees of the company and its officers. There was no dissatisfaction over wages or hours of labor because the officers of the company had always manifested a willingness to meet the men walf way in adjusting any fair and reasonable complaints; and the men in turn showed their appreciation of the interest taken in their welfare by working for and with the company.

J. J. Kreidler, a motorman, spoke for the Minstrel Troupe. After recounting the reasons for formation of this organization of employees he paid a high tribute to the officers of the Denver City Tramway Company for their liberality, fairness and interest taken in the welfare of the men. Like many other employees of the Denver City Tramway system, he had come west some 10 years ago in search of a place to work where his wife might regain her health and strength. He had been working for the Cincinnati Traction Company and had seen his wife wasting away, with no hope for her recovery. One day he found a copy of the **Street Railway Journal** in the car-house, and in reading it through he happened upon a description of the street railway system in Denver. This gave him an idea and he immediately broke up his home in Cincinnati and came to Denver with his family looking for a job. The Tramway Company gave him the chance he was looking for and he had been here ever since. His wife had improved in health from that day and he was now happy in the enjoyment of his home, blessed with a family of healthy and happy children. All this, he said, he owed to the inspiration given him by the **Street Railway Journal**, and he took this opportunity of expressing his heartfelt thanks and gratitude to James H. McGraw, president of the McGraw Publishing Company, who had made the **Street Railway Journal** and its successor, the **Electric Railway Journal**, one of the greatest elements of good in the street railway business.

Mr. Booth, a conductor, spoke for the Tramway Band and pointed out how organizations of this kind among the men promote a spirit of good fellowship and welded the men into a unit with the single idea of giving their best efforts to the work they were doing.

Mr. Peirce congratulated the men on their esprit du corps and their loyalty to the company and pointed out to them that they were an essential part of the machine. Their officers might be capable and efficient, but without the men a street railway system could not be run.

Mr. McGraw expressed his appreciation of the high compliment paid him by Mr. Kreidler and narrated some of the early history of the founding of the **Street Railway Journal.** He expressed a desire to make the **Electric Railway Journal** a powerful influence for the betterment of the service and said he hoped to continue the good work which he believed the paper had already done in the field.

Mr. Keegan made a few remarks in which he pointed out the opportunities of today for men who take an interest in their work to rise above the routine duties of subordinate employees and assume positions of responsibility in the organizations of street railways.

The supper party dispersed with general expressions of mutual good-will and the singing of "Auld Lang Syne" at a late hour.

DENVER & SOUTH PLATTE RAILWAY

The Denver & South Platte Railway Company is a new interurban line connecting with the Broadway line of the Denver City Tramway at Englewood, 7 miles from the central loop in the business district of Denver. The new road is now in operation between Englewood and Littleton, 5 miles. Littleton is the county seat of Arapahoe county. At this point the road crosses the Platte river. An extension is projected up the river from Littleton to Roxborough Park, which is located at the mouth of the Platte canyon in the edge of the Rocky mountains. Within this park is a natural formation similar to the Garden of the Gods, near Colorado Springs. It is expected that the new park will develop into a popular tourist resort. Along the route of the present and proposed lines are coal, lime rock, silica and cement deposits.

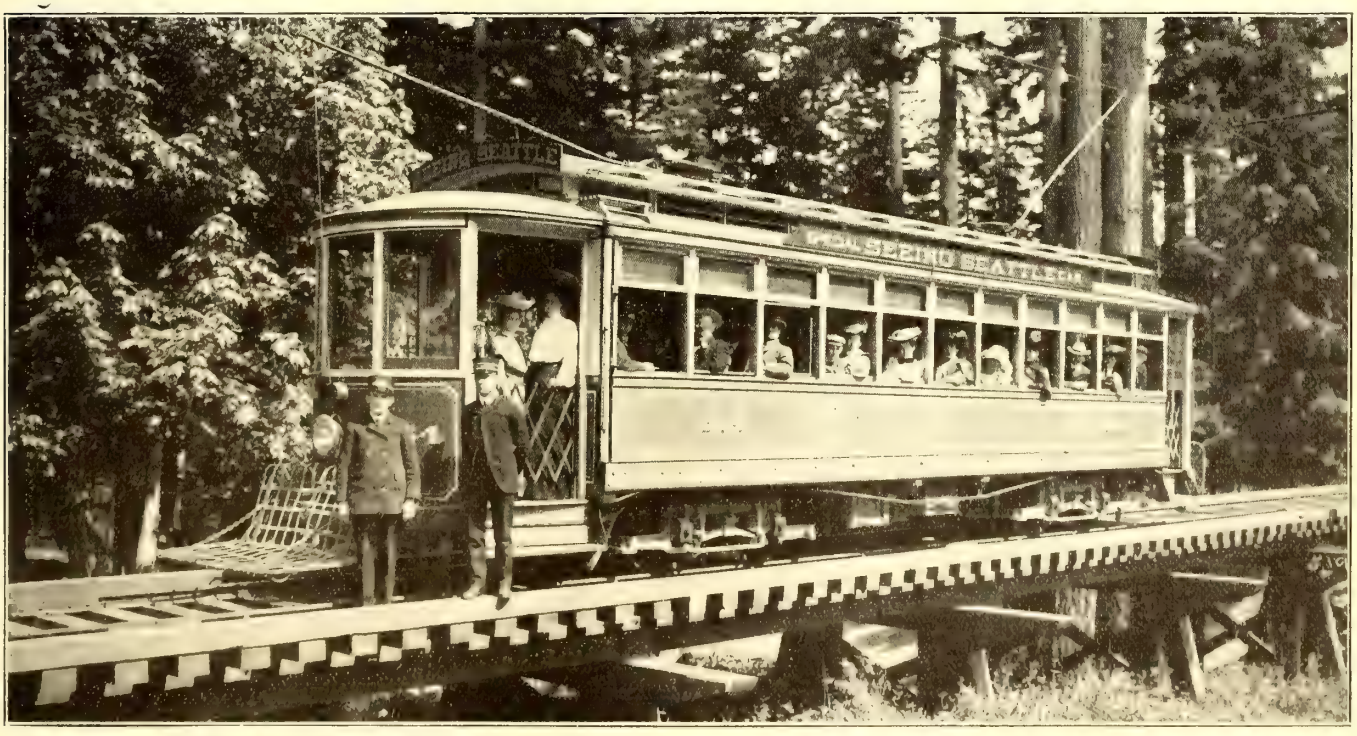
The new road has few curves and these with a maximum of 3 deg. The maximum grade is 3 per cent. while the average grade of the entire line is less than 1½ per cent. There are but two bridges to be built on the line. At Littleton the road passes under two steam railroads through substantial reinforced concrete arches. The tracks are laid with 70-lb. rails built to 3-ft. 6-in. gage to conform to the tracks of the Denver City Tramway. Power for the operation of the line is purchased.

A theater party was given by the entertainment committee last evening at the Broadway Theater. The entire house was reserved for convention people, and it was more than filled. The attraction was "Vasta Herne," a four-act modern American drama, with Mrs. Leslie Carter in the title role. Ross F. Hayes of New York and W. K. Beard of Philadelphia were the members of the entertainment committee in immediate charge.

"SEEING SEATTLE" TROLLEY TRIPS

The Seattle Electric Company is especially well situated for operating sight-seeing cars. The city and the neighboring country offer many interesting scenic features, and the city is visited throughout the entire year by large numbers of tourists so necessary in making this type of service profitable. An accompanying illustration shows one of the "Seeing Seattle" cars as operated by the Seattle Electric Company. Two trips a day are made: one at 9:30 a. m. and the other at 1:30 p. m. The trips are each about 26 miles long covering the city and suburbs and occupying three hours time. A fare of 50 cents is charged.

The "Seeing Seattle" car starts at Pioneer Place in the center of the business district and runs over Second Avenue through the commercial district and on the original Ballard line along the water front. Here are many interesting views of the deep sea docks of the transcontinental railways and large lumber and shingle mills. From the water front the car proceeds to Green Lake where a complete trip around this beautiful body of water is taken. En route on this part of the trip Woodland Park is visited. This park is the largest of the city's improved pleasure grounds and comprises nearly 200 acres. The greater part of its area has been left in the natural state. After leaving Woodland Park the sightseer is taken over Westlake Boulevard, along the shore of Lake Union and through the residence district to Capitol Hill. From this hill a splendid view of Puget Sound on one side and of Lake Washington on the other, with the city between, may be had. On the return route the sightseeing car is taken to Madrona Park, located on the shore of Lake Washington. The return route from there is through the central residence and business portion of the city to the starting place in Pioneer Square. On each of these trips the lecturer explains the interesting scenic features as the car passes along.



Sight-Seeing Car of the Seattle Electric Company

Mr. R. D. Wynn has been elected vice-president and general manager of the Central Engineering & Construction Company, Chicago, Ill. Mr. Wynn was formerly vice-president and general manager of the Waukegon, Rockford & Elgin Traction Company, Waukegon, Ill.

THE LAST HORSE CAR IN DENVER

New York has been made famous in the joke papers as the only city of any size in the Unites States which can still boast of horse cars. The reputation is emphatically denounced as being undeserved. Denver had a horse car, on exhibition



Convention Visitors and Old Horse Car

yesterday morning in front of the Auditorium, which antedates any in service in New York. It is the original pay-as-you-enter car, all passengers except the horse being compelled to pay toll to the owner, general manager, purchasing agent, superintendent of transportation and driver of the Cherrelyn line. The car is pulled up hill by a motor of one horse power and the driver is careful to conserve his propulsion energy when running down grade by shutting off and coasting while the motor is unhitched and rides on one platform.

The Alaska-Yukon-Pacific Exposition at Seattle cost $10,000,000 and the exhibits are valued at another $5,000,000. There are 15 large buildings and many smaller structures.

THE SELECTION, TRAINING AND DISCIPLINE OF CONDUCTORS AND MOTORMEN*

By Charles B. Wells, Denver City Tramway Company

The selection and training of conductors and motormen has become one of the most important factors in successful street car operation—so much so, in fact, that educators are being attracted to the problem; and at the present time schools are established for the purpose of preparing young men to enter the street railway service, and to assist the already over-wrought manager in securing enough honest and intelligent men to meet the demands of his city's ever-growing population.

It has been well said that "a company is known by the men it keeps." To the masses of daily street car patrons you managers and operating men are unknown. Your desires and ambitions to achieve greater efficiency in service and to provide adequate transportation facilities, are a sealed volume to them. Only apparent results are considered. If your men are lacking in courtesy or intelligence; if they are ill-dressed and poorly disciplined; if traffic is delayed by the failure of cars or from other cause, and your "rush-hour" service appears to the generality of strap-hangers insufficient; you are lashed to the pillory of public censure, and there judged, misjudged and reviled by the very people for whose safety, comfort and convenience you are giving the best years of your life, and the best that is in you.

To further add to your discomfiture, some unfriendly newspapers take up the hue and cry—probably revamping a series of past unfortunate accidents and printing in glowing colors an incident or two from your past—to make up good measure and show your general unfitness to cope with the situation.

If you would overcome public prejudice, your chief hope must lie in your conductors and motormen—the agents who represent you in dealing with the company's patrons. It is therefore of the utmost importance that such men be carefully selected, and that the most approved methods be employed in fitting them for this service. They must be fairly educated, of good appearance, and possess a knowledge of human nature which will enable them to enforce the company's rules, and yet do so without giving offense. The subtle art of diplomacy, when exercised by a street car conductor or motorman, is an invaluable asset for him as well as for the company he represents. It shortens his hours of labor; it lightens his burdens; and it wins friends many times even without his knowledge. Much depends, therefore, upon the selection of material.

To attempt the establishment of an uniform weight, height or even an age limit adaptable to every locality, would seem to be impracticable. In densely-populated districts where the demand for men continually exceeds the supply —as, for instance, New York and near-by cities—the employment agent, daily harassed by the clamor of the operating department, opens his door each morning in the face of a rabble representing all conditions and all nationalities. Many can barely make themselves understood. Here they stand—Hungarians, Roumanians, Jews, men bearing the stamp of the rowdy and the ill-bred—a motley assortment of impossibilities with perhaps here and there one who may stand the test. Then the elimination process begins. Facing a continual shortage of perhaps 300 men, think you this company can be restricted to the limitations which we of the West impose?

The ideal conductor or motorman should possess a good figure and a kindly face. He must be above the use of loud, vulgar or profane language, and he must not be addicted to excessive drinking nor objectionable tobacco chewing. The filthy use of tobacco, in my judgment, totally unfits a man to succeed on either end of a car. In weight he should not be under 150 lb. nor more than 200 lb. Heavy men cannot long stand the strain of remaining on their feet. His age, at the time of employment, should be between 25 and 38 years. My observations have convinced me that at least eight out of every ten men between the ages of 21 and 25 are not well enough seasoned to fit them for the responsibilities of a conductor or a motorman. As the weeding-out process goes on, few of them are found who meet the requirements or who are willing to submit to necessary discipline. Men of families, as a rule, are much more desirable than those unmarried. The former are of much more regular habits, and accept their positions with a view of providing homes for their families and becoming permanent; while a single man, unless he is bound by ties of mother or sister, feels no responsibility, and is free to rove from place to place as often as he accumulates a little money. Our experience has proven the truth of this assertion; and therefore married men are always given preference in Denver.

The climatic conditions of Denver, the attractiveness of its street car service and the generous rates of wages paid, render comparatively easy the securing of good men. Before a man is accepted for employment by the Denver City Tramway Company his references are carefully investigated and all available information about him is secured. I am satisfied that this method could not be employed in eastern cities, for the reason that many desirable men are lost to the company on account of their being forced to await the result of a search for their past records. Only men between the heights of 5 ft. 7 in. and 6 ft., and those not less than 150 lb. nor more than 200 lb. in weight, are eligible for the service. They are required to pass a rigid physical examination conducted by the company's surgeon. If successful, they are admitted to membership in the Tramway Mutual Aid Association, and no man who cannot obtain such membership may enter the car service. On account of the fact that Colorado's climate is well known to possess wonderful curative properties, Denver has become the Mecca of health-seekers; and in order to safeguard the company against an influx of men who would be physically unable to endure the rigors of the car service, it is necessary that our test be more rigid than would perhaps be required in many other cities. In addition to the requirements already mentioned, successful applicants must be between the ages of 25 and 38 years.

Country-bred men often make good conductors and motormen, but it is, as a rule, much more difficult for them to become familiar with the details of street car operation than for the city-bred man, who has the advantage of a better knowledge of human nature. One item in favor of the farm-bred man, however, is the fact that he considers his position a decided step in advance; and, unless he falls into evil hands or is led away by the glamor of the city, he makes his best endeavor to hold the position given him, and desires to acquit himself with credit. Much may be said in favor of both the city and the country-bred man; but the problem hinges upon the man himself—whether he has sufficient character to carry him through the difficulties of his position and keep him honest in dealing with the company he serves.

Training Employees

The question of training employees is a weighty one, and at present is far from being solved. We all know what it means to have cars manned by squads of green conductors and motormen, during seasons of heavy traffic. One of the most approved methods of training, and the one adopted in Denver, consist in giving the novice a thorough course of instruction before he begins actual practice upon a car. A schoolroom is provided, and is placed in charge of a com-

*Communication presented during discussion of report of Committee on Training of Transportation Employees at meeting of the American Street & Interurban Railway Transportation & Traffic Association, Denver, Oct. 7, 1909.

petent instructor. Here beginners are shown the uses and abuses of all machinery which may come under their charge, and the preservation of the overhead line and its parts is dwelt upon. The student is thoroughly drilled upon his future duties and his obligations toward the railway patrons; the necessity for the avoidance of accident, and the importance of securing accurate data, when an accident occurs; the result which may attend his failure to report an accident; and many other pertinent matters in reference to the duties which lie before him. When he is ready for actual practice, he possesses a valuable fund of information, which is, as yet, theoretical. Whether he will be enabled to put it to practical use, depends largely upon his mental powers of assimilation. I am inclined to the opinion that on many students much of our preliminary instruction is wasted, on account of the fact that, while it all seems very plain and easy of understanding, yet by reason of its great volume, it appears to the raw recruit much like a chapter in Sanscrit, and he is confused by the multitude of new ideas with which his brain has suddenly been charged. From my own observation I believe that our efforts would be productive of better results were we to reserve our school room instruction until after the student has been given an opportunity to familiarize himself more thoroughly with the company's rules and regulations, and has been pronounced by his conductor or motorman instructor as capable of handling a car. As a result of the practical experience, his mind is now more receptive; he asks intelligent questions based upon actual problems which may have confronted him, and derives more benefit from the schooling given him. Under such conditions he will without doubt be better fitted to make a satisfactory "trial trip," and able to pass a more creditable final examination. Now he is ready to be listed and numbered, and is launched upon a sea of activity. If he proves to be of the right stuff, it remains with us to hold him by the bonds of friendliness and mutual interest, and make him a permanent factor in the company's growth.

It is a fact well known that many of our strongest business enterprises have been built up by employees who had more than a mere salaried interest in their welfare, and I believe that transportation companies will come in time to recognize the value of greater co-operation among their armies of workers, and will perfect a plan by means of which their interests may be more strongly cemented.

Discipline

No attempt will be made in this paper to discuss numerous methods of discipline, but we shall touch briefly upon two of them.

About three years ago, we, in Denver, determined to adopt the Brown merit system. We read all the available literature upon this subject, and corresponded with numerous street railway companies who were known to have given it a trial. Strange as it may seem, some of the replies to our questioning were far from reassuring; but notwithstanding these, we believed that if any company could succeed in perfecting a satisfactory method, we could do the same. In order that we might be just to all concerned, we prepared voluminous schedules of misdemeanors, and set opposite each the number of demerits to be charged. We also appended a long list of meritorious acts for which credits were to be given. We purposely made the penalties as light as possible, hoping thereby to show the conductors and motormen that the company's justice was always tempered by kindness and a consideration for the difficulties of their positions. We abandoned suspension, and made strenuous efforts to ferret out all actions of our men that were worthy of special commendation. It was known that each merit nullified one demerit, but if the balance on the debit side reached 100, such fact would be deemed by the company as sufficient ground for dismissal. It seemed only fair to the men that they should receive notification when demerits were charged against them, and also when merits were given. For this purpose we used a printed blank upon which were shown the date and time of the occurrence, the car number and name of line, the name of conductor or motorman, the number of rule or section violated; and a brief summary of the misdemeanor itself, together with the number of demerits charged; and the men were given an opportunity to explain or deny any report made against them. The same blank was used in sending out commendatory notices. Instead of drawing our men into closer relations with the company, we found that the demerit slips created an irritation among them, which continued to grow, and which could not be overcome by numerous merit notices of good behavior. Some of the hitherto good men became decidedly unfriendly, and expressed great disapproval of the system among themselves. Our discipline suffered. Instead of continually striving to obtain merits for good monthly records, many of the men seemed to care little for the number of demerits charged against them; and, as the number grew near the danger point, became reckless—stating openly that it was only a matter of time when they must inevitably be dismissed from the service. The feeling continued to grow, in spite of every effort made by us to turn the tide. In addition to the disappointing results in our attempt to win the confidence of the conductors and motormen, we found that the labor of keeping records was increased by nearly one-half. And so, after two years of conscientious effort to promote closer relationship and a better understanding between company and men, we reluctantly abandoned a system of discipline marked by dismal failure, so far at least as we were concerned.

At the present time our records are kept with the same vigilance as formerly, but the demerit marks are absent. We refer to it as "the silent system," and use our discretion as to making any part of it public, even to the men most concerned. Discipline notices are sent out with much less frequency. We adhere strongly to the principle that a "heart to heart" talk in the privacy of the superintendent's office is productive of more good to an offender than a bushel of demerit notices; but at the same time we are not slow to publicly acknowledge an act of merit. We resort to occasional suspension, but suspension does not mean total absence from duty. It means that an offender who has a regular run must pay his penalty upon the extra list, and see an extra man marked up in his stead. To an extra man it implies a position at the foot of the extra list each day until his sentence is served.

Under this method our discipline has improved. Our relations, for the most part, are pleasant and harmonious. A friendly spirit, seemingly impossible under the "merit" system, now prevails, and the results have been more than satisfactory.

DINNER FOR PACIFIC COAST RAILWAY MEN

The Albany Hotel was the scene of a jolly dinner party last night. The hosts were the supply men of the Pacific Coast and Northwestern States, and they had as their guests nearly the entire delegation of railway men from their territory who are attending the convention. The party consisted of about fifty, and of these thirty-five were railway men. F. F. Bodler, of San Francisco, filled the chair very acceptably, and there were songs by Will Judge, a well-known Denver baritone singer. A number of speeches were made and an atmosphere of the most cordial good-fellowship prevailed.

The States of California, New York, Oregon, Utah, Pennsylvania, Nebraska, Missouri, Michigan, Idaho, Montana, Massachusetts, Kentucky, Nevada, Wisconsin, Kansas, Minnesota, Ohio, North Dakota and Colorado have separate buildings and exhibits at the Alaska-Yukon-Pacific Exposition at Seattle.

THE CORPORATION TAX

A Letter Presented to A. L. Linn Jr., General Auditor, New York State Railways

Out of the prolonged discussion of the tariff question, during which manufacturing and commercial interests were given the fullest opportunity for criticism and objection, the new corporation tax law was finally and suddenly evolved, almost without protest, and certainly without adequate consideration or discussion. This convention affords an opportunity to call attention to the measure, which seriously affects the companies represented by the American Street & Interurban Railway Association. It is the purpose of this communication to discuss the impracticability of the law so far as it affects the present methods and practice of accounting by common carriers, and not to discuss the questions of policy, public finance and economics involved, the merits of the law itself, or its constitutionality or far-reaching effects.

Some of the difficulties which will be encountered by corporations in keeping their accounts in the form prescribed by the Corporation Tax Law were ably set forth in a letter to each member of Congress, signed by twelve prominent firms of public accountants in New York City, a copy of which, together with the subsequent correspondence, is hereto attached. This correspondence calls attention to certain accounting errors in the form of the bill, claiming that some of its provisions are "impossible of application" and that others "violate all the accepted principles of sound accounting."

Complication of accounting methods should be avoided by making one classification of accounts and one fiscal year the basis of all reports required by the Federal or by State governments for corporation tax or other purposes. When separate classifications are prescribed for different purposes, the resultant complications are serious.

The Interstate Commerce Act, for example, provides that "The Commission may, in its discretion, prescribe the forms of any and all accounts, records and memoranda * * * and it shall be unlawful for such carriers to keep any other accounts, records or memoranda than those prescribed or approved by the Commission. * * * In case of failure or refusal on the part of any such carrier * * * to keep such accounts, records and memoranda on the books and in the manner prescribed by the Commission * * * such carrier * * * shall forfeit to the United States the sum of five hundred dollars for each such offense, and for each and every day of the continuance of such offense." Under this act the Commission has promulgated a classification of accounts for interstate electric railways.

The Public Service Commission Law of the State of New York provides that the Commission for each district "may prescribe the manner in which such accounts shall be kept, * * * the forms of accounts, records and memoranda to be kept by such corporations, including the accounts, records and memoranda of the movement of traffic, as well as of receipts and expenditures of moneys. The system of accounts established by the Commission and the forms of accounts, records and memoranda prescribed by it as provided above shall conform as near as may be to those from time to time established and prescribed by the Interstate Commerce Commission under the provisions of the Act of Congress entitled 'An Act to Regulate Commerce.' * * * Where the Commission has prescribed the forms of accounts, records and memoranda to be kept by such corporations, it shall be unlawful for them to keep any other accounts, records or memoranda than those so prescribed or those prescribed by or under the authority of the United States."

In either case, the Government has subjected the accounting corporations to the discretion of a commission whose views may change at any time; and this situation is now still further complicated by the fixed provisions of the new Corporation Tax Law, which necessitates a different classification of accounts. Why should a different classification be prescribed for purposes of taxation?

The law states that the tax is to be "equivalent to one per centum upon the entire net income over and above five thousand dollars received by it from all sources during such year, exclusive of amounts received by it as dividends upon stock of other corporations, joint stock companies or associations, or insurance companies, subject to the tax hereby imposed."

How is the "net income" to be determined under this law? A reading of the law discloses that "net income" is assumed to be the cash income for the period, less the amount of cash disbursed on account of expenses, interest, taxes, etc. This is not the true way to determine "net income." I would respectfully call your attention to the fact that the definitions of net income as set forth in all classifications of accounts so far promulgated by the Federal or by State governments have recognized the principle of accounting that the net income of a corporation for a given period can be arrived at only by making an allowance for accrued liabilities, and in some instances these classifications require that corporations shall recognize and provide for an estimated monthly accrual on account of depreciation, obsolescence and inadequacy.

To cite a few instances of inconsistency, the classifications of accounts promulgated by the Public Service Commissions of the State of New York prescribe the following regarding material and supplies, accounts receivable, and interest and dividends receivable.

Material and Supplies: That this account be charged with "the cost of all material and supplies acquired by the corporation, regardless of whether the same are intended to be consumed in construction or in operation or later to be sold." The Corporation Tax Law, on the other hand, provides that "all the ordinary and necessary expenses actually paid within the year out of income in the maintenance and operation of its business and property" shall be deducted in ascertaining the net income of the corporation. It is customary for railroads to take advantage of market conditions and purchase large quantities of material for future use, and it is not always possible accurately to determine whether material and supplies paid for within the accounting period will be charged to expenses or improvements.

Accounts Receivable: "Charge to this account all amounts owing to the corporation upon accounts with solvent concerns (other than banks) * * *" and credit the proper applicable earning accounts. The Corporation Tax Law provides "gross amount of income * * * received within the year from all sources," which would eliminate amounts due for service rendered or material sold for which the accounting corporation had not been reimbursed during the accounting period.

Interest and Dividends Receivable: "Whenever the income account is stated the appropriate sub-account therein shall be credited, and this account shall be charged with all accrued but not yet collected interest upon all commercial paper and accounts considered collectible held by or for the benefit of the corporation; also all dividends declared or guaranteed by solvent concerns but not yet collected, the right to which is in the corporation." The Corporation Tax Law provides "gross amount of income * * * received within the year from all sources." This would eliminate amounts accrued on account of interest and dividends but not yet collected.

A great many more inconsistencies might be cited, such as those resulting from prepaid insurance, prepaid taxes, prepaid rents, taxes accrued, interest accrued, casualties and insurance reserve, etc.

Gross income, operating expenses, depreciation, and net income, as interpreted by the Corporation Tax Law, are not

in accord with the classifications of accounts promulgated by the Federal and State governments.

The accounting problems discussed will confront, to quote the language of the law, "every corporation, joint stock company, or association organized for profit and having a capital stock represented by shares * * * under the laws of the United States or of any state or territory of the United States * * * or under acts of Congress applicable to Alaska or the District of Columbia."

I would respectfully recommend to this convention that a committee of the association be appointed with a view to co-operating with associations and organizations representing this and other lines of business in carrying out a campaign of publicity to bring the defects of this law directly before the people.

Accounting Errors in Corporation Tax Bill

Following is a copy of a letter which has been sent to each member of Congress in reference to the proposed corporation tax:

New York City, July 8, 1909.

Dear Sir:

On reading the text of the proposed corporation tax law, as reported in the Commercial and Financial Chronicle of July 3, 1909, we have formed the opinion that some of its provisions are absolutely impossible of application, and others violate all the accepted principles of sound accounting.

Under the third clause it is provided "that there shall be deducted from the amount of the net income of each of such corporations, * * * ascertained as provided in the foregoing paragraphs of this section the sum of $5,000.00, and said tax shall be computed upon the remainder of said net income of such corporation * * * for the year ending Dec. 31, 1909, and for each year thereafter, and on or before the 1st day of March, 1910, and the 1st day of March of each year thereafter, a true and accurate return under oath or affirmation of its president," etc., etc.

In connection with this clause we would call attention to the fact that as you are no doubt aware, the fiscal year of a number of corporations is not and for business reasons cannot be the calendar year, and consequently, having in mind that in such cases an inventory was not taken at the beginning of the calendar year 1909, it is and will be quite impossible for any business, corporation or institution, whose fiscal year does not terminate with the calendar year, to make a true return of its profits as required by the proposed law.

Under clause 1 the tax is to be charged upon the "entire net income," and the net income is to be "ascertained by deducting from the gross amount of the income * * * from all sources,"

(1) "Expenses actually paid"
(2) "Losses actually sustained"
(3) "Interest actually paid"

in each case "within the year." The words "actually paid" convey, and it is to be presumed are intended to convey actual disbursements out of the treasury

The proper deductions should be:

(1) Expenses actually incurred, because the payment is not necessarily made in the year in which the expense is incurred;

(2) Losses actually ascertained, because losses may be incurred and the amount not be ascertained until a subsequent period;

(3) Interest actually accrued, because interest is never paid until the end of the period during which it accrues, and the interest accrued is the proper charge against income.

In clause 1 the bill refers to "net income received"; in clause 2 it refers to "gross income" without the addition of word "received"; in clause 3, paragraph 3, it refers to "gross income received." There is here a complete confusion between income and income received, which can only lead to endless complication.

Two methods may be adopted for taxation purposes, either

(1) To tax the difference between actual cash receipts on revenue account and actual cash payments on revenue account, which difference will seldom if ever represent the profits of a manufacturing concern; or

(2) To tax profits made up in the ordinary commercial way, namely, to ascertain the gross income earned whether received or not, and to deduct therefrom

(1) Expenses actually incurred during the year whether paid or not;

(2) Losses actually ascertained and written off during the year whenever incurred;

(3) Interest accrued during the year whether paid or not;

(4) A reasonable allowance for depreciation of property; and

(5) Taxes.

As accountants actively engaged in the audit and examination of a number of varied businesses and enterprises, we unhesitatingly say that the law as framed is absolutely impossible of application, and would suggest that in the said clauses 1, 2 and 3 of paragraph 2, the words "actually paid" and "actually sustained" be changed to read "actually incurred" and "actually ascertained," and that the third clause be changed to read so that the return will be based on the last completed fiscal year prior to December 31, in cases where the fiscal year of a corporation is not the calendar year. Yours very truly,

Deloitte, Plender, Griffiths Co., 49 Wall Street.
Price, Waterhouse & Co., 54 William Street.
Haskins & Sells, 30 Broad Street.
Lybrand, Ross Bros. & Montgomery, 165 Broadway.
Wilkinson, Reckitt, Williams & Co., 52 Broadway.
Niles & Niles, 111 Broadway.
Gunn Richards & Co., 43 Wall Street.
Edward P. Moxey & Co., 165 Broadway.
Geo. H. Church, 55 Wall Street.
Barrow, Wade, Guthrie & Co., 25 Broad Street.
Loomis, Conant & Co., 30 Broad Street.
Marwick, Mitchell & Co., 79 Wall Street.

The Corporation Tax Correspondence

The joint letter sent to Attorney-General George W. Wickersham by several firms of public accountants in New York City, which was published in the July issue of The Journal of Accountancy, was answered as follows by the attorney-general:

I am in receipt of the letter signed by your firm and a number of others with respect to the proposed corporation tax law, in which you advise me that you have formed the opinion that some of its provisions are absolutely impossible of application and others violate all the accepted principles of sound accounting.

You first call my attention to the fact that the "fiscal year of a number of corporations is not and for business reasons cannot be the calendar year, and consequently, having in mind that in such cases an inventory was not taken at the beginning of the calendar year, 1909, it is and will be quite impossible for any business, corporation or institution, whose fiscal year does not terminate with the calendar year, to make a true return of its profits as required by the proposed law."

I beg to call your attention, in the first place, to the fact that the proposed law does not impose a tax upon "profits" but upon "the entire net income over and above $5000 received by" the corporation, joint stock company, or association, or insurance company subject to the law, from "all sources during such year." It has been the uniform practice of the government in framing revenue bills to require the tax to be paid as of a fixed date, and, so far as I have been able to ascertain, in every instance the tax is imposed for the calendar year ending Dec. 31. Such was the income tax law of 1894. It may be inconvenient, but it is certainly not impossible for any corporation which keeps just and true books of account to make up a return such as that required by the proposed law, particularly as the return requires statements of actual receipts and payments, and not, as you recommend in your communications, of expenses "incurred," interest "accrued," and losses "ascertained."

2. You next object that the proposed law authorizes the deduction of "expenses actually paid," and you contend that this should be changed to read "expenses actually incurred." The bill was purposely framed to deal with receipts and disbursements made within the year for which the tax was to be imposed, and the words "actually paid" were employed advisedly. The same may be said with respect to losses actually sustained and interest actually paid. The theory of the framers of the bill in this respect differs from that which you advocate.

3. You then object that in clause 1 the bill refers to "net income received"; in clause 2 it refers to "gross income" without the addition of the word "received"; and in clause 3, paragraph 3, it refers to "gross income received," and you comment: "There is here a complete confusion between income and income received, which can only lead to endless complication."

I cannot agree that there is any confusion whatever in this respect. "Gross income" in clause 2 obviously and necessarily means "gross income received." The tax is im-

posed by clause 1 upon the entire net income above $5000 received from all sources during the year. By clause 2 "such net income" is to be ascertained by deducting from the gross amount of the income from all sources the specified items; and if anybody could question whether that meant "gross income received," his doubt would be removed by the provisions in paragraph 3 of clause 3.

Your further statement that "as accountants actively engaged in the audit and examination of a number of varied businesses and enterprises, we unhesitatingly say that the law as framed is absolutely impossible of application," causes me very great surprise. My personal acquaintance with you and a number of other signers of the letter leads me to the belief that you have underestimated your capacity. Certainly the statement of objections made in your letter is entirely insufficient to support the conclusions which you express.

To this communication the accountants replied as follows:

Our only object in addressing you was to be of assistance in a matter of practical accounting which enters into the proposed law, as to which we believe that our experience specially qualifies us to speak. We have purposely refrained from any reference to the policy involved in the law, with which we as accountants are not concerned.

The views expressed in your letter of the 12th instant would seem to indicate that you have not fully appreciated the difficulties which will be met with in carrying into effect the previsions of the proposed law as amplified and explained in your letter; and we therefore feel that in justice to ourselves we must refer at greater length to some matters which were only briefly touched upon in our letter of July 8.

We are glad to have your clear expression as to the intention of the law to deal with receipts and disbursements only (presumably on income account) and not with income earned (or profits) and expenditures incurred. Under these circumstances it would seem better to use the term "receipts on income account" and "disbursements on income account" rather than "income" and "expense" as the latter terms are more commonly defined and used in relation to income earned and expenses incurred. In any case if in clause 2 "gross income" means, as you state it is intended to mean, "gross income received" it would certainly be better to say so and thus remove any possible ambiguity.

We note that you refer to the precedent of the income tax law of 1894. We believe that this law was declared unconstitutional before there had been time to experience the difficulties and uncertainties which any attempt to enforce it, if drawn on the lines of the present bill, would have involved. In this connection we may perhaps point to the precedent of the English income tax law which has stood the test of over half a century. In this case the tax is on profits which in this country are frequently termed "net income"; and the accounts of corporations prepared in the regular course of business for their respective fiscal years are and always have been accepted as the basis of taxation, subject to minor provisions as to rates of depreciation, interest deductions, etc.

Our main criticism of the bill in its present form is that in the large majority of cases it will be impossible of application for the year 1909, as explained in our previous letter, and very expensive and difficult if not altogether impossible in subsequent years.

Railroads perhaps require the simplest form of accounting obtaining among business corporations. These accounts are kept in a form prescribed by the Interstate Commerce Commission and severe penalties can be inflicted for any departure from those forms. They must be kept on a basis not of receipts and disbursements but of earnings, whether collected in cash or not, and of expenses, whether paid or not, which in both cases accrued during the fiscal year closing on June 30; the outstanding income and expense item uncollected and unpaid running into very large figures and frequently varying considerably in amount between one year and another. While it would be possible to prepare also an account of receipts and disbursements, this would involve a great deal of extra work in the compilation of special data and would raise most difficult questions as to the proper distribution between capital and income of large payments for stores, the ultimate use of which is not and cannot be known at the time of payment.

Turning now from this, which is perhaps the most simple case, to that of a large manufacturing concern producing all kinds of finished products out of purchases of ore and other raw materials, an accurate or even approximate statement of cash receipts and disbursements on income account is a practical impossibility at any time. Cash receipts arising from sales of products can be ascertained without much difficulty beyond requiring considerable extra work. But no system of accounting can give even approximately "the ordinary and necessary expenses actually paid within the year out of income in the maintenance and operation of its business and properties." Such expenses presumably must include the cost of the goods sold. Into this cost and following it through all the intricate accounting which has been found to be necessary are raw materials actually used in manufacture, labor expended and innumerable items of expense which are taken into costs as they accrue quite irrespective of the date of payment. Very large inventories are carried of materials and supplies which are purchased at one period, paid for at another, and used at all sorts of times, in all sorts of quantities, and for all sorts of purposes, mainly for manufacture into products for sale but to a large extent for additions to or extensions of the plant. Such as are used for the latter purpose are not, as we understand the proposed law, a proper deduction from gross income, and yet long before they are used all identity between the materials themselves and the disbursements made for them has been lost. There is in our opinion no method in which any such statement as that called for in the proposed law can be prepared short of an entirely independent and separate set of books, designed to follow each bill paid through to the ultimate destination of the materials or services covered thereby, thus duplicating the present cost of the accounting department, and serving no useful purpose whatever. Even if such method were adopted it is very doubtful if it would produce the results required with even approximate accuracy.

Without unduly burdening this letter it is impossible to go into further details here; but the facts must in the opinion of any one familiar with the operations and accounts of a complicated modern manufacturing concern fully justify the conclusions which we expressed in our letter of July 8, and which we now emphatically endorse. Whether the proposed method is physically impossible, or merely as you state "inconvenient," it will, we think, be generally conceded that it is in the general interest of the effective administration of laws relating to taxes that they should involve as little inconvenience as possible upon those required to make returns thereunder. The basis for arriving at the amount liable to taxation suggested in our former letter would have the advantage of simplicity, and if the tax is to be a permanent institution, its efficient operation would be greatly facilitated by conformity with regular accounting methods.

We have felt it our duty to protest strongly against the wording of the proposed bill upon the grounds set forth, but our object is to help and not to hinder. If you think any good purpose would be served by our appearing before you and discussing this matter fully with a view to arriving at a satisfactory solution, which we are satisfied can be done, we shall be pleased to hold ourselves at your disposal for this purpose.

Regretting our inability to in any way modify the conclusions already expressed,

We are, dear sir,

Yours very truly,

Deloitte, Plender, Griffiths & Co.
Price, Waterhouse & Co.
Haskins & Sells.
Lybrand, Ross Bros. & Montgomery.
Marwick, Mitchell & Co.
Niles & Niles.
Gunn, Richards & Co.
Edward P. Moxey & Co.
Barrow, Wade, Guthrie & Co.
Loomis, Conant & Co.
Suffern & Son.

The correspondence was closed by the following letter from Mr. Wickersham:

I have a letter dated the 21st inst. signed by yourself and a number of other firms of accountants in response to my letter of July 12, replying to your former letter of July 8. In your last letter you set forth in somewhat more detail the following proposition:

But no system of accounting can give even approximately the ordinary and necessary expenses actually paid within the year out of income in the maintenance and operation of its business and properties.

I think the bare statement of that proposition would be received with very great incredulity by most minds. Certainly, I am quite unable to assent to it. However, it is now too late to attempt to recast the corporation tax amendment bill on the basis of such proposition.

Colorado is the land of sunshine. It has averaged 357 sunny days each year for the last 20 years.

LIGHTNING PROTECTION*

By J. V. E. Titus, Second Vice-President Electric Service Supplies Company

The term "lightning" is now used in a general way to describe surges of potential of a value high enough to approach the danger point. With this viewpoint lightning may be subdivided into two great branches, viz., internal, disturbances caused by switching, short circuits, grounds, etc.; and external, or more properly speaking, cloud lightning.

The most common phenomenon of external lightning is manifested as the induced static or "bound" charge, and that, by the way, is practically all that has to be contended with in low voltage circuits, such as railway lines. To illustrate, consider any overhead line insulated from ground; suppose a positively charged thunder cloud passes over it. The ground below the cloud assumes an electro-static charge opposite to that of the cloud above, as does also the line, and furthermore, the charge assumed by the line is higher than that of the ground since it projects above it. A flash between cloud and cloud, or between cloud and ground, equalizes the potential existing between them, and requires a change of potential distribution on the line.

This equalization of potential between cloud and ground leaves a free charge on the line which manifests itself now as an abrupt impulse or wave traveling along the line with the approximate velocity of light, 186,000 miles per second. These waves have frequencies corresponding to the discharge frequency of the cloud, and amount to thousands of cycles per second. Reaching an end of the line they suffer reflexion either from resistance or otherwise, and give rise to complex phenomena.

On a line not connected to ground, some provision must be made to supply leakage for waves like these, otherwise the potential will rise until the insulation is punctured.

High e.m.f.'s are caused in a system by means of electromagnetic induction, since the cloud discharge is a current and sets up an opposing e.m.f. in any parallel conductor.

The phenomenon known as direct stroke perhaps occurs very infrequently on a system. In case the discharge does strike the line, it is quite possible that small damage to apparatus will result, owing to the choking effect of the line on such an abrupt discharge. The e.m.f. will on this account build up very suddenly and probably jump to the pole and ground itself that way. Shattered insulators and splintered poles are the result. Supposing, however, that the discharge does take place near some apparatus, or that sufficient passes along the line to enter the station; in such cases protection will sometimes only be obtained at the loss of the arresters, which then certainly will have paid for themselves many times over.

The early lightning arresters therefore were crude affairs, and but few of the early ideas have survived. Originally, efficiency in discharging the circuit was the prime requisite and the other essential to a successful lightning arrester, namely, durability, has come by a process of development.

A majority of the users of lightning arresters today do not realize that just about one-half of the efficiency and just about one-half of the durability depends upon the manufacturer and the lightning arrester itself, and the other half depends upon the user, in the way he installs it, and the care he takes of it after it is installed.

Today the most progressive roads make it a practice to inspect lightning arresters at least three times per year, preferably in the spring just before the first lightning storms occur, and while the earth is still moist with the winter rains; another inspection is made in mid-summer when the earth is dry, and at the time when the most severe storms usually occur. This inspection is probably the most important, as it enables one to find out whether the ground connection is as good as it should be after the surface of the earth has become thoroughly dry. The last inspection is made in the fall, after the storms are over for the season. At that time such arresters as have been damaged may be taken down and repaired or replaced.

Particularly at the spring inspection should the connections to rail be investigated. Frequently the connecting wires become frozen in the earth and the vibration of the rails breaks off the wires. Arresters having no visual means of operation are better tested by employing tell-tale papers—the size of the puncture serving in a measure to check up the condition of the arrester and the ground. By employing this plan of a series of inspections, the cost is kept down to a minimum, and the efficiency of the installation is properly maintained.

Installation of Arresters

In installing lightning arresters, and particularly in the method of providing ground connections, there is a woeful lack of standard practice. Until the last year or two the ground connection has usually been made by burying a copper plate or coil in the earth, with which the ground side of the arrester is connected by means of a copper wire. As an original installation this makes an ideal connection, but such grounding has probably caused as many lightning arrester troubles as any other one element.

In most soils copper rapidly corrodes, and usually the resultant salts form a coating around the conductor that is practically an insulator, thereby introducing in the discharge path a high impedance. This not only impairs the discharging efficiency of the installation, but with some types of lightning arresters prevents the flow of sufficient current following the discharge to operate the circuit opening device.

The argument has been advanced that such resistance in a ground path is of but small importance because such a ground connection being of large cross section, offers a multitude of tiny paths or outlets over which the discharge will escape to earth. The fallacy of this argument is apparent when one considers the impedance that is offered a sudden rush of lightning by even a normal amount of resistance. It is quite as important that the ground path be of low ohmic resistance as that the lightning arrester itself should be. Any ground connection must discharge freely or the desired protection against very sudden rushes of lightning will not be secured.

The use of galvanized-iron pipe for ground connections has been recommended for the last year or two with the very best results. In soils that will permit, the pipe may be driven to a sufficient depth to reach permanent moisture. This method of connecting lightning arresters by means of iron pipe insures the greatest possible durability at a reasonable first cost. Its chief advantage lies in the fact that iron pipe corrodes very slowly in practically all soils, and the resultant salts are fairly good conductors. Even after the pipe has completely wasted away the usual oxide provides a good conductor, unless of course it becomes broken. An effort should always be made to secure genuine iron pipe, and in its absence, the best grade of galvanized steel pipe.

Some operating officials question the advisability of grounding arresters on railway circuits to the rail, as well as to the ground-point. There are several reasons for a rail connection in grounding lightning arresters. The ideal condition is that at the instant of discharge the line, rail and earth shall be at the same static potential. It is to accomplish this result that the discharge occurs. To secure this end it is absolutely necessary that rail and ground shall be of the same static potential at all times. Great care is usually taken to have these conditions, but on many systems, particularly large interurban properties where rock ballast

*Abstract of paper presented as Appendix E, report of Committee on Power Distribution, American Street and Interurban Railway Engineering Association. Read at Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

is used, the rail may be of other potential than the earth at many points.

Unless the rails and the ground are of the same potential there is every possibility of a discharge from the rail puncturing the windings of the motors of a car that is passing, and going to earth via the car, the trolley wire and the arrester on the adjacent pole. There has been advanced most unmistakable evidence that many car motors are burned out in exactly this way.

Principles of Design

In choosing a system of lightning protection compromises have to be made. The air gap must be adjusted for some point between normal voltage of the system and what we may call the danger voltage at which the insulation of the system is imperiled. The first consideration, therefore, is that an arrester must have an air gap small enough to come between these limtis.

A reason why the simple air gap is unsatisfactory as a lightning arrester is that on a grounded circuit every discharge will necessarily produce a dead short circuit between line and ground. This means not only a loss of energy, but severe and dangerous strains on the apparatus supplying the current. Something must be found that will limit the flow of dynamic current to such a degree that these severe strains and the resulting dangers are avoided, but in limiting this flow of dynamic current we must be careful not to limit or seriously impede the discharge of abnormal voltages.

To solve this problem, resistance, in series with the air-gap, at once suggests itself. The requisites then of a satisfactory lightning arrester appear to be:

(1.) A medium, such as an air-gap, which breaks down on a voltage low enough to insure protection to apparatus.

(2.) A resistance of a value sufficient to prevent grounding and the consequent strains on apparatus, but not so high as to impede to any appreciable extent the free passage of the more heavy discharges.

(3.) Some positive automatic means of interrupting the relatively small flow of normal current following the discharge.

Users are heard even today expressing the opinion that a lightning arrester is good for but one discharge. If that were true, then a fuse in series with an air-gap would be the ideal arrester, because it would be entirely efficient for its one discharge, and would be inexpensive. Results, however, have proven quite differently with the more modern types of lightning arresters now on the market.

A large part of the failures of the older forms of lightning arresters, employing a low series resistance and some form of circuit-opening device, was due to an increase of resistance of the resistance rod itself. These rods were usually made of some combination of carbon or graphite with kaolin. Due to the action of the discharge in some cases, and to an apparent aging process in others, these rods kept on increasing their resistance while in service.

There are resistance rods on the market today, however, that entirely overcome this trouble, as after four years' service absolutely no increase of resistance is shown. These rods are composed of a combination of a special grade of carborundum, kaolin and a high percentage of metallic conducting material, properly fluxed at an extremely high degree of heat in the firing kilns.

Modern arresters are so designed that the discharge has practically a straight path to earth. They overcome many of the troubles of the older forms, due to an insufficient surface distance on the arrester base, between parts of opposite potential.

Many arrester failures are due to the use of iron boxes. An iron box offers an inductive effect to a discharge, and this effect becomes very marked as the frequency of the oscillations increases. Often the discharge jumps around the insulating bushings surrounding the leading-in wires, the normal current follows, and establishes a serious short circuit. Wooden or asbestos lumber boxes are greatly to be preferred; the former are cheaper than iron and quite durable, while the latter have their fireproof qualities to recommend them. For car service asbestos lumber boxes should always be used, as any lightning arrester, unless properly fireproofed, may burn out and hazard valuable apparatus.

Service Results

If arresters are properly designed to meet service conditions; if they are properly installed and frequently inspected to see not only that the arresters themselves are in good condition, but that the ground connections are likewise, users may reasonably expect several years' service from an equipment of the present-day lightning arrester.

If tell-tale papers be put in the gaps of lightning arresters it will be a matter of considerable surprise to note the number of discharges taken. If this practice is continued for a period of two or three years, it will enable railway operators to determine where discharges most frequently occur, and at these points, arresters may be installed more frequently and better results thereby secured.

As a sample of what has been accomplished by careful inspection, one of the large interurban roads in the center of the lightning belt of Indiana has shown a total loss of lightning arresters of less than two per cent of the entire equipment per year for three years. This company inspects its arresters frequently, and the saving of lightning arresters due to this inspection, together with the increased protective efficiency of their arrester equipment, has more than paid for the inspection.

Another company, located in practically the same territory, operating at 1200 volts d.c. since 1906, has lost or had partially damaged in the past three years, a total of but 6 arresters out of 225 originally installed, and during that time has lost absolutely nothing in the way of equipment. On this property frequent and careful inspections are the rule.

The foregoing statements refer throughout to lightning protection of direct current circuits. A large part is equally pertinent in relation to alternating current circuits. The design of alternating current lightning arresters has presented very different but quite as difficult problems as direct current railway circuits.

The characteristics of alternating current are taken advantage of very nicely in practically all modern types of a.c. lightning arresters. The use of several air-gaps in series, where the current flow is limited to certain values by various means, results in the failure of the arc in the gaps, when the current wave passes through zero. In some forms of a.c. arresters this action is supplemented by shunting some of the gaps with a series of resistance, in others a circuit-breaker cuts off the flow of normal current, if for any reason the air-gaps fail to respond promptly.

There is no more fitting conclusion than to remark that the price of satisfactory lightning protection is proper installation and inspection. The manufacturers today may be said to have done very well with this problem, as is evidenced by highly satisfactory general results. But these satisfactory results are secured only when the operating companies co-operate by giving the arrester installation the proper care.

Denver is a particularly bright and attractive city, in which electric illumination at night rivals the brilliant sunshine of the day. The famous "Welcome" sign at the Union Station typifies a characteristic hospitality. One interesting example of decorative street lighting is the combination of arc and incandescent lamps in handsome fixtures on the trolley span-suspension poles on Sixteenth and other streets.

SOME NOTES ON CALIFORNIA HIGH-TENSION TRANSMISSION LINES*

By S. L. Foster, Chief Electrician, United Railroads of San Francisco, San Francisco, Cal.

In California are to be found some of the longest transmissions, the highest voltages, and at the same time some of the best and some of the worst electrical conditions. Much that is of vital interest here is only of historical interest, or perhaps incredible to engineers east of the Rocky Mountains. Much that interests those of the East is valueless here. We have no sleet or snow loads, no sleet nor snow driving or accumulations, no tornadoes, and practically no tree or lightning interferences such as are met with in the East.

For high-tension station outlets we simply build ordinary terra cotta sewer pipes, bell ends inside, into the walls, set a circular perforated disk of plate glass in each bell end, and lead the wire through the center. The hole aids station ventilation. There is no snow to fear, and the upward tip of pipe toward the inside of the station obviates danger from rain. In later 60,000-volt work a 24-in. square of glass with a central 3-in. hole for the conductor is used, and the terra cotta pipe feature is omitted, as birds sometimes build nests in them. Lightning arresters are usually conspicuous by their absence, as are also the effects of lightning.

As compensation for these advantages, however, we have in some parts of the country eagles, wild swans, pelicans or blue herons with over 6 ft. spread of wings, that occasionally short-circuit even 72-in. spaced wires. We also have from four to six months of rainless weather during the summer when the dust becomes prevalent. In addition, along the coast and bays we have spells of heavy fogs at night.

The combination of dust, fog and night wind applies a conducting smear over the insulators, the pins, the cross-arms and the poles of our high-tension lines, that results in most unexpected and extraordinary phenomena to disturb the electrician's equanimity. One effect appears in the fact that in a few, though important, localities a voltage test factor of safety of six in the insulator is inadequate to secure continuous operation. Another is the fact that the brush discharge from insulator to wood pin generates nitric acid from the nitrogen of the air and the hydrogen and oxygen of the fog or air. This nitric acid attacks and "digests" the threads of the wood pin top until it becomes a powder, and the thread ceases to serve as a support.

As the surface of the pin, where unprotected by the insulator, is covered with the moist paste of salt, dust and fog drops, it is a better conductor than the protected part of the pin, and is not attacked at first. On the drier and more highly resisting part of the wood pin, up under the insulator, the heat generated by the leakage current appears first, but as the moisture is dried out of the other surfaces the evidences of heat appear, and pins, cross-arms and pole tops suffer.

Brown striation marks on pin, arms and pole, charred "worm holes" in pins, wood pins burned off altogether, leaving insulators adrift in the air, cross-arms charred or entirely burned off around the iron pin or at the gain in the pole, are some of the strange symptoms of the disease. The "static" or "brush discharge" or "Corona," as it is variously called, cracks and snaps between insulator and pin by day and scintillates by night.

All these interesting manifestations occur on a 13,000-volt, 25-cycle, three-phase line, 24-in. spacing, equipped with porcelain two-part insulators tested by the author to 50,000 volts, and advertised by the maker as "test voltage 70,000." Of course, these eccentricities do not occur every day nor continue all the day when they do occur. In fact, they cause very few interferences with our city 13,000-volt service, but to one accustomed to the prosaic behavior of the insulator on the 500-volt d.c. work they are mighty interesting doings and keep us guessing sometimes.

The cause of the burn-offs at the pole is a natural query, and various theories have been advanced.

At first, the two ¾-in. galvanized-iron machine bolts holding the cross-arm to the pole were passed through the pole, as was the classical practice derived from the Eastern lag-bolt custom. After much trouble from fires in cross-arm gains during foggy weather, it was felt that it would be an improvement to do away with these through bolts and substitute a U-bolt that would go around the pole.

In the early 60,000-volt, 150-mile transmission construction the single three-wire circuit was constructed at the points of an equilateral triangle, apex up, using a single cross-arm and setting one wooden pin into the top of the pole. In the fog district even a spacing of 42 in. between conductors and insulators, tested to 120,000 volts, failed to be infallible on the 60,000-volt line, and fires started around the "kingpin," and even further down on the pole. The theory was advanced to explain these phenomena that there were certain paths of varying conductivity in or between the fibers of the wood pole, and that in this star-connected line with grounded neutral the potential tended to force current along these conducting paths, and as the moisture was evaporated the persisting current caused heating and the fire.

To break up this action by breaking the uninterrupted course of these paths the pin was removed from the center of the pole and mounted on a short one-pin cross-arm bolted around the top of the pole. The wood pins had been "digested" seriously in the "fog belt" by the "brush discharge," and were replaced by hollow galvanized iron pins provided with lead threaded tops. These wood pins referred to were made of eucalyptus or Australian blue gum, which is stronger than the locust or oak usually furnished in pins, and is equal to hickory. The wood is specially seasoned and treated for this purpose. Sawed into stocks 3 in. square, the wood is boiled in water for 24 hours, thereby being deprived of its sap. These pieces of wood are then arranged for efficient drying, and so exposed for three months. After being turned to shape, the finished pins are boiled in linseed oil at a temperature of 100 deg. C. for several hours, the oil penetrating about 1/16 in. and serving as a protection against moisture. When new in the laboratory these pins readily withstand a 60,000-volt test from end to end. Thus there seems to be no ground for a claim that thorough work was not done on the wood pins.

The form of construction just described represents about the last steps in constructing combustible or perishable high-tension overhead work. The next step is to the steel tower, the steel cross-arm and the suspender insulator.

The 13,000-volt line referred to was built in 1902, after observing the difficulties of an 11,000-volt, 60-cycle, three-phase line, that with 24-in. spacing and wood pins, could not succeed during the foggy weather with triple-petticoat glass insulators, which have been used successfully on a 44,000-volt line in Utah.

The new San Francisco line has about 4000 insulators, 20 miles total length of pole line, 82 miles total length of conductor—No. 0000, No. 000, No. 00 copper, some No. 0000 solid, some stranded (no advantage found so far in use of stranded wire), equilateral triangle arrangement, apex up, no transposition, no cross-arm braces, no line lightning arresters.

The poles are 50, 60 and 70 ft. long, square, sawed, planed, tapered and of red-wood cut from the hearts of young trees—16 in. by 16 in. at butt, 10 in. by 10 in. at top—set 6 ft. deep in concrete—stepped with galvanized-iron step irons. In the suburbs some 40's and 35's were used. The cross-arms are 4 in. by 6 in. clear Oregon pine, bolted to gained poles originally by 2¾-in. through bolts, but on latest work and

*Abstract of paper presented as Appendix C of Report on Power Distribution, American Street & Interurban Railway Engineering Association, Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

in case of burned off cross-arms by ¾-in. U-shaped galvanized bolts passing around the pole.

In this climate all ironwork on poles, such as lag screws, bolts, braces, steps, etc., is galvanized by the hot-dip process to prolong life and to prevent streaking with rust.

On straight line work composite pins were used, consisting of ⅝-in. galvanized wrought iron carriage bolt, threaded wood top and truncated conical porcelain base.

The nitric acid formed by the brush discharge has "digested" many of these threaded oak tops, and as opportunity offers or necessity requires, they are replaced by threaded lead tops. When from "digestion" or burning of wood top of pin it seems necessary to take some action, a threaded lead top is substituted for the threaded wood top without washing, wiping or changing the insulator. No recurrence of similar symptoms on identical poles have been recorded, either where cross-arms have been burned or wood pin tops digested.

Another company profiting by our experience did not attempt to use the wood tops, but retained the rest of the parts of this composite pin, cementing the bolt into the insulator with litharge and glycerine.

The brush discharge occurs during very heavy fogs between the lower insulator petticoat and iron pin, just the same as when the wood top was used, but so far (four years) with no serious results.

For corner work a 1⅜-in. galvanized iron pin is used cemented into the insulator with a mixture of litharge and glycerine. These ingredients are mixed on a glass plate with a putty knife to a stiff paste. The pinhole of the upturned insulator is filled to the proper height and the pin pressed into place, being held central in the hole by wooden wedges until the compound sets. Pins thus cemented are usually allowed to stand for 24 hours before being used, though this setting depends on the weather. In rainy weather 24 hours is not long enough. In dry weather haste must be used lest the cement set before the pin can be inserted.

Insulators

The insulators generally used are a two-petticoat brown porcelain, umbrella-top insulator. When building this 13,000-volt line it was specified that the insulators should pass a 50,000-volt brine test. All that were accepted (about 80 per cent of the shipment) passed this test, which consisted of inverting the insulator in a metal pan of brine connected to one pole and putting a wire in the brine-filled inner petticoat connected to the other pole of the testing set. Today the manufacturers advertise these insulators as "Test Voltage 70,000." With two of these in series, each having 13 in. of creepage distance between conductor and pin, it was felt that the construction was safe from leakage, but we were disappointed.

The 20 per cent that were punctured in the testing made the makers feel so badly that they now insist on the insulators being tested at the factory before shipment.

The "static" or "brush discharge," or "Corona" that is active in certain localities during six months, or during our summer months when sea fogs are prevalent, "digests" some of the wood tops of our composite pins. It has led in a few cases to burned-off pole tops, where the cross-arm was fastened to the pole by bolts passing through both.

Some engineers in testing insulators use the spray test. In the "fog belt" out here we would like to have a spray on all our insulators all the time. In the winter, when we have long spells of continued rain, we have no insulator trouble at all. During the summer the fog and dust form a conducting paste that at some points leads to all the peculiar exhibitions previously detailed. As soon as the first rain of winter has washed off this paste the troubles vanish for six months. So far, no evidence has been reported of the lead-pin tops or cementing being affected by this "static."

When the fog is persistent and the action gets serious, we stop it readily enough by washing the insulators with ordinary water inside and out, but without removing them.

In the beginning there were four types of porcelain insulators in use, all having passed the 50,000-volt test, but since the number has been reduced to one, there has been but one out of 1000 poles burned-off pole in six years resulted in an interruption to the service, and this one occurred on a pole standing 15 ft. from a chemical factory. There was more than one burn-off, but the others occurred, fortunately, either on a duplicate line or near the regular shutting-down time.

When the fog is absent it is marvelous how little porcelain is required to insulate one wire from its neighbor. During our recent strikes, or due to malicious boys, two adjacent insulators have often been seen with the outer petticoat in both cases entirely gone, and yet there was no evidence of trouble, and they were left undisturbed till shutting down time.

The best defense against this fog and dust action is a generous insulation factor of safety in the insulator (say, make a test voltage six times working voltage), which should always be of porcelain, as being less hydroscopic than glass and tougher. If this fails, the last resort is the cloth and the water pail at night. Of course, falling tree limbs, the busy small boy with his piece of wire, or the malevolent striker with his chain have burned off our line a few times, but so far without injury to persons or property. Much of this would be prevented by having had the three wires of the line arranged with the apex of the triangle down.

One power company in San Fransisco goes farther, and besides arranging the three wires on an inverted equilateral triangle plan, extends light galvanized iron channel irons along the line of the ends of the cross-arms and 3 ft. beyond. A guard wire is stretched along the tops of these upward projecting points.

Some of the lines arranged on the apex-down plan offer an attractive roost for eagles and hawks. When the bird stretches his wings for his final hop into space he short-circuits the two wires, and incidentally kills himself.

Precautions During Work

When making repairs, even if assured by the station men that the current has been cut off, the linemen always hang an iron chain over the three wires to prevent the current coming on again without warning. No lineman has ever been injured on our 13,000-volt lines.

The other methods of completing the line contained nothing different from standard practice. The last six years' experience has taught us how to construct and how to maintain our high-tension lines so as to escape the interesting effects of fog and dust.

The results of our experience, summed up, are as follows:

1. There should be a larger factor of safety in the test voltage of insulators to be used in the foggy localities than elsewhere, say six.
2. To keep the insulators up to a safe margin these insulators should be wiped or washed once a year in the most aggravatingly foggy locations.
3. The through bolts for attaching the cross-arms should be replaced by the U-bolt around the pole.
4. The all-wood pin or the wood-tipped iron pin should be replaced by the all-iron pin with the threaded lead top.
5. No pin should be located in a hole bored in the top of the pole, but should be installed on a short arm bolted to the pole by a U-bolt.
6. All iron parts should be galvanized.
7. An insulator with a few "still air spaces" is preferable to one with many such spaces, no matter what the comparative "test voltage" may be.
8. If the wood pins are used, very many will surely burn off during the foggy conditions. If iron pins are used, a few cross-arms may burn off. In any case the main dependence must be upon the insulator.

REPORT OF COMMITTEE ON STANDARDS*

W. H. Evans, Chairman; H. H. Adams, L. L. Smith, G. H. Kelsay, James Heywood, E. O. Ackerman, B. Penoyer, M. J. Kehoe, J. Z. Murphy

At a meeting of the executive committee of the American Street & Interurban Railway Engineering Association held at Atlantic City, Oct. 12, 1908, the question of the standing committees and their relation to each other was very carefully considered, and as a result the executive committee submitted certain recommendations for the consideration of the association which were subsequently adopted by the convention at its first session, Oct. 13, 1908.

The report submitted referred to the work of this committee as follows:

"The committee on standards to consist of nine members, four of whom are to be chairmen of the other standing committees, four of whom are to be appointed by the president from lines of work represented by the other committees, and a fifth member at large, also appointed by the president.

"All recommendations for adoption of proposed standards made by any of the general committees shall be subject to the approval of the committee on standards and are to be presented by them to the association.

"It was the sense of the meeting that each committee should endeavor as far as possible to make definite recommendations as a result of its work."

This action by the executive committee and the association is heartily indorsed by the members of this committee and no doubt will result in a more satisfactory manner of arriving at standards. It is very necessary, however, that the other committees make definite recommendations as to standards in their annual reports, as it is upon these reports that the work of the committee on standards will in the future largely depend. Owing to the fact that no definite recommendations as to standards were made in the reports of the committees last year, this committee has been somewhat handicapped in this respect and has not profited by the above rule to the extent that subsequent committees will.

At a meeting of the executive committee, held in New York City, on Nov. 16, 1908, the following subjects were suggested for the consideration of this committee this year:

(a) Gears and pinions; (b) standard dimensions with particular reference to standard taper for pinions; and (c) standard gear ratios.

Also that data be collected for the purpose, if possible, of submitting specifications for material for: (d) Iron for brake rigging; (e) axles; and (f) rubber-covered wire. Considerable work on all of the above subjects has been done by the different committees, and this no doubt will take form in their reports, making definite recommendations for standards to be adopted by the association.

Standards of the Association

It is gratifying to your committee to report that no recommendations are submitted nor suggestion made for changes or alterations in the standards and recommended practices that have been adopted by the association at the 1907 and 1908 conventions, held at Atlantic City. These standards have met with general approval and there is an increasing tendency to adopt them as standard practices with a large number of the electric railway companies throughout the country; and with the more general use of the standards, greater benefits will be realized and economics effected.

Also many of the manufacturing and commercial concerns have adopted these as their standard practice and are urging their use. In a number of cases they have reproduced the standards in their advertisements and catalogues, with the result that considerably greater publicity has been given them. Your committee considers this a very decided advantage in the introduction of the standards of the association and takes this opportunity to express its appreciation of the effort of those that have taken the matter up in this manner.

(a) Gears and Pinions

Consideration has been given this subject with the view of adopting standards for gears and pinions in addition to those that have already been adopted. It has developed, however, that, owing to the great variety of motor equipments that are in use and the different classes of service in which each of these is being employed, it is very difficult to agree at this time on additional standards for gears and pinions that will be acceptable generally.

It is suggested that a careful study of the table adopted in 1907 will very materially assist in the standardization of the gears for the different motors and in connection with the standard axles will greatly assist in the interchange of gears for different motors on the same axle. The character of the pinion is naturally dependent on the gear used. This matter was taken up with the representatives of the motor manufacturing companies, with the result that it developed that the time is not now opportune for suggesting additional standards for gears and pinions. Your committee, therefore, has no recommendation to make on this subject at this time.

(b) Standard Taper for Pinions

A consideration of this subject disclosed the fact that it was not possible to adopt a standard taper for pinions that would conform to any general extent to that now used by the equipments already in service. It is, therefore, desirable that the standard recommended shall conform as nearly as possible to that used by the greatest number of equipments already in service. It is also thought that the difference in the taper of the pinions now in service can be harmonized without a great amount of difficulty and the advantage, especially to the companies that operate motors manufactured by the different makers will be very considerable.

Your committee would, therefore, recommend that the standard taper for pinions be made in the proportion of 1¼ in. in diameter to 1 ft. in length.

(c) Standard Gear Ratios

This subject was taken up by the committee in connection with the first subject, (a) Gears and Pinions, and was considered in much the same light as that subject, with which it is s closely allied. While it is evident that considerable improvement is possible along this line, it is, in the opinion of your committee, questionable whether it is altogether advisable at this time to insist on a very rigid standard in this particular. Conditions vary so widely as regards service requirements and limited space in which to locate motors that it hardly seems practicable to adopt standard gear ratios. In the opinion of one manufacturer, the situation is as follows: "Even were it possible I think it would handicap other features of design to such an extent that on the whole it would be a detriment rather than an advantage." While it is the opinion of the committee that considerable can be accomplished by the individual member companies with their own equipment, we do not consider that the matter has had sufficient general investigation to warrant the association in adopting standards along this line at this time. Your committee, therefore, has no recommendations to offer at present on the subject of gear ratios.

(d) Iron for Brake Riggings

Your committee is of the opinion that the important duty of brake riggings and other wrought-iron forgings on electric railway equipments demands a thoroughly reliable grade of material, which should be fully specified to the manufacturer. Care should be taken in the inspection of the material received. Your committee does not consider it advisable to

*Abstract of report read before the American Street & Interurban Railway Engineering Association, Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

prepare special specifications for forgings for brake riggings alone, but rather for a general character of No. 1 wrought iron, which will not only serve for the above purposes, but also for general blacksmith work.

The committee recommended the adoption of the specifications submitted as the standard of the association.

In connection with these specifications and as a further safeguard in the purchase of round bar iron of proper diameters, not only on account of strength, but also to insure the cutting of a satisfactory standard screw thread when desired, a set of limit gages for round iron together with tables of sizes of limit gages for round iron are proposed.

(e) Axles

In considering the subject of specifications for material for axles your committee has confined its investigations to the steel axle. With the general introduction of larger and heavier cars and motors of greater capacity, and the exacting conditions under which these are operated, it has developed that the conditions affecting the motor axle are such as to require the greatest care in the selection of the material from which it is formed.

While we may profit very materially by the experience of organizations similar to ours that have developed the axle problem since the beginning of operations of railroads in this country, it is no doubt true that the requirements of the motor axle under all conditions call for a material fully equal to, if not much better than, that used under any similar circumstances.

Your committee recommends the following specifications for axles:

Standard Specification for Steel Axles

(1.) **Material:** All axles must be made of steel manufactured by the open-hearth process and the material required shall have the following composition:

(2.) **Chemical Requirements:**

	Basic Open Hearth.	Acid Open Hearth
Carbon	0.40 to 0.55 per cent	0.35 to 0.50 per cent
Manganese, not to exceed	0.70 per cent	0.70 per cent
Phosphorus, not to exceed	0.05 per cent	0.05 per cent
Sulphur, not to exceed	0.05 per cent	0.05 per cent

In no case must the total of carbon and manganese exceed 1.15 per cent.

(3.) **Physical Requirements:** Tensile strength, not less than 80,000 lb. per sq. in. Elongation in 2 in., not less than 20 per cent. Reduction in area, not less than 25 per cent.

The standard turned test specimen, ½ in. in diameter and 2-in. gage length, shall be used to determine the physical properties. Drillings or turnings from the tensile specimen shall be used to determine the chemical properties.

The railway company must be notified in advance when axles will be ready for inspection and no shipment shall be made before tests shall have been completed and the inspector shall have advised that the axles are satisfactory.

(5.) **Stamping and Marking:** Each axle must have the heat number and manufacturer's name or initials plainly stamped on one end with stamps not less than ⅜ in. high and have order number plainly marked with white lead.

(6.) **Inspection:** All axles must be free from seams, pipes, cracks or other defects and must conform to the sizes ordered, as per drawings which accompany these specifications.

Axles must be rough-turned all over with a flat-nosed tool, cut to exact length, have ends smoothly finished and centered with good 60-deg. centers.

Axles that fail to meet any of the above requirements or that prove defective on machining will be rejected and returned at the expense of the manufacturer and must be replaced by them free of cost to the railway company.

(f) Rubber Covered Wire

The subject of rubber-covered wire has been investigated by the committee on power distribution, and James Heywood, chairman of that committee, reported at the meeting of the committee on standards that his committee would make a definite recommendation in its report to the convention this year and ask that the same be adopted as the recommended practice of the association.

The committee on power distribution is of the opinion that the standard specifications adopted by the Railway Signal Association would be suitable and advisable as a standard compound for rubber insulated wire to be adopted by this association.

This committee therefore has no recommendations to offer on this subject at this time.

Definite Recommendations as to Standards

In order to facilitate the work of the committee on standards for the year 1910 as well as in subsequent years, it is considered very necessary that the reports of the various committees to the convention make definite and distinct statements of what they would recommend be adopted by the association either as standards, recommended practice or suggestions for specifications and also make recommendations for what action they desire to be taken by the convention. This will materially assist the committee on standards as well as avoid the possibility of considerable confusion in the work to be taken up by the different standing committees of the association.

Adoption of Standards

The subject of the adoption of future standards by the association has been given very careful consideration by this committee during the past year with a view to making the standards more effective. In the opinion of the committee considerable additional force and effect would be gained for the standards and recommended practices by submitting them to a vote by all the member companies entitled to a vote for final decision by letter ballot.

The committee on standards offers the following amendment to the constitution and by-laws of the American Street & Interurban Railway Engineering Association subject to the approval of the executive committee:

Recommendations for Standards

Sec. 1. Any proposition recommending the adoption of standard construction or practice shall be in writing and be accompanied by drawings, if the latter are necessary for a clear understanding of the subject. Such proposition shall then be submitted to the association for discussion, after which a vote will be taken to decide whether the proposition shall be submitted for decision by letter ballot to all the members entitled to vote. If decided in the affirmative the secretary, within three months from the time the vote of the association is taken on such measure, shall send by mail to each member a blank ballot and a copy of the proposed recommendation with a report of the discussion thereon approved by the executive committee; such ballot to be filled in, signed and remailed to the secretary, who will count all the ballots received within 30 days from the date they were sent to the members and he shall then announce the vote in such manner as the executive committee may prescribe. Any recommendations securing two-thirds of the votes cast shall be thereby adopted by the association.

Sec. 2. Each active member shall be entitled to one vote on all questions, and in addition thereto shall on all measures pertaining to the adoption of standards have one more vote for each full 1,000,000 car-miles made by the cars of that company during the fiscal year next previous to the convention at which such standards are recommended to be submitted to letter ballot for adoption by the association.

The General Use of the Standards

The committee on standards desires to call attention to the fact that the standards and recommended practices which were adopted at the 1907 and 1908 conventions at Atlantic City have become standard practice with a large number of companies, and it also desires to emphasize the importance of the adoption of these standards by other companies. It has been demonstrated that many of these standards can be readily applied to the older types of trucks and motors with decided advantage. Particular attention, how-

ever, should be directed toward the use of these standards in ordering new equipment.

Your committee is of the opinion that some agitation on this subject by the association at this time would be advisable and would result in advantage to the member companies and also promote the cause of a system of standards and recommended practices.

Reprint of Standards in Annual Reports

Your committee would recommend that as a further means of bringing the standards of the association into general use and that the information may be readily obtainable, a reprint of all the standards, recommended practices and specifications that have been adopted up to the time of each convention, together with proper notations as to the time adopted with any additions or alterations made, be embodied with each annual report of the American Street & Interurban Railway Engineering Association as an appendix.

CHICAGO'S TRANSFER CRUSADE*

By Joseph V. Sullivan, General Supervisor, Chicago Railways Company

With a record of more than 1000 arrests in one year for misuse of transfers, officials of the Chicago Railways Company believe that their experience may be of interest to other street railway operators, especially in the larger cities. In the first place, let it be understaood that while Chicago has been one of the most fruitful fields for persons with an inclination to make improper use of transfer slips, yet the facilities for correcting this evil are now as helpful as any large city could expect. This is principally true because we have a valid ordinance under which offenders of this class may be punished, and we get assistance from the police and the courts in enforcing it. Through our campaign with posters and the newspapers the terms of the ordinance have been made known throughout the city, and if anyone is now making illegal use of our transfers it is not because he is ignorant of the law but because he thinks he is more clever than others and is willing to "take a chance."

Let me quote the section of our city laws under which we have made all these arrests:

It shall be unlawful for any person to sell, barter or exchange for any consideration whatsoever any street railway transfer ticket or other instrument issued by any person or corporation operating any street railway within the city giving, or purporting to give, to the holder of such transfer ticket or other instrument the right to transfer, without the payment of additional fare, from one car to another car on the same line or route, or from one line or route to the car or cars operated upon another line or route; or for any person to give away any such transfer ticket or other instrument as aforesaid to another for the purpose of enabling, or with intent to enable, the latter to use or offer the same for passage upon any street railway car or cars; or for any person not lawfully entitled thereto who shall receive any such transfer ticket or other instrument as aforesaid to use, or attempt to use, or offer the same for passage upon any street railway car or cars: Provided, however, that this section shall not relate to nor in any manner affect the issuing and giving of transfer tickets or other instruments as aforesaid by the agents or employees of any street railway to passengers thereof lawfully entitled thereto. Any person violating any of the provisions hereof shall be fined not less than $5 nor more than $100 for each offense.

The provisions of this ordinance are plain, and we had progressed some months in our crusade before any judge would agree with the defendants that it was unconstitutional. Then the Illinois Supreme Court, following a ruling in a similar case in California, decided that this was a valid ordinance. Since that time we have had no further interruptions in our work, and while successfully prosecuting an average of almost 100 offenders each month, we have had no setbacks in the way of suits for false arrest.

The Chicago Railways Company operates practically all the surface lines on the north and west sides of Chicago, 306 miles in all. These tracks are spread over a large area, approximately a square, where the north and south and the east and west lines are about equally divided. We are compelled to issue and receive transfers at every intersecting point or wherever our lines approach within 200 ft. of other lines of the same company. The same provisions of the city ordinance extend to points where our lines connect with three other surface railway operating companies. This combination gives, perhaps, the largest number of transfer points of any city in the world. Not only that, but we issue transfers upon transfers without number, so long as the passenger is riding in the one general direction, and it is possible for a person to make proper use of transfers and travel the better part of a day, with many stopovers for the transaction of his business. If any conductor fails to make the required limiting punch mark on the slip, the privileges may be further extended, and it is not an unusual happening for a passenger to put in half of the day going in one general direction and double back on his trail to get home in the evening. These are the burdens from which we can find no relief.

In our last fiscal year we carried 373,000,000 passengers, of whom 153,000,000 rode on transfers and almost 3,000,000 were free riders. This showed a percentage of 41.03 transfer passengers out of the total. The percentage of revenue and free passengers using transfers was 69.57. Of course, there were thousands of other transfers issued to passengers who did not use them, and it was the careless disposition of these by our patrons which made work for our squad of secret service men.

Transfer Traffic

At the time we started our crusade the sale of transfers at junction points and in stores was quite general. At one point there were a dozen newsboys who solicited transfers from passengers and sold them to others. Testimony given in court showed that at this crossing alone each of the boys derived a revenue of from $1 to $3 per day through this source. There were other corners where the unlawful sale of transfer slips was almost as extensive. But the greatest injury to the company's business was done at points where hundreds of transfers were not sold, but were thrown down, picked up or traded daily. At one place where three important lines connected, it is estimated that several hundred transfers were presented daily by persons who had not received them from a conductor. Since the start of our prosecutions we have arrested 85 offenders at this crossing, and as a result the loads originating here are now made up almost entirely of cash instead of transfer passengers.

This nuisance had grown to such a size in the late summer of 1908 that the company decided to make a determined effort to eradicate it. Three of our investigators were sworn in as special officers and we secured a detail of two plain clothes policemen from the city to make up our transfer squad. These men first cleaned up the junction where the dozen newsboys were making a living out of the sale of transfers, and it required many raids in the morning and evening rush hours before the last offender was driven away.

Gradually we followed up each car route until we had touched at every crossing where there was evidence of the misuse of transfers. After six months of such scouting we narrowed the crusade down to a score of places where the evil had grown so strong that the daily arrest of five or six men or boys did not seem to make a proper impression on the others. At the present time there are not more than a dozen junctions, where the frequent attention of the transfer squad is necessary, and even at these points the person who picks up or trades transfers knows that he is taking a

*Abstract of paper read before the American Street & Interurban Railway Transportation and Traffic Association, at Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

long chance if he hands his slip to a conductor for transportation on our cars.

It was surprising to find what a class of men we got in our net. There were hundreds of laboring men and clerks by the score, but it was not a rare happening to pick out a business man of high standing who should have considered it too small a thing to beat the street car company out of a nickel. After a dozen or more of these men had been advertised in the daily papers with a humiliating account of their actions, there were few, if any, of the "silk stocking" grafters in the monthly list of "results." The patrol wagon was called into frequent service in our work, and its appearance helped to scare off many who otherwise might have failed to be impressed by the crusade at that point.

We have never asked for the maximum fine under the transfer ordinance; in fact, it has become customary to waive this charge and change to a prosecution under a disorderly conduct ordinance. This makes the usual fine about $2 and costs, about $8 in all, which proves sufficiently expensive to the victims to deter them from a second offense. We have had cases, however, where the misuse of a single transfer has cost the defendant $16, and in one instance an Italian, known as the transfer king, was held to the grand jury on evidence that he was the leader of a crowd of boys who were selling transfers.

Not the least pleasing development of the campaign was the manner in which we won over many of our opponents by kind treatment of prisoners. We have not insisted on severe punishment in any case where the defendant was shown to be in hard circumstances financially, and, in fact, dozens of men and boys were turned loose with a warning when it appeared that there were extenuating circumstances. There were only a few cases where we found it necessary to arrest women or girls as frequent offenders.

Our work was looked down on when first undertaken and was decidedly unpopular and somewhat scorned by public officials and the courts, but the crusade was continued in as dignified and humane a manner as possible, and soon officials and the public generally saw that it was not a case of persecution or boys' play. They began to realize that it was a matter of considerable magnitude in a financial way and educationally, and those engaged on the job received more encouraging words, looks and friendly aid all along the line.

The public had sufficient notice of our plans: In the first place a warning notice, quoting a section of the ordinance, was printed on the reverse side of the transfer slips. Then a similar warning was posted in all our cars, and finally a notice printed in English, German and Polish—11 in. by 21 in. in size—was distributed among the principal factories and stores in the vicinity of our lines. In this last publicity work we had the assistance of the leading industrial concerns. One thousand of these signs are now displayed in places employing from 100 to 10,000 helpers, and the warning printed thereon is backed by each concern's endorsement.

We believe that this part of our plans has brought almost as good results as our raids by the police, because we have been informed that men have been discharged by their employers for failure to heed the warning given in printed notices and their fellow employees doubtless have profited by their lesson. The newspapers also have sided with us, and their editorials have played an important part in educating the people to the fact that it is illegal to give away, barter or make other improper use of transfers.

As we progressed in our crusade our trainmen also began to take an exceptional interest in the work. They enjoyed witnessing the misfortune of some of the prisoners whom they had often suspected of presenting transfers unlawfully received, and it was not long before our office got daily information from conductors and motormen as to the location of bad transfer points and the identity of individuals who had been defrauding the company for months. This was quite a help to us in our plans. Another strong factor in the work was the constant vigilance of our investigators.

We have been engaged for about one year in this work and we believe that the sale of transfers at street corners and in stores practically has been stopped. We know that at corners where it was not unusual to see hundreds of transfers thrown in the street to be picked up by anyone so desiring, there is now a small scattering of such slips and they are rarely taken up for use. We know also that the cars taking a load at such places now get about 75 per cent more cash passengers than formerly in the rush hours. It is impossible to estimate in dollars the increase in earnings due to our educational work along these lines, but we believe it to be considerable. The work of educating our patrons has been costly, but when we see how the misuse of transfers has been materially reduced in one year we feel that the investment has netted good returns.

AT THE DENVER COUNTRY CLUB

The ladies had the time of their convention lives at the Denver Country Club on Thursday afternoon. Two hundred and twenty-five of them were taken in the "Seeing Denver" and other cars out to the club, where they were received by a committee consisting of Mrs. W. G. Evans, Mrs. John Evans, Mrs. James Brown, Mrs. Fred Moffat, Mrs. George Sanger, Mrs. Sam Perry, Mrs. Charles Whitehead, Miss Archibald and Miss Brown.

The club is most attractive and located in an extremely picturesque spot, affording a charming view of the hills. Excellent arrangements had been made by Mrs. Evans and her committee for the comfort, pleasure and entertainment of their guests.

A clock-golf tournament has held, the prizes being, first, a silver picture frame, won by Mrs. James W. Rollins; second, a cluney lace centerpiece, won by Mrs. Warren L. Boyer; and third, a silver picture frame, won by Mrs. W. H. Glenn. For those who did not wish to participate in the clock-golf tournament tables were set both inside and outside of the clubhouse for bridge-whist. About sixty of the ladies participated in the bridge-whist game. The prizes were, first, a silver picture frame, won by Mrs. Rusell; second, a handsome silver dish, won by Mrs. Henry Clay Evans; and third, a silver picture frame, won by Mrs. A. L. Price.

During the afternoon, the wind becoming decidedly chilly, a large roaring log fire was built in the office of the clubhouse and the ladies gathered around to exchange anecdotes and experiences. At 4 o'clock refreshments were served, consisting of sandwiches, ices, ice-cream, cake, tea, coffee and chocolate.

The ladies who served at the table were Mrs. John Evans, Mrs. Fred Moffat, Mrs. Hunt and Mrs. Charles S. Clark.

The weather was rather threatening during the latter part of the afternoon, but the rain held off until all of the automobiles had left for the city, the party returning about 5:30.

It was the unanimous opinion of all the ladies present that the afternoon had been a most successful one and all of them expressed their appreciation of the efforts made by Mrs. Evans and her committee to make them feel at home and to provide them with pleasant recollections of their visit to Denver.

The gentlemen who assisted were Messrs. Charles R. Ellicott, Ross Hayes, Fred Elmquist, Nathaniel C. Garland, William Wampler, W. L. Conwell and James M. Wakeman.

The Denver & Rio Grande Railroad crosses the Continental Divide at Marshall Pass, which has an elevation of 10,856 ft. above sea level.

INTERURBAN STATISTICS*

By S. C. Rogers, Treasurer, Mahoning & Shenango Railway & Light Company

Investigation of this subject reveals the fact that while statistics of interurban operation are compiled concerning almost every detail, there are hardly two interurban properties in which the statistics can be compared without first taking into consideration the method employed on each property in obtaining and in tabulating such statistics, together with a comprehensive idea as to the conditions governing their operation.

The subject is still more complicated by the efforts of the Inter-state Commerce and the several State railroad and public service commissions in attempting to outline rules and regulations concerning these matters for the guidance of the individual companies coming under their jurisdiction, and the work of this association is in the mind of the writer very clearly similar to that of a balance wheel to harmonize all these factors and finally produce a uniform standard of comparative statistics of operation of interurban railways with uniform rules for their compilation.

Recognizing the necessity of uniformity in this regard our affiliated association, the American Street & Interurban Railway Transportation & Traffic Association, has recently sought to obtain statistical information bearing on revenues and expenses as applied to freight and express traffic. It recognizes, however, that such information will not be complete because many of the companies make no attempt whatever to separate their operating expenses as between freight and passenger service and where efforts are made to segregate the expenses chargeable to freight service alone, the equity and reliability of the arbitrary bases of divisions are sometimes open to question.

This paper cannot better convey an idea of the exact situation than by giving herein extracts from correspondence in answer to four specific questions addressed to over 100 companies engaged in interurban operation throughout this country and Canada in the investigation of this subject.

1. What statistics are compiled covering the detail of revenue, traffic and operation of your interurban lines, both passenger and freight?

(a) Daily report of earnings made up within 24 hours from the reports of agents and conductors, used by operators and traffic officials as an index of business conditions.

Monthly statement of earnings, expenses and net earnings, cumulative as well as comparative, furnished to general manager and board of directors.

Statistical statement of earnings and expenses reduced to a per car-mile on passenger and a per ton-mile on freight business, furnished to operating department, where they are plotted graphically. This forms a basis of all increases or decreases in service.

Comparative statement of tonnage and revenue, showing the actual net tonnage hauled and revenue received from freight in and out of each station, furnished to general manager and traffic department, showing the results of traffic department efforts. Similar statement of passenger business out of all stations monthly, furnished to general manager and traffic department.

(b) Daily report showing the earnings, apportioned as between city, suburban and interurban companies, worked out on the basis of traffic agreement between companies.

Monthly report of service earnings and passengers of each of the three systems without regard to any separation or apportionment for the purpose of traffic agreement between the two companies or for any other purpose.

The first-named report might be named "Financial Report of Passenger Earnings," as it shows the earnings of each company or system operating under specific traffic agreements, one with the other, and the second report, the "Transportation Report of Passenger Earnings," showing the actual earnings of each division without regard to such agreements.

(c) Monthly comparative report of tons moved one mile; empty cars hauled one mile; trains hauled one mile; loaded cars hauled one mile; and empty cars hauled one mile.

Average cost per train per mile for each item of operating expense; per 100 ton-miles for each item of operating expense; per ton and passenger for station service; per passenger per mile for operating expense; and per estimated loaded car-miles for operating expense.

Average number of tons moved per train per day; estimated loaded cars moved per train-mile; tons moved per loaded car-mile; and tons moved per car-mile, loaded and empty.

Percentage of engine mileage to train mileage.

(d) Daily, weekly and monthly reports show the details of operation and the classification of receipts and expenditures in comparative form, and percentage is figured in relation to track mileage, car mileage and car hours.

(e) Average mileage of road operated.

Passenger car-miles—revenue, motor and trailer, each separately. Special car-miles—revenue. Total revenue car-miles.

Car-miles—non-revenue, service and business, each separately.

Train-miles—revenue and non-revenue, separately.

Operating revenue, operating expense and net operating revenue per mile of road.

Operating revenue, operating expense per car-mile and net operating revenue per car-mile.

(f) Daily statement of passenger earnings.

Monthly comparative statement of passenger traffic with the previous year, showing the number of passengers handled, fare, transfer, free and total.

Passenger car-mileage, showing revenue, non-revenue and total.

Car passenger earnings and car earnings from chartered cars.

Average earnings per passenger and per passenger car-mile.

Statement showing movement of freight in tons of the different commodities on a receipt basis at all stations, including transfer points with steam roads; also a statement showing revenue produced by each line.

Monthly comparative statement of earnings and operating expenses, both cumulative and comparative.

(g) Daily report of receipts (being a detailed cash statement covering conductors' cash-fare collections), agents' ticket sales, agents' freight collections, scrap sales and sundry receipts from operation, compiled from treasurer's report of cash and daily traffic report.

Daily report of earnings, compiled from daily traffic report for cash and ticket earnings, from treasurer's report of miscellaneous earnings and from waybill tissues for freight earnings.

Daily traffic report, compiled from conductors' turn-ins and used as a basis for statistics covering earnings, mileage, number of passengers, car-hours, etc.

Monthly comparative statements of ticket sales by station and freight forwarded and received by stations.

Monthly statement of revenue and operating expenses.

(h) Revenue and expense per car-mile and car-hour for each.

Item of classification of operating expenses.

Average fare per revenue passenger, average freight receipts per ton, and average express receipts per ton.

Per passenger results for the following: Operating revenue, cost of power, platform expenses, other car service expenses, other expenses, total operating expenses, and net operating revenue.

Car-mile results for the following: Operating revenue, way and structures, equipment, traffic expenses, superintendence of transportation, cost of power, platform expenses, other car service expenses, general and miscellaneous expenses, total operating expenses and net operating revenue. Car-hour results for all except other car service expenses.

Daily averages for the following: Passenger revenue, freight revenue, other operating revenue, total operating revenue, operating expenses and net operating revenue.

Per cent of the following: Operationg expenses to operating revenue; taxes and licenses to operating revenue; operating expenses and taxes and licenses to operating revenue; and fixed charges to operating revenue.

Revenue passengers, transfer passengers, advertising passes, complimentary free passes, employee free tickets, total passengers carried, average passengers per day, and average passengers per car.

Freight tonnage and express tonnage

*Abstract of paper read before the American Street & Interurban Railway Accountants' Association, Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

Car mileage of motor cars, work cars, passenger trailer cars and freight trailer cars, each separately, and total car mileage, average mileage, average mileage per day, and average mileage per car.

Cars operated, average cars per day, car hours, average car-hours per day.

Power, kw-hours per car-mile, revenue per mile of track, operating expenses per mile of track, and operating expenses and taxes per mile of track.

2. Method or system employed in obtaining such statistics in each case.

(a) Statistics are worked up from the following: (1) Weather and temperature report; (2) conductors' reports; (3) audit stub of conductors' cash receipts; (4) recapitulation of time table; (5) daily report of cars operated and car-hours run; and (6) statement of tickets collected, statement of tickets issued, passengers carried and earnings of the three systems.

(b) Our accounting systems are so arranged and interrelated that our reports to officers and heads of departments contain all statistics which we have so far been called upon to compile.

(c) Cash fare receipts, tickets and conductors' reports—The transportation department has a table covering each day, showing the actual number of car-miles that should be run, and by deducting therefrom the number of trips lost or the extra trips made, which conductors are required to report, we are enabled daily to compute the actual car-mileage run.

(d) The basis for the compilation of mileage, hours, etc., is sometimes difficult to decide. The Interstate Commerce Commission has decided that passenger car-hours of electric railways include not only actual time while in revenue service, but also the time consumed in running from car house to point where regular service is begun, and delay for layover on special occasions, such as ball games, circuses, blockades, etc. It includes the entire time during which the crew is on duty. The commission will, no doubt, later issue instructions regarding the basis for compiling mileage with particular regard to trailers, dead mileage, etc. Such companies as are subject to the jurisdiction of the Interstate Commerce Commission will necessarily be governed in the future by the rules laid down.

3. The practical use to which each form of statistics is put.

(a) Both "Financial Report of Passenger Earnings" and "Transportation Report of Passenger Earnings" furnished to the president, general manager and superintendent of transportation, for their information, one copy of each statement being retained by the comptroller and one copy by the ticket auditor, under whose direct supervision the work is done. Incidentally the comptroller incorporates into his monthly report a detailed analysis of the statistics and results of each line, submitting them to the president, general manager and the superintendent of transportation.

(b) Each departmental head is sent that part of the detailed monthly report which directly relates to his department, and his explanation is requested of such variations. His inquiry into the situation then brings a satisfactory explanation, or brings to light some unusual occurrence.

(c) A daily record from the conductor shows the mileage, time, routes and destination, which is very valuable for court record, and also to find where the peak of our riding is. Comparison of earnings from year to year and from route to route enables us to make the unit as small as possible and to get at the exact cause of increase or decrease in business.

(d) The practical use of statistics as compiled is that of making comparison both with passenger statistics of the steam road, and with the electric lines, thus serving as a guide both to the operating and traffic departments.

(e) The statements are used by the operating and executive officials for comparative purposes and to show the differences in the cost of operation as well as the results of operation of the different divisions. It is a question whether the information is of sufficient value to pay for the work, but the fact that nearly all lines require statistical information, and the Interstate Commerce Commission as well as the railroad commissions of the various States require statistical information, would indicate that they are considered of sufficient value to warrant their cost.

(f) It enables the management to make comparisons and to keep track of all revenue, expenses, etc., and to regulate the service according to passengers carried, expenses and earnings per passenger.

(g) The principal use of these statistics is to determine what expense seems to be abnormal and what traffic needs stimulation.

4. If no traffic statistics are compiled as to passengers carried on your interurban lines from and to each individual station, is your system of recording fares collected such as to make this possible, and would this information be valuable?

(a) It has been considered of more importance with us to know the amount of business out of each station rather than the amount of business into the station, as this information enables us to place the matter before our traffic department for investigation of further needs of that particular locality to suggest improvements in the service, or other inducements to be offered which will increase the travel. Our system of recording fares was especially designed for this purpose, and could, with very little change, be made to show business to each station. In addition to a monthly statement, which shows business from all stations, we furnish our traffic department and operating officials a statement of business done between the largest towns, and on this line passenger business is largely in and out of the larger towns.

(b) No traffic statistics are compiled as to passengers carried on our interurban lines to and from each station, but the earnings of each line are apportioned between divisional fare points. Outside of the main terminal station conductors are the ticket sellers. It is the opinion of this correspondent that the actual number of passengers in and out of each station, fare-point and stopping place should be compiled rather than an apportionment of earnings, but that in either case the information is not of sufficient practical value to justify the labor and expense involved.

(c) We compile traffic statistics, our lines being divided into fare zones, and conductor's day-card is so arranged for reporting passengers carried through each fare zone. We have at certain periods worked up data relative to the number of passengers to and from each individual station for special purposes.

(d) Statistics are compiled showing the amount of business in each division and each agency station. Passenger statistics are worked up from agents' monthly ticket reports, conductors' reports of cash fares, and interline ticket reports received from foreign lines. All except the conductors' reports are worked out on blank sheets of journal paper. Conductors' reports of cash fares issued are abstracted on triangular form and totals for the month carried forward to journal paper, the combined totals so obtained being total passengers carried as taken from the recapitulation of the conductor's book for the month.

(e) It is impossible to give the exact number of passengers carried to and from each individual station for the reason that our line runs on the highway more than half the way and makes local stops.

(f) We do not compile any statistics of passengers carried on our interurban lines between individual stations. Our system would enable us to do this in a great many instances, and we are enabled partially to arrive at it through the record of ticket sales to each station, but we do not think its value to us would outweigh the additional labor and expense in keeping it fully.

(g) About 70 per cent of our business is either upon commutation or card tickets, and it is possible to compile the number of passengers carried from station to station, and the revenue thus derived. It is of interest, both to the operating and traffic officials, to obtain this information, as it is of great importance in coming to a determination as to the necessity of complying with requests to open new stations, or as to the possibility of closing those which we may already have, and it is also extremely useful in making comparisons with steam line revenues from and to the same stations.

(h) Other than ticket sales reported by agents, no attempt is made by this company to compile statistics local to any particular station, and except in special cases I can see no necessity for such information.

(i) We do not compile statements of passengers carried between individual stations, and although it would be possible for us to prepare a statement of this character, the cost would be large. We do not think the information would be of sufficient value to warrant the labor and expense.

(j) In the passenger department we keep a traffic sheet which shows detail of ticket collections and cash fares, giving selling point and destination and value of each. This requires one sheet per month for each station and is a complete record of all tickets or cash fares from such station to all other points on the road. This sheet shows the number of passengers carried from and to each individual station.

(k) We have found no method whereby we can arrive at the number of passengers carried between individual

stations. We feel, however, that this information would be of service to us.

(l) While our fares are classified as to the different prices, the register does not show to or from any station. No such statistics are compiled, as we have never considered them of sufficient importance.

(m) This is very important information to have if it can be obtained without too great complication and expense. On our line we are basing our fares on a two-mile zone, but have never worked out details fully.

(n) We do not keep any account of passengers carried from and to individual stations on our line. We have over 100 stops on our western divisions alone, so that this information would be quite difficult to obtain and of doubtful value. About 55 per cent of our interurban passenger earnings are ticket sales, the balance—45 per cent—represents cash collected by conductors.

(o) Our own experience has been that the expense of ascertaining travel from and to each individual station and stop is not justified by the value of the information thus received. We did this for one week on our entire system, and in addition to requiring extra conductors at the time, our auditor was compelled to work a number of extra clerks for several weeks in order to tabulate the information. However, such information would be of value where it is desired to ascertain whether or not a particular run is profitable.

(p) It is not possible, without making special provision, for us to compute the number of passengers carried from and to each individual station, nor do we, under our conditions, consider that the information would be of much practical value to us.

(q) The only regular traffic statistics we compile consider value only, regardless of destination or direction, although we are able to deduce some information as to how our traffic originates. Occasionally we take stubs of tickets and plot the results, from which we can tell accurately the business done from the several points, although we are unable to tell direction passenger was traveling. We would be glad to have these statistics compiled regularly, but do not believe they would be worth to us what the cost would be.

(r) Until quite recently our interurban lines have been operated on the fare zone method of collection, which would require considerable labor to compile statistics regularly as to the amount of or direction of travel at any particular point. We have, however from time to time, compiled statistics for a few days or a week at a time. Such information we consider quite valuable, but not sufficiently so to warrant the expense necessary for regular compilation.

(s) Our interurban lines do not permit quick service between termini. They consist of several local lines joined together and afford an opportunity for interurban traffic. We have not, therefore, considered it practical to make a distinction between interurban traffic and local traffic, and have not considered this information of sufficient value to make any attempt to obtain it, and, I doubt, under our conditions, if it would be practical to do so, although I appreciate it would have many advantages.

(t) We compile no statistics as to number of passengers carried from and to individual stations, although we could get this information from our tickets and cash fare receipts if we felt that the large amount of labor involved would be justified. At one time we worked this information up for one week, but never attempted it afterward.

Practice in Computing Car-Miles and Car-Hours

As an examination of the correspondence, especially of the forms submitted, which were in large number, indicated that the basis of computing car-miles and car-hours, the two principal units of comparison, were many and varied, the following extracts of letters are submitted as illustrating this fact and containing certain suggestions for more uniform practice:

(a) If we have a motor car pulling two express trail cars we obtain the mileage of the train and multiply by three. The same method is used in obtaining car-hours. We have frequently taken data pertaining to train-miles and train-hours showing the average number of trains daily and the average train-hours per day. It is intended to modify this data by showing locomotive or pulling-car mileage separate from the individual car-mileage. We have a number of electric locomotives that are beginning to haul cars. I believe that ton-mileage would serve a better purpose, even though different companies handle different classes of shipments bearing different rates, etc.

(b) We have discontinued using car-hours as a basis for statistical data, but follow the usual practice in figuring mileage, the mileage of the locomotive being added to the mileage of each car to determine the revenue car-miles. We use for handling our freight business on one division a steam locomotive, on another division an electric locomotive, and on other divisions motor cars with and without trailers. We include the mileage of both motor-car and trailers in our mileage statistics.

(c) We consider that each car operated for one hour, whether motor-car or trailer car, whether operated singly or in trains, represents one car-mile, making a part of the total car-hours and total car-miles of the system in computing earnings and expenses per car-hour or per car-mile. In view of that fact that the weight of the car operated, directly and materially affects the maintenance of the track, line, cars and the power consumed, a unit should be used entitled "car-mile tons," or some other approved term, the tons referring to the weight of the cars operated. Consideration should be given to "trail car-miles," but they should not be on the same basis as "motor car-miles."

In the operation of cars in trains, consisting of a motor car pulling one, two or three trail cars, the wages of motormen per car-mile would be affected and the cost per car-mile would show very different results when comparing the operation of motor cars operated singly with the operation of motor cars and trail cars operated in trains. The speed at which the cars are operated, the conditions of operation with respect to the number of stops, the type of track and condition, as well as the difference in types and weights of cars operated, are all factors that affect results, as shown by the car-mile unit, and, therefore, should be taken into consideration.

(d) We consider the mileage of passenger cars from the division terminal to the point of going into service, as revenue passenger car-miles, for the reason that with hardly an exception the car immediately enters service when leaving the terminal. Should a passenger car become disabled or wrecked the mileage of that car from the point of disablement to the division terminal would be considered non-revenue passenger mileage. On certain of our lines cars are operated in trains of from two to six. This mileage is compiled on the basis of that made by each car, the train-mileage not being considered. We have practically no non-electrical equipped passenger cars in service.

The compilation of freight car-mileage is handled in the same manner as that of the passenger car mileage. Each freight conductor on his daily time report shows initials, car number, loaded or empty, and from point to point handled by him during the day. Conductors of work trains are required to turn in a regular work train report showing every car, loaded or empty, handled by them during the day and between points.

In our car accounting bureau we keep a record of each passenger, freight or work car owned by the company. This record is posted daily and totaled at the end of the month statements being furnished to the electrical and mechanical departments as to the mileage made. From these statements these departments base the efficiency of gears, pinions, motors, controllers, etc., installed on each car, a record being kept of the installation or transfer of all such equipment on each car by the different departments.

(e) All of our statistics of passenger car mileage are based upon actual mileage of each car in a train, whether motor or trailer. "Ton-mileage freight" includes the gross tonnage of the train, motors as well as trailers, and is worked up from the car and tonnage report.

(f) In the case of our company we have always considered mileage of motor cars only in computing passenger or freight revenue and expenses per mile, regardless of whether one trailer or several were hauled. Freight traffic, therefore, seems to resolve itself into a question of tonnage rather than mileage, in order that accurate results may be secured. While we consider mileage as car-mileage it is in reality train-mileage, and when considered as such the number of trailers hauled on particular trips do not have to be considered. The trailer mileage cannot be entirely ignored, however, and in our case an item of "total trailer mileage" is included in our statement of operating statistics. In the case of car-hours we follow the same general plan.

Statistics Must be of Practical Use

Statistics are valuable only when put to some practical use. What is essential that the presidents, general managers and individual superintendents should know in order that the property may be operated to produce the maximum revenue with the minimum of expense consistent with proper maintenance, is the question that should be given mature consideration by every accounting officer, and this is particularly true of interurban operation. Condition of

operation must govern in determining the statistics to be complied in each case.

I have sometimes felt, and presume that many have had the same experience, that our efforts to furnish daily, weekly and monthly elaborate statistics figured to the fourth decimal point have not attracted the attention and provoked action on the part of operating officials that their importance would warrant and that maybe the same information at special periods, rather than regularly, would get better attention for the reason that the regular reports become more or less a matter of routine and often pass to the file as a matter of course.

A busy man does not wish a mass of figures. Find out what the management wants to know and present such information on one side of a single sheet of paper in such a manner that it can readily be grasped in a moment of time.

There is one form of statistics that has proved of very great value to the management of a particular property, and which I do not think, as a rule, is furnished, and that is the detail of labor costs separate from material. To know what percentage of the cost of the different items of classification represents labor and what material, is of interest and value to the management as it shows immediately by comparison with previous months wherein labor has increased and material decreased, or vice versa, inviting more careful scrutiny of the large item of labor costs which, in the majority of instances, represent between 50 and 60 per cent of the total operating expenses, and it is in the labor item where economies generally are affected. This is done by making a division as between labor and material on each account, and when a voucher is entered under its proper general heading it is at the same time entered in what is known as an "Abstract of Expenses," which consists of a loose-leaf in binder form, each leaf representing a classification of account and ruled for columns as between material, labor and total. These individual leaves carry full information concerning every charge made from month to month and any statistics may be compiled concerning the costs of operation without reference to voucher files or otherwise. It involves very little additional labor and has resulted in more practical benefit in the operation of this particular property than anything ever attempted in the statistical line.

Another item of statistics that indicates at a glance the actual conditions of a property is to show by percentage the relation of total fixed charges to the gross revenue.

As to the value of so-called traffic statistics, one can readily see how an interurban line, say 50 miles in length, might be operating its cars for the full distance and be earning an adequate revenue per car-mile, at the same time carrying the bulk of its passengers over one section of the line, due to the lack of knowledge as to the density of traffic, while a system of collection of fares, designed to furnish information as to the number of passengers from and to each station, would serve to reveal this fact. It might also serve to indicate that certain stations on the line might be discontinued as stopping points for limited service, confining the services at these stations to local cars, thus improving the service for through passengers and increasing the earnings per car-hour. This is a class of information, however, in the majority of instances, which might be obtained periodically rather than daily or monthly. I believe, however, that a system of collection of fares should be laid out for the purpose of obtaining such information when needed.

Taking the car-mile and the car-hour as the two units of comparison, I find, for instance, in the case where in interurban practice it is customary to operate cars in trains, that some companies takes the mileage and car-hours of the electric locomotive, or motor car plus the mileage, and car-hours of each trailer, while others take the train as a unit. Some companies include the mileage from the carhouse to the point at which the car starts on its schedule run and commences to earn a revenue, applying this as a unit for comparison of both revenue and operating expenses. Others take only the revenue car-miles or the mileage of the cars operating on its regular schedule. Some companies figure the mileage from the transportation department reports of car schedules, while others figure from the conductor's trip card as to operation of each individual car each day.

We have a very complex situation, when considered in the light of comparative statistics between companies; we have no unit of comparison that can be applied with equal force and value between companies. Our present units, "car-miles" and "car-hours," mean little or nothing unless all the many factors governing the individual operation of each company are considered.

The operation of interurban railways offers many intricate problems peculiar to itself and to this particular industry. We furnish service somewhat similar to that of the steam roads, but only to the extent that we carry passengers and freight. The difficulty of the collection of fares, due to the many stops and often local conditions, necessitating the use of the same car in certain portions of the road as a local street railway car, and for carrying passengers long distances at high speed and the many different conditions that apply in franchises and ordinances of different localities and peculiar traffic agreements between companies, make the compilation of statistics, of comparative value, a most complex one.

I think, however, that the time is ripe for this association to appoint a committee to act with and in connection with the committee on standard classification of accounts to take up this matter of defining as a standard of this association the character of the car-miles and car-hours, the method upon which they should be computed, and the fixing of a standard unit of comparison which will be comparative as between companies; this committee to represent the association before the Interstate Commerce Commission or other Federal or State commissions, to secure uniformity of ruling on this subject.

AWARD OF BRILL PRIZES

It will be remembered that on Sept. 28, 1908, The J. G. Brill Company offered three prizes to the students of the technical schools of the United States to be graduated in 1909 for the best three theses on the subject of "Design of an Electric Car for City Service." The first prize consisted of $250, the second of $150 and the third of $100. In April, the company announced that in addition, it would give to the winner of the first prize, a gold medal issued in memory of John A. Brill, the former vice-president of the company. The successful winners in the contest have just been announced. They are as follows:

First prize of $250 and the John A. Brill Memorial Medal to Charles T. Ripley, University of Illinois; residence, 414 Maple Avenue, Oak Park, Ill.

Second prize of $150 to Victor D. Dressner, Polytechnic Institute of Brooklyn; residence, 2460 Seventh Avenue, New York City.

Third prize of $100 to Robert T. Pollock, Worcester Polytechnic Institute, Ashland, Mass.

The Griffin Wheel Company, Chicago, Ill., is showing samples of single and double plate spoke center, chilled cast iron wheels which are adapted for all classes of street and interurban railway service.

The Exposition Monument at the Alaska-Yukon-Pacific Exposition in Seattle is a Corinthian column 80 ft. high entirely covered with gold from Alaska.

PAYROLLS AND TIMEKEEPING*

By N. E. Stubbs, Auditor, United Railways & Electric Company, Baltimore

In considering the question of timekeeping and the handling of payrolls the first thought would be the very important part which timekeeping and payrolls bear to any large industry, particularly the railroad field, where we have no factory cost tables to guide us and where the workers are of many grades, scattered all over a city and its suburbs, necessitating the employment of competent timekeepers. Where the nickel is generally the maximum standard of receipt of a railroad, with the patron paying that nickel ever clamoring for more in return and the company anxious to increase its business by comfortable and attractive service, it is most essential that operation, of which labor is such a large factor, should be kept ever to the point of strict but sensible economy as well as accuracy and every attention given to perfecting methods which would throw a safeguard around this important outlay. Those of us whose work carries with it the compilation of statistics of comparative costs, percentages and other interesting data, are shown conclusively what an important bearing labor has on the operating expenses of any road, and my company, having these facts in mind, has never deemed it advisable to restrict the paymaster in making any reasonable expenditure for the company's protection.

Officials, Departmental Heads and Clerks

The salaries of our officials and heads of departments generally are paid by voucher and check at the end of each month; and the salaries of the large clerical force are paid monthly by the envelope system, a receipt being given on a voucher, made out for each employee.

In cases of resignations, new employees, increases of salary and other changes, letters to the paymaster and auditor must be sent by the heads of the departments as authority. If the changes are very marked they must bear the approval of the president.

The motormen and conductors, track, overhead, power stations and other employees, numbering about 4,000, are paid each 10 days by the envelope system, i. e., on the 15th, 16th and 17th for pay ended the 10th of the month; 25th, 26th and 27th for pay ended the 20th of the month; 5th, 6th and 7th for pay ended the last day of the month, and each man signs in the payroll book opposite his name.

Motormen and Conductors

The dispatchers' time sheets, certifed to by the line superintendent, are checked against the schedule operated and the conductor's manifest, so as to insure their correctness as to name, time, etc., and, after being passed by the checker, are entered in the payroll books daily.

At the end of the 10-day pay period the time is extended and rate of pay and amount due each employee are placed opposite his name. These amounts are then checked against the dispatcher's time books and any differences investigated and adjusted.

The foundation of the motormen and conductors' wages is a schedule, which is approved by the general manager. This schedule shows the time the crew takes a car, the leaving time of the various trips of the run operated and the time the crew leaves the car.

The superintendent of the line makes out his run list, showing the run number, car numbers, trips, motormen and conductors, time out, time in, total and remarks. Each run on the schedule calls for a certain number of hours and minutes. If there are no delays the employee is paid accordingly and his name is entered upon the daily time sheet, on which is written the run number, the name and the time, i. e., "regular per schedule," "extra tripper" (not on schedule), "delays," "special" and "totals."

In case of fires, etc., the crews are paid from the time they leave the barn until they return, the extra time over and above the time provided for on the schedule being entered in the "delay" column on the time sheets and the cause for same noted. When attending court in accident cases they are paid through the claim department for the time consumed.

Investigations are arranged as far as possible to avoid an employee losing time. There are times, however, in special cases where employees are used as witnesses in an investigation, for which they are paid for the time lost.

Track Department

On the maintenance work two timekeepers visit each day the majority of the gangs (always including the most important) and the time of the men, the rate of pay of each, together with the character of work done, is noted in a daily time book, a separate book being kept for each of the four divisions into which the system is divided.

Each of these four divisions is under the supervision of a division foreman, and each afternoon the timekeepers check up with these foremen (who also keep a record of the time made by all men in their respective divisions) and also obtain from them the time of such gangs working on outlying sections as the timekeepers may have been unable to reach during the day.

The following day the timekeepers, each one of whom covers two divisions, post from these four daily timebooks to two 10-day payroll books and on the 11th, 21st and last day of each month these 10-day books are extended, totaled, approved by the chief engineer and turned over to the paymaster's department.

After the timekeepers have completed their posting to the 10-day books the daily time books are turned over to a bookkeeper, who extends the time (in dollars and cents) made by the different gangs on each particular piece or kind of work and distributes the correct amounts to the various sub-accounts of the department. This information is then recorded daily on a specially ruled sheet, each amount under its proper classification, and at the end of each 10-day period is totaled and sent to the auditor.

In order that the department may receive the proper credit for all work done for outside parties or other departments, or for work other than actual maintenance, a record is also kept by this same bookkeeper of the daily amounts so spent and department charges, or cross entries, charging the proper accounts and crediting maintenance, are made up at the end of each month.

On construction work, where handled by our own men, the same procedure is followed except that a different timekeeper is detailed on this work and the checking with the division foreman is eliminated as the jurisdiction of these foremen is confined exclusively to maintenance. On this character of work the distribution is sent to the auditor once a month, although the payroll is made up in 10-day periods and the men paid exactly the same as on maintenance.

On work done on force account, on percentage basis, one man is detailed to look after the timekeeping for the company. The information as to the number of men working and the time made by each is made up in duplicate, and after being signed as correct by the timekeepers or both the railway company and the contractor, one slip is turned over to the contractor and one kept as an office record to check the contractor's bill when presented.

When contracts govern work and the charges are to be made by measurement of excavation, track laying, ballasting, etc., the work is checked by the company's engineer and the bills of the contractors are approved on this basis.

*Abstract of paper read before the American Street & Interurban Railway Accountants' Association, Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

Overhead Line Department

Each foreman at the end of the day turns in a time sheet for himself and for each of his men; from these sheets the timekeeper prepares a time sheet daily. This is approved by the departmental head and forwarded to the paymaster as soon as made out. In addition the timekeeper makes a transcript of the time in a book and turns it into the paymaster's department at the end of the 10-day period for checking as to rates and computations. The payroll is then made up in the paymaster's office and the distribution made from the foremen's daily sheets by the timekeeper in the line department office is sent to the auditor at the end of the 10-day period.

Power Stations

A time clock is installed and each man rings "in" and "out," time cards being used for this purpose. These cards are changed by the timekeeper, whose office is located directly opposite the clock (thus enabling him to keep track in a general way of men going in and out), and are used by him in making up his time book for the 10-day periods, after which he turns them into the paymaster's department, first being approved by the superintendent of motive power. The timekeeper at the same time turns into the auditor's office the distribution of time shown thereon for the operating department to the various accounts.

Station men engaged in work other than distinctly operating, as well as the construction crew engaged on reconstruction or construction work, turn in at the end of each day, in addition to these cards, work cards upon which are noted the jobs and the time spent on each job. These cards are inspected by the foreman in charge of the men and are then used by the timekeeper in distributing the time to the proper accounts.

In the case of special jobs, where it is desired to keep an accurate record of time required to do this work, a special job number is given and all time upon that particular work is charged to that number.

Car Shops

The various departments of the main repair shops are equipped with Dey time registers and the workmen register the time of arrival and departure against which is checked the time shown upon the foremen's time sheet. This latter sheet is made up each day and turned into the office of the superintendent of shops at the completion of the day's work.

At the various car houses not equipped with time clocks the shop foreman forwards each day to the shops office a time slip for each individual employee showing a distribution of the time of each employee and the total number of hours worked. He also enters in his time book the number of hours and forwards this time book every ten days to the office of the shops department. This time book is used as a check against the time slips forwarded each day.

From the data furnished by the time card and time sheet the daily time report is made up, approved by the superintendent of shops and forwarded to the paymaster each day.

For the information of the superintendent of shops a monthly summary sheet is prepared showing the number of hours of work made by the various departments or car houses at the end of each ten-day period.

To carry out work other than maintenance of equipment or work for other departments, special job-work requisitions are issued, and are furnished to the foreman of each department concerned. Upon completion of a piece of work a department charge, in the nature of a bill, is rendered against the department or account for which the work was required. The department doing the work receives the credit according to the distribution of accounts.

Payroll Department

This department is in charge of a paymaster, who reports to the cashier and has as his assistants five entry clerks and one checker. At the end of each pay period the paymaster makes up his report, showing the number of employees, hours and wages for each department and furnishes a comparison with the same period of the previous year. He also prepares a comparison of the wages of motormen and conductors, showing service mileage, hours and amount and comparison with the same period of the previous year. A comparative statement of employees—powerhouse organization—is also made up. These are forwarded to the president and general manager for their information. A recapitulation of the payroll is forwarded to the auditor, who draws a voucher, forwards it to the treasurer and a check is drawn to the order of the cashier, who with guards goes to the bank for the money for the paymaster, who verifies the amount received with his payrolls. Each employee's name on the payrolls is numbered and the envelope system is used in paying off. Before the money is placed in the envelope it is verified by a checker, who is held responsible for the correctness of the amount placed therein.

The paymaster is in charge of the pay car, which is scheduled to be at the various barns at certain times, and has as his assistant the entry clerk whose books he is using that day. The pay car was built especially for the purpose and has safes and wire guards for the protection of the money. The crew of the car is stationed upon the platforms and regulates the entrance and exit of the employees. All in charge of the car are armed and every precaution is taken to safeguard the money. All employees must sign the payroll when paid, and signatures are witnessed by the paymaster and his assistant.

At the end of each three months all unpaid wages are returned to the cashier by the paymaster, and the amount is credited to unclaimed wages. This report is certified to by the paymaster and two checkers and is receipted for by the cashier and audited by the auditor. The amount of each envelope returned to the cashier is tabulated in a sub-ledger by the paymaster. If claim is made and found correct it is paid by the cashier through petty expense, and so noted by the paymaster on his sub-ledger, and at the end of each month the balance is checked against the balance on the general ledger of the company.

General

Of the three large roads which I visited recently I found that none paid off by the envelope system or did they obtain any written receipt from the employee. One of these roads has a roll of over 15,000 names and to place the money in envelopes and obtain a receipt on a payroll book was claimed to be out of the question when the paymaster could pay out the money directly from his cash box almost as rapidly as the men could file past him and have their names and amounts checked on the roll by his assistant. However, these roads did furnish time cards to the majority of their men, which were filled in, signed by each employee and handed in when he received his pay. Any difference of 50 cents or more was adjusted on the next payroll. The lower class of labor had brass checks or cards for identification.

One road used the Dey time clock for its motormen and conductors and the time of going on and coming off a car was punched by a recorder on the counductor's manifest, which was used to make up his time. On another road the motormen and conductors paid themselves each day from the passenger receipts of their cars, noting the same on their manifests.

It would seem that each road should have in its timekeeping and payroll department competent and loyal men, and such system of comparisons and checks as would keep the management in touch with the entire labor situation in every department.

REPORT OF THE COMMITTEE ON POWER DISTRIBUTION*

By James Heywood, Chairman; W. J. Harvie, G. W. Palmer, Jr., S. L. Foster, W. G. Matthews, and E. J. Dunne

The committee decided to work as closely as possible to the outline submitted by last year's committee, giving special attention to those subjects which were designated by the executive committee. It has been thought advisable to submit with this report a number of specifications for material used in power distribution.

High Tension Feeders

Underground high tension cables have passed the experimental stage, and are giving satisfactory service in a large number of installations. The majority of the later installations have been made with paper insulation. The highest voltage of which the committee has knowledge is 25,000, and this is rather the exception than the rule. From 11,000 to 13,200 seems to be the most popular range of voltage.

In Appendix A [Not republished.—Eds.] will be found a specification for use in purchasing high tension underground cables. In view of the high cost of cable of this kind, the committee recommends that in general cables be made large enough to accommodate future needs; in fact, in usual installations it is well to install as large a cable as can be pulled through the ducts. This applies to entire underground installations.

Rubber and cambric are sometimes used for high tension underground cables, and if it is desired to use rubber, the committee recommends that the specifications in Appendix B [Not republished.—Eds.] be used to determine the quality of rubber compound.

High tension cables should be protected outside the lead where they pass through manholes, the common practice being to cover the lead with woven asbestos saturated with a solution of silicate of soda. The silicate of soda solution should be omitted in manholes that are full of water. This method of protection is recommended by the committee.

Where overhead high tension transmission circuits are used, the committee recommends steel supports in the form of towers where the line is isolated, and when along the tracks to be supported from extensions to the structure that supports the trolley wires. All steel towers should be galvanized, and subjected to the test for galvanizing given in last year's report, to obtain the most economical results.

Some special conditions demand the use of wood poles instead of steel towers, for instance on streets where the line must be carried along the sidewalk, and in climates where wood is not subject to decay.

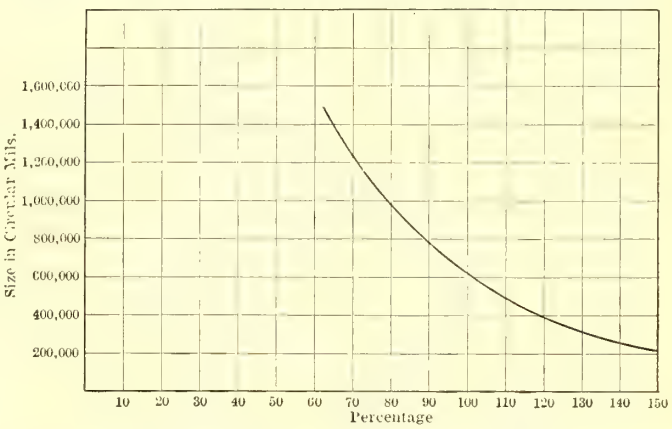
As illustrative of special conditions, Appendix C gives a discussion by S. L. Foster, of this committee, showing some results with moderately high tension transmission lines in California. [Appendix C presented elsewhere.—Eds.]

With the new form of suspension insulator, and with ten feet of vertical separation between conductors, the use of wood poles for even ordinary spans is out of the question when ample clearance between lowest conductor and foreign wires or even the earth is maintained. The steel tower or pole is practically invulnerable to fire and is safe from deterioration and from short circuits by climbing animals.

The suspended insulator is built up of a series of insulator units connected together by hooks and eyes. Each disc-shaped unit has a mechanical breaking strength factor of safety of from 25 to 50, even after all the flange has been broken off. In case of a broken or burned off conductor, this reserve strength in the insulator would take care of the unusual strain, and not result in a broken insulator or a split cross arm. The flexibility of the suspended type of insulator also raises the factor of safety. On one California 154-mile steel tower line now being operated at 75,000 volts and intended to be operated later at 110,000 volts, five units in series are used, each tested at 65,000 volts, giving an ultimate factor of safety of three. On another 150-mile steel tower line in the same state with 60,000 volts at present and 100,000 volts as prospective, five units tested to 90,000 volts each are used, giving a factor of safety of 3.6. Another 13,200-volt transmision in the same locality contemplates a three-part insulator of a test voltage of 80,000, or a factor of 6.06. Assuming that city construction averages $50,000 per mile, and high tension insulators cost 40 cents each, the cost of high tension insulators is a little over 1/100 of 1 per cent of the total cost of construction, exclusive of cars, buildings and power houses on a large street railway system there. Such being the case, the advance from an admittedly inadequate factor of 5.34 to one of 6.06, the sufficiency of which is yet to be demonstrated, seems not over-cautious in the light of the great importance of absolute continuity of service in heavy street railway operation demanded now.

Other qualifications of the suspended insulator are: Superior accessibility for cleaning and observation; and superior resistance to missiles.

If wood construction were to be attempted on a scale corresponding to that of the steel tower, the cost would probably exceed that of the steel tower and would last only eight or ten years, whereas the galvanized iron tower should



Power Distribution—Fig. 1.—Cost of Re-Leading Cable According to Cost of New Cable Less Scrap

last indefinitely. Also, greater durability of the conductor is assured when it is strung on suspended insulator because of less crystallization at the point of support. It has been the experience in California where after a year's operation on spans varying from 350 to 4000 feet and towers varying from 50 to 300 feet high and 60,000 volt lines that no short circuits are made in high winds. As steel towers consist of many separate pieces which are only assembled when at the point of erection, it is easier to transport a tower piecemeal to a location difficult of access than it would be to transport a wooden pole of equal height.

Low Tension Feeders

The committee recommends the use of paper insulated and lead covered cable for underground service. Specifications for this material have been prepared. There are two methods of disposing of condemned underground cables, viz., scrapping and rehabilitation.

Where re-leading is practised, a small stock of cables is maintained. When a cable fails, the faulty section is replaced from stock, the bad piece re-leaded and placed in stock. It is also possible to splice two or more pieces of cable together and re-lead them, the outside diameter at the splice remaining the same as in the continuous cable.

When it is necessary to change large quantities of cable from one location to another, as for instance when a new substation is installed, the re-leading of cable becomes a very attractive method, as shown by Fig. 1. It is more eco-

*Abstract of report read before the American Street & Interurban Railway Engineering Association, at Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

nomical to re-lead the large sizes, but when the size is small re-leading becomes more expensive than scrapping the old cable and purchasing new.

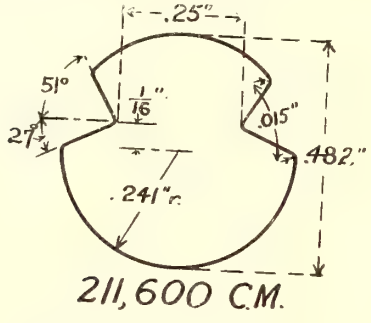
When underground cable is scrapped it can be sold as junk, or it can be separated either by stripping the lead and insulation by means of chipping knives, or it can be separated by heat. The metals in underground cables can be separated in a special furnace at a cost of labor and fuel of about $0.002 per pound. A furnace for such service can be built for approximately $300 exclusive of flue and stack.

Considerable work has been done by individuals and various associations of manufacturers and engineers in the drawing of specifications for rubber insulated wire and cable.

The committee has gone over the various specifications which have been prepared, and at present is of the opinion that instead of drawing a complete new set of specifications, it is better to use such portions of the specifications recently adopted by the Railway Signal Association as are applicable to the work of street railway companies, if a compound of pure rubber and mineral matter only is desired. This is done with the consent of the Railway Signal Association.

A reputable brand of wire that uses rubber and bitumen compound is unavoidably ruled out by these specifications. At the present writing no satisfactory specification has been drawn that covers this class of rubber, although it is recognized as a perfectly satisfactory product. Overhead low tension cables are in such common use that little (that is new) can be said in reference to them.

A marked improvement has been shown in the results



Power Distribution—Fig. 2

given by lightning arresters for low tension service. With a liberal distribution of lightning arresters along overhead feeders they will probably save their cost in the prevention of burned out insulators and delay to service. Some roads find it advantageous to install arresters as frequently as 10 per mile. Where overhead feeders connect to underground or submarine cables, arresters should be installed at the junctions. A paper on the subject of lightning protection has been prepared by J. V. E. Titus at the request of this committee, and is published elsewhere.

Working Conductors—Ordinary Trolley

The committee holds the opinion that for roads with frequent service a 211,600 circ. mil wire should be used, preferably of the grooved section. The American standard section of grooved wire has been sufficiently tried out to warrant its adoption as standard by this association, with the possible exception that manufacturers who draw the groove, rather than cut it, shall be permitted to increase slightly the radius of the curves shown as 0.015 in., working as closely as possible to the drawing. Fig. 2 shows the section referred to. The committee has considered several specifications for trolley wire, but has been unable as yet to decide on a practical one. The committee can only report progress on this subject.

Where excessive wear on the trolley wire is encountered and conductivity can partly be sacrificed by reason of sufficient feeder cables, wire of special alloy or of steel has been found to give longer life and is recommended by the committee.

We recommend that for round trolley wires, a clinched ear be used. There is some difference of opinion as to the proper length of the ear, and we hope that a future committee may be able to arrive at a definite length of clinched ears and prepare a standard drawing for adoption by the Association, together with a formula for the composition of the metal in the ear.

Insulators and Hangers

In view of the delay to traffic incident to burned out line insulation, the committee considers it economical practice to change insulators that are defective, but that have not yet totally broken down. With this end in view a method for testing of faulty insulators has been devised and is giving good results. Two phosphor bronze springs are supported from a wooden cross-arm near the top of the trolley pole on a car. These springs are well insulated from the trolley pole and are made so flexible that they will not catch in the overhead work. As the car is run along the line the springs come in contact with the span wires on each side of the hanger. A wire leading down from the springs is connected through a relay to ground when it is desired to test the hanger. Leakage through the hanger actuates the relay and through a secondary circuit is recorded on a piece of moving paper. Where iron poles are used and it is desirable to test the strain insulators in the span wires, the wire leading from the springs is made alive from the trolley through the relay, hence in passing under a grounded span the relay will be actuated as before. It is necessary on a single track road to run over the line twice to get a complete test of span and hanger insulation. On a double track line it is necessary to run down one track testing the hanger insulation and up the other track, testing the strain insulators.

By means of adjustable resistance the relay can be set so that it will work at any predetermined leakage value. A view of the spring contacts used in this arrangement is shown in Fig. 3.

Line Material Tests

In view of the small amount of data obtainable in reference to the properties of overhead line material and insulation, the committee has thought it advisable to make certain tests on this class of material from which data could be compiled and rendered valuable for ordering line material. Owing to unavoidable delays, as much progress as was desired has not been made in this direction. Some work, however, has been done, and the results obtained are outlined in Appendix F. [This appendix is presented elsewhere.—Eds.]

Your committee has gathered a number of opinions on the subject of wood pole preservation, and are of the opinion that poles should be treated at and near the ground line. A paper by J. M. Nelson, of the U. S. Forest Service, published in the **Electric Railway Journal** for April 3, 1909, page 628, describes the causes of delay and the principles of its prevention.

A difference of opinion exists in reference to the use of concrete around wooden poles. Good results, however, have been obtained in San Francisco by means of concrete setting, poles having been in service fourteen years set in concrete and are still in good condition. These poles, however, were of redwood, which is not available in all parts of the country.

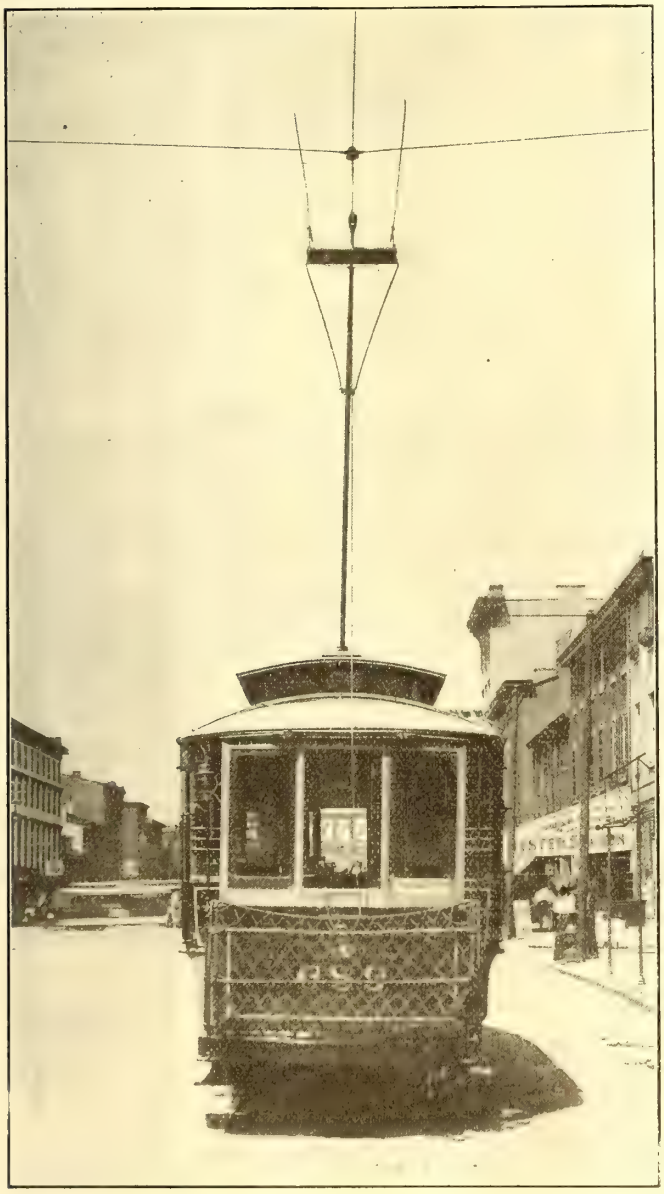
A patented process for reclaiming wood poles which have been decayed at the butt by means of re-enforced concrete, has been brought to the attention of the committee. It is too early at this time to say what the results will be.

Repair of Poles

The principal seat of trouble in old poles is at the ground level, where the moisture lies the longest and either cor-

rodes metal poles or rots wooden poles. In selecting a method for repair, the essentials are: The work should be done with common labor; no special tools should be required if possible; the fault should be entirely eliminated—i. e., further corrosion or rotting of the pole stopped; the repairs should be permanent, i. e., no further maintenance should be required; when complete the poles should be as strong as when new; the cost must be low. To attain this there are at present several methods in use:

One method, applicable to metal poles only, consists of filling the inside of the pole with grout in which steel rods



Power Distribution—Fig. 3.—Attachment for Detecting Faulty Insulators

are bedded. A second method, applicable to wooden poles only, consists of driving U-shaped rod around the pole at the point where the timber has been rotted away and then filling in space with concrete. A third method, applicable either to wooden or metal poles, consists of placing metal clamps and bolting these together. A fourth method, also applicable to either metal or wooden poles, consists of using a metal sleeve either of pipe section or split, depending on the number of fixtures on the pole. This sleeve has a larger diameter than the pole, and is placed over the corroded or rotten portion of the pole, and the space between is filled in with some material.

Some of these methods have very serious objections.

In the first method, since the diameter of the pole is fixed, in order to obtain the desired strength of the original pole, computation shows that a considerable amount of steel must be bedded in the grout, and then the cost becomes almost prohibitive. With less rods only part of the original strength is obtained. The concrete being entirely enclosed, it takes a very long time for it to set; in the meantime, if the pole is badly corroded, and as the corrosion is all the time going on and increasing on the outside, the pole is liable to bend or collapse; further, the swaying and vibration of the pole is liable to loosen the bond between the concrete and the metal, and therefore the strength to be greatly decreased. It has been found out from actual experience that in the winter time, when the metal of the pole contracts, the inside plug of concrete does not permit of such a shrinkage, and the pole splits. There are known instances in which such poles split the entire length. The pole itself continues to corrode on the outside, and in course of time some other method must be applied on the outside to eliminate the trouble.

The second method would appear to be quite effective on wooden poles, but it has not been tried a sufficient length of time to prove its efficiency. It would appear that the concrete surrounding the pole must shrink away from the wood, thus permitting water to percolate and a further rotting of the portion repaired.

The third named is quite costly, as the clamps have to be very heavy to be efficient, and even then, being held by bolts, the latter in time may become loose and corroded, and it requires constant inspection and maintenance. At best it is only temporary. It also does not stop the further corrosion of the weak spots.

The fourth method from every standpoint seems to be the most efficient. It is applied at the spot where the trouble originates, and entirely eliminates further corrosion or rotting. It is permanent in its nature. It brings the pole to its original strength, and, as a matter of fact, poles that have been tested with such sleeves have stood a greater stress than new ones. It looks well and neat in the street. And finally, its cost is the lowest. This method is especially efficient when the filling material is introduced in a molten state, e. g., molten brimstone. In making this repair, some sleeves have been filled with grout, but this method is not recommended by the committee.

Joint Occupancy of Poles

The committee brings this matter to the attention of the association with a view to having it take such action as it may deem advisable, the thought being that the foreign interests could be approached through their national associations and the subject given joint consideration.

Third Rail

The committee has not observed any particularly new developments in third-rail construction, with the exception that impregnated wooden blocks have been given a trial for third-rail insulators instead of porcelain and other similar substances, with excellent results. This subject will bear further discussion and experimentation.

Catenary

In following out the instructions to your committee to amplify and bring up to date last year's report on catenary, the committee found some difficulty in locating any very new or recent developments.

Quite recently one of the technical papers published an article making a cost comparison between the construction of catenary and ordinary trolley for a two-track interurban property, and this will be taken up later, as there are some features to which your committee wants to call your attention. Your committee desires to recommend: The 211,600 circ. mil. grooved trolley wire of the American standard

section; the use of galvanized iron mechanical clips; some form of rigid suspender and a permissible spacing of 30 ft., with the suspender tightly fastened to the catenary. In the matter of messenger cable your committee wishes to make no definite recommendation other than it believes that high strength steel should be used. This cable should be galvanized so as to meet the test recommended by your committee last year. One interurban company is installing a line in which the messenger cable is 500,000 circ. mil. copper feeder. Figures indicate that this cable is strong enough for all strains to which it will probably be subjected, and its use considerably cheapens the first cost of construction.

Your committee recommends the use of porcelain insulators wherever possible for line carrying over 600 volts.

The art of building steel bridges for catenary support has been considerably improved during the last year, and the first cost of bridges for ordinary double track, interurban electric service has been somewhat reduced. This committee recommends the use of steel bridges for supports for use on private right of way. We would like to present a cost comparison which will clearly show the advance that has been made in the last year.

For comparative purposes, the costs are taken, first for a mile of double track construction for heavy interurban electric service for three types of construction, ordinary trolley, catenary with wooden pole supports and catenary with bridges.

The comparison has been confined to the type of interurban or suburban electric railway work. In these comparisons the figures cover only the support of a working conductor. All feeder or transmission line fixtures or wires are excluded from the costs shown.

Comparative Costs of Overhead Trolley (Span and Bridge) Construction Per Mile, Double Track

Ordinary span. Poles, spans, hangers and ears, $1,085.00.
Catenary bridge. Bridges, messenger, suspenders and clamps, $1,760.36.

Conductor	$1,089.60	Conductor	$1,089.60
Insulators	48.00	Insulators	18.30
Miscellaneous	214.50	Miscellaneous	143.40
Labor and tools	1,323.10	Labor and tools	1,407.10
Total	$3,760.20	Total	$4,418.76

Comparative Costs of Catenary Overhead Trolley (Center Pole) Construction Per Mile, Double Track

Wood Center Pole, Bracket

Thirty-three poles, brackets, messenger, suspenders and clamps, $726.26.

Steel Tower, Bracket

Towers, brackets, messenger, suspenders, clamps and anchor bridge, $1,280.36.

Conductor	$1,089.60	Conductor	$1,089.60
Insulators	36.60	Insulators	18.30
Miscellaneous	117.57	Miscellaneous	112.00
Labor and tools	1,032.00	Labor and tools	1,230.07
Total	$3,002.03	Total	$3,730.33

Return System.—Bonds

The committee favors the use of under-the-fish-plate bonds for T-rail construction. We suggest to the next committee and the committee on way matters the re-designing of standard fish-plates with a view to giving more room for bonding. The committee recommends the use of under-the-fish-plate bonds for girder rail in paved streets for new construction, and bonds outside the plates for repair work.

All bonding should be tested after installation. Bonds should be tested at least once each year, repairs made to defective bonds, and a complete test made after repairs are made. Most careful attending should be paid to the bonding in districts where the current density is high and where it is known that rapid deterioration exists. It is the opinion of the committee that all track bonding and bonding maintenance should be done by the track or roadway department under the inspection and supervision of the distribution engineer. All responsibility for track bonding and all other parts of the return circuit should be placed on the distribution engineer.

Special track work should be "jumped" by supplementary copper in order that it may be renewed when necessary without disturbing the continuity of the return circuit.

Conduit System.—Ducts

The committee recommends the use of single terra-cotta ducts laid in cement mortar and surrounded by a concrete envelope. In certain conditions it is impossible to use terra-cotta ducts, and iron pipes are a necessity. In cases of this kind the committee recommends covering all cables passing through iron pipe with a weatherproof braid.

The committee recommends the use of brick manholes for most work. Concrete manholes can sometimes be used to advantage, however, where other underground structures are not likely to be met with.

General

A circular letter has been received from the Association of American Steel Manufacturers on the subject of abolishing numbered gauges for wire and sheets. The committee desires to concur in this recommendation as far as wires are concerned, and submits a short abstract of the plan as outlined.

Inasmuch as confusion exists by reason of the numerous systems of wire gauges, it has seemed a good thing to abolish the numbered gauges entirely. No effort is to be made to change any of the existing standard dimensions of wire, but to insist that sizes of wire be expressed in decimal parts of an inch instead of being indicated by number, as, for instance: If a No. 10 B & S gauge wire is desired, it would be ordered as a 0.102 wire, and so on. It will be seen that it would be a very simple matter to issue orders to all interested parties to use the decimal diameter of wire instead of the numbered gauge, without changing any of the existing standards. In ordering wires of special shapes the circular mils cross-section should be used instead of the diameter.

The committee also recommends that, in ordering cables, the area be specified in circular mils rather than by the gauge number. We also recommend that, in ordering cables of sizes larger than the existing gauge numbers, the present practice of using an even number of circular mils be discontinued, and a cable ordered having a standard number of wires of a standard size. This will in many cases expedite delivery of cable, because the manufacturers can make up their strand from stock wire, instead of having to draw special size wire. For instance, instead of ordering a 1,000,000 circ. mil cable, the specifications would call for a cable of 61 wires of 0.128 diameter, which would give a completed cable of 999,424 circ. mil.

In following out the recommendations to use decimal diameters instead of gauge numbers, the committee has computed a copper-wire table, using as a basis the data contained in a supplement to Transactions, October, 1893, American Institute of Electrical Engineers, and a revision of the temperature coefficients in accordance with the standardization rules of the American Institute of Electrical Engineers, June, 1907.

Conclusion

In conclusion, the committee desires to recommend for adoption as standard of this association the American standard section of grooved trolley wire for 211,600 circ. mils cross-section, and the copper-wire table earlier mentioned.

THE ELECTRIC RAILWAY AUDITOR, HIS DUTIES AND RELATION TO THE ORGANIZATION*

By W. B. Brockway, General Auditor Birmingham Railway, Light & Power Company

At the midwinter meetings of the executive committees of the affiliated associations, suggestions were received regarding the subjects to be considered at this convention. Among them was this:

"Is the head of the accounting department of a street railway simply a recorder of figures, showing certain results and facts, or should he be generally informed on physical conditions of the road, and what should be his relationship with the heads of the operating departments?"

The question came from the operating president of one of the large street railway companies.

Owing to the contraction of system into more direct method which must exist on the smaller roads, a reply applicable to the road having annual gross revenue of $100,000 would not be as exact when applied to the road whose revenue extends to many millions of dollars annually.

The administration of the smaller company usually requires much less information than does the larger in carrying out the operating policy of the company, a condition which relieves the accounting department of many of the duties which the same department of the larger company has to perform. The reason for this is that the heads of the operating departments of the smaller company do less through assistants, or have none at all, and are thus brought into direct contact with things as they occur. Thus they know conditions and facts by observation without the use of many formal reports. The same work, as the company gets larger, is done more and more by assistants making the use of many reports and statistics imperative because the heads of the operating departments, who direct the policy without seeing every move made, must have more information and have it arranged systematically.

However, while the work of the officers at the heads of the various departments differs with the size of the company, in essence it remains the same, except that the smaller companies have less departments, so that the work of each officer is more diversified. Nevertheless, the work of the accounting department must be done in approximately the same manner and always with the same care.

Accepting this as a general outline of the situation on an electric railway system, we may use it as a basis to consider the question which may be separated into three slightly amplified questions:

1. Is the head of the accounting department of a street railway simply a recorder of figures [a bookkeeper] showing certain results and facts?

2. Should he be generally informed on physical [and all other] conditions of the road?

3. What should be his relationship with the heads of the operating departments?

As the questions do not wholly cover the situation, the following are added:

4. What should be his authority over the accounts of the company and over the sources of information from which the accounts are made?

5. To what officer should he report and receive instructions?

6. To what extent is he responsible for the accuracy of the accounts?

1. Is the head of the accounting department a bookkeeper only?

The bookkeeper of the old partnership came close to being the auditor of to-day in this, that by his responsibilities he knew the most intimate matters so far as they were disclosed in the records of the firm. But there were rarely many partners and the accounting system needed to be only as much or as little as would satisfy them. He it was who kept the books because their contents were most confidential, therefore, that work was not trusted to a subordinate. Nowadays, with the numerous supervising commissions, both State and National, with the annual reports published and spread broadcast, the former secrecy has passed. Anyone with a knowledge of bookkeeping and some experience with the system used by the company can now write the record of the accounts in the books, but it is quite a different thing to keep the books.

Another thing that has caused the change is consideration of the rights of a large number of stock- and bond-holders, where previously the few partners were the only ones to be considered. This has caused an entirely different system of detail accounting, much of which is statistical, and has brought forth an accountant who is more than a bookkeeper. In addition to his knowledge of accounting he must be something of a statistician as well as a deviser of systems for the accurate and economical handling of all matters connected with the accounts and the statistics. The other qualifications he should, and in many instances must have, are numerous, and the more he has the more valuable he is to his company. The more he knows of accounting, finance, law, general business, operation, construction, manufacturing, analysis and human nature and the more tact, individuality, originality and common sense he has the better railway accountant he will be and the greater the importance will be placed upon both him and his department.

2. Shall he be generally informed on the conditions of the road?

It would seem that with a little consideration the questions would almost answer itself. For instance, it is trite to say that the more a person knows about the details of his business, the better he can perform his part of it; therefore, the more informed an auditor is about the "physical and other conditions of the road," the more intelligent his accounting methods and results will be.

In connection with the general information which an auditor should have, permit me to point out one of his troubles. Few of the heads of the operating departments have any extended knowledge of accounting. This condition frequently results in a source of confusion to both the operating heads and the auditor. He is, or should be, most willing to furnish them with every part and quantity of information he can get out of his accounts. But owing to their unfamiliarity with accounts misunderstandings of their requests will arise unless he knows something about their work and about the physical and other property of the company. When thus equipped he is able to approach the matter from their point of view.

It is not my intention to say that the auditor should be expert in the work of the other departments, but he should be "generally informed" so that he may understand what his duties require of him.

There is no doubt in my mind that the auditor will be a better auditor and a more helpful one if part of his time is spent away from the office with one of the heads of the operating departments just to see how the property moves and what is done before the reports come to his office. When he obtains this familiarity with the work of the other departments their reports to him mean activities as well as figures, and so will his own reports be more intelligent to him. In other words, he must be a better accountant and keep better accounts when he understands intimately what has transpired as shown in his accounts.

3. What should be his relationship with the heads of the operating departments?

The relationship of the auditor with all officers and employees of the company should, of course, be cordial and sympathetic. They are all working to the same end but by

*Abstract of paper read before the American Street and Interurban Railway Accountants' Association, Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

different means, therefore, if the best results are to be obtained for the company the relationship throughout the organization should be as nearly single-minded and mutually helpful as possible.

The most important part in the relation of the officers to one another is that taken by the president, to whom every one, either directly or indirectly reports. His tactful handling of the organization will usually keep the various departments in harmony.

Even with a well-defined system of accounts, it will always be found that the information which reaches the auditor's office will be, in a measure, colored by the relations existing between the head of the originating department and the auditor. The men absorb and reflect the feelings of their superior officers. An unguarded remark, an unconsidered bulletin, a curt letter, discloses friction and produces information cut on the same bias. On the other hand, the feelings of earnest desire to do all things needful will spread under the leadership of men in harmony with the rest of the organization.

I do not think it is the auditor only who should be conciliatory. The accounting department occupies a peculiar position, as it is the only one that touches all the activities of the other departments with equal contact. It is the duty of this department to record facts without favor. The auditor cannot order a car put into service, nor can he take one out. He cannot order more or less power. He cannot say whether the tracks shall be of one style of construction or another. But he must keep his accounts so that the effect of the order given by those upon whom these duties devolve shall be evident. He is keeping the history of the road for the benefit of those who own as well as those who operate it. Therefore the relationship between the heads of the departments is an important part of the corporate organization.

4. What is his authority over the accounts of the company and of the sources of information from which the accounts are made?

The accounting department, having equal contact with each other department, considers the information it receives from any department as of equal importance to that of any other. Delays in receiving its reports, or a lack of system in making reports from any one department, will so delay the finished work of the accounting department that its machinery or system is immediately put out of order. It follows, then, that some means must be provided to guard against the interruption. This safefuard lies in the arrangement by which that part of the work of the employees of other departments which relates to accounting or reports to the accounting department is directly subject to the orders of the auditor.

While of course the auditor does not have the right of assignment or the power of dismissal of the employees of another department, he should have some control over the method of preparing this information and the manner in which it should come to him.

This safeguard is so universally recognized that the large industrial corporations place representatives of the accounting department in each mill or locality. In those corporations whose practice I have investigated, I find that these representatives are charged to report any and all information required by the auditor, whether connected with the usual order of the accounting system or of any other nature.

While this looks as though many of the operating employees are working for two heads and subject to all the confusion that would follow from such a division of authority, the fact is that the situation presents no such complications. The regular operating and other reports must be made according to a definite system or else the results of operation and other movements would never be known in a uniform manner. Whenever any interruption occurs, if the auditor did not have the authority to reach directly to the source of the trouble, the delay would greatly aggravate the confusion. This is so well recognized that it needs no further consideration.

As the statistician of the company the auditor may also ask for information of an unusual nature, but in this connection it is exceedingly difficult to define where the line lies between routine and other matters. To the auditor and his work very much is routine which may be exceptional in other departments. Certainly his investigations lead him to make many statements and comparisons that are unusual, but for the time being necessary, so that if a line is drawn beyond which he cannot go in obtaining information he ceases to be all an auditor should be and all that his title means.

5. To what officer should he report and receive instructions?

There was a time when this question would have been answered differently than now. But at the present time the answer is almost universal that he should report to the president or other chief executive officer. In the case of one of the largest companies in America he reports to the chairman of the board of directors, while in one, at least, of the large steam railroads the auditor is responsible to the board itself.

These plans permit the executive to be placed in immediate contact with the accounts and the statistics, instead of at arm's length through other officers. It has happened in the past that when the records are placed under the control of any minor executive or an administrative officer by requiring the auditor to report to him, instead of to the chief executive, the temptation has been to require the records to be so kept and the data taken therefrom to be presented in such manner that any actions to which criticism might attach are obscured. In other words, the opportunity to "make a record" exists.

Wood, in his "Modern Business Corporations," which is written from the standpoint of the lawyer, says, in connection with the auditor of a corporation: "He should not be a partisan of any stockholder or group of stockholders, and should be the most independent employee of the corporation."

This is the view now being taken by the most important companies, but it cannot permanently obtain if the auditor is not fully equipped by training and personality to act properly under such responsibilities. I believe the present generation of auditors is measuring up to the new requirements more completely at this time than ever before. As time progresses, this understanding of the place the auditor occupies will be more universal, until no one will question it or have any other views.

6. To what extent is he responsible for the accuracy of the accounts?

This question has frequently been discussed, and books on accounting nearly all mention some phase of it. The law recognizes its importance and has passed upon it, and now, under the revised Interstate Commerce Act, the auditor is made personally responsible for the accuracy of the accounts. Please note the word accuracy (it does not mean plausibility), which places upon the shoulders of the auditor a responsibility he must face and he must have the authority to face it successfully.

Prof. Henry C. Adams, in charge of the bureau of statistics and accounts of the Interstate Commerce Commission, presented a paper at the annual meeting of the American Association of Public Accountants in October, 1908, entitled "Railway Accounting in Its Relation to the Twentieth Section of the Act to Regulate Commerce," in which he said that his paper was not a "theoretical discussion, but rather a practical consideration" of transportation accounts, "in view of the somewhat unusual powers conferred upon the Interstate Commerce Commission." In the conclusion of his paper are these words: "Were there time, I should like to comment upon that phase in the accounting order of the commission which holds the accounting officer per-

sonally responsible for the enforcement of the accounting rules laid down. * * * " I regret his paper did not include this further consideration of his subject that I might quote it here. It would be exceedingly interesting and a valuable part of the subject we are considering.

At any rate, from this it will be seen that direct responsibility is placed upon the auditor by the Interstate Commerce Commission; therefore the auditors of roads doing an interstate business must face the responsibility, whether the method of company organization allows for it or not. As no one should have responsibility without authority, those few roads where the direct authority over the source of accounting information does not now rest with the auditor will no doubt soon change their methods.

As a summary, and speaking in generalities, I believe any consideration of the subject or any attempt to answer the questions must be qualified by the personality of the auditor and the size of the company.

I have placed the personality of the auditor first because if he is properly equipped, not with experience only, but with everything else comprehended in the word personality, he will build up, even in the smaller roads, all I have outlined as relating to the auditor of the larger companies.

The auditor to-day is very much closer to the president than in the early days of electric railroading, but with this improvement of his position none of the other officers has lost any part of their importance. All the departments are positively inter-dependent, although specialized in their duties, and the whole organization is more efficient when recognizing that "accounting to-day is more than keeping books."

WESTINGHOUSE REPRESENTATIVES

The following is a complete list of representatives of the Westinghouse companies in attendance at the convention: Westinghouse Electric & Manufacturing Company, J. C. Kyle, J. S. Tritle, L. M. Cargo, G. O. Noble, C. W. Register, H. S. Sands, E. C. Means, J. L. Davis, J. A. Brett, W. L. Conwell, C. S. Cook, Thos. Cooper, J. C. Jones, D. W. Belden, Geo. Ewing, C. H. Davis, B. S. Manuel, L. H. Kidder.

Westinghouse Air Brake Company: T. A. Hedendahl, H. A. Crocker, Horace Clark, Jos. Ellicott, T. W. Ainsworth, P. H. Donovan, C. W. Townsend, Chas. Ellicott, S. D. Hutchins, S. J. Kidder, A. L. Humphrey, W. S. Bartholomew, C. Olmstead, W. V. Turner, C. P. Cose, E. L. Adreon, R. P. Noble.

Westinghouse Bureau of Publicity: E. H. Heinrichs, J. C. McQuiston.

R. D. Nuttall Company: T. A. Estep, Milton Rupert.

Westinghouse Machine Company: E. H. Sniffin, C. C. Chappelle, Jos. Breslove, I. L. Brinsmade, A. A. Rogers, E. E. Heise, N. G. Symonds.

Emery Lubricator Company: L. D. Sweet, R. E. Adreon, T. P. Livingston, D. A. Emery.

The Atlas Railway Supply Company is exhibitng its line of track fittings which includes Atlas rail joints, tie plates and rail braces. The demand for these specialties, the company reports, is in excess of expectation. The appreciation of the utility of Atlas joints is shown by orders received from all over the world, especially for the "Special" joint, which is made to raise the pounded or cupped rail in double-track operation and where cars run in one direction, making the track, after grinding off the end of the cupped rail, as good as new. The company's one-piece joint is also proving its merits for single-track or two-way operation. This is a combined bedplate and angle bar in which the old plate or bar can be used on the inside. It may be made for any type or shape of rail, and this also applies to all of the company's products. The exhibit is in Space 168, and Pres. J. G. McMichael and D. Thompson are in charge.

Among the Exhibits

Underfeed Stoker Company of America is giving out printed matter of more than ordinary interest regarding the Jones stoker.

* * *

Crane Company of Chicago, Ill., located in Space 613, is showing a very complete and interesting line of steam traps, gate valves and heavy brass valves.

* * *

Chicago Varnish Company, in Space 370, is showing sample car sides painted and varnished by the six-day process. This system has been adopted by 80 roads since June 1, 1909.

* * *

A. L. Whipple and A. H. Sisson, representing Forsyth Bros. Company of Chicago are showing to an appreciative audience the new car specialties manufactured by this company.

* * *

One of the prominent men at the convention is E. A. de Campi of Chicago. Mr. de Campi is the special representative of the National Lead Company and is here in the interest of his company.

* * *

The car exhibited by the Cincinnati Car Company for the Logan Rapid Transit Company, Ogden, Utah, is equipped with Root scrapers. This is one of five cars built for this company, Root scrapers being specified on all of them.

* * *

Samples of Bryan-Marsh tantalum lamps designed for street railway cars may be seen in the Allis-Chalmers exhibit. J. S. Corby of the Chicago office of the Bryan-Marsh Company is prepared to furnish information about these lamps.

* * *

Henry A. Dorner, president of the Dorner Railway Equipment Company, Chicago, Ill., is spending the week at the convention. Mr. Dorner is telling his railway friends of the good quality of the rebuilt street railway cars which his company sells.

* * *

The Duntley Manufacturing Company of Chicago is exhibiting in Spaces 176-178 pneumatic cleaners and gasoline motor section cars. The cleaners have been endorsed by the Board of Fire Underwriters, and both the cleaners and cars took the grand prize at the Alaska-Yukon-Pacific Exposition at Seattle.

* * *

The Sterling Varnish Company of Pittsburgh, Pa., manufacturers of insulating varnishes and metal protective paint, is represented at the convention by W. F. Hebard, A. S. King and W. V. Whitfield. They will be found at Space 418 on the balcony of the main auditorium, where they are receiving their many friends.

* * *

The Valentine-Clark Company of Chicago is exhibiting in connection with the "C. A." Wood Preserver Company samples of butt treated poles, treated by the open-tank process at its new plant located at Minnesota Transfer, St. Paul, Minn. A neat little pamphlet entitled "On Doubling the Life of Cedar Poles" is being distributed.

* * *

The Handlan-Buck Manufacturing Company of St. Louis occupies Space 140. This company is one of the largest manufacturers and dealers in general railway supplies for electric and steam railroads in the Southwest. It is showing a complete line of standard one, two, three and four-lens markers, classification, semaphore, switch and blizzard lamps; also a large variety of the well-known Handlan wire guard lanterns. Some of these lamps are arranged for

burning oil or for electricity. Metal flags, machine tools, perfection oilers, engine bells, switch locks, engine lamps, Simplex jacks, and the Rooke recording fare box and registers are also exhibited. The company is represented by A. H. Handlan, Jr., H. O. Rockwell, Frank Stevens, A. E. Barron and R. S. Rooke.

* * *

The American Railway Guide Company, Chicago, Ill., is distributing a pamphlet which contains a time-table of all trains leaving Denver on the various railroads running into the city. The covers of the pamphlet are similar in every respect to the covers of the "Travelers' Railway Guide," which is published by this company.

* * *

The International Register Company has held a continuous reception during the week at its booth, in Spaces 134-138. Arthur H. Woodward, John Benham and William G. Kirchhoff, who are representing the company, have been busy demonstrating the fare and recording registers and showing the other devices which the company manufactures.

* * *

After the convention is over John Taylor, president of the Taylor Truck Company, will take an extended pleasure trip to the coast. He expects to visit Salt Lake City, Tacoma, Seattle and Vancouver. Then he will go down the coast to San Francisco and Los Angeles, over the Southern Pacific to El Paso, Houston and New Orleans. From New Orleans he will return by boat to New York.

* * *

L. M. Cargo, the manager of the Denver district office of the Westinghouse Electric & Manufacturing Company, is one of the busiest men during the convention. Besides the duties devolving upon him as chairman of the exhibitors' committee of the convention, he was also kept exceedingly occupied with the many demands made upon him by the other Westinghouse visitors, who were strangers in the city.

* * *

E. A. Wurster, secretary and treasurer of the Falk Company, which is among the largest manufacturers of street railway motor gears and pinions, reports a general increase in business throughout the country. His company has recently closed some very large gear and pinion contracts in the East, and its special grade of AA pinions, for meeting the requirements of extra heavy service, has already been adopted by many of the large systems.

* * *

The Burroughs Adding Machine Company is showing a complete line of adding and listing machines in Spaces 215-219, where F. A. Willard, manager of the railroad department, is meeting many of his old friends and making actual demonstrations of the application of the machines in traction accounting. The Burroughs duplex machine is particularly useful in handling material distribution accounts. This machine is the chief attraction of the exhibit.

* * *

Although the National Railroad Trolley Guard Company does not have a separate exhibit, its trolley guard is being shown at the booths of the Ohio Brass Company and the Electric Service Supplies Company. Delegates to the convention will find it instructive to give a few moments of their time to its examination. C. R. Ellicott is taking care of the interests of the company at the convention. The many friends of L. J. Mayer regret his inability to be present in Denver.

* * *

The Adams & Westlake Company is exhibiting a line of balanced-draught non-sweating signal lamps for street and interurban railway service. This company also shows railroad lanterns, arc and incandescent headlights, basket racks, car trimmings and brake handles. New specialties are an adjustable headlight holder for swinging the headlight to illuminate the roadway on curves; also a safety floor mat which is light in weight, easily removed for cleaning and affords a perfect safeguard against passengers slipping. The company is represented by William J. Piersen, Charles B. Carson and Alfred Connor.

* * *

The following orders are announced by the American Mason Safety Tread Company: Car Karbolith and treads for Kuhlman coaches for the Milwaukee Electric Railway & Lighting Company; car Karbolith for Laconia cars building for the Boston & Northern Street Railway; for the Long Island Railroad Company and for the Metropolitan West Side Elevated Railroad. The New York, New Haven & Hartford Railroad has installed Karbolith flooring in one of its new stations.

* * *

The Wharton "H. T." switch is attracting considerable attention in the booth of William Wharton, Jr., & Company, Incorporated. This switch was adopted for use in all rehabilitation work by the Chicago Board of Supervising Engineers. It is shown in solid manganeze steel construction, as well as in manganese steel hard center construction for girder and T rails. Another piece of special track work of interest in the Wharton exhibit is a solid manganese steel electric-over-steam crossing. A solid manganese steel frog to pass M. C. B. wheels is also shown. A peculiar feature of this frog is the use of separate extended easer rails, which are furnished in either manganese or rolled steel.

* * *

The Curtain Supply Company of Chicago has recently received the order for the curtain fixtures for 350 new cars ordered by the Chicago Railways Company. They are to be of the Ring fixture type. Orders for these Ring fixtures have also been received recently for the new cars for the following traction companies: Boston & Northern Street Railway, Interborough (N. Y.) Rapid Transit Company, Detroit United Railway, Kansas City Railway & Light Company, Louisville Railway Company, Washington, Baltimore & Annapolis Electric Railway Company, Buffalo & Lackawanna Traction Company, Indianapolis Traction & Terminal Company.

* * *

The Buda Foundry & Manufacturing Company, represented by W. S. Weston, chief engineer, and F. C. Webb, local agent, has a very complete exhibit in Spaces 50-52, 153-155. The material exhibited comprises a number of typical examples of manganese center street and interurban special work, switch stands for interurban and steam railways, a full line of ratchet, ball-bearing, cone-bearing and friction jacks, car replacers, Wilson and Paulus track drills of the latest improved patterns, track gages and levels, velocipedes and motor cars. The special work and the motor cars attracted the most attention. The street and interurban railway engineers have shown particular interest in the Buda tongue switch construction in which the tongue is provided with a manganese steel heel support and a reversible spring throw. The motor cars exhibited show the inclination to substitute power-driven cars for the old type of hand cars and velocipedes for the use of section gangs, bridge inspectors, linemen, roadmasters and division engineers.

* * *

The Falk Company of Milwaukee, Wis., is represented at the convention by E. A. Wurster, secretary and treasurer; W. Frank Carr, chief engineer, and the company's Pacific Coast representative, Alphonso A. Wigmore of Los Angeles. The company has had a very busy year in the several branches of its business, especially in the open hearth steel casting and track special work departments, requiring the added capacity of a new extension to the plant to meet the demand. Several large shipments of special track work of solid manganese and hardened center types have been made during the season to the Huntington systems of Los Angeles,

the Central California Traction Company, the Northern Electric Company, and other roads in California. Among the recent orders secured are two single-track, double-track crossings; two double track with double-track crossings, and one double-track crossing with three tracks, in all comprising 18 electric steam crossings of the solid manganese type for Los Angeles and 12 steam-electric crossings of the hardened center steel bound type for the Northern Electric Company at Sacramento. The steel bound feature of the hardened center type of special work made by the Falk Company is proving especially attractive to the railway men throughout the country as all liability of loosening of plates is eliminated.

* * *

A striking feature of the exhibit of the Pennsylvania Steel Company, Steelton, Pa., is the preparation of fully 114 lantern slides illustrating many scenes and processes in the production of this company's products. Thus there are shown views of ore banks, coke ovens, furnaces, pig iron ladling, scrap unloading with magnets, several open hearth processes, blooming mills, the company's foundries and machine shops, track work, bridge and bridge pieces, etc. Ten slides are devoted to views in connection with the Spanish-American Iron Company's mines in Cuba.

* * *

The Ironsides Company, Columbus, Ohio, is showing in Booth No. 709 its various products, including gear shield, wire rope shield, fiber rope shield, belt shield, Abba roof and stack paints, boiler scale solvent shield and Tormay oilers. The durable properties of the Ironsides gear shield are shown by two pairs of serviceable gears and pinions which were taken off after six years' operation on city cars. The pinions exhibited have run for 305,876 miles. This gear shield was devised both to reduce the noise and increase the life of the gearing. The exhibit is in charge of Assistant General Manager James L. Bone, who is distributing souvenirs, including an aluminium match box.

* * *

The Automatic Lubricator Company of Denver has equipped one car, No. 361, of the Denver City Tramway Company with its new automatic alarm signal. This car is being operated over the Fourth Avenue line on which the necessary actuating devices have been applied on the trolley wire at 22 points in advance of curves, sidings, crossings and other dangerous points. A yoke supported from the trolley wire engages with a light pivoted arm carried on the trolley pole just below the wheel. When the arm strikes one of the yokes electrical contact is made for an instant and thus actuates a relay on the car. The relay starts a bell and lights a lamp in the motorman's cab, warning him to reduce speed.

* * *

The Emery Lubrication Company, St. Louis, Mo., is showing an air-brake lubricating device which was first used in Colorado on the Denver & Rio Grande, Denver & Interurban and the Denver city lines. The device is applied in the air-brake system in such manner that the moisture in the air dissolves the lubricant, which is then carried by the air to all frictional surfaces of the air brake and control mechanisms. In this manner the amount of lubricant conveyed to the various parts is proportionate to the amount of air passing through the system, and consequently to the duty performed by the air brake or control mechanism. The lubricant finally passes to the brake cylinder, where it effectually prevents leakage of air past the packing leather.

* * *

The T. H. Symington Company, Baltimore, Md., is exhibiting its ball-bearing center bearing which has been so widely adopted throughout this country as an ideal, durable mechanism for relieving the friction between the car body and trucks when rounding curves. The company is also showing a complete line of journal boxes for all classes of electric railway service. Particular attention is directed to the "Lift-off" lid journal box designed for cars with check plate collarless journals operating exclusively in city streets. This box has a very tight lid fit and is non-rattling in service. Another interesting exhibit of this company comprises the Association standard boxes equipped with both "pivot" type machined swing lids and M. C. B. type "torsion" lids.

* * *

In addition to its well-known Barrett jacks and motor lifts, the Duff Manufacturing Company, Pittsburg, Pa., is showing a sectional hydraulic jack. The latter is said to be the only hydraulic jack made entirely out of forged steel. It will work either horizontally or vertically and weighs but one-half of ordinary jacks for the same capacity.

* * *

The Electric Traction Supply Company, St. Louis, Mo., is showing in Spaces No. 207-213 the Fallik controller check, a new device which makes it impossible for a motorman to accelerate his car beyond a predetermined speed. The working parts of this check are few and durable, as they are made of case-hardened steel. By simply changing a star wheel in the controller check, the device can be made to fit any standard form of controller and any angle at which the controller is set.

* * *

The Aluminum Company of America has a striking exhibit of aluminum conductors and cables for all classes of transmission work and is also showing various styles of joints and aluminum bus-bars. The company is giving away a booklet containing many important tables on aluminum conductors. The representatives who are making visitors welcome are Ernest H. Noyes, Chicago, manager, and Fred N. Baylies, manager of the St. Louis territory.

* * *

The exhibit of The J. G. Brill Company includes a large interurban truck of recent design which has attracted much attention and favorable comment. This truck is known as the Brill M. C. B.-E. 3 and is the heaviest type used in interurban service. It is also built for lighter cars designed for high-speed operation. The truck contains the M. C. B. principles, but differs from all others of that class in that the side frames are composed of solid forgings, including the pedestals. The method of securing the transoms to the side frames by heavy wrought gusset plates folded over the side frames and the substantial connection of the end crossings with the side frame extensions enables the truck to be maintained square under the severest conditions. Double equalizing bars are employed and the design throughout is well suited to the most rigid requirements of modern high-speed service.

* * *

The Hess-Bright Manufacturing Company has a novel exhibit in Space 126. Two GE 74, 35-hp, 500-volt railway motors are mounted on a platform of convenient height and operated "light" with 220-volt current. Both of these motors have been in regular service. One is fitted with ball bearings and the other with ordinary babbitted bearings. Practically the only heating that takes place in the ball bearings is due to conduction from the commutator and armature along the shaft, while the babbitt bearings rise 30 deg. to 40 deg. C. higher in temperature than do the ball bearings, in spite of the fact that the ball bearing motor runs at a speed of 1700 rpm, and the babbitt bearing runs at speed of only 1000 rpm, due to the difference in friction. The importance of ball bearings in preserving clean streets and saving oil is readily apparent by an inspection of the exhibit, much oil having dripped out around the babbitt bearing motor, while the ball bearing motor is clean. This ball bearing motor is one of an equipment formerly in service on the Schenectady Railway. This equipment has run without attention or wear 30,000 miles to date

on its initial charge of lubrication. At the back of the booth are photographs of a 40-ton Atlantic City interurban car, the New York City gas-electric car journals, illustrating the application of ball bearings to main car journals, and two 25-ton cars of the Schenectady Railway and Philadelphia Rapid Transit Company's lines, in which ball bearing motors are used.

THE H. B. LIFE GUARD IN NEW YORK

The following letter was recently received by Wonham, Magor & Sanger, New York, from James A. Roosevelt, general superintendent of the Third Avenue Railroad Company, New York:

"I want to tell you that since we have put H. B. life-guards on our cars, we have picked up 11 people. We have never had a single case of the life-guard failing to operate, nor have we had a single person run over by a car equipped with a life-guard. The H. B. life-guard is the best that I have ever seen in use for it really does pick up people and save lives. Another thing in its favor is that in making the pick-ups it apparently does not injure the person picked up. I really think that for city use it is absolutely essential unless the company wants to have a lot of death cases."

CARNEGIE STEEL COMPANY'S EXHIBIT

It has been only a few years since the Carnegie Steel Company exhibited any of its materials at the street railway conventions, but the age of specialties of steel has been marked by the development of several interesting examples in connection with street railway construction. It might seem to the casual observer that it would be difficult to get up a display of cold steel which would attract any attention, but the display shown by the Carnegie Steel Company is not only tastefully arranged but the articles shown have awakened much interest among the large numbers of street railway men who are attending the convention. The question of safety in transportation is well taken care of in the use of steel wheels as well as in the permanent track construction with steel ties. One pair of steel wheels which were shipped direct from the Brooklyn Rapid Transit Company shops, Brooklyn, N. Y., show the condition of the Schoen steel wheel after having been run 89,638 miles in service without any attention. These wheels are still in very good condition and can be made as good as new wheels with a very slight amount of work. Several types of new wheels are shown, adapted for single truck cars as well as for heavier cars for high-speed interurban service.

There is also shown a piece of track about 30 ft. long, built exactly the same as it would be were it out in actual service. This track is laid with steel ties and shows the various stages of construction, the section at one end showing in detail the method of laying the track in concrete. This type of construction has gained in favor, and when once placed in city streets requires little or no attention for years. This type of construction has been illustrated in former issues of this journal where tracks have been laid in Cleveland, Buffalo and other large cities.

The Duquesne joint, which has met with much success in steam railroad construction, is shown, as well as the lighter section of the same type adapted for the T-rail sections commonly used in interurban work. Another interesting part of the exhibit is steel piling of various weights, used in building coffer dams, core walls for dams and other construction purposes. A miniature representation of a dam is shown, illustrating the type of dam built some time ago in Colorado. The circumstances surrounding this particular installation are that a stream through a ranch had dried up, showing no water on the surface. The owner wanted to reclaim the water of this stream and drove a certain amount of piling through the sand into the hard bottom the same as shown in the exhibit, shutting off the seepage, and within a few hours had water flowing over the dam, which is now being used for irrigation purposes. Another interesting feature of this exhibit is the various tests to which the Carnegie soft welding steel has been put to show that it is possible to make a grade of steel which will meet the most severe requirements. A full-sized section of a truck made from this steel for the Denver & Interurban Railway is shown.

The loss and waste to packages containing bolts and spikes is eliminated by the use of steel slack barrel hoops, a pyramid of which is shown.

While the street railway fraternity is not especially interested in mine construction, yet for the benefit of the mining people in the Denver district, a small skeleton mine is shown illustrating the uses to which steel may be put in supporting mine roofs. This exhibit also shows a portable steel track which is coming into extensive use around mines.

The Carnegie Steel Company is represented by the following men from the various agencies: N. M. Hench, J. C. C. Holding, N. D. Trist and L. P. Lincoln of the general offices and works at Pittsburg; E. S. Mills, special sales agent, Chicago; R. B. Carr, manager of sales, San Francisco; E. M. Sparhawk, manager of sales, Denver; O. M. Ash, Portland; A. H. Hawkins, Denver; K. E. Porter, Cincinnati; C. B. Friday, Chicago, and W. E. Berry, New York.

Although the Dayton Manufacturing Company has no exhibit of apparatus at the convention it is represented by F. M. Nicholl, Joseph Leidenger and Peter Leidenger, who are in attendance.

* * *

John A. Roebling's Sons Company, Trenton, N. J., and Chicago, Ill., is showing some fine specimens of the well-known Roebling car cables. The company is ably represented by W. H. Slingloff, E. E., assisted by John McG. King, its Denver representative.

* * *

The Avenarius Carbolineum Wood-Preserving Company of Milwaukee, Wis., and Portland, Ore., has an interesting exhibit in Space 701. The representatives of this company have some new facts regarding the preservation of wood which they are furnishing free to visitors.

* * *

Berry Brothers, Ltd., Detroit, Mich., are exhibiting a number of panels showing different car-body colors and varnishes, interior finishes, etc. Interesting picture books for children and samples of some of the company's products are being given away for sourvenirs.

* * *

The Western Pole & Lumber Company, which has an exhibit in Booth 701 in the main Auditorium, has eight cedar yards in the State of Idaho and two white cedar yards in the State of Michigan. The company keeps a large stock of cedar poles at all of these yards, ready to ship on short notice. The company will ship its cedar products to all sections of the country, excepting that part of the United States lying south of the Ohio and east of the Mississippi rivers.

* * *

One of the interesting exhibits at the convention is the gasoline locomotive shown by the Milwaukee Locomotive Manufacturing Company. This locomotive is driven by a 25-hp engine and is designed for use in mines and industrial plants for hauling trains of small cars. However, the company builds these locomotives in all sizes up to 300-hp for use in high-speed freight and passenger service. They may also be used as line cars by installing a tower on the frame of the locomotive.

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This Issue of the Electric Railway Journal

A word of explanation in regard to the mailing place of this issue of the **Electric Railway Journal** is necessary. Although it is the regular weekly number of the paper it is being printed in Denver and will be mailed from that city. As our readers know, we have supplied them during the past four days with four daily issues, which have contained an account of the Denver convention. The compilation of these issues required that practically the entire editorial and business staff should be at the convention. The publication of this issue of the paper in Denver permits us to complete our report of the convention, thus giving this news to our subscribers at the earliest possible time. The issue for Oct. 16 will be printed upon our own presses, and at that time a return will be made to the usual style of type and arrangement of articles followed in the **Electric Railway Journal.**

The Re-Election of President Shaw

The re-election of a president is a complimentary course for the American Street & Interurban Railway Association to follow, and it is one that has a good precedent. Mr. Shaw's re-election, like that of Mr. Ely several years ago, was a recognition of valuable leadership. The policies enforced during the last year will be continued and will be supplemented, if we may pre-judge the course of events, by appropriate action on all new matters that may arise affecting the industry. Mr. Shaw is to be congratulated on the re-election of the four vice-presidents who have served the interests of the association so well. The strength of the support which the power of these executives assures will be an important factor with the co-operation of all members in making the coming year the most successful and effective in the history of the association.

Variations in Railway Practice

We are all creatures of habit, and this fact stands out as prominently in railway methods as in anything else. We do not refer particularly here to railway practices as instituted by the companies but to those demanded by the public of different countries. In America, where center aisle cars have always been used on the steam railroads, they naturally were adopted by the street railways, but abroad a different condition prevails. There the compartment car, the inheritance from the old traveling coach, is standard on the steam roads, and, while the tramway cars have center aisles, there is a tendency to pattern the longer cars used on the high-speed lines after the compartment model. For the same reason, as the European steam car doors are opened by the passengers, the practice has been continued on the Metropolitan underground railway system in London and in the cars of the Berlin subway, although in this country a platform guard is considered necessary. Again, like their steam contemporaries, both the London and Berlin subway companies permit smoking in a large percentage of the seating capacity in their cars, while in the New York and Boston subways smoking is prohibited and this regulation meets popular approval.

Discussion of Corporation Tax in Denver

It was undoubtedly merely a coincidence that President Taft should have selected as the place for his discussion of the corporation tax on Sept. 21 the Denver Auditorium, where two weeks later the representatives of the street railway companies were to assemble and consider technical and financial matters relating to their properties. The tariff and other national issues were considered at length elsewhere, but he reserved for Denver his explanation of the reasons for the adoption of what is in a sense the most radical departure ever made in the control of State corporations. The income tax on individuals and corporations enforced during the Civil War cannot be considered as a precedent in this respect, because the corporations had not at that time reached the magnitude which they now possess, nor can the regulations of the Interstate Commerce Commission for the steam roads and for the control of industrial corporations through the Sherman and other laws afford a comparison, because all of these companies do an interstate business. But the business of the vast majority of the electric railways is circumscribed within narrow limits by city and State boundaries; they are purely the creation of the individual state and are held by it responsible for the proper performance of their duties.

If the walls of the Denver Auditorium had tongues as well as ears, they could repeat the presidential arguments enun-

ciated here two weeks ago in favor of the corporation tax. These were partly because of the income which the law will produce and partly because of the publicity of the affairs of the corporation which its enforcement will entail. A. L. Linn, Jr., general auditor, New York State Railways, in his paper presented before the American Association, which was published in yesterday's issue, directed attention to the serious accounting errors in the law. The 1 per cent required on net income, as it advocates say, may "hardly affect dividends at all as it would be taken out of the surplus," but in conjunction with State corporation and city taxes, franchises, payments and other assessments made under one guise or another, it presents a very serious aspect when viewed in the light of high operating expenses and decreased fares caused by the compulsory issue of transfers.

Goodby to Denver

It is with no feigned reluctance that every person connected with the 1909 conventions of the American Street & Interurban Railway Association and its affiliated associations, says goodby to Denver. There was some skepticism, some shaking of heads, when it was first announced that the conventions would be held this year 2000 miles west of the Atlantic seaboard. Many thought that the attendance would be comparatively small and that the expense of making an extensive exhibition would be disproportionate to the returns to be expected from it. But the convention has proved that the Denver convention was rightly placed. The Denver people rallied to its support in the most effective and encouraging fashion, and the attendance was surprisingly good from all parts of the country. The reception has been so cordial that the word of farewell to Denver which will arise in the minds of all, will not be goodby, but au revoir!

The close of the convention is a suitable time for a brief summary of some of the features of the convention week which we have not yet had an opportunity of mentioning in previous daily issues of this paper. We have already commented on the excellence of the papers and discussions before the various associations and have also mentioned the exhibit features. A review of the convention would be incomplete, however, without a reference, even if brief, to some of those who have made the Denver convention possible; especially the officers of the Denver City Tramway Company, the Denver Convention League and the vice president in charge of exhibits, the director of exhibits and the entertainment committee of the Manufacturers' Association.

The task set before the Manufacturers' Association in arranging for and conducting an exhibit 2000 miles away from home was enormous and can hardly be realized by those who have not been actively engaged in the work or in touch with what was being done. It included not only engaging the hall and securing additional space by the erection of a temporary structure, but also the decorations of the exhibition premises, the arrangement of a uniform scheme of colors and posts, railings, signs, etc., and provision for the administrative utilities of the convention. At Atlantic City a great deal of the material needed is ready for the use of the numerous conventions that meet on the piers from year to year; at Denver everything had to be created. Not only this, but the manufacturers had to be urged to make exhibits in face of the objections that it was a long distance to transport men and apparatus and the plea that the attendance would be small.

Finally, the entertainments were not only most profuse and liberal, but they were in many respects almost unique. For instance, there is no other city in the country that could provide such an excursion as that over the Moffat Road to the region of the perpetual snows, crossing the Continental Divide. Where, too, could a wild game barbecue, such as the remarkably successful affair of Wednesday night, be arranged so well as in Denver? Then the numerous side trips through majestic scenery—in what other center outside of Denver could so many be planned? From the brilliant official reception of Monday night to the official excursion over the Continental Divide of Friday, there was a succession of interesting events, including the sight-seeing automobile and trolley rides for the ladies, the excellent vaudeville show of Tuesday evening, the ever memorable barbecue of Wednesday, the ladies' afternoon at the Denver Country Club and the theater party Thursday evening.

We are sure that the convention has proved the wisdom of those who were responsible for the selection of the Metropolis of the Rockies as the meeting place of the 1909 convention.

Studying Economy in Small Power Plants

Engineers who have made a special study of the cost of generating electric power in stations of varying capacities find that the size of the plant by no means is certain to set the limits of production efficiency. The general tendency is for large stations to produce power more cheaply per unit than is feasible in the smaller installations, but so many plants of moderate size have made good records in the line of current cost at the switchboard that no manager of an active property should hesitate to analyze his operations through fear of not being able to improve the figures. As a matter of fact, the smaller power plant usually is better fixed for studies of economy than the larger station, so far as those studies involve temporary changes in practice. It costs a good deal less to operate a small station under revised conditions than to impose similar modifications upon plants of higher capacity.

Often a small station will illustrate in its composition quite a wide range of designs, with practically obsolete methods in daily service, beside the latest equipment and its applications. In one small plant we may find belted units in service at one end of the building and one or more of the most recent steam turbine units in service at the other end; again, part of the plant may be equipped to run condensing with fresh water, and part with salt water; some of the auxiliaries may be steam driven, others motor driven; and further, both natural and forced draft may be in use in the same boiler room, combined with one or more methods of feed water heating. Also, with the recent wide-spread movement for taking advantage of nature's resources and developing power hydraulics, we now nd some generating stations with their machines direct-driven or belted to water wheels as well as steam engines and turbines. Not many railway stations have yet been equipped with storage battery plants, except those which also generate current for lighting service and these usually are of relative large capacity.

In stations with mixed apparatus of this sort a great deal can be learned if the records of the plant performance are carefully maintained and examined regularly. In plants of moderate size the loads vary through wide sweeps, and in order to keep up the output, it is often necessary to run the equipment in different combinations. On one day the lighting and the railway service may have to be run upon a single machine or pair; on the next day the plant finds itself short of condensing water of the proper temperature,

and perhaps has to run non-condensing for two or three hours at the peak.

All these changes in load, equipment and weather conditions, the use of water of a certain injection temperature at one time and of a different temperature at another, and in general any marked differences in station conditions, afford valuable service test data from which may be drawn accurate conclusions regarding the value of the practice maintained. If necessary, operation can often be carried on for artificially extended periods, in order to determine the conditions making for the least fuel consumption in proportion to the output, in the small station. The quantities involved are so much smaller than in plants of scores of thousands of kilowatts rating that the actual cost of studying production conditions and changing them within the limits of reliable service becomes very moderate in proportion to the lasting benefits derived. The greater the variety of apparatus in the small station, the better becomes the opportunity to study plant efficiency on an experimental basis closely bound up with the routine service rendered.

Central Power-Station Power for Electric Railways

In the vicinity of large cities blessed with populous suburbs the supply of power to electric railways outside the limits of the urban lines offers an attractive field for central station enterprise. Inside the urban community itself the traction company usually generates its own current, although a notable exception is afforded by the late railway contracts of the Commonwealth Edison Company of Chicago. Beyond the confines of the large city traction system, however, there is usually found a sort of no-man's land of engineering, where the facilities offered to the public have to be worked out on a much smaller scale and generally at a much lower efficiency than is possible on systems of larger resources. If the local central station organization is equipped to transmit power to points from 10 to 20 miles away, it is often possible to arrange to establish substation equipment either at or near the sites of the older and less efficient power stations, and to operate the suburban railway lines with a much better supply of electricity than is ordinarily available on the small rural or semi-rural trolley system.

A conspicuous example of improved power supply through the establishment of central station service is just now afforded by the Boston Suburban Electric Company's system, which has begun to take power from the Edison Electric Illuminating Company of Boston for certain of its lines in the Natick-South Framingham district. The Edison company has for some time operated a distributing substation of its own in the town of Natick, 18 miles west of the city of Boston, and in order to supply the trolley lines in that district it was only necessary to install a transformer and rotary converter equipment, with suitable connections to the trolley feeders. An old non-condensing station with belted equipment was then shut down at South Framingham. The drop in potential common to the service provided by the old station was largely cut out with the establishment of the new power supply; the maintenance of schedules was facilitated, and the inefficient service of the old station displaced by a more economical contract with the larger organization. It is expected that the Homer Street power station of the Suburban companies at Newtonville will shortly be shut down as a generating plant for similar reasons.

Another noteworthy example of widespread distribution by a single company is the transmission distribution system of the California Gas & Electric Company which has 60,000-volt lines tying together several hydraulic generating stations in California. Current is converted in railway substations owned by the generating company and also is distributed to individuals and municipalities for general services.

Of course, it does not always follow that even the service of a large central station will be more economical or desirable than that which can be produced by a small suburban company in its own plant, but the tendency in the vicinity of large cities will undoubtedly be in the direction of eliminating the less efficient and smaller direct-current self-contained railway plants as their apparatus grows older and then of obtaining power from a centralized station owned either by the company itself or by outsiders.

Oil in Boilers

It is a common experience that a film of oil on a boiler plate will tend to cause overheating of the plate and will raise by many degrees the temperature of the fire-side of a plate. A writer in the Engineer (London) raises the question of molecular continuity, in explanation of this. He illustrates the meaning of this continuity by the case of the hot soldering iron and a strip of thin tin-plate. If the hot iron is simply laid on the strip of plate there is but slow heat transfer between the two pieces of metal. But a simple drop of fluxed solid between the two, metallically adhered to both, will cause heat to flow with great rapidity. This is due to the establishment of molecular continuity. Heat will not pass a boundary surface with readiness. If clean water be in contact with clean plate a fireside temperature of the plate may be obtained from a fierce fire at 3000 deg. Fahr. that is only 85 deg. Fahr. greater than the water side temperature. The water has thus so full a control of the fire-side temperature of a ⅜-in. plate that the temperature difference is not as great as that between a hot and a cold day.

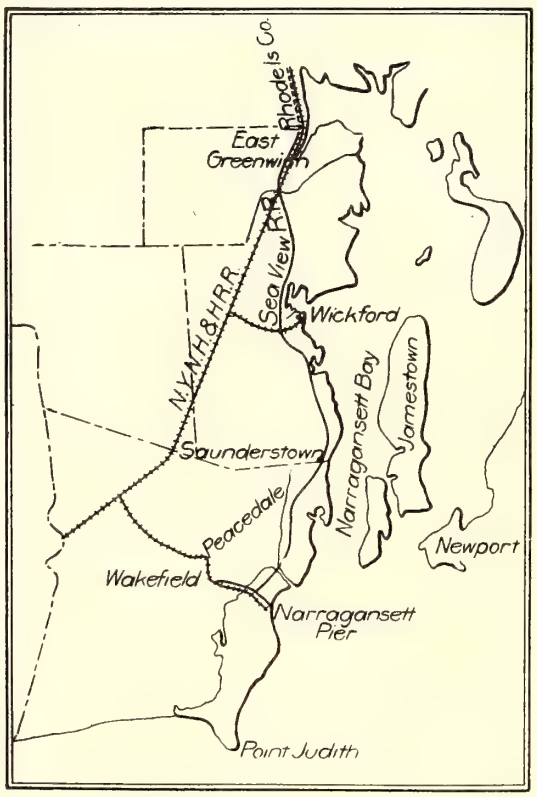
Now this great influence of the water is due to the molecular continuity of water and plate. There is no boundary surface to offer a resistance to the flow of heat between plate and water. But if the plate surface is just greasy, the greasiness having no definite thickness, there will be boundary surfaces to resist flow; there is no longer a molecular continuity. It may even be supposed that there are four bounding surfaces to be crossed by the heat stream.

Assuming the hypothesis to be sound, and there seems good reason to admit its soundness, it is enough to explain many matters which will come up from time to time to be attended to by the steam engineer. It certainly serves to explain the mysterious action of greasiness, and it should help such in the evaluation of different sources of water. It may be that water ought to be tested in the laboratory with a view to showing the degree of molecular continuity that it is possible to set up between it and the plates of a boiler. The effect of salt in solution might be similarly tested, for there are reasons to suppose that some salts do prevent water from touching a plate in the fullest of molecular sense, while again other salts have been supposed to aid considerably in the transmission of heat.

This is a direction in which research has never been directed to any great extent. Only a few experimental results have been made with greasy plates and with water variously treated or mixed with other liquids, jellies or flours, and it might be a good subject for an engineering thesis in a technical school.

OPERATING FEATURES OF THE SEA VIEW RAILROAD COMPANY

The western shores of Narragansett Bay, R. I., border one of the most attractive vacation districts in southern New England, and an important factor in the upbuilding of this territory is the electric railway service provided between the city of Providence and the well-known resort of Narragansett Pier. The lines of the Rhode Island Company extend southward from Providence to East Greenwich, a distance of about 12 miles, and from East Greenwich to Wakefield the service is furnished by the Sea View Railroad Company, whose headquarters are at Wickford. The terminus



Sea View Railroad—Map of Territory Served

of the Sea View Company at Wakefield is about 3 miles west of Narragansett Pier, the latter being the most important station on the southerly end of the road. The total length of the Sea View line is 20 miles and all of the traffic is handled on a single track route. All but 2 miles of the line are located upon a private right-of-way. The car service is conducted by telephone dispatching, and both passenger and express service, with haulage of freight cars, are maintained. Although the greater portion of the travel occurs during the summer months, an all-the-year-around service is maintained by the Sea View Company on lengthened headway.

Schedules and Territory

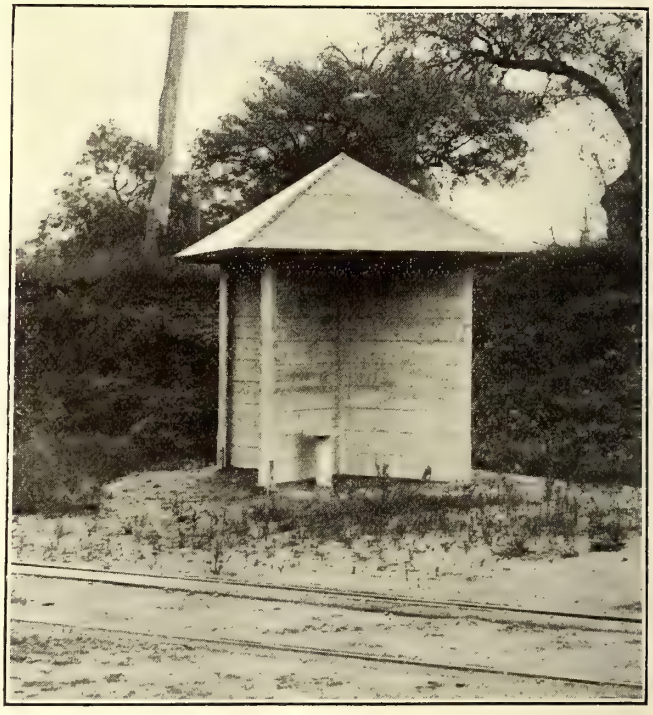
The service on the passenger car schedules in the summer season is in the main half-hourly, with a few omitted runs during the lighter hours of the morning and evening. The company provides its patrons with time tables in card form, 3⅛-in. by 4⅝-in., for pocket use, showing the service between Providence and the Wakefield terminus, and not stopping at the end of its own system. In general the service extends from about 6:30 a. m. to 10:30 p. m. and five cars are sufficient to handle the regular schedule. The running time is 70 minutes from East Greenwich to Wakefield, giving a schedule speed, including stops, of 17.2 m.p.h. The company serves the following communities: East Greenwich, Lafayette, Wickford, Hamilton, Barbers Heights, Saunderstown, Narragansett Pier and Wakefield. It supplies electric lighting service to all these places except East Greenwich, and in addition it lights Peacedale and Matunuck.

Dispatching

The operating center of the road is at Hamilton, where the power plant and dispatcher's office are located. The repair shops are also situated here. A feature of the car service is the supplying each motorman and conductor with a working time table of the diagrammatic type. The principles of this time table are thoroughly familiar to electric railway operating officers, the plan being to show by appropriate lines the runs of the different regular scheduled cars, with passing, arrival, leaving and meeting times, and the points where turnouts are to be made. The novelty of this application lies in its use by every man in the car service, in place of the more common tabulated runs. The management has found that the men quickly grasp the idea of the diagrammatic time table and utilize it effectively in making their meeting points and generally holding to schedule. Strict control of all movements, of course, is vested in the dispatcher. All train orders are written down and repeated back to the governing authority, who in turn records them with all telephone reports on the daily log sheet of the road.

Fares and Stations

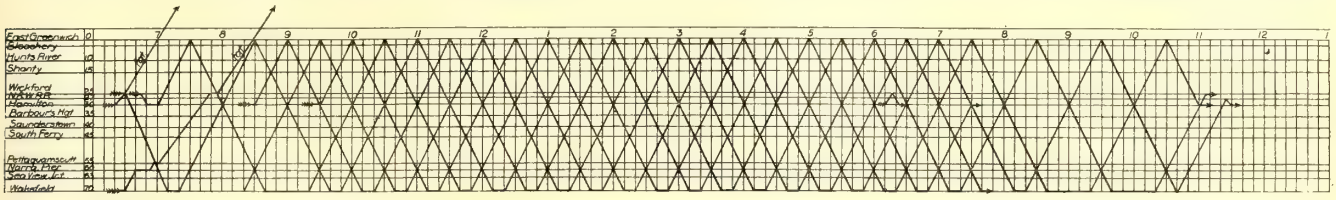
The passenger traffic is handled by both cash fares and tickets. Each conductor is provided with a blue-print table which gives the fare between every station on the road at a glance. In general the fare unit is 5 cents, the average rate per mile being about 2 cents. At a number of points on the road ticket offices are established, and for all cash fares taken on the cars in excess of 5 cents a 5-cent excess



Sea View Railroad—Standard Shelter Shed at Farm Crossing

is collected with the issuance of a rebate slip as in steam railroad practice. The tabulated lists of fares have proved to be of great value in the handling of summer traffic in particular. The company sells through and round trip tickets between points on its lines and Providence, as well as round trip transportation on its own system. At various points on the road old combination open and closed cars have been set down at the side of the track for use as waiting stations, giving the passenger the choice of an

indoor or an outdoor seat irrespective of the weather. A waiting station built in the form of a plus sign is frequently used by the company. The latter stations can be built at nominal cost and enable the passenger to be sheltered in all weathers, regardless of the direction of the wind or the storm. An attractive feature of the combination car



Sea View Railroad—Dispatcher's Train Record

waiting station is the provision it makes for smokers with no annoyance to other patrons who may be waiting for cars.

Rolling Stock

The rolling stock of the company consists of four Brill Narragansett type open cars seating 99 persons each; two trailers of the same type; four 15-bench Newburyport cars; two 15-bench Jackson & Sharp cars; five closed cars, two express cars, two work cars, two plows, one hopper, one flat car and three gondola cars with hopper bottoms. The Narragansett and Newburyport cars are equipped with four Westinghouse 49 motors each; also one of the work cars. The Jackson & Sharp cars are fitted with four GE-67 motors



Sea View Railroad—Interior of Dispatcher's Office

each, and the second work car has four Westinghouse 12-A motors. The following data apply to an express car built by the company. A noteworthy feature is the frame, which is of white oak, sawed from native ties:

Express Car Data

Height from sill to rail	3-ft.
Length over all	43-ft.
Length over sills	38-ft.
Width over sills	8-ft. 3-in.
Width inside car	7-ft. 5-in.
Length inside bulkhead	32-ft. 5-in.
Height above rail	11-ft. 11-in.
Size of sills	6-in.x7½-in.
Bolster	9-in.x6-in.
Iron plate each side	6-in.x½-in.

The sills and plates are of hard pine. All framework, including roof purlins, is of white oak. The inside of the car between the bulkheads and the head of the car is used for storing empty milk cans. On the outside of the sheathing and running along the side of the sill are iron plates 8 in. x¼ in. bolted on, which prevents any damage to this portion of the car. The car is mounted on McGuire & Cummings trucks and has four Westinghouse 49 motors, K-12 controllers and Janney couplers. The company saved $1,500 on the purchase price by building this car in its own shops.

The snow plow equipment was built from two combination open and closed cars. The cars were sawed in two and the closed ends bolted together, the windows being boarded up. The plow noses are raised and lowered by compressed air. The whole work was done in the shops of the company at Hamilton. The open ends of the combination cars were put together in the same way and utilized for a work car. This car also is used as a locomotive to haul freight cars over the line from connecting roads and is provided with a full set of line tools. The ends were left open so that the car can carry poles when desired. A useful feature is a folding step ladder attachment to the roof for the quicker and easier handling of line repairs. The car is equipped with Janney couplers.

Express and Freight Service

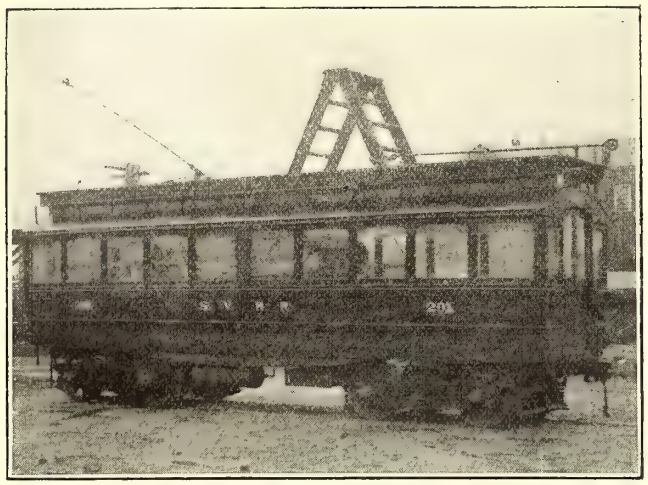
About one-fifth of the company's revenue in the year 1908



Sea View Railroad—Old Car Used as Shelter Shed at Cross Road

was derived from its freight service. There are two express car movements over the line each day in each direction, and in addition a considerable amount of interchange business with the New York, New Haven & Hartford Railroad and its connections is handled. Coal is hauled in large quantities to the East Greenwich bleachery and also to dealers in Wakefield at the southern end of the road. The road handles all its own coal for the use of the power station at Hamilton via its own lines. The classification of freight charges conforms to that of the New York, New Haven & Hartford Railroad, and through rates are quoted from Providence to Wakefield as well as to all other points on the line. A minimum charge of 25 cents per shipment is in effect. There are six classes of freight or express matter and all trips are made on fast schedules which do not interfere

with the passenger schedules. The express service has proved to be of invaluable utility to the summer population of the Narragansett Bay district. Many of the points along the shore south of Wickford are entirely served by the Sea View line, as no other railroad facilities are available. Between Wickford and Narragansett Pier the entire summer

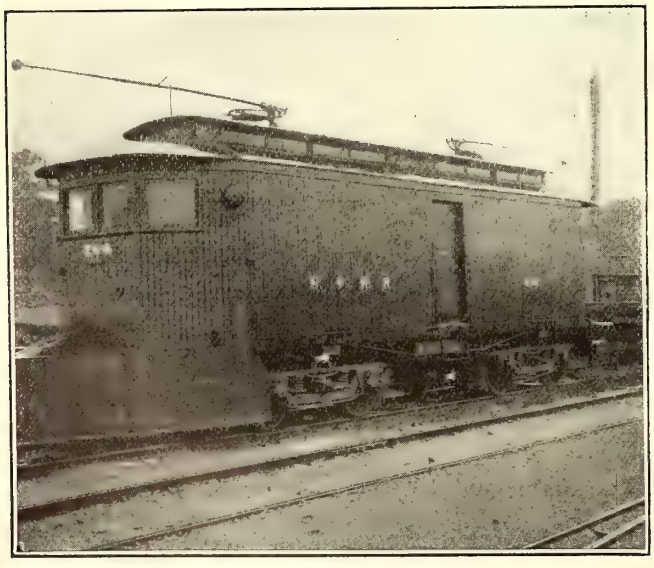


Sea View Railroad—Combination Line and Wrecking Car Built in Company's Shops

patronage and population of the district are vitally dependent upon the electric railway service.

Power Station

The power station at Hamilton furnishes all the energy needed for the road. It is now being modernized. The machinery at present in this station illustrates the advance in station design from the belted multipolar 500-volt d.c. generator with square frame to the engine-driven direct connected revolving field alternator, the rotary converter and the steam turbine. Steam is supplied by four 925-hp hand-fired Erie boilers. Two iron stacks about 125 ft. high provide natural draft for the furnaces. In a recent storm one of the stacks was bent by the wind to a point where it was



Sea View Railroad—Snow Plow Built in Company's Shops

necessary to remove a part of the pipe, through the use of a gin-pole structure, block and tackles.

The engine room contains a 200-kw 500-volt d.c. generator, belt-driven by a 250-hp Brown-Corliss engine, simple condensing type; a 200-kw Westinghouse rotary converter which may be driven by a belt connection to a 200-hp simple condensing Greene engine; a 300-kw Westinghouse revolving field alternator, wound for 360 volts, direct driven by a cross compound condensing Brown-Corliss engine; and a 500-kw Westinghouse-Parsons 12 stage turbine, three-phase alternating type, wound for 360 volts and making 3600 r.p.m. at normal speed. The trolley service is supplied through the rotary converter at Hamilton and another of the same capacity at Narragansett Pier. Two three-phase 13,200-volt transmission lines connect the Hamilton power station with the substation. In addition to the foregoing machinery the company has in service a storage battery of 248 chloride accumulator cells which floats on the substation bus at the Pier.

The capacity of this battery is 160 amp at the one-hour rate. The railway service requires three 75-kw transformers at Hamilton for the local rotary and a similar bank at the Pier. At Hamilton there are also installed three 100-kw lighting transformers, with a secondary potential of 2300 volts for local lighting and small power distribution. The connections of the transformers provide that any bank can be used at Hamilton for either railway or lighting service, and the rotary converter at Hamilton is operated at times as a generator and at times as a rotary, according to the conditions.



Sea View Railroad—Freight and Express Car Built in Company's Shops

When the plant changes are completed, it is expected that in general the turbine unit or the 300-kw alternator at Hamilton will handle both the rotary converters during the day, and with the 200-kw direct current machine at the station will supply the railway and day lighting service. The battery is counted upon for momentary peak and emergency service. Three cars handle the railway schedule after 8 p. m. At night the plan will be to separate the lighting load from the railway service, one being carried on the direct-connected alternator and the other upon the turbine. After midnight the lighting load will probably be handled by the rotary at Hamilton run as a double current generator through the belt connection with the Greene engine, the alternating output being delivered to the transmission lines through the transformers and the surplus direct current being utilized for charging the battery at the Narragansett Pier substation. The rotary will be separately excited when run as a double current generator. Two sets of bus-bars are provided at the Hamilton power house for switching the generators and rotary to one set or the other of the transformer secondaries, and the high tension service from the transformers is assembled on three sets of bus-bars, one set for each transformer bank, with disconnecting knife switches between the different sub sections.

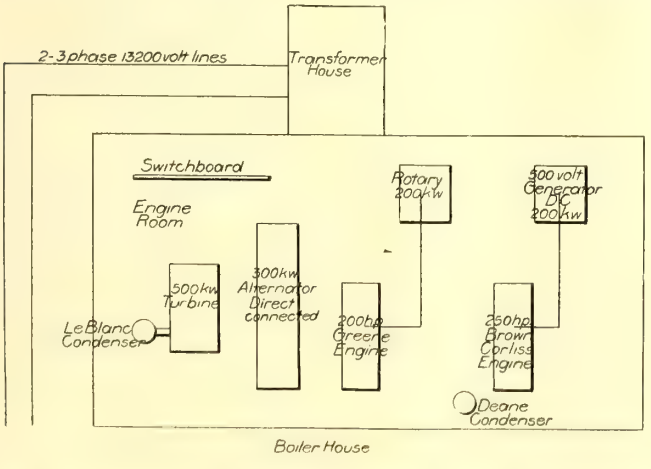
Condensing water for the plant is provided by the Anaquatucket River, with a supplementary pipe line serving salt water to the station by a 5-hp motor-driven centrifugal

pump. The river water is ordinarily discharged into a 50,000-gal. pond just outside the station. Just below this pond is a small reservoir of 10,000 gal. capacity. Between the two reservoirs is a movable dam having a height of about 4 in., so that when a sufficient supply of fresh water exists, salt water need not be used for condensing purposes.

There are two condensers in the station, one being a 12-in.x18-in.x18-in. Deane jet condenser, used in reciprocating engine service only, and the other a Westinghouse-Leblanc condenser. The Deane condenser receives its injection water through a 6-in. line and discharges back to the reservoir through a line of the same size. If the supply of fresh water from the river is sufficient, the movable dam between the two reservoirs can be raised or else the stream flow can be utilized to provide fresh injection water for the Leblanc condenser through an 8-in. line, with an 8-in. return to the larger reservoir from the turbine. When salt water is used the dam can be raised between the two reservoirs if desired, and the turbine discharge carried away from the plant and ponds to an outlet having a drop of about 8 ft. below the level of the reservoir. Either fresh or salt water can be used in the Deane condenser at such times, according to the supply. The centrifugal pump serving the station with salt water has a total lift of about 8 ft. at low tide and is located about 175 ft. away from the lower reservoir. When the discharge from the Leblanc condenser is thrown away by the lower pipe the drop secured helps to maintain the vacuum in the turbine and enables the centrifugal pump to handle the service without danger of overload. The salt water is carried about 175 ft. before it enters the lower reservoir, with an 11-ft. lift to the turbine. Suitable valves are provided to permit cutting off different pipe sections as needed.

New Type of Condenser

The Leblanc condenser installed is one of the first of its kind to be utilized in railway service in New England. It occupies little space, has no reciprocating or rubbing parts and no valves of any description. Exhaust steam enters the condenser at its top, and cooling water is injected into it at nearly the entrance level, projecting the water and condensed steam downward to a centrifugal discharge pump operating under a head of 2 or 3 ft. which insures positive

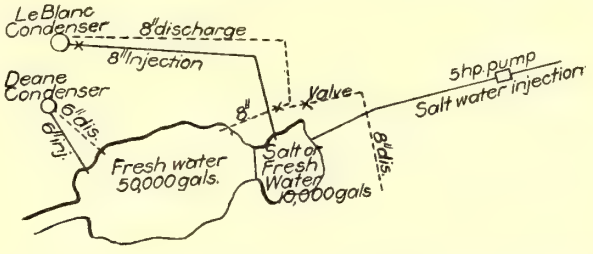


Sea View Railroad—Diagram of Engine Room Arrangement in Power House

filling of the pump. The exhaust steam is drawn downward and condensed by the water spray. The space above the water is occupied by the water vapor plus the air released from the injection water and the exhaust steam. A pipe on the front side of the condenser carries the entrained air to a small pump in the lower part of the casing and the latter is then discharged independently from the water delivered to the apparatus through condensation. The water and air pumps are driven by an induction motor manufactured by the Westinghouse company.

Lines

The transmission line is carried upon 35-ft. chestnut poles. The wire is No. 6 copper arranged in two circuits on 18-in. equilateral triangles. Triple petticoated glass insulators are used. The trolley poles are 28 ft. in length. In general the feeder system for the railway 500-volt service consists of a 500,000-circ. mil cable run from Wickford to Wakefield, with a supplementary 300,000-circ. mil feeder over practically the same distance, and a No. 0000 trolley throughout. North of Wickford two No. 0000 feeders run to East Greenwich. The distance from the Hamilton power house to the substation at the Pier is about 9 miles. Throughout the district the local communities are supplied with lighting and small power service from one of the above transmission lines. In general a single transformer is located at the line for the supply of small communities and the street lighting and house



Sea View Railroad—Diagram of Condensing Water Supply and Dischahrge

service is handled on the three-wire low-tension secondary system of distribution. Usually the limit of this distribution is about ½ mile from the transmission line, the company recommending the proper sizes of wire to eliminate excessive voltage drop.

Shops and Track

The shops of the road contain no unusual features. The tools are group-driven by a small motor, and the general plan is followed of carrying on special construction work in the interims between repairs calling for instant attention. The shops contain a well equipped blacksmith division and a convenient carpenter section. A special feature of the car house design was the use of reinforced cement grouting in the roof construction. The roof is V-shaped with a slight pitch and a central supporting wall dividing the car house into two parts. It was built up from below by placing wooden forms at the proper elevation, and then putting on layers of paper, fence wire, cement, tiling, and a final tar and gravel coating. In this work the wire was lapped over the center portion of the building.

The track is built of 60-lb. T-rail, with a No. 0000 concealed bond at each joint. The operation of the road is in charge of W. C. Clarke, general manager, and F. L. Caswell, superintendent, with headquarters at Wickford.

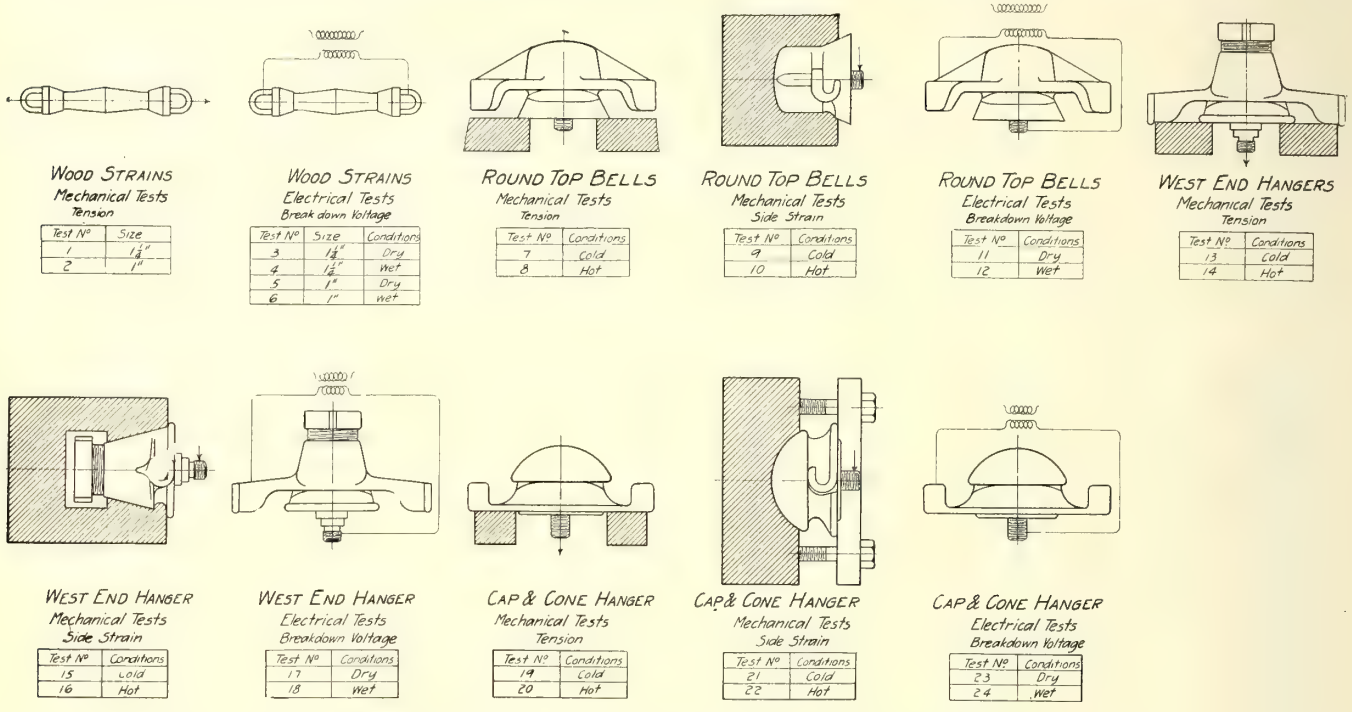
PARK SUGGESTION

A cheap, popular and safe attraction for a summer park would be a safety tight rope upon which ambitious amateurs could try to walk for the edification of the crowd. A rope, 1½ in. or 2 in. in diameter and 15 ft. to 20 ft. long, can be stretched between two platforms 5 ft. above the ground. Eight feet above the tight rope the park manager could stretch a wire cable, to which a safety belt is attached by means of a pulley. The candidate for tight-rope honors would then be prevented from falling to the ground if this harness is strapped about his waist, but it will not prevent his slipping from the rope if he is not expert enough to maintain his balance.

TESTS OF LINE INSULATORS*

The committee asked a number of manufacturers to furnish for tests samples of line material of the following classes: Wood strains, both 1-in. and 1¼-in.; round top bells, West End hangers, and cap and cone hangers. Seven manufacturers furnished samples. These firms are designated by numbers in the test reports. Where more than one type of any class was submitted the letters "a" and "b" were used to distinguish them.

Twenty-four tests were made as outlined. The results of these tests will be found tabulated, together with explanatory notes. The committee desires to express its appreciation to the following companies for furnishing samples: Albert & J. M. Anderson Manufacturing Company, Electric Service Supplies Company, General Electric Company, H. W. Johns-Manville Company, Ohio Brass Company, Western Electric Company, and Westinghouse Electric & Manufacturing Company.



Methods Used in Making Tests of Trolley Wire Insulators.

Notes on Tests of Wood Strains

Test No. 1.—Tensile Strength; Size 1¼-in., Conditions normal:

1—Split both metal end pieces.
3—Broke wood near one end piece.
4—Pulled wood body out of end pieces.
5—Broke one eye.

Sample From Firm No.	Test No. 1	Test No. 2	Test No. 4	Test No. 4	Test No. 5	Test No. 6
	Tensile Strength	Tensile Strength	Breakdown Voltage	Breakdown Voltage	Breakdown Voltage	Breakdown Voltage
	Size 1¼ In.	Size 1 In.	Size 1¼ In.	Size 1¼ In.	Size 1 In.	Size 1 In.
	Conditions Normal	Conditions Normal	Conditions Normal	Conditions Wet	Conditions Normal	Conditions Wet
	Load in Lbs.	Load in Lbs.	Voltage	Voltage	Voltage	Voltage
1	8,260	6,420	48,000	9,000	42,000	9,000
2	.....	6,280	.....	.....	42,000	4,000
3	10,760	9,440	46,000	5,000	42,000	8,000
4	15,640	7,590	48,000	12,000	45,000	11,000
5	10,940	8,850	48,000	15,000	45,000	9,000
6	8,350	8,000	47,000	11,000	44,000	10,000
7	11,020	6,280	47,000	11,000	42,000	7,000

Test No. 2.—Tensile Strength; Size 1-in., Conditions Normal:

1—Pulled wood body out of end pieces.
6—Split one end piece and started to pull out of the other.
7—Pulled wood body out of end pieces.
2—Split metal end pieces.
3—Broke one eye.
4 and 5—Pulled wood body out of end pieces.
6 and 7—Split metal end pieces.

Test No. 3.—Breakdown Voltage; Size 1¼-in., Conditions Normal:

1, 4, 5, 6 and 7—Did not fail; voltage given was highest attainable.
3—Arced over paint.

Test No. 4.—Breakdown Voltage; Size 1¼-in., Conditions Wet:

These insulators were scraped and soaked in water for 18 hours. The excess water on the surface of the insulators was wiped before testing them.

1, 3, 4, 5, 6 and 7—Started to burn up and finally voltage jumped between ends.

Test No. 5.—Breakdown Voltage; Size 1-in., Conditions Normal:

1, 2, 3, 4, 5, 6 and 7—Did not fail. Voltage given was highest attainable.

Test No. 6.—Breakdown Voltage; Size 1¼-in., Conditions Wet:

These insulators were scraped and soaked in water for 18 hours and the excess water on the surface of the insulators was wiped off before testing.

Sample From Firm No.	Test No. 7		Test No. 8		Test No. 9		Test No. 10		Test No. 11		Test No. 12	
	Tensile Strength		Tensile Strength		Side Strain		Side Strain		Breakdown Voltage		Breakdown Voltage	
	Conditions Normal		Conditions Temp. 150° Fahr.		Conditions Normal		Conditions Temp. 150° Fahr.		Conditions Normal		Conditions Wet	
	Size In.	Load in lbs.	Size In.	Load in lbs.	Size In.	Load in lbs.	Size In.	Load in lbs.	Size In.	Volt-age	Size In.	Volt-age
1	¾	17,700	¾	13,310	¾	14,730	¾	11,950	¾	17,500	¾	6,000
2	a-¾	15,430	.....	.....	.....	.....	.....	.....	a-¾	16,000	.....	.....
	b-⅝	8,200	.....	.....	.....	.....	.....	.....	b-⅝	20,000	.....	.....
	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,000	.....	.....
3	a-⅝	14,670	a-⅝	13,260	a-⅝	9,310	a-⅝	9,310	a-⅝	20,000	a-⅝	9,000
	.....	.....	.....	.....	.....	.....	.....	.....	.....	8,000	.....	.....
3	b-⅝	9,820	b-⅝	9,100	b-⅝	10,250	b-⅝	8,970	b-⅝	20,000	.....	.....
	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,000	b-⅝	7,000
4	¾	13,550	¾	1,390	¾	12,280	¾	9,320	¾	15,000	¾	7,000
5	¾	9,050	¾	500	¾	13,470	¾	11,600	¾	14,000	¾	7,000
6	⅝	8,080	⅝	8,340	⅝	9,700	⅝	9,610	⅝	16,000	⅝	5,000
7	a-⅝	10,900	a-⅝	2,300	a-⅝	9,000	a-⅝	7,700	a-⅝	16,000	a-⅝	11,000
	b-¾	8,060	b-¾	1,110	b-¾	10,300	b-¾	6,340	b-¾	16,000	b-¾	10,000

1, 3, 4, 5, 6 and 7—Started to burn up.
2—Started to burn up. Carried current at less than 1000 volts.

Notes on Tests of Round Top Bells

Test No. 7.—Tensile Strength; Conditions Normal:

1—Broke ¾-in. bolt; insulation not badly damaged.
2—(a-¾ in.) Pulled body of insulator out of casting.
2—(b-⅝ in.) Pulled stud out of insulator.
3—(a-⅝ in.) Outriggers turned up; broke one outrigger.

*Abstract of Appendix F to report of Committee on Power Distribution, American Street & Interurban Railway Engineering Association. Read at Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

3—(b-⅝ in.) Outriggers turned down; pulled stud loose in insulation.
4.—Pulled stud loose with most of insulation.
5—Pulled body of insulation loose in casting.
6—Broke stud inside of insulation.
7—(a-⅝ in.) Broke one outrigger; insulation slightly cracked.
7—(b⅝ in.) Pulled stud loose insulation.

Test No. 8.—Tensile Strength; Conditions, Temperature of 150 deg. F.:

The insulators used in this test were placed in water which was kept at a temperature of 150 deg. F. for one hour before testing.

1—Pulled insulator loose in casting.
3—(a-⅝ in.) Outriggers turned up; stud pulled down and thread stripped.
3—(b-⅝ in.) Outriggers turned down; stud pulled down.
4 and 5—Stud pulled down.
6—Broke brass stud casting; insulation only slightly damaged.
7—(a-⅝ in.) Stud pulled down.
7—b-¾ in.) Stud pulled loose.

Test No. 9.—Side Strain; Conditions Normal:

1—Crushed insulation under stud; broke ¾-in. bolt.
3—(a and b-⅝ in.) Outriggers turned up; crushed insulation under stud; broke ⅝-in. bolt.
4 and 5—Crushed insulation under stud.
6—Broke ⅝-in. bolt; cracked insulation slightly.
7—(a-⅝ in.) Broke ⅝-in. bolt; crushed insulation under stud.
7—(b-¾ in.) Bent stud; crushed insulation under stud.

Test No. 10.—Side Strain; Conditions, Temperature of 150 deg. F.:

The insulators used in this test were placed in water, which was kept at a temperature of 150 deg. F. for one hour before testing.

1—Broke ¾-in. bolt; crushed insulation slightly.
3—(a-⅝ in.) Outriggers turned up; forced stud down through insulation until ⅝-in. bolt broke.
3—(b-⅝ in.) Outriggers turned down; crushed insulation under stud.
4—Crushed insulation under stud until ¾-in. bolt broke.
5—Forced stud down through insulation until ¾-in. bolt broke.
6—Broke ⅝-in. bolt; loosened insulation slightly around stud.
7—(a-⅝ in.) Forced stud down through insulation until ⅝-in. bolt broke.
7—(b-⅝ in.) Crushed insulation under stud.

Test No. 11.—Breakdown Voltage; Conditions Normal:

1—Jumped from stud to hanger casting.
2—(a-¾ in.) Jumped from stud to hanger casting.
2—(b-⅜ in.) Spark gap broke down at 20,000 volts. On re-test insulation failed at 7000 volts.
3—(a-⅝ in.) Outriggers turned up; spark gap broke down at 20,000 volts. On re-test insulation failed at 8,000 volts.
3—(b-⅝ in.) Outriggers turned down; spark gap broke down at 20,000 volts. On re-test insulation failed at 7000 volts.
4, 5 and 6—Jumped from stud to hanger casting.
7—(a-⅝ in.) and 7—(b-¾ in.) Jumped from stud to hanger casting.

Test No. 12.—Breakdown Voltage; Conditions Wet:

Insulator was hung at angle of 45 deg. Spray was directed vertically downward on the insulator. No attempt was made to measure precipitation.

1—Jumped from stud to hanger casting.
3—(a-⅝ in.) Outriggers turned up; jumped from stud to hanger casting.
3—(b-⅝ in.) Outriggers turned down; jumped from stud to hanger casting.
4, 5 and 6—Jumped from stud to hanger casting.
7—(a-⅝ in.) and 7—(b-¾ in.) Jumped from stud to hanger casting.

Notes on Tests of West End Hangers

Test No. 13.—Tensile Strength; Conditions Normal:

1—Broke ⅝-in. bolt; cracked outrigger; broke insulation slightly.
2—(a-¾ in.) and 2—(b-⅝ in.) Broke insulation away from head of stud.
3—(a-⅝ in. long stud) Broke insulation away from head of stud.
3—(b-⅝ in. short stud) Broke outrigger; cracked insulation on head of stud.
4 and 5—Broke insulation away from head of stud.
6—Broke outrigger and insulation on head of stud.
7—Broke outrigger; cracked insulation very slightly.

Test No. 14.—Tensile Strength; Conditions, Temperature of 150 deg. F.

The insulators used in this test were placed in water, which was kept at a temperature of 150 deg. F. for one hour before testing.

3—(a-⅝ in. long stud) and 3—(b-⅝ in. short stud)—Pulled insulation loose from head of stud.
4—Pulled insulation loose from head of stud; cracked outrigger.
5 and 6—Pulled insulation loose from head of stud.
7—Broke outrigger.

Sample From Firm No	Test No 13 Tensile Strength Conditions Normal		Test No. 14 Tensile Strength Conditions Temp. 150° Fahr		Test No. 15 Side Strain Conditions Normal		Test No. 16 Side Strain Conditions Temp. 150° Fahr.		Test No. 17 Breakdown Voltage Conditions Normal		Test No. 18 Breakdown Voltage Conditions Wet	
	Size In.	Load in lbs.	Size In.	Load in lbs.	Size In.	Load in lbs.	Size In.	Load in lbs.	Size In.	Voltage	Size In.	Voltage
1	⅝	7,910	.....	.....	⅝	4,230	.....	.....	⅝	13,500	⅝	9,000
2	a-¾	3,200	.....	.....	a-¾	6,230	.....	.....	a-¾	15,000	a-¾	8,000
	b-⅝	4,700	.....	.....	b-⅝	4,030	.....	.....	b-⅝	15,000	b-⅝	6,000
3	a-⅝	7,100	a-⅝	3,100	a-⅝	3,210	a-⅝	6,570	a-⅝	13,000	a-⅝	5,000
	b-⅝	6,970	b-⅝	4,590	b-⅝	7,700	b-⅝	8,060	b-⅝	13,000	b-⅝	5,000
4	¾	3,810	¾	4,110	¾	5,200	¾	8,760	¾	13,500	¾	8,000
5	¾	2,800	¾	2,000	¾	6,230	¾	3,800	¾	13,000	¾	9,000
6	⅝	11,290	⅝	1,200	⅝	5,960	⅝	5,600	⅝	13,000	⅝	5,000
7	⅝	3,040	⅝	2,420	⅝	7,890	⅝	7,730	⅝	13,000	⅝	5,000

Test No. 15.—Side Strain; Conditions Normal:

1—Broke ⅝-in. bolt; crushed insulator slightly.
2—(a-¾ in.) Broke ¾-in. bolt; cracked insulation.
2—(b-⅝ in. Broke ⅝-in bolt; crushed insulator; bent stud.
3—(a-⅝ in., long stud) Broke ⅝-in. bolt; insulator only slightly damaged.
3—(b-⅝ in., short stud) Broke ⅝-in. bolt; bent stud; cracked insulator; cracked petticoat of casting.
4 and 5—Broke ¾-in. bolt; crushed insulation
6—Broke ¾-in. bolt; cracked insulation slightly.
7—Broke ⅝-in. bolt; bent stud; crushed insulation.

Test No. 16.—Side Strain; Conditions, Temperature 150 deg. F.

The insulators used in this test were placed in water which was kept at a temperature of 150 deg. F. for one hour before testing.

3—(a-⅝ in., long stud) and 3—(b-⅝ in., short stud) Bent stud until ⅝-in. bolt broke; insulation slightly cracked.
4—Bent stud until ¾-in. bolt broke.
5—Bent stud and crushed insulation.
6 and 7—Bent stud until ⅝-in. bolt broke.

Test No. 17.—Breakdown Voltage; Conditions Normal:

1—Jumped from stud to hanger casting.
2—(a-¾ in.), 2—(b-⅝ in.) and 3—(a-⅝ in., long stud)—Jumped from stud to hanger casting.
3—(b⅝ in., short stud)—Jumped from stud to hanger casting.
4 and 5—Jumped from stud to hanger casting.
6—Punctured side of stud about 1¼ in. from bottom.
7—Jumped from stud to hanger casting.

Test No. 18.—Breakdown Voltage; Conditions Wet:

Insulator was hung at an angle of 45 deg.; spray was directed vertically downward on the insulator; no attempt was made to measure precipitation.

1, 2—(a-¾ in.), 2—(b-⅝ in.), 3—a-⅝ in., long stud), 3—(b-⅝ in., short stud), 4, 5, 6 and 7—Jumped from stud to hanger casting.

Sample From Firm No.	Test No 19 Tensile Strength Conditions Normal		Test No 20 Tensile Strength Conditions Temp. 150° Fahr.		Test No 21 Side Strain Conditions Normal		Test No 22 Side Strain Conditions Temp 150° Fahr		Test No 23 Breakdown Voltage Conditions Normal		Test No 24 Breakdown Voltage Conditions Wet	
	Size In.	Load in lbs.	Size In.	Load in lbs.	Size In.	Load in lbs.	Size In	Load in lbs	Size In	Voltage	Size In	Voltage
1	⅝	9,500	.....	.....	⅝	5,550	.....	.....	⅝	14,000	⅝	7,000
2	a-⅝	6,630	.....	.....	a-⅝	3,500	.....	.....	a-⅝	14,000	a-⅝	6,000
	b-⅝	11,560	.....	.....	b-⅝	4,700	.....	.....	b-⅝	16,000	b-⅝	6,000
3	⅝	8,640	⅝	4,400	⅝	7,570	⅝	4,700	⅝	15,000	⅝	7,000
4	¾	11,440	¾	2,310	¾	5,820	¾	7,700	¾	17,000	¾	7,000
5	⅝	4,900	⅝	1,080	⅝	5,040	⅝	4,900	⅝	18,000	⅝	6,000
6	⅝	8,200	⅝	1,000	⅝	6,800	⅝	4,000	⅝	19,000	⅝	8,000
7	⅝	9,170	⅝	2,140	⅝	7,200			⅝	18,000	⅝	6,000

Notes on Tests of Cap and Cone Hangers

Test No. 19.—Tensile Strength; Conditions Normal:

1, 2—(a-⅝ in.), 2—(b-⅝ in.), 3, 4, 5, 6 and 7—Broke cap insulation.

Test No. 20.—Tensile Strength; Conditions, Temperature of 150 deg. F.

The insulators used in this test were placed in water which was kept at a temperature of 150 deg. F. for one hour before testing.

3—Broke cap.

4, 5 6 and 7—Pulled stud down in cap.

Test No. 21.—Side Strain; Conditions Normal:

1—Crushed both cap and cone.

2—(a-⅝ in., plain) Split both cap and cone.

2—(b-⅝ in., galvanized rim) Crushed both cap and cone.

3—Bent stud and crushed cone and cap.

4—Bent stud and crushed cone and split cap.

5—Crushed cone and split cap.

6 and 7—Crushed cone, split cap and bent stud.

Test No. 22.—Side Strain; Conditions, Temperature 150 deg. F.

The insulators used in this test were placed in water, which was kept at a temperature of 150 deg. F. for one hour before testing.

3—Crushed cone and split cap.

4—Crushed cone; forced stud sideways in cap.

5 and 6—Crushed cone and split cap.

Test No. 23.—Breakdown Voltage; Conditions Normal:

1, 2—(a-⅝ in.), 2—(b-⅝ in.), 3, 4, 5 and 7—Jumped from stud to hanger casting.

6—Jumped from stud to hanger casting, inside of cap, across top surface of cone.

Test No. 24.—Breakdown Voltage; Conditions Wet:

Insular was hung at an angle of 45 deg. Spray was directed vertically downward on the insulator. No attempt was made to measure the precipitation.

1, 2—(a-⅝ in.), 2—(b-⅝ in.), 3, 4, 5, 6 and 7—Jumped from stud to hanger casting.

THE MOFFAT TRIP

The concluding feature of the Denver convention of the American Street & Interurban Railway Association occurred yesterday when a trip was made to Corona over the "Moffat Road." This is the popular name of the Denver, Northwestern & Pacific Railway, which is being built between Denver and Salt Lake City and will be much shorter than any of the existing routes. At present the road is open for a distance of 214 miles from Denver, but its highest point is at Corona, 65 miles from that city. Here the road crosses the Continental Divide at an altitude of 11,660 ft., and for this reason is said to be the highest standard gage railroad in the world.

The convention party traveled by special train to Corona and as there were so many who wished to go, a train of two sections, each made up of seven cars, was required. Altogether 721 passengers took the trip.

The start was made from Denver at 9 o'clock and the foot hills were reached about a half an hour later. As the heavily loaded trains, each drawn by two locomotives, slowly ascended the heavy grades and passed through many tunnels and across deep ravines, beautiful vistas were presented to please the eye at almost every turn. To gain the proper altitude the road follows a very sinuous course and the trains often pass the same object several times, each time at a different elevation, as they steadily climb the ascent. Several stops were made on the trip up, so that the tourists could enjoy the views from vantage points. Many carried cameras and used them frequently.

Corona is surrounded by perpetual snow and consists simply of the railroad station and snow shed. Here the party disembarked and a group photograph was taken amid the snow. Several of the more venturesome then climbed the top of a peak near the station and some 300 ft. higher than it. Those who did so were amply repaid by the extensive panorama presented of snow-capped mountains as far as the eye could reach.

The return trip was made in about the same time as the ascent, one section leaving about 1:30 p. m. and the other at about 2 p. m. The trip was carried out under the auspices of the entertainment committee of the Manufacturers' Association.

STORES, ACCOUNTING AND INVENTORY*

By E. S. Pattee, Secretary and Comptroller, Twin City Rapid Transit Company

The intention of the writer is to set forth in a general way the features of stores accounting that require special attention without attempting to cover all the necessary details, these being subject to the decision of the chief accountant, who will, of course, be governed by local conditions.

The results that should be attained by an efficient system of storehouse accounting are twofold: A thorough check on all material received, thereby assuring proper value for all moneys paid out; the correct distribution of material drawn on account of operating and construction expenses.

While the purchasing department is and should be a separate and distinct department, it is so closely connected with stores that a few words are necessary in connection with the receipt of goods.

All purchases should be made by the purchasing agent; all requests for the purchase of material should come from the storekeeper, and all goods so purchased should be consigned to storehouse as far as possible, that the receiving books, from which to check and pass invoices, may be complete.

All invoices of purchases should be received first by the purchasing agent for the checking of prices and by him immediately forwarded to the storekeeper. The purchasing agent should also note on invoice the f.o.b. point, thus informing the storekeeper whether the freight is to be paid by the company or to be charged back to the shipper. All goods should be carefully received by the receiving clerk and entered on his receiving books.

In the regular course, the invoice will be received at the store house and checked against the receiving book by another clerk and any discrepancy noted. If a shortage appears it is reported to the purchasing agent for him to make claim before settlement of invoice. If invoice agrees with actual receipt, as shown in receiving book, the entry is then completed showing the f.o.b. point, deduction of freight (if any), date of passing of invoice, etc.

The above applies only to goods purchased. As some of the companies here represented do more or less manufacturing, we can not well ignore that feature, even though not of particular interest to the majority.

When the storekeeper receives a requisition for goods of this nature he fills out a form of order, requesting the master mechanic to make the articles required. This order is known as a stock order and is numbered. The labor, as well as the material, is charged against the stock order number, and all material left over is credited back. To this total is then added a fixed percentage of the labor charge to care for the non-productive labor and wear and tear of machinery of shops. The unit cost is then obtained and the goods turned back to the storehouse to be charged out as required at this unit cost. A sufficient part of the amount added for non-productive labor, etc., to eliminate the manufacturing feature, should be credited to the shop expense accounts and the balance credited to a shop tools and machinery renewal fund.

The above method would apply to any one or more articles made for a special purpose and not going into stock at all, but charged directly to the account affected. This would not be strictly a stock order, but might be distinguished by calling it a spare work order, with a different series of numbers from the stock orders.

When material is returned to the storehouse as scrap or second-hand for repairs, a practical method of handling it

*Abstract of paper read before the American Street & Interurban Railway Accountants' Association, Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

is to credit all of such material at a scrap price. Upon investigation, any that can be profitably repaired should be sent to the master mechanic for repairs on stock order. The article itself should be charged against the order at scrap price. To this should be added the cost of new material used and all labor, plus a fixed per cent for non-productive labor and wear and tear of machinery and the order should be credited with all material returned. When returned to storehouse this article then goes on the shelf at the scrap price, plus added labor and material as above.

As there is some material that does not pass through the storehouse a report on a form for this purpose should be filled out at once and sent to storekeeper signed by the head of department who receives it, informing the storekeeper of the receipt of such goods and their condition.

The suggestions made in this paper are based on the assumption that all the employees in any way connected with accounting, including the storekeeper and employees, shop clerks and track timekeepers, are the employees of the chief accountant, whether he be comptroller or auditor.

The storekeeper should keep in close touch with his stock and should be held responsible for having at all times a sufficient stock of all standard material at hand. On the other hand, he should exercise great care not to have an overstock at any time, thus tying up the company's funds. As an aid to this end a system of cards showing the amount of each class ordered and used is suggested, the above to apply to manufactured goods as well.

The method of pricing out goods varies materially. The method the writer would suggest, however, is that all material be charged out at the last purchase or manufactured price and all scrap credited likewise at last selling price.

All material and supplies delivered from the storehouse should be on requisitions which should be approved by one officer, preferably the general manager, the only exception being the material used in shops for maintenance and that used on work covered by a stock order or an approved authorization.

A suggestion for economy and accuracy in handling material drawn on material slips, based on the assumption that the storehouse is as it should be, adjacent to the shops, is as follows:

Install a telephone system connecting each shop with a switchboard in the storehouse, the switchboard to be handled by a storehouse man, who knows material thoroughly, and who is supplied with a list of all order numbers and authorizations. As material is wanted in a shop the shop material man anticipates the demand and telephones the storehouse the order, stating for what the material is to be used. The storehouse man then makes out the material slips in triplicate, taking care that the material on each slip is chargeable to but one account. He retains one and passes two copies to a storehouse employee who fills the order and delivers the goods. The shop material man signs one of the slips, acknowledging receipt of goods, and keeps the other copy. This system saves the time of high-priced mechanics getting their material together and is a check on ordering, as the storehouse man will question closely if, in his judgment, the material requested does not correspond with what the order number calls for.

Here is a suggestion for a correct distribution of time: Before quitting work each day the foreman of the shop informs each man what he will start at in the morning. He also informs the clerk, the clerk then making out a time sheet for each man to cover the work indicated by the foreman. Before leaving at night each man gets his time sheet and when he arrives in the morning proceeds accordingly. When this job is finished he returns the time sheet to the clerk, who stamps the time on it and gives him another sheet filled out for such other work as the foreman has instructed, along with the time of starting. In this way no man is at any time forced to waste a moment's time between jobs, as his time sheet, showing what he will do next, and the materials to be used in the work, are always waiting for him.

The exchange basis for furnishing supplies for stations is suggested. This method does away with all requisitions from stations except for articles where exchange is not possible, such as stationery, etc. The stores department is thus relieved of back orders and other annoyances connected with a large number of requisitions. Each station is supplied with a small stock of stores, carefully inventoried, of which a record is kept, the station being treated as a sub-storehouse. These supplies are used by repairmen as needed, the old or scrap part being carefully preserved for exchange for a new part. A supply car containing a full assortment of supplies, in charge of a capable storehouse man and clerk, makes a daily trip collecting all scrap and giving a new part in exchange therefor to make good the stock. This new part is charged out on material slips to the proper account by the clerk and the old parts are credited, both charge and credit slips being turned in daily to the storehouse. Of course, this system calls for a careful inventory and a possible adjustment at the close of the year, but this adjustment is a small matter.

With the foregoing suggestions all charges for labor as well as material are absolutely in the hands of the stores acountants, thus insuring a correct distribution. The writer believes this to be a very important point and feels that too much emphasis cannot be put upon the necessity for care in making both material and labor slips, as they are, the basis of the accounting.

Track scales at the storehouse for weighing all material received in carload lots, as well as scrap sold, will be found of immense value. Particularly is this true in the case of fuel, which is often invoiced as of one weight, while the railroad freight bill shows another, thereby causing much correspondence and no end of annoyance before the difference is adjusted. By the use of your own scales you are able to figure accurately your consumption for each month and incidentally may be able to reduce the cost of fuel.

The class of material that perhaps causes the most annoyance, and incidentally may be the large factor in any discrepancy between book balance of stores at the close of the year and actual inventory, is the track material. In the opinion of the writer, correct accounting for this class of material is only obtained where such material is directly under the control of and delivered by the storekeeper under the same conditions as any other class of material.

As it is desirable to take inventory as quickly as possible, it is suggested that a crew of men go through the stock and ascertain the exact quantity of each article on hand, attaching a card with the quantity stated thereon. On this card may be shown the deductions from or additions to for the few days previous to the actual taking of the inventory. When this time arrives a large enough force should be put on to take down the entire stock in one day, this being possible if complete lists of material with prices attached have been made out previously.

After the sheets have been priced, extended and checked and all the adjustments made, the total is checked against the book balance.

The writer, in spite of the most scrupulous care and watchfulness on the part of a trained force of storehouse accountants thoroughly conversant with all material and accounts, invariably finds an average at the close of the year's business, in the adjustment of which the operating and construction accounts receive their proportionate credits.

Some of the properties here represented may be composed of two or more underlying companies whose accounts must be kept separate. This condition would in no wise affect the stores accounting principles. The different accounts of a general nature may be apportioned to each separate company on a mileage or any other acceptable basis.

QUESTION BOX OF THE ENGINEERING ASSOCIATION*

KEY TO ANSWERS TO QUESTIONS

No.	Name.
1.	Anderson, Ind., Indiana Union Traction Company.
2.	Anonymous.
3.	Baltimore, Md., United Railways & Electric Company of Baltimore; William A. House, president.
4.	Boston, Mass., Boston & Northern Street Railway Company; G. W. Palmer, Jr., electrical engineer.
5.	Denver, Colo., Denver City Tramway Company; W. H. McAloney, superintendent rolling stock.
6.	East St. Louis, Ill., East St. Louis & Suburban Railway Company; M. M. Lloyd, master mechanic.
7.	Fort Wayne, Ind., Fort Wayne & Wabash Valley Traction Company; L. W. Jacques, master mechanic.
8.	Fort Worth, Texas, Northern Texas Traction Company; H. T. Edgar, manager.
9.	Kansas, University of; George C. Shaad, professor of electrical engineering.
10.	Kingston, N. Y., Kingston Consolidated Railroad Company; C. Gordon Reil, vice president.
11.	Madison, Wis., Southern Wisconsin Railway Company; Dudley Montgomery, vice president and superintendent.
12.	Mobile, Ala., Mobile Light & Railroad Company; S. M. Coffin, master mechanic.
13.	Mobile, Ala., Mobile Light & Railroad Company; J. H. Wilson, president.
14.	Newark, N. J., Public Service Railway Company; R. E. Danforth, general manager.
15.	Newark, N. J., Public Service Railway Company; E. J. Dunne, superintendent of distribution.
16.	Newark, N. J., Public Service Railway Company; Dudley Farrand, general manager electrical department.
17.	Newark, N. J., Public Service Railway Company; C. Remelius, superintendent rolling equipment.
18.	Newark, N. J., Public Service Railway Company; Martin Schreiber, engineer maintenance of way.
19.	Newark, N. J., Public Service Railway Company; Martin White, superintendent maintenance of way.
20.	Philadelphia, Pa., Philadelphia Rapid Transit Company; James Heywood, superintendent lines and cables.
21.	Pittsburg, Pa., Standard Motor Truck Company; W. G. Price, mechanical engineer.
22.	Schenectady, N. Y., Schenectady Railway Company; B. Penoyer, engineer maintenance of way.
23.	Syracuse, N. Y., Syracuse Rapid Transit Railway Company; E. P. Roundey, engineer maintenance of way.
24.	Utica, N. Y., Utica & Mohawk Valley Railway Company; M. T. French, engineer maintenance of way.
25.	Washington, D. C., Washington Railway & Electric Company; L. E. Sinclair, acting for general manager.

POWER HOUSES

1. What experience has been had in the use of hot water meters in power plants?

Many experiments with hot water meters indicate that there are very few that even approximate accuracy in their indications. Those that test quite close to correct when new rapidly fall off in accuracy and often show erratic results. The Venturi type of meter is undoubtedly the best now on the market for this purpose. (16.)

We have used Venturi meters with indicating manometer very successfully on water up to a temperature of 212 deg. F. The calibration of this meter was checked by means of a weighing hopper and verified to within approximately 150 lb. in 33,000. Thus the Venturi meter is sufficiently accurate for any work in connection with boiler or station tests. (2.)

2. What have been the actual results of purchasing coal under contracts that specify a standard quality and price, with a sliding scale of prices covering variations in quality?

The result has been that the price we pay is commensurate with the quality only, and not quantity; it has also had the effect of keeping the quality nearer to the standard than it would be otherwise. (3.)

We purchase nut and slack coal under a guarantee as regards ash, moisture and sulphur, and B t. u's. During the early part of the contract the contractor was penalized, since then we have got a more uniform and better grade of coal, coming up to guarantee. (2.)

Our contract does not provide for a bonus as the contractor would not guarantee the B t. u's. to run as high as the analysis of his coal, consequently the contractor guaranteed 13,000 B. t. u. with penalty if coal went below that. (13.)

We purchase coal under contract but without any specifications or sliding scale covering variations in quality. (25.)

Our present contract specifies the quality of coal but we have no sliding scale of prices, the purchasing agent merely deducting whatever he thinks right from the bill whenever the coal does not come up to specifications. (2.)

3. Give an exact definition and basis on which power station load factors are worked out, especially in combined railway and lighting stations.

We supply railway current only and base our station load factor on the formula:

$$\text{Load Factor} = \frac{\text{Total daily output}}{\text{Rated capacity of station} \times 24} \qquad (3.)$$

The true definition of load factor is the ratio of the average demand made on the station to the maximum normal capacity of the station. A station would have a load factor of unity if it were loaded to its maximum continuous capacity 24 hours each day. On account of the fact that the ratio between the maximum capacity and the maximum load on any station is a changing quantity, it is customary to calculate the load factor on the basis of maximum demand and not on the basis of maximum capacity. The definition then becomes: the load factor of a station is the ratio of the average load to the maximum demand on the station. This is the definition commonly used in practice. The load factor may be calculated for any period of time, a day, a month, a year. In any case it is the average load for the period divided by the maximum load occurring during that interval of time. In central station practice the load factor for periods of less than one year has little significance. One company, which has the management of several stations that supply a combined load of lighting and railway power, records the load factor for each station at the beginning of every month as calculated for the year just ended. The load factor in this case becomes:

$$\text{Load Factor} = \frac{\text{Output for year just ended, in kw hours}}{\text{Maximum load in kw during year} \times 8760.} \qquad (9.)$$

We take the maximum ampere or kw demand for any time during the 24 hours, multiply by 24, and divide this into the daily output for the day, which gives us our load factor for the day (25.)

Load factor means the ratio between maximum load and output and is obtained by dividing output by maximum load, multiplied by time. Thus:

$$\frac{\text{Maximum load (in kw)} \times \text{time (in hours)}}{\text{Total output for same time (expressed in kw hours)}}$$

For instance, if the max. load in a station is 1,000 kw and the output for 24 hours is 12,000 kw hours, the load factor is 50 per cent, viz.:

$$\frac{1{,}000 \times 24}{12{,}000} = 50$$

This applies equally to any station, whether lighting or railway. In many cases superintendents use the station capacity, or machine rating, instead of actual maximum load, but this method is very misleading and not correct. (16.)

TRACK

4. How does the cost of steel ties in concrete compare with with that of wooden ties laid in concrete, and what life is expected for steel ties?

We use steel ties 4 ft. on centers, costing $1.76 apiece with fastenings; wooden ties 3 ft. apart, costing 76 cents apiece. Steel ties should last 20 years at least and then have a scrap value of almost half of first cost. Scrap value of wooden ties would be from 2 to 10 cents. (2.)

One steel tie (Carnegie, 14½ lb.), costing $1.77, replaces three 6-in. by 8-in. by 8-ft. wooden ties, spaced 24-in. centers, costing $2.16. Excavation with steel ties, 4-2 cu. ft. per ft. of track; with wooden ties, 8-5 cu. ft. per ft. of track, an increase of 8 cents per ft. of track when excavation costs 50 cents per cu yd.; track laying and surfacing with steel ties costs 20 cents compared with 50 cents per ft. with wooden ties on stone ballast, that generally require two and, in places, three tampings. Assuming top of concrete at base of rail, with steel ties concrete extends only 6 in. below rail, except concrete beam 12 in. wide extends 6 in. under tie. If 6-in. concrete is placed under wooden ties about 2 cu. ft. per ft. of track would be required in excess of concrete for steel ties. At $4.50 per cu. yd. this amounts to 33 cents per ft. of track. Two spikes per ft. of track, costing 3 cents, are saved. The total saving per ft. of single track with steel ties is thus about $1.13. Steel ties should last at least as long as the best wooden ties. (24.)

Wooden ties on 2 ft. centers, and steel ties on 5 ft. centers cost about the same.(2.)

5.—(a.) Does the gage line of both rails on straight track wear equally, and if not, what causes one rail to wear more than the other?

(b.) Does such unequal wear occur on high speed lines only?

(c.) On what foundation is the track? (d.) What kind of ballast? (e.) What rail section?

(f.) Are both rails bonded, and if only one is bonded, which rail wears most?

(g.) What kind of trucks?

(a.) Both rails should wear equally on gage lines if rails are surfaced level and motors are suspended alternately on right and left sides. The leading wheel of a car on the gear side generally shows more wear than the other wheels, as driving force is exerted at an oblique angle to the rail, being more noticeable when the gear and pinion become worn. This tends to wear the rail on that side, but suspending motors alternately should prevent unequal rail wear. Heavy wagons wear gage in turning out to the right from double tracks. Passengers are liable to sit on right side of car, thus bringing heavier loads on outside rails of double tracks. (24.)

(a.) Gage line of both rails on straight track usually wears equally if the track is in perfect line and surface. If the track is not in line and surface the tendency is to shift with service from side to side, causing unequal wear to the gage lines of the rails. (25.)

(a.) The difference in the wear of the two rails has been so immaterial as not to engage our serious attention up to this time. (3.)

(a.) City track in pavement; outside rail (double track) shows excess wear over inside rail due to outside rail being surfaced ½ in. low in order to conform to street surface contour. (22.)

(a.) No. Depends on manner trucks are set and the weight distributed. (19.)

(b.) Unequal wear should be more noticeable on heavy city grades where wheels slip and spin. (24.)
(b.) Not necessarily. (25.)
(b.) Low speed (city lines.) (22.)
(b.) No; on both high and low speed lines equally. (19.)
(b.) Not necessarily. (21.)
(c, d, e.) Would apply to track on most any kind of ballast, foundation, or rail section. (25.)

* Presented and discussed by the American Street & Interurban Railway Engineering Association at Denver, Colo., Oct. 4, 5, 6, 7 and 8, 1909.

(c, d, e.) See answer to Question 5 (a.) (3.)
(c, d, e.) Track foundation sand, ballast concrete, rail section 7-in. and 9-in. girder. (22.)
c, d, e.) Not due to kind of track foundation, ballast or rail, but due to reasons outlined in answer to Question 5a. (24.)
(d, e.) Generally with rock ballast T or girder rail sections. (19.)
(f.) Both rails bonded. (22, 25, 19, 2.)
(f.) I do not believe bonding has anything to do with rail wear. (24.)
(g.) Brill trucks 27-E-1 and 27-E-2, double, and 27-E-1, single. (22.)
(g.) Believe "maximum traction" trucks damage more than others. (24.)

6. What is the most satisfactory manner of testing for defective bonds in pavements?

Using Roller bond tester, which indicates conductivity of bond as compared with feet of rail. (25.)

Probably by a well equipped car for the purpose, such as the one used by Herrick, or a voltmeter test. (3, 19.)

We have got very satisfactory results from a bond tester purchased from the Western Electric Company. (10.)

Preliminary test, "Tee Pole" testing outfit, check test, milli-voltmeter. (22.)

Herrick test car. (23.)

Testing bonds with special car is most satisfactory. Hand instruments measuring joint resistance in comparative length of abutting rail are fairly satisfactory. (24.)

7. What is the average cost of creosote block pavement, laid on concrete foundation?

$3.25 per square yard. (25.)

$3.55 per square yard. (3.)

About $3.45 per square yard laid on 6 in. of concrete. (24.)

$2.75 per square yard. (19.)

$5.50 per square yard paving, with concrete beam under rails and concrete to bottom of ties. $4.50 per square yard paving, with concrete to bottom of tie under rails and 6 in. of concrete under balance. (2.)

8. What is the average life of creosote block pavement?

None in use longer than four years. This apparently is in as good condition today as when it was laid. (3.)

14 years. (19.)

9. Do physical and chemical tests show any difference between rolled manganese steel rails and cast manganese steel rails? Give details and recommendations?

Yes; but the rolled manganese rail and cast manganese rail could have same chemical test, but show a difference in physical tests. It is more difficult to drill or plane the present cast manganese steel that is in general use for special work than the rolled steel rails that up to this time have been offered to the trade. (18.)

10. Is it practicable and advisable to adopt a standard set of track maintenance rules for city and also for interurban lines, including both streets and private right of way?

Yes. (25, 3, 24, 23, 18.)

No. (22.)

11. Have electrically brazed or soldered bonds, placed on outside of rail-head in paved streets, or in streets graded to top of rail, proved satisfactory? Give some figures.

Soldered bonds placed on the outside of rails in streets graded to the top of the ties have proved most unsatisfactory, and have been replaced by the twin plug terminal exposed bond, also fastened to the head of the rail, which has given excellent results. (3.)

Have no brazed bonds. Soldered bonds have proven unsatisfactory in test made with five different makes placed on outside of head of 65 lb. T-rail. Out of a total of 444 bonds, placed in 1907, 83 were off, 64 were loose at one end, and nine had defective strands, in February, 1909. Some of these bonds, among them those giving poorest results, were placed by repsentatives of the makers. (24.)

No. (19.)

12. What is the life of cast weld joints on new rail laid with good foundation in paved street?

We have some cast weld joints which were placed on new rails laid 10 years ago on slotted track, which is supported on cast-iron yokes, spaced 5 ft. center to center. They will probably last as long as the rail. (25.)

As long as the rail. (3.)

After a four years' service under 12-ton cars, running on a 10-minute schedule, our cast weld joints on 72 lb. 6 in. T-rail are in very good condition. (11.)

It would depend on car movement. Cast welded joints from tee to girder rail sections installed 1904 on 7½-minute lines, estimated life 10 years. (22.)

Satisfactory at end of five years. (2.)

13. How close should ties be spaced on track laid with 6 in. of crushed stone underneath the ties and 4 in. of concrete between the ties; ties 8 in. by 8 ft.?

About 2 ft. 6 in., center to center. (25.)

2 ft. centers. (3, 10, 22, 24, 23.)

15. What is the life of one of the best mechanical joints put on new rail laid with good foundation in paved street?

Our experience with mechanical joints has not been entirely satisfactory, as in almost all instances, in the course of three or four years the paving has had to be opened and the joints tightened. We have adopted electrically welded joints as our standard. (3.)

About six years ago with 12-ton cars running on 10-minute schedule. We expect to cast weld the joints. (11).

Varies according to car movement; special support joints have failed in from 3 to 5 years. (22.)

"Clark" joints and other good makes of mechanical joints, when properly installed and surrounded by concrete and pavement, should last as long as the rails. (24.)

Less than the life of the rail. (2.)

16. What is the life of electric welded joints put on new rail laid with good foundation?

The same as that of the rail itself. (3.)

Of 1,325 joints welded in September, 1905, about 1 per cent have developed breaks to June, 1909. (22.)

17. How long should concrete be allowed to set, under and between rails, before allowing cars to run over same?

If mixture is strong, and weather favorable, 15 to 20 hours should be sufficient. (25.)

Three to seven days, depending upon the equipment and the traffic conditions. (3.)

With proper precautions it is not necessary to stop cars to allow concrete to set. (10.)

Not less than four days. (22.)

Concrete should set at least one week before car operation begins. (24.)

Ten days at least, and longer, if possible. (23, 2.)

Seven days. (19.))

18. Is the use of soapy water, in place of oil, in general use as a lubricant for drills used in boring holes for copper rail bonding to improve conductivity of contact?

Strictly prohibited on our system. We have used, with good results, a solution of bicarbonate of soda. (3.)

We do our drilling for bonds dry. (11, 23.)

Use oil. (22.)

Clear water is preferable to soapy water. (24.)

CAR HOUSE CONSTRUCTION

19. What percentage of the length of a car storage house (first floor) should be of open pit construction?

About 30 per cent. (25, 3.)

25 per cent. (7.)

About 50 per cent. (11, 2.)

All car house storage tracks should be of pit construction. (8.)

Depends on the number of cars and the equipment; ordinarily about two-thirds. (18.)

For at least 25 per cent and, better, 30 per cent of the total number of cars in the house. (2.)

20. What is the opinion of the Association regarding the necessity of aisle sprinklers when the ceiling sprinklers are not more than 18 ft. above the top of the rail?

If the ceiling sprinklers are located in sufficient numbers, aisle sprinklers should be unnecessary. (3.)

Not necessary. (18.)

Aisle sprinklers in line with car ventilators. (2.)

We believe that regardless of the height of the building, the aisle sprinklers are a needed protection, and should be installed so as to play on one side of every car at least, for if there should be a large amount of draft, the fire would probably spread from car to car without being controlled by the ceiling heads. Furthermore, the aisle sprinklers are generally installed with separate mains from the ceiling sprinklers, thus lessening the possibility of a section being without protection on account of repairs to apparatus. (2.)

LINES—OVERHEAD AND UNDERGROUND.

21. Given a network of street railway lines fed from several 600-volt, d. c. stations and substations: (a) Would you install trunk line feeders to tie the stations together so that they might help each other in case of trouble? (b) Or would you extend and connect the ends of certain feeders so that in addition to feeding a section they might serve as tie lines? (c) What proportion of station or substation capacity would you provide in the capacity of such trunk lines or tie lines?

Where stations are not more than 1½ miles apart, method (a) is preferable. Where more than 1½ miles apart, method (b) should be adopted. (c) Say 25 per cent. (8.)

(b) Connect feeders so that they serve as tie lines. (c) Seventy-five per cent. (22.)

(a) As a general rule, no In especially indicated circumstances, yes. (b) Yes. (c) This must necessarily depend upon local conditions. In a general way it might be stated that the capacity of each individual trunk line should be such that their joint capacity would be equal to the average demand of the station, less any load that might be taken up by the feeder which migut be connected to another station than the one in question. (4.)

(a, b, c) I would extend certain feeders so that in addition to feeding a section they would serve as tie lines, and would also run a number of these feeders between stations so that in case of a trolley break or other accidents which would make it necessary to cut out a section there would be always some feeders available for tie lines between stations. I would supply at least 50 per cent of the capacity of the stations in the tie lines. (3.)

(a) No. (b) Yes. (c) One-third. (15.)

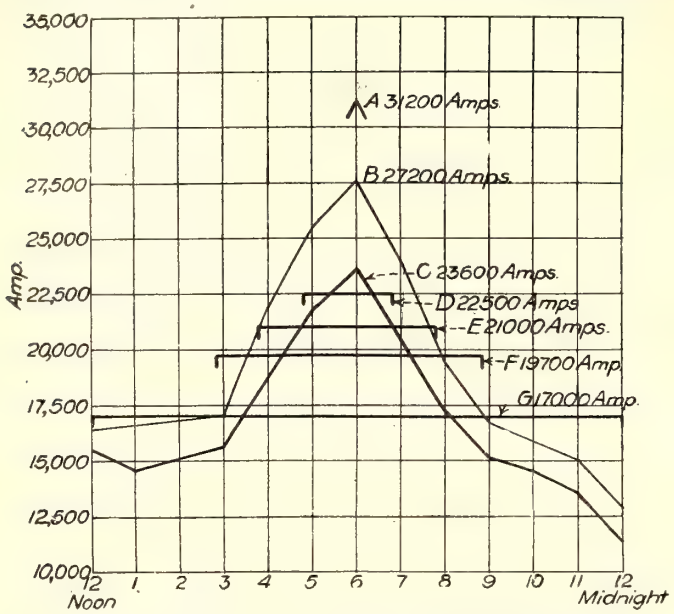
It has been found desirable to operate the stations on flat voltage characteristics, so that any sudden or unexpected demand near any one station will be shared by more distant stations. The feeder copper from the several stations into the tie-sections should be so laid out that the removal from service of one of the largest generating units at any station will not necessitate such lowering of bus-voltage at that station that the schedule speed of the cars will be seriously interfered with. (2.)

22. Given a network of street railway lines fed from several 600-volt d. c. stations: If the total system loads are similar to accompanying diagram, and if the morning and afternoon peaks are approximately the same, assuming underground distribution, by using paper insulated copper cables, would you calculate your feeders on the basis of the loads, as per values A, B or C in accompanying diagram, or would you use, say, the 2-hour or 4-hour value D and E and allow the overload capacity of the feeder cables to take care of the system through the peak period?

Would use value D with one spare cable. (3.)

Calculate value of feeders on basis of value C if only one feeder per section is used. (22.)

If the distances were short and the controlling feature was the ampere capacity or temperature rise of the cables, should



A—Momentary maximum observed.
B—Average maximum heaviest month.
C—Average maximum heaviest 3 months.
D— 2-Hour average of C.
E— 4-Hour average of C.
F— 6-Hour average of C.
G—12-Hour average of C.

calculate feeders on the basis of the load B; if the lines were long and the line loss was the controlling feature, should calculate feeders on the basis of value D. (4.)

14. What is the best method of getting good fitting combination joint plates, whether from the manufacturers of special work, or made in home shop?

Order from manufacturers, giving rail sections and amount of wear. Then turn over to a blacksmith with a portable forge and upset to exact fit on job. (25.)

From manufacturers of special work. (22, 3, 24, 2, 23.)

I would use the two-hour value and let the cable run overloaded during the peaks. (8.)

Would base our calculations on B. (15.)

We would calculate the feeders for the four months' average one-hour peak, and then the copper would have sufficient overload capacity to take care of the maximum loads that occur. (2.)

23. Can the life of cedar poles be prolonged by treatment? If so, to what extent, and by what method?

Yes, by either brush or tank treatment, but cannot say in the case of cedar poles, what percentage of extra life would be obtained. (4.)

Yes. (15.)

24. What is the best method of testing underground power cables? Interval between inspections and interval between tests?

Insulation test by use of voltmeter in series with conductor made about twice a month; inspections once a month. (3.)

Initial test, high voltage; after that a daily voltmeter test, which will generally detect deterioration before final failure. (20.)

For the insulation test a measurement of the insulation resistance is best. The interval between the inspections and tests will depend upon the importance of the line, possibility of trouble occurring, and the previous condition of the cables as shown by former tests. (4.)

Ordinary voltmeter test daily. (15.)

We have been testing our underground cables regularly for about 14 years. We use for the purpose: D'Arsonal ballistic galvanometer; Ayrton universal shunt box; one-third mfd. mica condenser; 220-volt home-made test tube storage battery, 140 cells; necessary keys, switches, etc. A portable outfit comprising the following pieces of apparatus is used for testing isolated pieces of cable: Special D'Arsonal ballistic galvanometer of Weston voltmeter type; Ayrton universal shunt box; one-third mfd. paraffin condenser; necessary keys, switches, etc.; line voltage is used for testing purposes. The so-called "Loss of Charge" method of testing for insulation resistance is used with an application that is dictated by our experience. Where earth currents are present this method, which is a ballistic one, is necessary. The more important of our cables we test once a week, others once a month, and still others once in six months or more. Inspection of cables in the manholes is made once in about every three months. (2.)

25. Is the use of galvanized Siemens-Martin steel strand for overhead supports found as satisfactory, both from a lineman's point of view as regards ease of manipulation and from a general manager's point of view as regards reduced maintenance charges, as the use of ordinary galvanized steel cable?

No. (3.)

Use ordinary galvanized steel cable. (22.)

26. Is the San Francisco practice, of putting out fires on wooden poles and crossarms of 13,000-volt a. c. lines by portable extinguishers while the conductors are kept in service, in general use?

We do not use it. (3.)

We have never attempted to put out a fire on the 15,000-volt a. c. wooden pole line until the current was cut out. (8.)

27.—(a.) Is the leasing of the feed-in tap from the underground feeder cable up through the inside of the iron side pole in successful, satisfactory use anywhere in this country? If so, where? (b.) In case this is done, what is the B & S size of the conductor, and what is the preferred insulation of that part of the feed-in tap that passes up the interior of the pole—giving all layers outside of the conductor? (c.) In this particular case is the conductor stranded or solid? (d.) In this same case is a cut-out installed in each feed-in tap, and if so, where is it located?

(a.) Yes, in Philadelphia. (b.) About 300,000 cm, with 6-32 in., 30 per cent rubber insulation, cloth tape, ⅛-in. lead sheath, cotton weatherproof braid outside. (c.) Stranded. (d.) Yes, at the top of the pole. (20.)

Our practice is to bring underground to overhead connections from the main conduit to cut-out boxes on poles through a 3-in. pipe (fiber preferred). Above the cut-out the wires are run open and properly insulated from the pole, using rubber insulated stranded copper wire. From the pole to trolley weatherproof wire is used, of 0000 capacity. (2.)

CAR BODIES

28. Is it better practice to use electric markers in connection with storage batteries on interurban cars than to use regular oil makers?

We consider oil markers preferable. Our system has a metallic circuit, and with electrical markers the battery does not charge properly. (25.)

Electrical markers in connection with storage batteries should not be used on account of danger from fire. We have found that electrical markers wired in connection with trolley circuit in combination with one oil marker on bumpers, using three markers on the rear end are best and safest. (7.)

No. (8, 1, 17.)

29. What is the most satisfactory position of the truck centers in relation to the "over all" length of car?

This is somewhat dependent upon conditions, but would say about 1¾ ft. to 3 ft. (7.)

Place body bolster as close to end of car as truck clearance on curves will allow. (12, 25, 2.)

Position of truck centers in relation to over all length of car, if possible, should be so there would be a downward stress in center of car. We have found it impossible to get truck centers on city cars far enough apart on account of drop platforms and sills. (12.)

30. Are the ventilating devices on cars more efficient with or without the monitor, or upper deck?

Without upper decks. (1.)

Have no definite knowledge, but think that the possibility of eliminating weight of monitor deck would warrant thorough tests. (5.)

We consider ventilating devices more efficient with monitor decks. (17.)

I believe the monitor type will be replaced with cars so constructed as to eliminate the extra weight necessary for this style of top. It would be better to obtain fresh air from a more indirect source than through any ventilator sash in the side of the monitor. Efforts should be made to ventilate by exhausting the foul air, thus drawing in fresh air. If it is possible to so arrange a device that will cause this suction without moving parts, it would seem that it could best be arranged at the end of a car roof without monitor, better than through the sides of the upper deck. To successfully do this, however, on a surface car with a maximum speed of about 10 to 12 miles an hour is, to my mind, the whole problem. (2.)

31. What is altogether the most satisfactory disinfectant to be regularly used on the interior of closed city cars? Interurban cars?

We use "Chloro Naphtholeum." (25.)

None is thoroughly satisfactory. (7.)

We use with excellent results "Excelsior" disinfectant. (3.)

Kilitol. (1.)

Preparation derived from coal tar more pleasing and lasting in an enclosure than formaldehyde. Spraying each time car is cleaned is sufficient for city cars, and for interurban cars something in cake form to hang in car in addition, may be advisable. (5.)

In our experience, formaldehyde sprayed in all parts of car is best. (17.)

32. In your particular locality, approximately, what actual saving in cost for power can be effected on one car for one year, or for 100 miles run, by reducing the dead weight of an average city car by 100 pounds?

Estimated $4.00 per 100 pounds per year for city car operating about 40,000 miles. (20.)

Approximately 0.3 kw hour per 100 lb. per 100 miles. (11.)

33. What is the best method of car washing with special reference to the preservation of outside varnish?

We use "Amberzo" to clean cars and then wash off well. Have found this to be very good. (25.)

With clean, cold water. (7.)

For a number of years have used Columbia oil soap, as, with care, this removes the dirt without the least harm to the varnish, and is in turn easily washed off with water. (3.)

Flushing. (11.)

Imperial Car Cleaner. (1.)

Use clear, cold water through brush—hose connected directly to water main. (6.)

We use a linseed oil soap of medium strength and mix half

pound of soap to one gallon of water for a stock solution and dilute to suit work. If cars are kept in good order the stock should be diluted with equal quantity of clear water, but if very dirty, may be used full strength. We use sponge and brush. A very important point is to rinse well with clear water. Natural finish inside should be rubbed dry with chamois skin. (12.)

If dirt is such as can be removed by water alone, good, clear water, free from alkali, no doubt is not injurious to varnish, but we think that car cleaners can be used which, while they may not prolong the life, are not damaging, and with this manner of cleaning, water does not soak into joints. (5.)

Wash car once a month with linseed oil soap, using only clean water in the intervals. (17.)

First remove all dirt and dust by the application of soap and water, the soap containing only sufficient alkali to saponify the oil or grease present. Wash copiously with water and after all grit has been removed an oil cleaner should be applied, of which there are several good ones on the market. We have recently tried a so-called soluble oil which when mixed in the proportion of one part oil to five parts water makes an excellent emulsion. A small quantity of ammonia added to this provides cleansing properties that we have found advantageous. (2.)

35. What is the average life of a closed passenger car, an open car, and a service car?

Fifteen years in each case. However, it has been our experience that cars get out of date and are scrapped or sold before they are worn out. (25.)

Fifteen years, twenty years and ten years, respectively. (7.)

Closed cars used about six months in the year should last at least 30 years with proper care; an open car, under the same conditions, 25 years. (3.)

Twelve years. (11.)

We are still running closed cars purchased in 1893, yet are having to make repairs on modern semi-convertible cars purchased in 1904-5. The first have all been rebuilt once, some twice, and the last will soon have to go through the shop for heavy repairs. Open cars purchased in 1893-4 have all been rebuilt twice and do not make as many miles in the year, so do not see how to arrive at a definite answer. (12.)

Average closed or open car, if exposed to weather when out of service, 16 years; protected under sheds, 20 years. Service cars 10 to 12 years. (17.)

36. What percentage of the original cost each year should be deducted for depreciation?

Twenty per cent. the first year and 10 per cent. from the value of the car each year thereafter. (25.)

Depreciation should be figured at a continually increasing rate. Having agreed upon the ultimate scrapping value of the car, and the probable duration of its usefulness, the rate of depreciation should increase from 0 per cent. to 95 per cent. (if 5 per cent. has been fixed as the scrapping value). In other words, the depreciation can be figured by plotting a logarythmic curve. (3.)

Fifteen per cent. (12.)

Depreciation greatest the first year, but would average from 5 to 6 per cent. on passenger cars and from 8 to 10 per cent. on service cars. (17.)

37. What value is placed on a car after it has outlived its usefulness?

About 20 per cent. (25.)

Of no value whatever. Should be destroyed. (7.)

The average scrap value is about 5 per cent. of the first cost. (3.)

The value of the iron, glass and brass trimmings. (6.)

38. Which is preferable on strap-wound armatures, one or two part coils?

One-part coil for motors of 75 hp or under. (25.)

The two-part coils are giving good satisfaction. (7).

One-part coils. (1, 3.)

One-part coil is preferable because the trouble at the connection of the parts of the coil overbalances the advantage gained by being able to replace the top half of the coil without disturbing bottom half.

39. From experience of the past year with vacuum process of coil impregnation, is such treatment considered more or less valuable than it was a year ago?

More valuable. (3, 7, 10, 5, 17, 2.)

40. For motors of 50 hp or under, are commutating fields desirable?

Do not think so. (25, 3.)

Yes. (11,1, 6.)

For motors of 50 hp or under very doubtful. (21.)

41. Does it pay to furnish the depot repairmen small tools, such as hammers, monkey-wrenches, pliers, screwdrivers, etc.?

Yes. Because labor is cheaper when tools are furnished. (25.)

Yes. If the proper check is kept upon them. (7.)

Small tools should be the personal property of each workman. Wrenches of all special kinds necessary for the work should be furnished by the railway company. (3.)

Yes. (11, 6, 12, 5, 2.)

Furnish depot repairmen all small tools except hammers, pliers and screwdrivers. (17.)

42.—What results have been obtained from the use of automatic slack adjusters, and what has been the saving of labor by use of same?

The saving in shoes, wheels, motors, current, renewals of adjustors, labor and accidents should be ample to justify their use. (21.)

With leverage not entirely suitable, we find it necessary to adjust by hand only once during life of shoe, whereas without, adjustment must be made each night. (5.)

Not recommended. (1.)

The brakes are set so tightly by the adjuster when car is heavily loaded that when load is off the brakes are too tight. (6.)

With properly designed trucks and brake rigging, automatic slack adjusters are valuable in maintaining better braking cars and increase the length of periods between inspection and adjustment of brakes. (2.)

43. What is the average life of a car body?

About 15 years. (25, 7.)

Sixteen to 20 years according to care given them. (17.)

44. Average life of equipment?

We replace motors with newer and better equipment, not because the old are worn out, but because it pays from a maintenance standpoint. (25.)

Can be kept in condition indefinitely, modern improvements not considered. (7.)

Six to eight years—see my answer to 35. (12.)

45. Which is the best policy, viz.: to continue using an expensive tin base babbitt metal as used with grease lubrication after your motors are converted to oil lubrication, or to use a cheap lead base metal?

Use tin base babbitt metal. (25, 7, 3, 1, 8, 6, 5, 17, 2.)

Cheap lead base metal. (11.)

Lead base is more economical on low-speed cars. (12.)

46. Do you use either ball-bearing or rolling center plates or side bearings; and, if so, what effect have you noticed on wheel flange wear, power consumption and saving in center plate lubrication?

We are using Baltimore center bearings on our newer cars, and consider that the wheel flange wear is reduced. (25.)

Using them on one car. Note considerable decrease in flange wear, which decreases in power consumption. (7.)

There does not appear to be any special merit in ball or roller center bearings. (3.)

Ball-bearing center plates save wheel flange wear, power and center plate lubrication. (1.)

Effect on flange wear is good. Saving in center plate lubrication about $1.72 per car per year. (6.)

We have ball and roller bearings in service, giving excellent results in flange wear by overcoming thick and thin flanges, flanges wearing equally. Requires less current, from ordinary observation. Center plate lubrication eliminated entirely. (17.)

47. Have you ever tried the use of a recording meter under the car for car mileage records?

In the cab. (1.)

Yes. (6.)

48. How many motors should one armature winder take care of—average conditions on a road having, say, 25 4-motor equipments and 75 double motors, city and suburban traffic?

About 150 motors, if of a late type. (25.)

With good fields, brush holders set at proper point, correct brush holder spring tension, grooved commutators, motor worked within its capacity and a line voltage for which it was designed, together with proper operation by motorman, three winders could take care of this work. (3.)

We have 27 4-motor equipments and 78 double equipments, most of which have been in service for six or seven years, and they are taken care of by one armature winder, who spends about half his time on armature work. (8.)

One winder should handle the number indicated with spare armatures amounting to 5 per cent. (5.)

49. What should determine the minimum diameter of a railway motor commutator, that is, when should it be scrapped on account of being too small?

Should be scrapped when commutator segments become narrow enough to cause excessive sparking. (25.)

On Westinghouse No. 49 and No. 56 commutators they should be worn down to 80 per cent. before scrapping. (3.)

Three-sixteenths inch thickness of copper. (11.)

One-fourth inch thick. (1, 6.)

If mica segment shows good, may be worn within ⅛ in. of mica rings at end of bars, but if the built up or micanite is used between bars 3-16 in. to ¼ in. is close enough. (12.)

50. What has been your experience with motor fields and armature coils wound with asbestos-covered wire? Do you think impregnation of such coils is necessary in addition to being wound with asbestos wire?

We consider the asbestos-covered wire is a moisture absorber and causes almost as much trouble from grounding as it saves by being fire-proof. We have never impregnated asbestos-covered wire. (25.)

Think the motor field wound with cotton-covered wire properly impregnated is as good as when wound with asbestos-covered wire. Do not know as to armature coils. (7.)

Asbestos-covered wire fields that have been impregnated properly will outlast any other field. On account of the frequency of armatures getting upon the poles, it is a matter of conjecture as to whether asbestos-covered wire is more desirable than cotton-covered wire. Impregnation is of immense value to any coil, as it prevents the vibration, increases the insulation and keeps out moisture. (3.)

Wires in fields become loose and chafe one another. Yes. (6.)

Consider satisfactory on field coils but not on armature coils. Think they should be impregnated. (5.)

51. Is not the use of asbestos-covered wire for motor and car wiring sufficiently important to justify the manufacturers of asbestos covered wire to so perfect their product as to enable it to stand the necessary insulation test required of wire used for such purposes?

Yes. (25, 7, 3, 6, 5.)

52. What are the advantages, if any, of asbestos wire-wound field and armature coils over those wound with cotton-covered wire? Do you think there is anything harmful

in such construction due to liability of overloading of motors?

The asbestos wire-wound field withstands a greater temperature with safety. Nothing harmful in such construction provided the motors are used on the same work as formerly. (25.)

Should stand more heat and think they would be overloaded anyway if conditions were such that it became necessary, no matter with what they were wound. (7.)

Asbestos-covered wire should show higher insulation results. (3.)

No advantage. (1.)

The advantages are: the insulation won't carbonize and cause short circuits. No. (6.)

Will evidently stand more heat and do not see that additional harm will result from overload. (5.)

53. What have been the results of using babbitt-lined journal brasses on heavy high-speed interurban equipment?

We have had no trouble. (25.)

Think that there should be a very thin babbitt lining in journal brasses, just enough to form a bearing when starting a new brass. (7.)

Babbitt-lined journal bearings are much superior to unlined bearings. Experience has indicated that the sides of M. C. B. bearings should be carried down a little farther than is now standard to prevent the heavy emergency brake pressure from occasionally pushing the journal partially out of the bearing and causing the bearing to wear to one side. (21.)

Satisfactory. (1.)

Good. Facilitates the seating of the bearing. (6.)

Case harden them. (5.)

54. What is the best brake shoe for steel wheels?

Plain gray iron, medium hardness, with no insert. (7.)

Streeter shoes. (3.)

Steel shoe with inserts reinforced in the back with two steel rods. (8.)

Medium hard cast iron shoe, chilled about 3 in. on each end and steel back. (6.)

Hard iron shoe with chilled ends. (17.)

55. State best method of boring armature bearing true. Give any treatment to increase their life.

We have rolled the inside surface of our bearings. (25.)

Rolling or compressing of the babbit in bearings makes metal more homogeneous; consequently longer lived. (7.)

Armature bearings should be bored slightly out of center so as to give increased clearances over the holes at the bottom of the armature. (3.)

One method observed by the writer for increasing the durability of armature bearings is to bore the bearing smaller than the shaft and then press it out to proper size by forcing through it a roller device similar to a boiler tube expander. The roller device is attached to a drill press. This method was developed at the shop of the Allegheny Valley Street Railway Company at Tarentum, Pa. (21.)

Chuck bearing in jig on lathe and bore with expanding bit in tail stock—babbitt to size when possible. (6.)

We have designed a new chuck with which to expand the babbitt on mandrels for the purpose of hardening and tightening the babbitt in the shell. If the bearings are not too large we recommend using a bearing with a tin babbitt lining not more than 1-16 to ⅛ in. thick. (17.)

56. What is considered good mileage for cast iron brake shoes?

About 2,500 miles. (25.)

Five thousand miles with air brakes and 7,000 miles with hand brakes. (7.)

Seven thousand miles on interurban. (1.)

Seventy-six car miles per pound of brake shoe purchased. (11.)

About 310 miles per pound worn off. (6.)

Seven thousand miles, city. (17.)

57. What is considered good mileage for trolley wheels?

About 12,000 miles. (25.)

Four thousand five hundred miles interurban and 7,500 miles street. (7.)

Six thousand miles for 4 in. copper wheel and 15,000 for 6 in. copper wheel. (11).

Six thousand miles on interurban. (1.)

We get an average of 9,500 miles for trolley wheels in city service and 4,000 miles on interurban service. (8.)

A 6-in. wheel with 1-in. bearing, 7,000 miles. (6.)

Ten thousand miles approximately. (17.)

58. How much of the wear on the truck brake rigging and the resulting brake trouble, and the wear on the wheel flanges when in contact with the shoes is due to the lost end motion of the axles in its M. C. B. bearings?

We have not considered that the shoe wore the wheel flange to any appreciable extent. (25.)

Dependent upon the design of the truck and brake rigging, and also whether the flanged or plain shoe is used. (7.)

The lost end motion of the exles in the M. C. B. bearings does cause much brake trouble, due to the wheels pulling the shoes sidewise, both when the shoes are running loose and when they are applied to the wheels. The rubbing of the side of the wheel flanges against the sides of the flanged cavities in the shoes when the brake is not applied, must cause a considerable loss of current and some additional wear to the wheel flanges. (21.)

59. Will a car ride better if the excessive end-motion of the axle in its M. C. B. bearings is eliminated?

Yes. (25, 7, 21, 6.)

No. (1.)

60. What is the best method of preventing rapid wear on the bolts and other moving parts of the truck brake rigging?

We bush the brake pin holes and then replace the pins when worn. (25.)

The case hardening of the pins and levers will help, but a case hardened pin pressed into the lever is better. (7.)

Suspend the brake rigging properly, oil all parts frequently and use case hardened pins and bushings. (3.)

Put a coil spring on every bolt. This will prevent the bolts and other parts from vibrating. The end motion of the axles in their bearings must also be eliminated. Tests made by the writer show that more than 95 per cent. of the wear on the brake rigging of the trucks, running on surface roads, is due to grit sifting in between moving and rattling parts. Springs keep the parts together and thus keep the grit out; they prevent rattling and moving of one surface upon another, and thus stop the cutting away of the moving parts of the brake rigging. (21.)

Bush holes with case hardened steel and use case hardened steel pins. (6.)

Neat fits and case hardening. (17.)

61. What methods should be used to prevent excessive wear on the ends of M. C. B. journal bearings and the resulting side motion of the truck frame with reference to the axles and wheels?

The truck frame should be kept in square and wheels should be known to be true on the axles and in perfect gage. (7.)

There are two methods of preventing excessive end motion of the axle which the writer can recommend. First, the journal bearing wedge should be made of cast-steel and have a hood cast integral with it, which extends down over the end of the axle, and there should be a bronze bearing plate between this hood and the end of the axle. This device has been much used, but should be improved by making the bearing plate adjustable so that the end motion of the axle can be limited to not over ⅛ in. The second method is to use the motor as a connecting link between the axle and the truck frame to check the motion of the truck from sidewise movement with reference to the axle.

65. In using steel wheels, what mileage should be had between turnings, what wear from service, and how much should be turned off?

About 25,000 miles between turnings, approximately ⅛ in. in diameter of wear. We turn down from ¾ in. to 1 in. in diameter. (25.)

About 45,000 and as little to be turned off as possible to obtain the contour of the flange. (8.)

66. What is considered good mileage for solid steel wheels, steel tired wheels and cast iron wheels, allowing three turnings for steel?

For steel and steel tired wheels, an average of about 90,000 miles; cast iron wheels, about 40,000 miles. (25.)

Two hundred and fifty thousand miles, 220,000 miles and 45,000 miles, respectively. (7.)

Steel wheels should give at least 150,000 miles, and cast iron wheels should give at least 30,000 miles. (3.)

Forty thousand miles for cast iron wheels on 12-ton car. (11.)

Depending upon service conditions—cast iron wheels should average 40,000 miles. (6.)

PURCHASING AGENTS.

67. Should there not be a separate section in the convention for the deliberations and decisions of the purchasing agents of the American Street & Interurban Railway Association?

We do not think a separate section in the convention for the deliberations and decisions of the purchasing agents' division necessary, for the reason that the functions of the purchasing agent are peculiar to him, personality and not system entering greatly into the results he obtains, and though not directly in the operating or engineering branches, his work bears on each, still problems do not confront him as they do the departments named, which would be benefited by a mutual interchange of ideas. Consequently, our opinion is that very little benefit would be derived from making a separate section for the purchasing agents. Instead, it is better for them to affiliate with the engineering section, which is the prevailing arrangement. (3.)

68. Should the storekeeper be under the supervision of, and responsible to, the purchasing agent or engineer?

Preferably to the purchasing agent, where the local conditions will permit. (3.)

Neither. (14.)

69. To avoid the heavy loss by dead stock in storeroom, how often should the purchasing agent and engineer fix arbitrary standards of material?

No given time should be agreed upon for this purpose; instead, it should be taken care of as often as is considered necessary, for otherwise the greatest accumulation of dead material might accrue between the set periods. If the engineer contemplates the change of a standard item, the purchasing agent should be immediately notified to this effect. (3.)

Yearly. (14.)

70. How long should the agreement last?

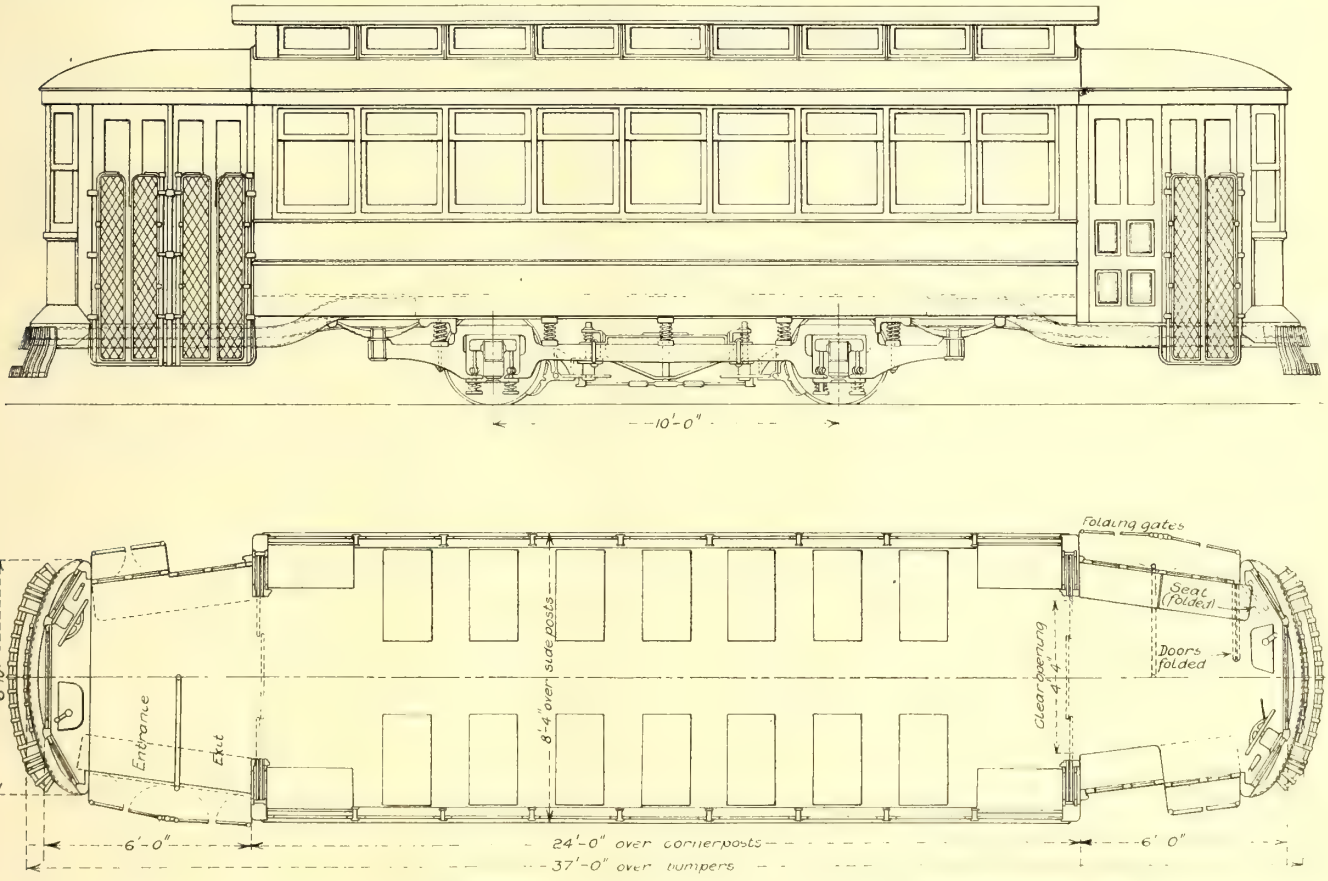
One year, except in special cases. (14.)

Mr. F. R. Wilhelm has been appointed superintendent of the Monongahela Division, No. 4, of the Pittsburgh (Pa.), Railways in charge of the operation of cars from the Glenwood, McKeesport and Rankin car houses. Mr. Wilhelm started as a conductor with the Birmingham Traction Company, Pittsburgh, Pa., in September, 1891, and remained in that capacity until April, 1898, when he was chosen night dispatcher for the Monongahela Street Railway. When the Monongahela Street Railway was absorbed by the Pittsburgh Railways on Jan. 1, 1902, Mr. Wilhelm was appointed superintendent of the old Monongahela Division, and has since remained in this position.

RADIAL AXLE, SINGLE-TRUCK CAR SEATING FORTY-SIX PASSENGERS

The St. Louis Car Company has just completed a single car built for the Birmingham Railway, Light & Power Company, of Birmingham, Ala., which is to be placed in service immediately. The car was designed by Ford, Bacon & Davis, of New York, engineers of the railway company, with a view of its ultimate adoption as the standard type for city service in Birmingham. It includes, so far as practicable, the best features of the principal types of cars previously designed by the engineers for service in other cities, but all of the details, of course, should not be considered as universal in their application, since the conditions of service in Birmingham are quite different in many respects to those existing in other cities.

As will be seen from the accompanying drawings, the car is of the single-truck, semi-convertible type, with long double-end platforms which will enable a prepayment system of fare collection to be used if desired. There are 14 double cross-seats and four double corner seats inside the body and drop-seats on the front and rear platforms. The front platform will seat six persons, and if the prepayment system of fare collection is not used four persons may be seated on the rear platform. This gives a maximum seating capacity of 46, or two more than can be seated in an ordinary double-truck city car.



Plan and Side Elevation of Radial Truck Car for Birmingham, Ala.

The platforms are 6 ft. long and the floors are dropped 10 in. below the floor of the body. The principal reasons for designing the car with drop platforms were: (1) greater safety in entrance and exit, and (2) greater speed in loading. A passenger entering the car can take the last step after the car is started, while if the platform is on a level with the car floor two steps must be taken before it is safe to start the car. The drop platform design utilizes the platform area to the same advantage for seating or standing room as if the floor was level with that of the car body. In addition, the design places all the seats the shortest possible distance from the exit and entrance steps. Passengers thus consume the minimum time in boarding or leaving the car. Both platforms have drop-end sashes and are enclosed on both sides with two-part folding storm-doors folding back against the controller and brake wheel and leaving the main area of the platforms entirely clear. A removable pipe partition railing is used on the rear platform, dividing the wide step into an entrance and exit. This partition extends from the edge of the platform to the center line of the car, leaving ample room on the inside for an entrance aisle. To prevent boarding and alighting accidents a modified form of Minneapolis gate will be used to close the opening above both steps on each platform. The gates are arranged to fold inwardly and will be used whether or not a prepayment system of fare collection is adopted.

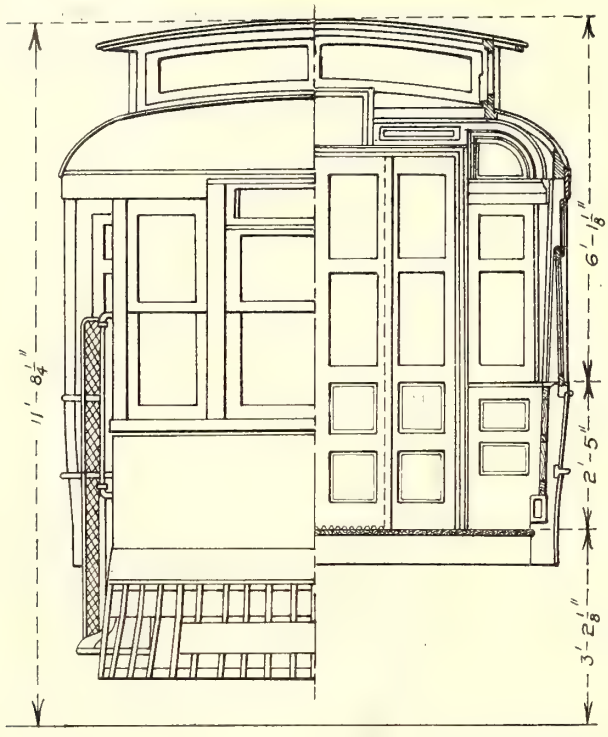
The car body is 24 ft. long over corner posts and 8 ft. 6 in. wide over drip rails. It has a monitor deck roof, and below the windows the side panels are slightly undercut. The cross-seats are 32 in. long, giving an aisle 25½ in. wide. A clear opening of 4 ft. 4 in. is provided for the end doors, which are of the double sliding type.

The great overall length of the car and the minimum center radius of the special work in Birmingham made it essential to use double trucks or a radial-axle type of single truck. After a careful study it was decided to use a single radial-axle truck of the Warner type, built by the St. Louis Car Company. These trucks have had an extended trial in England and are being largely used there, although this is their first application in this country. This truck has a wheel base of 10 ft., which is sufficient for easy riding of a 37-ft. car. The truck can be pushed by hand around a 35-ft. radius track curve. The truck could as well have been designed for a 12-ft. wheel base, which would permit the use of a correspondingly larger body and greater seating capacity. A car seating a maximum of 46 passengers, however, was considered nearly ideal for the conditions as they exist in Birmingham, and the 10-ft. wheel base truck was therefore adopted. The truck carries two motors.

The estimated weights of the car are as follows:

Body	15,000 lb.
Truck, including hand brakes	7,500 lb.
Motors	7,000 lb.
Total weight, empty	29,500 lb.
Weight, per passenger seat	641 lb.

The weight of this car is estimated to be about one-half that of a double-truck four-motor car of the same seating capacity and equipped with air brakes as used in Birmingham.



Cross Section of Radial Truck Car Designed Especially for Birmingham, Ala.

Before construction began the design received the careful consideration and approval of A. H. Ford, president, and G. H. Harris, superintendent of the Birmingham Railway, Light & Power Company.

FUEL OIL BURNING AT THE GEORGETOWN STATION OF THE SEATTLE ELECTRIC COMPANY

The Seattle Electric Company receives power for the operation of its railway from high tension transmission lines and from a large steam relay generating station at Georgetown, a suburb of Seattle. The power station building at Georgetown is a concrete structure which, together with the installation, was designed and erected by the Stone & Webster Engineering Corporation. The structure rests on a concrete monolith supported on piles set on 24-in. centers under the engine room and in rows of six under the boiler house walls. The general dimensions of the building are: Engine room, 64 ft. 3 in. by 79 ft.; boiler house, 73 ft. by 151 ft. A floor plan of this station showing the arrangement of the turbine room and the boiler house with the firing aisle at right angles to the dividing wall was presented in the **Electric Railway Journal** for March 27, 1909, page 538. The areas per kilowatt of station capacity are, 0.43 sq. ft. for the engine room and 1.01 sq. ft. for the boiler room.

A list of the principal apparatus of this station follows:

One 8000-kw and one 3000-kw 13,800-volt three-phase Curtis vertical steam turbo-generators.

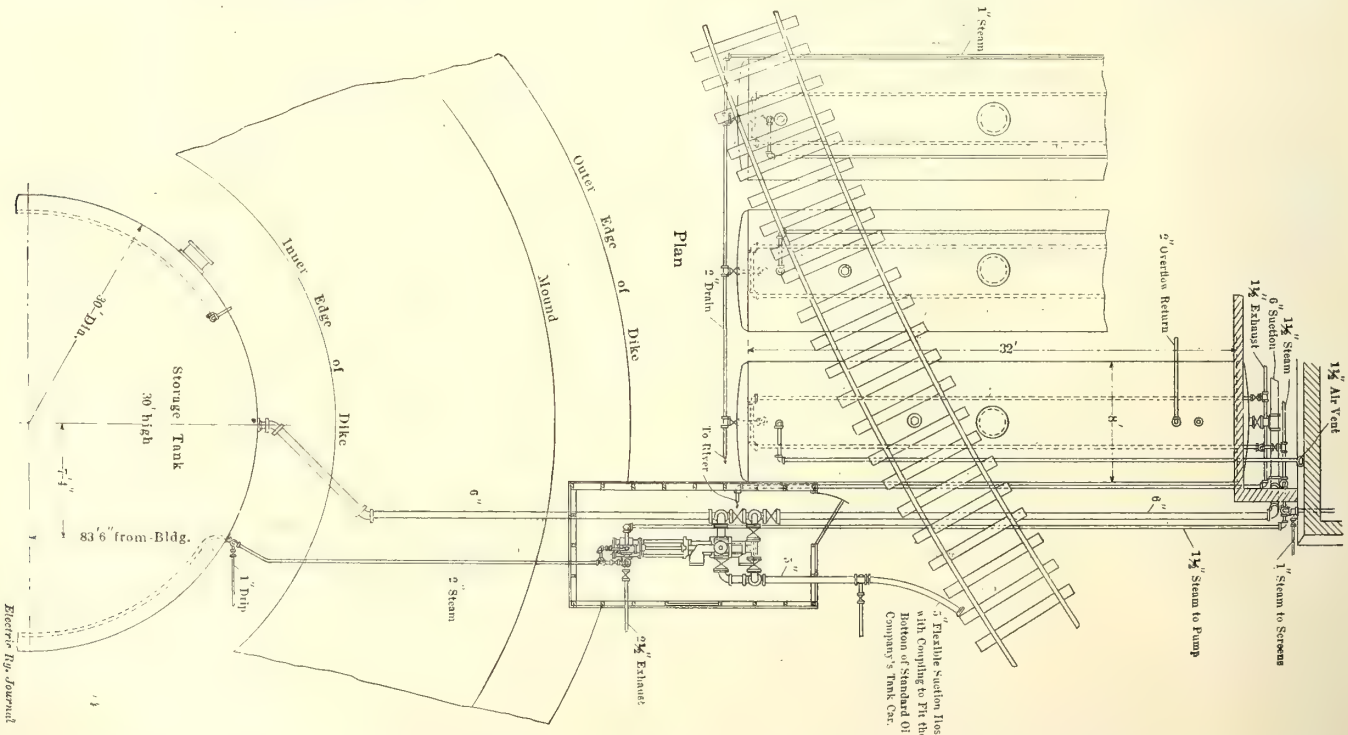
Two 500-kw G.E. synchronous motor-generator sets 13,300 volts, three-phase to 600 volts d.c.

Two 500-kw G.E. transformers 13,200 volts three-phase to 2200 volts two-phase for lighting and two-phase power.

One 30-kw G.E. 6.6-amp tub transformers for street lighting.

Two 100-kw G.E. transformers 13,200 volts three-phase, 2200 volts two-phase; used for station lighting and power.

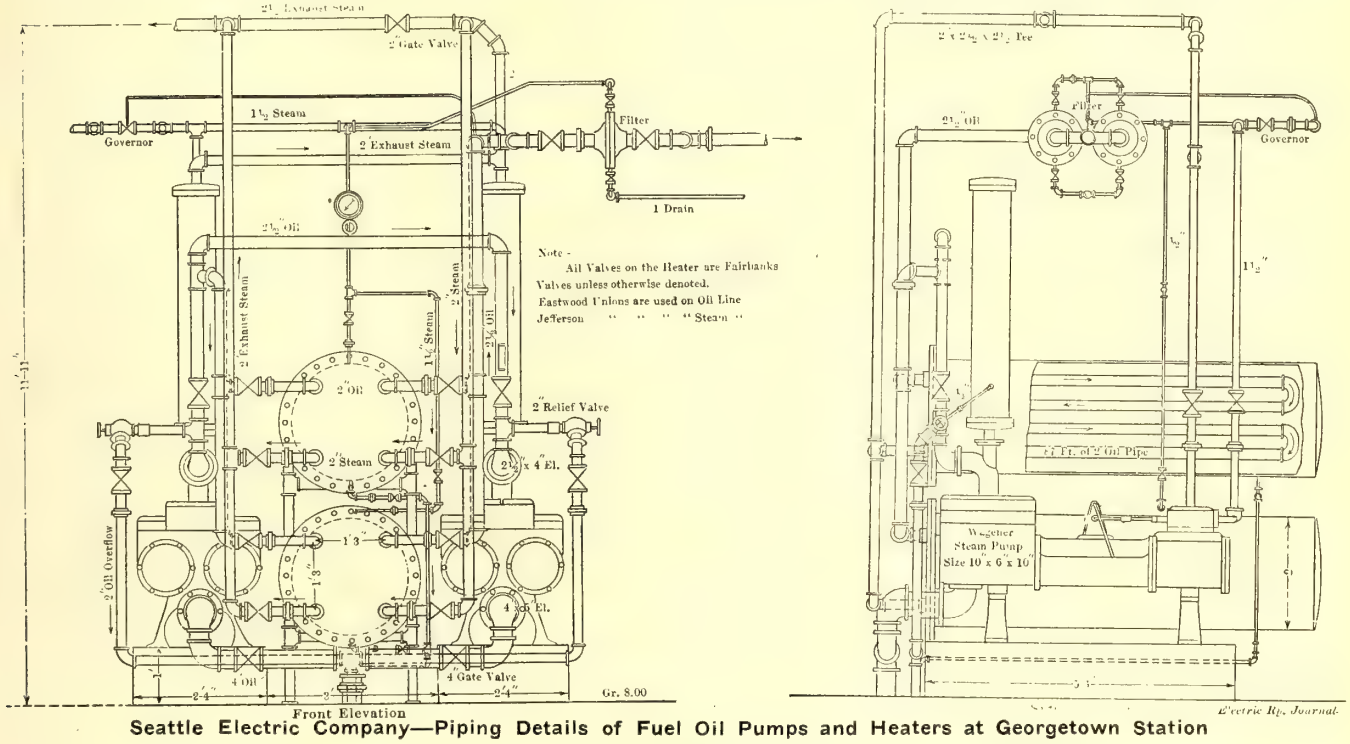
An interesting feature of this plant is the use of fuel oil for steam making. The boiler equipment comprises 12 Sterling vertical water-tube boilers of 470 hp each. The steam is taken out of the rear upper drum and supply water is fed in through the center upper drum. The blow-off is taken off from the bottom front drum. The boilers are fitted with plain grates and oil burners. Double ash pits are provided under each furnace divided longitudinally into two parts by a wall extending from the grate to the mouth of the pit, thus reducing by one-half the amount of cold air which would enter the furnace while the ashes were being removed in event of it being necessary to burn coal.



Seattle Electric Company—Plan of Storage Tank and Fuel Oil Pipe Connections at Georgetown Station

A ground plan presents the arrangement of the oil-tank system for the storage fuel. The main tank, 30 ft. in diameter and 30 ft. high, is located with its center 83 ft. 6 in

from the power station wall. The oil, as received from tank cars on a nearby siding, is forced into the storage tank by a small steam pump. The oil supply comes from California by boat to Seattle, and there it is loaded into tank cars for transfer to the power plant. The oil delivery pipe leading to the boiler house is 6 in. in diameter. The boiler house supply is first led through three auxiliary tanks, each 8 ft. by 32 ft. These tanks are buried underground close to the boiler house wall, so that the oil may be unloaded into them directly from cars standing on a track above. The capacity of these auxiliary tanks is 36,000 gal. and that of the main storage tank 133,000 gal. The oil is forced to the burners by either of two duplex pumps and distributed through oil mains ranging from 2½ in. to 1½ in. in size. These pumps



Seattle Electric Company—Piping Details of Fuel Oil Pumps and Heaters at Georgetown Station

have cylinders 10 in. by 6 in. by 10 in. The pumps force the oil through steel cylinders through which exhaust steam is piped, and in this way the oil, before being fed to the boilers, is heated to about 180 deg Fahr. When thus warmed it flows and atomizes more easily.

The oil is burned in an external-mixing burner designed by the company engineers and made in its shops. This burner delivers a flat stream of oil, directly under which is a flat stream of steam. The oil and the steam mix before reaching the ignition point and the steam mechanically breaks the oil into small particles, spreading the burning oil into a wide flame. The steam used for this purpose is taken directly from the superheated drum at 180 lb. pressure and 150 deg. of superheat. With this method of burning, which has been evolved after a considerable number of preliminary trials, the boilers show an evaporation of 14½ lb. of water per pound of oil, as fired.

To reduce the fire hazard in the car house from heaters left in circuit inadvertently, the trolley pole should be pulled down. This, however, interferes with the ready removal of the cars under power in case of fire. To obviate both horns of the dilemma a shield of wood or other insulting material can be slipped between the trolley wheel and wire. This shield could be fitted with a long handle so that it could be easily slipped into place or removed from the floor. It would resemble a hoe in general appearance, but should be of such a shape top and bottom as to retain its position on the wire when under tension.

RULING IN ELMIRA, CORNING & WAVERLY RAILWAY FARE CASE

The Public Service Commission of the Second District of New York has announced in an opinion by Commissioner Decker its decision in the case of C. E. Wheaton against the Elmira, Corning & Waverly Railway Company of Waverly, N. Y.:

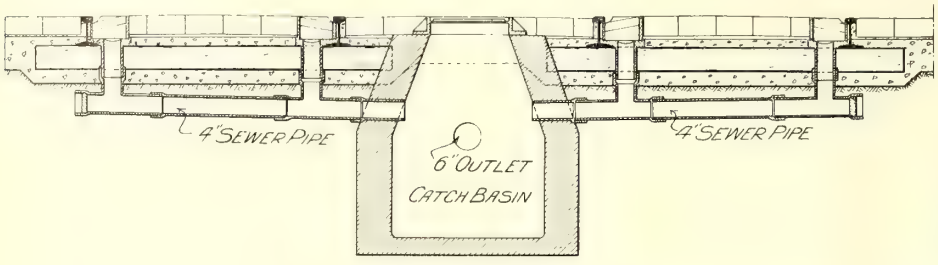
This company charges a 10-cent fare for about 3 1-7 miles between Holbert's Crossing and Waverly, equal to 3 2/5 cents per mile. It charges the same fare between Waverly and all points west of Wilson's Crossing including Holbert's Crossing. Between Wilson's Crossing and Chemung village (west end) it charges a 5-cent fare for a distance of 2 4/5 miles and has fixed this fare limit to accommodate travel to and from Chemung. The same reasons that induced the company to put its Chemung 5-cent fare limit at Wilson's exist for placing the limits of its Waverly 5-cent fare at Holbert's.

The opinion states that assuming the 10-cent fare between Waverly and Chemung (west end), 4 2/3 miles, is not unreasonable, it is apparent that a 10-cent fare to or from Waverly becomes too high a short distance east of Chemung The commission does not disturb the 5-cent fare from Wilson's to Chemung or return, but it does hold that on passenger traffic between Holbert's and Waverly and between points east of Holbert's and Waverly where a 10-cent fare is charged, the fare of 10 cents is unjust and unreasonable and must not during a period of at least one year exceed 5 cents per passenger. The order is limited to one year on account of the company's present poor financial condition, and it has leave to apply and show cause for modification or abrogation of the order at any time before the conclusion of that period.

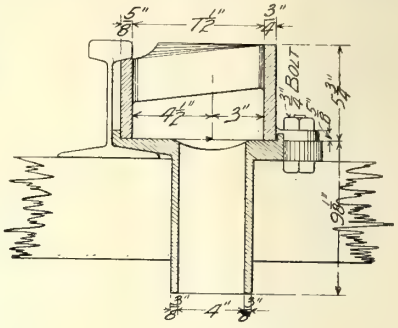
When the company's contemplated extension of service to the center of Waverly shall be effected the question whether the fare limit for Waverly traffic should be brought eastward a short distance may be raised. It appeared in this case that the complainant is trustee of a school district and that he applied originally to the company for a school commutation rate between Waverly and Holbert's Crossing and intermediate points, but his application was refused, and he then brought complaint to the commission against the 10-cent fare applying on all passengers.

TRACK DESIGN OF THE SEATTLE, RENTON & SOUTHERN RAILWAY

During the past summer the Seattle, Renton & Southern Railway, which operates an interurban line out of Seattle, Wash., has relaid and extended its double-track entrance to the city of Seattle on Fourth Avenue. The design of the track, which has been approved by the board of public works of Seattle, is illustrated. This track is laid with 7-in. 80-lb. T-rail supported on wood ties enclosed in concrete. Fourth Avenue is within one of the regrade districts of Seattle. Originally the grades on this street were very abrupt, but now the profile is comparatively even although there is a steady grade throughout the length of the street within the business district. Because of this grade it became necessary in designing the track to provide ample means for draining the water which might be brought in by the cross streets and which naturally followed along the flange groove close to the rails. The connections provided for furnishing this drainage are clearly shown in the illustration.



CROSS SECTION SHOWING SUMP AND DRAIN TO CATCH BASIN



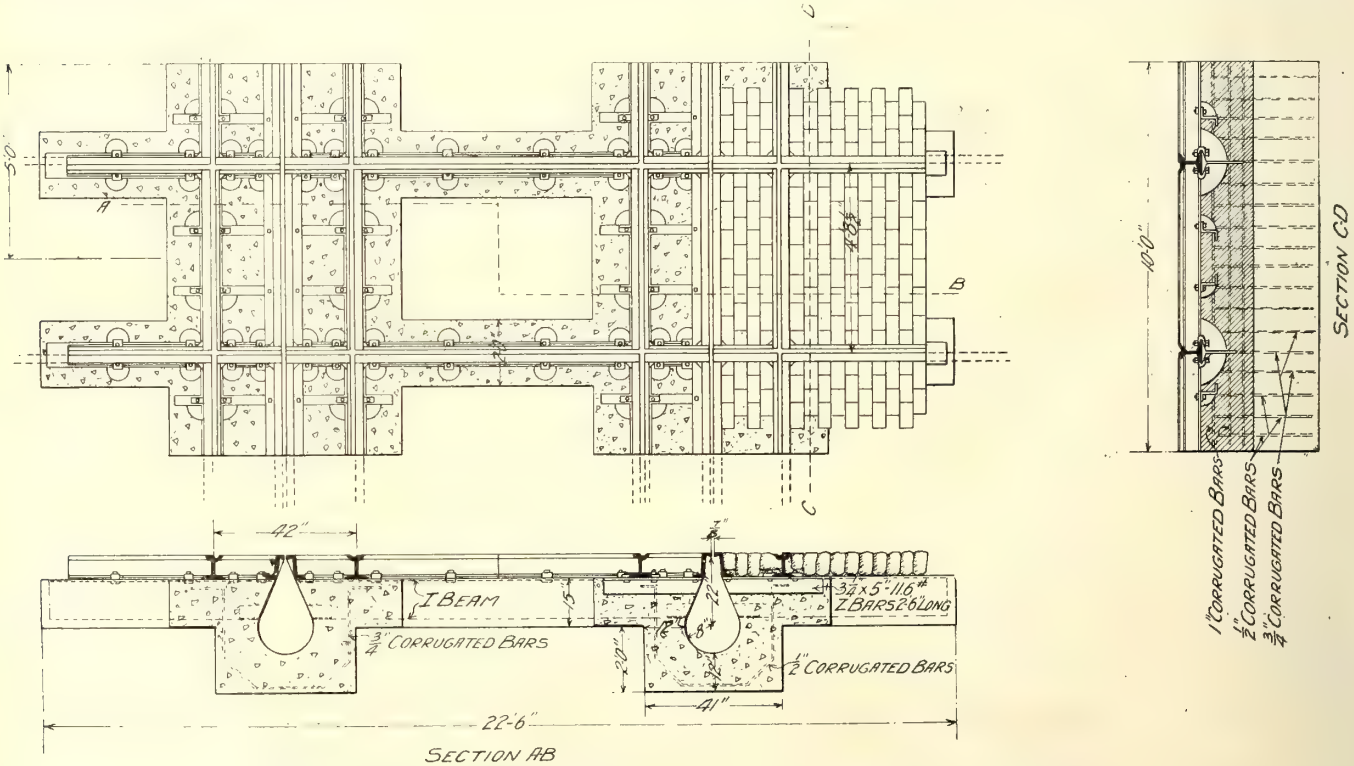
DETAIL OF SUMP

Seattle, Renton & Southern—Design of Drainage for New Track

At each break in grade where water would collect on the track a substantial drainage system has been constructed. Water is led from the flange groove through cast-iron gratings designed to be inserted in the pavement and replace nose bricks. These gratings are 16 in. long and 9⅛ in. wide installed close against the side of the rail, as illustrated. Each grating is bolted to a cast-iron pipe head which affords a 4-in. connection to lateral sewer-pipes discharging into brick catch-basins built beneath the devil strip. The catch-basins have 6-in. outlets to the city sewer system.

The work of constructing the Fourth Avenue double-track line of the Seattle, Renton & Southern Railway included the design and installation of two double-track narrow-gauge cable-line crossings with the James and Madison Street lines of the Seattle Electric Company. The headway on these cable lines approximates 60 seconds and the loads are heavy. Because of this service and for reasons of economy a very complete foundation was designed to carry the track intersections at each of these streets. An accompanying illustration shows the general dimensions and constructional features of one-half of one of these crossings.

The Fourth Avenue line of the Seattle, Renton & Southern is laid with 80-lb. 7-in. T-rail, except at the special work where a 90-lb. 7-in. grooved rail is used. This same rail also is used for the cable tracks. The slot rail is 7 in.



Seattle, Renton & Southern—Design of Cable and Trolley Track Crossing

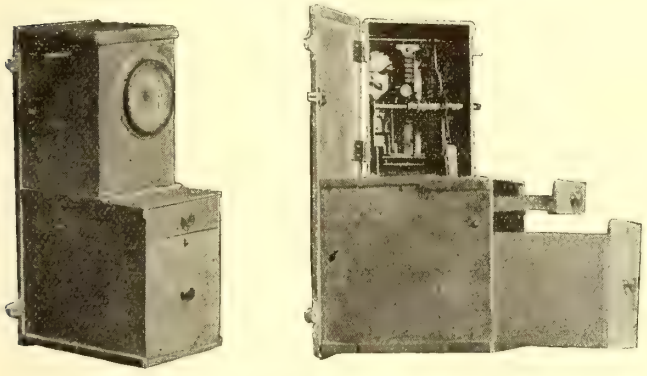
The principal rail-supporting members of this type of cable-track crossing are 24-in. 80-lb. I-beams placed beneath the trolley rails, and Z-bars weighing 11.6 lb. per foot used as ties for the cable rails. Track rails are secured to the ties and steel supports with wedge clips held in place by 1-in. bolts. The clips are 2 in. and 3 in. wide and those at the rail intersections are slotted and provided with taper keys for minor adjustments. The rail structure, with its heavy I-beams and Z-bar ties, is supported on a rein-

forced concrete foundation which also forms the cable conduit. The conduit has a vertical section 22 in. deep and 8 in. wide at the running height of the cable. The heavy concrete foundation is reinforced with 1-in. corrugated bars laid horizontally and ½-in. and ¾-in. corrugated bars placed vertically around the cable conduit. A 1:3:5 mixture of cement, sand and gravel was used for concrete. The street surface above this interesting cable crossing is paved with brick set in cement mortar.

Acknowledgement is made to Messrs. Hanford & Blackwell, consulting engineers, for the material used in this description of the recent track-work features of the Seattle, Renton & Southern Railway Company.

TRANSFER AND TICKET BOX IN LITTLE ROCK

One of the most difficult problems hitherto experienced in connection with transfers has been to prevent their interchange by dishonest conductors. After careful study and trial of different methods of checking and of registering and not registering tickets and transfers, the Little Rock Railway & Electric Company concluded that every paying passenger should be registered; and furthermore that the tickets and transfers should be taken out of the conductor's hands as speedily as possible and time-registered upon deposit. This object has been accomplished by devising the ticket box shown in the accompanying illustrations. The box is operated as follows:



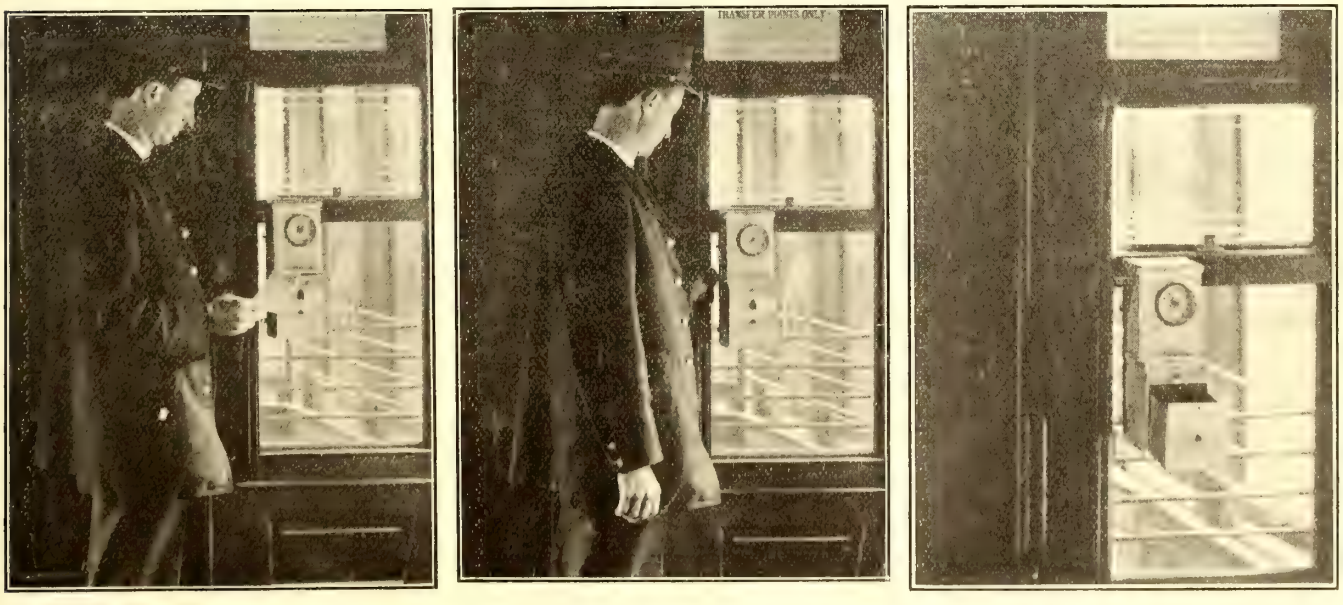
Views of Ticket Box Closed and Open

First all tickets and transfers collected on the trip are placed in an envelope. Then at the end of the trip the conductor goes to the box, pulls out the slide for the deposit of the envelope, pushes the slide back to its former position and pulls down the lever which stamps the time on the envelope and releases the slide so that it can be pulled out again for another envelope. The front of the slide has a keeper which prevents the withdrawal of the stamped envelopes so that a conductor cannot have an envelope stamped at one time and finally deposited at another time Once the envelope is stamped it drops to a bottom receptacle which can be unlocked only by the transfer clerk who compares these transfers with the conductors' way-bill and register readings.

This checking system was introduced by D. A. Hegarty, treasurer and general manager of the company, in 1908. It has proved so successful that despite an increase of 2 per cent in cash passengers carried during 1908, there were actually decreases of 8 per cent in transfers issued and 1 per cent in tickets issued during the same period. Comparing the eight months ending Aug. 31, 1909, with the like interval last year, it was found that while the passengers carried increased 8 per cent, the issues of tickets and transfers decreased 9 per cent and 2 per cent respectively. The tickets mentioned are half-fare slips sold to children under 12 years of age.

From his experiences with this system, Mr. Hegarty concludes that the register box has greatly simplified the question of checking conductors' returns. This regulation affords an absolute check on the time of depositing transfers and tickets and so prevents the conductors from meeting to trade these tokens. They cannot keep them in their hands for more than 30 minutes to one hour, according to the length of the round trip. The results obtained far exceeded the expectations of the management and appeared to prove that most railways pay too little attention to the revenue losses due to transfer and ticket manipulation by conductors.

The boxes now being used by the company are of aluminum. The earlier designs had the clock face showing but the later ones do not show the dial.



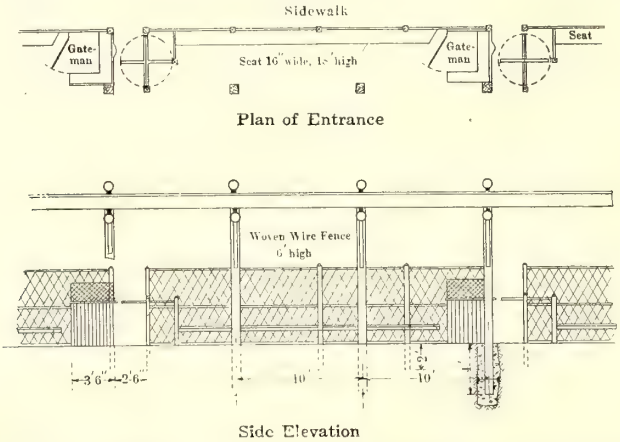
Views of Ticket Box on Car, Showing Operations of Inserting and Stamping Trip Envelope

Otto T. Bannard, who was nominated by the Republicans on Sept. 23, 1909, for the office of mayor of New York City, is president of the New York Trust Company and is also interested in a number of railway and industrial companies. He is a director of the Mahoning & Shenango Railway & Light Company of New Castle, Pa., the New Hampshire Electric Railways, of Haverhill, Mass., and the Metropolitan Water Company of Kansas City.

HANDLING EXPOSITION CROWDS AT SEATTLE

The Seattle Electric Company has very complete terminal facilities for handling the large crowds which have attended the Alaska-Yukon-Pacific Exposition during the present summer. These facilities include a terminal loading station with change booths and recording turnstiles through which station 44 cars an hour ordinarily are passed over double-track lines branching in three directions. The station is near the front entrance to the exposition grounds. At the south entrance to the grounds the company has a smaller station served by a two-track line and a loading loop.

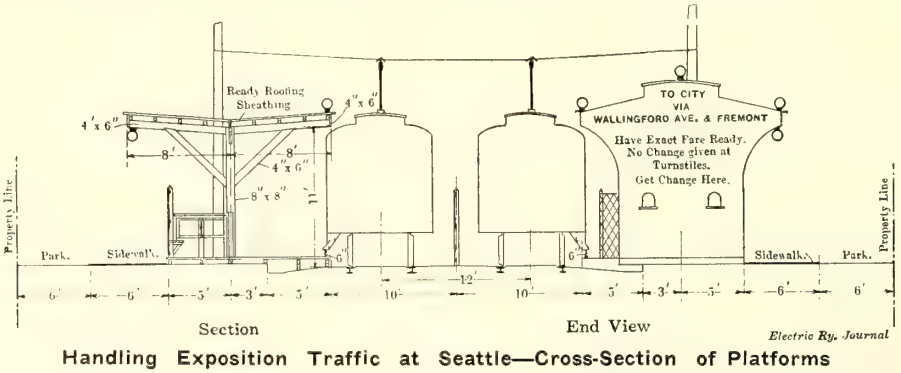
All passengers arriving at the fair grounds are unloaded on the street at the main entrance. Passengers returning to the city can enter only at the terminal station. This station has two loading platforms, each of which will accommodate six cars if



Handling Exposition Traffic at Seattle—Plan of Turnstile Gates

necessary. A plan and section of the platform are shown. Passengers desiring to get on the cars within two blocks of the station must enter the station through one of the 18 turnstile gates, where chop boxes and guards are present to receive the fares. This scheme of concentrating traffic at the terminal where the fares can easily be handled is a most important point in connection with the very complete arangements made by the Seattle Electric Company for handling the Exposition traffic. About 500 cars were in commission during the height of exposition travel.

Nearly all the cars operated on the lines to and from the exposition grounds are fitted with platform gates operated by the motorman. After the car is loaded these gates are kept closed until the third street outside of the loading platform is reach-

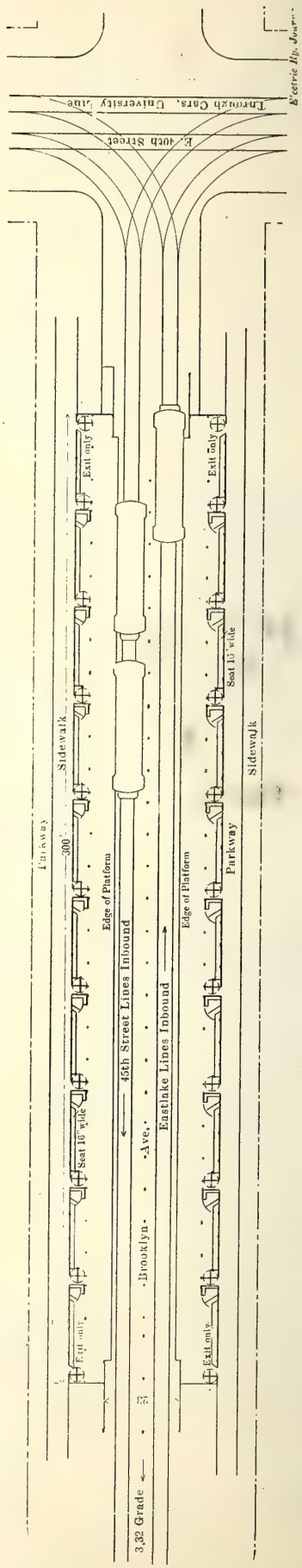


Handling Exposition Traffic at Seattle—Cross-Section of Platforms

ed; hence traffic is concentrated at the place where there are ample facilities and guards to properly collect the fares and to prevent accidents. On those cars which are not fitted with gates, guards ride through the loading station and some distance beyond and serve the same purpose as the gates. Conductors attend simply to the comfort and safety of their passengers in the terminal station area.

On an average about 20,000 passengers per day are loaded in this station. The lowest number, a rainy Monday, was 10,000, and on some days the number has reached 70,000. The regular schedule of cars over the two tracks between the loading platform is 44 per hour, but as many as 100 cars, about evenly divided between the two sides of the platform, have been handled. Track room is available to load six cars at a time in front of either platform, but it is the practice to load only one car at a time on each track so that the traffic can be more closely watched.

On the opening day of the fair a sudden rainstorm came up when over 90,000 people were in the exposition grounds. The terminal equipment was new and untried, and the people came pouring out of the grounds, almost in one mass. But, under these difficult conditions the station proved that it was well adapted for the purpose for which it was designed. Over 60,000 admissions to the station during the day were recorded, and about 40,000 of these came during three hours in the storm.



Handling Exposition Traffic at Seattle—Plan of Loading Station

Entrance to the loading platform on either side may be had through nine turnstiles. Before entering, the passengers get the correct change at change booths, of which there are 10 located at the street ends of the platforms. Four of these booths ordinarily are operated. The girls in charge of the change booth use ready-change-makers, and a supply of change is kept in the station office. Each hour an attendant goes to the change booths to replenish the supply of small change. With the proper change or ticket in hand the passenger drops it in a chop box and is permitted by a guard to pass through the turnstile on to one of the loading platforms. The names of the car lines using the two platforms are indicated on the ends of the structure.

Tickets and transfers are not acceptable at any but one turnstile on either platform. If a passenger gets into the wrong platform enclosure he must go to the "pass gate" where he is given a special transfer which is good at the "pass gate" on the opposite platform. All transfers are issued by the gatemen when fares are paid, and this issuance of transfers and payment of fares before entering the station insures against missed fares and transfer disputes, thus leaving the conductors free to look out for the comfort and safety of their passengers.

As this station is the terminus of the several lines operating through it, it is the practice, after a car has started on its return to the city and is about to pass through the exposition station, to make all fare collections for through rides before reaching the loading platform. The station force comprises a station master who has under him 18 gatemen, six guards and three starters, who regulate not only the admission, loading and starting of cars, but also the unloading, which is done at special points outside of the station.



Handling Exposition Traffic at Seattle—View Between Loading Platforms

The Chicago transportation committee under the leadership of Alderman Milton J. Foreman has asked the corporation counsel to assist in framing legislation which will prohibit further steam operation by the 26 railroad systems which enter Chicago. It is possible that the proposed ordinance will not directly demand electrification but will call simply for a method of operation which will eliminate the soft-coal nuisance.

As a mark of esteem to the late Governor Johnson of Minnesota, whose body lay in state in the rotunda of the Capitol at St. Paul, Minn., on Sept. 22, the Twin City Rapid Transit Company stopped all its cars in Minneapolis and St. Paul and the Duluth-Superior Traction Company stopped all its cars in Duluth and Superior at 3. p. m. on that day for a period of five minutes.

TRANSPORTATION & TRAFFIC ASSOCIATION CODE OF RULES FOR CITY OPERATION

At the meetings of the Transportation and Traffic Association on Wednesday and Thursday of this week the proposed standard code of city rules, as revised by the committee on city rules, was fully discussed. A number of amendments to the rules as printed were adopted by the association and the code as a whole was approved for adoption as the standard of the association. The complete text of the rules as amended by the association is reprinted below. Those parts of the rules which were stricken out by amendments are enclosed in brackets. New words or phrases inserted by amendments are printed in heavy-face type.

GENERAL NOTICE

To enter or remain in the service is an assurance of willingness to obey the rules **and be loyal to the interests of the company.**

Obedience to the rules is essential to the safety of passengers and employees, and to the protection of property.

The service demands the faithful, intelligent and courteous discharge of duty.

To obtain promotion, capacity must be shown for greater responsibility.

Employees, in accepting employment, assume its risks.

In all cases of doubt, take the safe side.

The rules herein set forth are for the government of the employees of the .....

.....Company, and become effective....., superseding all previous rules and instructions where they conflict with the same.

Special instructions may be issued from time to time by proper authority.

.....
General Manager.

GENERAL RULES

KNOWLEDGE OF RULES

Knowledge of Rules.

1. All employes whose duties are prescribed by these rules will be furnished with a copy, for which they will sign receipt, and will be required to have the same in their possession at all times while on duty.

Conductors and motormen are required to be familiar with the rules, and with every special order issued. The bulletin board must be examined daily for special orders. Employment by the company binds the employee to comply with the rules and regulations, and ignorance thereof will not be accepted as an excuse for negligence or omission of duty. If in doubt as to the exact meaning of any rule or special order, application must be made to the proper authority for information and instruction.

In addition to these rules, special orders will be issued from time to time; such orders, when issued by proper authority, whether in conflict with these rules or not, must be obeyed while in force.

RESPONSIBILITY

Responsibility.

2. (The motorman is held responsible.
   (a) For the safe running of the car.
   (b) For the proper operation of the machinery of the car.
   (c) For running car according to schedule.

The conductor is in charge of the passengers on the car and is held responsible.
   (d) For the safety and convenience of the passengers.
   (e) For the collection and proper accounting of fares.)

2. The conductor is in charge of the car and is held responsible
(a) For the stopping and starting signals.
(b) For the safety and convenience of the passengers.
(c) For the collection and proper accounting of fares.
The motorman is held responsible
(d) For the safe running of the car.
(e) For the proper operation of the car and its machinery.
(f) For running the car according to schedule.

Conductors and motormen will see that route and destination signs are properly displayed and will be held jointly responsible therfor.

PERSONAL CONDUCT

Personal Appearance.

3. Conductors and motormen must report for duty clothed in full regulation uniform, and must be clean and neat in appearance.

Politeness.

4. Conductors and motormen must treat all passengers with politeness, avoid difficulty, and exercise patience, forbearance and self-control under all conditions. They must not make threatening gestures or use loud, uncivil, indecent or profane language, even under the greatest provocation. Badge number of conductor and motorman must be given on request of a passenger at any time.

Habits.

5. The following acts are prohibited:
(a) Drinking intoxicating liquors of any kind while on duty.
(b) Entering any place where the same is sold as a beverage while in uniform or while on duty, except in case of necessity.
(c) Constant frequenting of drinking places.
(d) Carrying intoxicating drinks about the person while on duty.
(e) Carrying intoxicating drinks on the company's premises at any time.
(f) Indulging to excess in intoxicating liquors at any time.
(g) Gambling in any form, including the laying of bets (and playing raffles) while upon the premises of the company.
(h) Smoking tobacco while on duty.
(i) Smoking tobacco while off duty in any part of the company's buildings, except in the conductors' or motormen's room.
(j) Reading books or newspapers while on duty.

Conversation.

6. Motormen, while operating cars, are permitted to answer questions of superior officers, and to give proper instructions to students only. All other conversation with motormen while car is in motion is forbidden.

OPERATING RULES

Run on Time.

7. Cars must never be run ahead of schedule time, but must pass time points and leave terminals promptly on time, unless unavoidably delayed. Should a motorman be unavoidably detained he must not attempt to make up time by reckless running.

Conductors and motormen must carry reliable watches which must show correct time and be compared daily with the standard station clock.

Starting.

8. Motormen must never move car (whether stopped on signal or for any other reason) without signal from conductor, and then only when assured that no one is getting on or off front platform.

Conductor must never give signal to start when passengers are getting on or off.

Conductor must not put his hand on bell cord until passengers have boarded or left car; bell cord must not be touched until it is time to signal motorman to go ahead.

Conductor must never give signal to back a car unless he is on the rear platform and sees that track is clear behind the car.

Starting Cars After Blockade.

9. In the event of a blockade of cars from any cause, the cars in such blockade must not all be started at one time, but singly, and at such intervals as will not burden the feeder line.

Bell Signals.

10. From conductor to motorman, to be given on motorman's signal bell:
1 bell—"Stop at next crossing or station."
2 bells—"Go ahead."
3 bells—Stop immediately."
4 bells (given when car is standing)—"Back car slowly."
From motorman to conductor, to be given on conductor's signal bell:
1 bell—"Come forward."
2 bells—"Watch the trolley" and danger signal to the conductor.
3 bells—"Set rear brake."
4 bells—Signal to conductor that motorman desires to back the car.

Whenever a car in service is stopped, for any cause except to take on or let off passengers, the motorman will, as soon as he is ready to go forward, give two taps of the gong; after which, if the conductor is ready to proceed, he will give the "Go ahead" signal.

The motorman will answer the signal to stop from conductor by one loud tap of gong; and two loud taps of gong after receiving the signal to go ahead. If unable to proceed immediately upon receipt of signal, motorman will wait for another "Go ahead" signal before starting the car.

When the car is standing, and motorman desires to back, for any reason, he will give the conductor four bells, but must not move the car until the conductor has answered with four bells to signify "All is clear behind." However, when it is necessary to back for any distance, or whenever any danger would be likely to result from backing, motorman must always change ends.

When two or more cars are coupled together, 'Go ahead" signal must first be given by conductor of rear car and be repeated by each conductor in succession on his signal bell, when he is ready to start.

Obstructions Near Track.

11. Before passing any vehicle or obstruction close to the track, where passengers or conductor are liable to be injured while standing on the step of an open car, motorman must give two taps on conductor's signal bell as a warning, and must bring his car to a full stop before passing vehicle or obstruction unless he has received GO AHEAD signal from the conductor, indicating that all is clear. Great care must be exercised in passing over all excavations, workmen should be warned of the approach of car by sounding the gong repeatedly, and the car should be kept under full control. Where excavations are near regular stopping place, car should be run clear thereof before stopped.

Danger Signals.

12. Red lights or flags indicate danger, and when placed on the track cars must come to a full stop until such signal is removed.

Reports of Defects.

13 Conductors and motormen will report to superintendent, inspector, starter or foreman any defect in car, track or wire, and fill out blank provided for that purpose.

Disabled Cars.

14. The motorman or conductor of any disabled car, withdrawn from the main track, must remain with the car until relieved by proper authority. When a disabled car is being pushed or pulled, the signal for starting must first be given by conductor on rear car and repeated by conductor on forward car, each conductor being careful not to give the signal when passengers are boarding or leaving car.

Leaving Car.

15. When necessary for the conductor to leave his car he must notify the motorman to protect passengers and car. Should passengers board car during absence of conductor, motorman will notify conductor of the number and location of such passengers upon his return.

Cars in commission must not be left unprotected; either conductor or motorman always remaining in charge.

Responsibility for Damages.

16. Employees will be held responsible for any damages caused by their neglect or carelessness or by disobedience of rules.

Transfer Point Meetings.

17 Motormen and conductors will be held equally responsible for leaving a transfer point so quickly as to prevent the transfer of passengers from an approaching car on a connecting line.

Steam Railroad Crossings.

18. (Car must be brought to a full stop at a safe distance approaching steam railroad crossings at grade, and motorman must not proceed) **When approaching steam railroad or other flag crossings, the motorman must bring his car to a full stop at a distance of (——), and will not proceed** until conductor has gone ahead to the center of crossing, looked both ways, and given the COME AHEAD signal. Before starting, the motorman will look back to see that no passengers are getting on or off; and in no case proceed, even after conductor's signal, until he has also examined the crossing and satisfied himself that steam cars are not approaching.

When there is more than one track the conductor will remain in advance of the car until the last track is reached.

After boarding car, conductor will give GO AHEAD signal to notify motorman that he is aboard. Motorman is forbidden to proceed without this signal.

Where crossing is protected by derail, interlocking plant, or flagman (employed by the company) this rule does not apply, special instructions being issued to govern in such cases.

SAFETY OF PASSENGERS

Safety.

19. The safety of passengers is the first consideration. All employees are required to exercise constant care to prevent injury to persons or property, and in all cases of doubt take the safe side.

Warning to Passengers.

20. While persons assuming positions of danger, such as boarding or leaving moving cars, walking behind a moving car when another car is approaching, etc., do so at their own risk, conductors and motormen should call the attention of such persons to the danger of so doing. Conductors on moving cars must give the danger signal [three bells] if an accident appears imminent.

Standing on Steps.

21. (Permit no person to stand on the steps or buffers. Passengers should be fully inside of the car or safely landed on the platform before the signal is given to start.)
(21.) **Permit no person to stand or ride elsewhere than in a safe place upon the car. The standing or riding of passengers upon the buffer, dashers, fenders, roof or outside of a closed vestibule door is prohibited.**

Stealing Rides.

22. Any person caught stealing a ride on a car must never be driven therefrom while it is in motion, but car must be stopped at next street or station and such person put off. **[This rule was transferred to the section on ejectments.]**

ACCIDENTS

Assistance.

23. In case of accident, however slight, to persons or property, in connection with or near any car, the motorman and conductor in charge of the same will render all assistance necessary and practicable. In no case will they leave injured persons without first having seen that they are cared for.

Medical Attendance.

24. Motormen and conductors are directed not to employ medical attendance to injured persons, except for the first visit, in cases of personal injury; nor will they visit such persons at any other time afterward unless specially instructed so to do by an officer of the company.

Fire in Car.

25. When there is evidence of car being on fire, motorman will immediately throw overhead switch to OFF and conductor pull down trolley, both motorman and conductor using every effort to prevent passengers becoming panic-stricken or leaving car before it is brought to a stop.

Written Reports.

26. A full and complete written report of every accident, no matter how trivial, and whether occurring on or near

the car, must be made by the conductor **and motorman.** Accidents sometimes considered as not worth reporting are often the most serious, troublesome and expensive.

The conductor will obtain the name and residence in full of all witnesses on or near the car when the accident occurred, including badge number of any policeman, fireman, private officer, postman or uniformed employee of the company.

The motorman will assist the conductor in securing the names of witnesses whenever practicable, and will be held responsible for any neglect to render assistance.

In all cases full facts must be obtained and stated in the report, as follows:

The date, exact time, exact place, run and car number, and the direction in which the car was moving, the nature of the accident or collision and the cause of its occurrence.

The full name and address of the person injured, or whose vehicle was in collision (giving the name of both the driver and the owner of the vehicle).

Ascertain the extent of injuries or damage, if any, before leaving the spot.

In case there has been an accident on the car, and the crews change ahead, the conductor taking car on which the accident happened, must secure the names of witnesses as above.

In case a person is struck by a car after passing around the rear of a passing or standing car, the numbers of both cars must be obtained, and both crews must report the accident.

If an accident is caused by any defect or damaged condition of car, conductor must report the same and its cause.

Accidents to employees will be reported the same as accidents to passengers.

Any trouble or disturbance of a boisterous or quarrelsome character which occurs on a car, or the ejectment of a person from a car, will be reported as an accident.

Report Accidents to Inspectors.

27. Conductors and motormen will make a verbal report to the first inspector or official of the company they meet of any accident, blockade or mishap of any kind. The depot starter or dispatcher must also be notified.

Information to Proper Persons Only.

28. No employee shall, under any circumstances, give any information whatever concerning any accident, delay, blockade or mishap of any kind to any person, except to a properly authorized representative of the company.

Information by Telephone.

29. In case of accident involving personal injury or serious damage to property, conductor, after attending to the case and getting witnesses, will telephone at once to headquarters, giving notice and particulars of accident.

In case of a blockade, where assistance is needed to get cars moving, conductor of car first in block must summon assistance. Conductor of the second car, however, will also be held responsible for being sure that assistance has been summoned. Expense of telephone message will be refunded upon application at office.

EJECTMENTS

Ejectments.

30. Ejectments shall be made by the conductor, with the assistance of the motorman, after the car has been brought to a stop, using "only such force as is sufficient to expel the offending passenger with a reasonable regard for his personal safety." No passenger shall be forcibly ejected from the car for any cause whatever without order from an inspector, starter or official of the company, unless the conduct of the passenger is dangerous or grossly offensive.

Any person caught stealing a ride on a car must never be driven therefrom while it is in motion, but car must be stopped at next street or station and such person put off.

Where to Eject.

31. Any person ejected from a car must be put off at a regular stopping place.

No passenger will be put off at a point where likely to be exposed to danger.

Particular attention must be paid to this rule during bad and inclemnt weather, late at night, or when a passenger is intoxicated.

Intoxicated Persons.

32. No passenger will be ejected from a car for mere intoxication unless said passenger becomes dangerous or offensive; such passenger must then be ejected with great care and must be guided until free from probable injury.

CAR-HOUSE RULES

Report for Duty.

33. Regular conductors and motorman must report for duty (ten) - - - - minutes before leaving time for their first trip, or, for any good reason unable to so report, must give notice at least ten minutes before such leaving time.

Extra men must report at such time as ordered, or must give notice at least ten minutes before such time. They must not absent themselves after answering roll-call without permission.

HEARING BY SUPERINTENDENT

Hearing by Superintendent.

34. A hearing will be given by the superintendent to every employe who desires to complain. Reports or suggestions for the betterment of the service will always receive consideration.

RULES FOR CONDUCTORS.

OPERATING RULES

Position on Car.

101. Remain on rear platform **or main entrance** when not collecting fares, keeping a lookout for persons desiring to board car. Keep careful watch of passengers to observe requests to stop car. When stops are made at principal streets, places of amusement, churches, or at any point where a considerable number of passengers enter or leave car, conductor should be on rear platform until such point is passed. When descending steep grades conductor will remain on rear platform.

Announcements.

102. Announce distinctly the names of streets, public places and transfer points when approaching the same.

Route Signs.

103. Properly display route signs on each half trip.

Trolley.

104. Trolley rope must be held when passing over switches, crossings, or going around curves. Should the trolley leave the wire, the conductor must at once pull down the trolley and signal the motorman to stop. After the car has stopped, replace the trolley on the wire, look around and through the car and see if any persons are boarding or leaving same before giving motorman signal to start. See that passengers keep their hands off the trolley rope. Do not remove trolley from wire at end of run, or elsewhere at night, until passengers have alighted from car.

Gates.

105. Front and rear gates on closed cars on the side between the tracks must always be kept closed and securely fastened. On open cars the guard chains must be kept fastened and guard rail lowered on the side between the tracks. When gates or chains or their fastenings are broken or out of order, prompt report must be made to superintendent, inspector, starter or foreman.

Disabled Motorman.

106. In case motorman is disabled from any cause while car is in motion, conductor must stop the car as promptly as possible.

Inspection of Car.

107. Conductors will see that cars are clean and will carefully inspect floor, windows, grab-handles, steps, signs and all other parts of car which passengers may use, to see that same are in proper condition before car is taken out on the road.

HANDLING PASSENGERS

Moving Forward.

108. On closed cars when standing passengers crowd the rear door, request them to PLEASE STEP FORWARD.

Seating Passengers.

109. Standing passengers should be directed to vacant seats, and an effort made to provide them with seats where possible.

Assisting Passengers.

110. Elderly and feeble persons, women and children should be given assistance getting on and off car when possible. Crippled, blind or badly intoxicated persons should be assisted to sidewalk if necessary.

Information to Passengers.

111. Conductors are expected to be familiar with principal points along their route, so as to be able to give information to passengers about streets, parks, connecting or intersecting railway lines, depots, ferries, public buildings, large stores, hospitals, theaters, etc.

When on the stand at terminals, and when approaching passengers, conductors must announce the route and destination of car.

Spitting on Floor.

112. No passenger will be ejected from a car for spitting on the floor. If a passenger violates the rule or law prohibiting spitting, the conductor will call the attention of the passenger to the law prohibiting such conduct and endeavor to persuade the passenger to desist.

Carrying Packages.

113. Passengers must not be allowed to carry bulky or dangerous packages aboard cars.

Employes must not carry packages, letters or newspapers without an order from the proper authority, and must not assume responsibility for any package which a passenger may bring upon the car, excepting such articles as are to be turned into the Lost Article Department.

They must not hang nor allow articles to be hung on the brake handles.

Lost Articles.

114. Any article left in the car must be turned in promptly at office. Concerning articles found, conductors must not give information to any person, but must refer such person to the proper office. The names and addresses of parties giving lost property to conductors must be obtained.

Dogs in Cars.

(115. Dogs will not be carried on any car.)

FARES AND TRANSFERS

Collection of Fares.

116. Fares must be collected promptly after passenger has boarded car and immediately registered. When more than one person boards car at a time, **and one passenger pays the fare for others,** the fares must be registered immediately in the presence of the passenger who paid them before any more fares are collected. Fares should be collected separately and not in bunches.

Should a conductor for any reason return a fare to a passenger, or by error register more fares than he collected, he must not attempt to recover same by omitting to register fares subsequently collected, but should make report of such fact.

Change.

117. When necessary to give change, first register fare, and immediately thereafter give change, stating the amount received and amount returned.

Should a conductor have any dispute with a passenger in regard to change, he must make a report in writing to the superintendent.

Conductors will make change for passengers to the amount of (two) - - - - dollars.

Conductors will provide themselves with - - - - dollars, for the purpose of making change, previous to taking charge of the car.

Register Bell.

118. Be careful to see that register rings each fare.

Register Out of Order.

119. In case the register gets out of order, stop using it, make report of fares on back of trip report or on blanks supplied for that purpose, and report the fact to the first inspector, (or) starter **or dispatcher** met on the road, and subsequently report to superintendent.

Transfers in Blockades.

120. In case any line is blocked it is the desire of the company to carry passengers to their destinations on other

lines. Under such circumstances, conductors of parallel or intersecting lines will accept transfer tickets accordingly and will issue a transfer on a transfer if necessary. They will also accept transfer passengers without tickets on orders from any inspector or authorized representative of the company, making report of same on back of trip report.

Issuance of Transfers.

121. Correctly punched transfers will be issued only on request made at time fare is paid.

Acceptance of Transfers.

122. Transfers will be accepted only when properly punched and offered for ride by persons to whom transfers are issued at designated transfer point within the time limit punched on transfer.

Refusal to Pay Fare—Transfers.

123. When a passenger refuses to pay fare or presents a defective transfer ticket, upon which, in the judgment of the conductor, the passenger is not entitled to ride, the conductor must retain such defective transfer or ticket and secure the names of as many witnesses to the fact as is possible, whereupon the car must be stopped and the passenger requested to leave.

If the passenger fails to comply with such request, the facts of the case must be brought to the attention of the first inspector, starter or official of the company who is met, and the conductor must act according to instructions received from such inspector, starter or official. In all cases the passenger must be given the benefit of any doubt.

When a passenger who refuses to pay fare requests to be allowed to leave the car, the car must be stopped and the person permitted to alight.

RULES FOR MOTORMEN.

HANDLING CARS

Stopping for Passengers.

201. Keep a careful lookout on both sides of the street and bring the car to a full stop for every person who signals, except that when a car has considerable headway, is overcrowded and another car of the same line follows within 500 feet passengers should be requested to take the following car.

Cars will stop on signal only at (farther) **designated** corners, at car stations, transfer points, and at points as provided in special orders.

Do not stop cars so as to block cross-streets or crosswalks.

Churches, Hospitals and Schools.

202. When passing a church during the hours of service, and at all times when passing a hospital, run quietly and do not ring the gong unless necessary.

Cars must be run slowly and with great care, and gong sounded, in the vicinity of schools when there are children on the street.

Run Slowly.

203. When passing standing or slowly moving cars, gong must be rung and car brought to slow speed.

Run slowly over special work, especially over all facing switch points, and if there is another car moving in the opposite direction on the other track, allow that car to pass before striking the switch point.

Motormen must see that all switches are properly set before passing over them, coming to a full stop if necessary.

Looking Back While Car Is Moving.

204. Motormen must not look back, either through or around car, while it is in motion.

Changing Ends.

(205. When changing ends at terminals motormen must not pass through car.)

Destination Signs.

206. Properly display destination signs on each half trip.

Entering Terminals.

207. Motormen must reduce speed when running into terminals to a rate just sufficient to carry the car into terminal.

Persons Authorized to Run Car.

208. Motormen must not allow any person to run their car except men placed there for instruction or some inspector or duly authorized officer of the company, known to the motorman to be such. Conductors must not be allowed to run cars. A motorman who has a student "breaking in" in his charge must, under no circumstances, allow the student to handle the car unless he (regular motorman) is at his side, ready to take the brake or controller immediately if necessary.

Inspection of Car and Equipment.

209. Motorman must test brakes, switches, controller, lights and other apparatus and examine sand boxes to insure himself that car is in proper running order before taking it out on the road.

Emergency Stop.

210. Motorman must not use the reverse to stop car except to avoid accident or when the brake rigging is disabled.

Do not reverse when the brake is set, but release the brake and throw the reverse handle simultaneously, and, when the reverse handle is thrown in position, apply the current one point at a time; otherwise the fuse will melt or the breaker will release. Sand should be used when making an emergency stop.

Runaway Car.

211. While descending a grade, should it not be possible to stop a car equipped with two motors by means of brake, the motorman must immediately turn off hood switch, reverse and advance controller cylinder to last position. In the event of car being equipped with four motors, simply reverse to stop.

Should a car equipped with two motors start to roll backward while ascending a grade and the brakes be unable to hold it, the hood switch must be immediately turned off and the controller cylinder advanced to last position. Should the car be equipped with four motors, if the reverse is set in forward position the car will stop.

Leaving Car.

212. Never leave platform of car without taking controller and reverse handles, throwing off the overhead switch and applying brake. Always remove reverse handle first.

Before leaving car at any point set hand brake sufficiently to prevent car from drifting.

Overhead Switch.

213. An overhead switch must never be thrown until power is turned entirely off, except in case controller cylinder fails to turn when power is on. It must be thrown by hand only.

Power Off Line.

214. When the power leaves the line the controller must be shut off (the overhead switch thrown and the car brought to a stop); the light switch must then be turned on and the car started only when the lights burn brightly; **but motormen must never allow their cars to coast when power is off the line except to clear crossings or dangerous points.**

Economical Use of Current.

215. In order to effect an economical use of the electric current it is necessary that the continuous movements of starting and increasing speed should be made gradually. In starting a car let it run until the maximum speed of each notch has been attained before moving handle to the next notch.

Rapid feeding of the controller is injurious to the equipment of the car and causes discomfort to passengers. Controller must never be thrown on last point if car does not start from preceding points. The controller must never be thrown from a higher to a lower notch. Controller must not be held for any length of time on any one point except the first and second running positions. If necessary to run slower than the first running position speed, power must be thrown on and off, and not be taken continuously from a lower notch than that of the first running position.

Do not apply brakes when the current is on.

Do not apply current when brakes are applied.

Do not allow the current to remain on when car is going down grade or when passing over section breakers. Endeavor to run car with the least amount of current, allowing the car to drift without the use of current when it can be done without falling behind time.

A great amount of power can be saved by using judgment and discretion in approaching stopping places and switches by shutting off the power, so as to allow the car to drift to the stopping place or switch without a too vigorous use of the brake.

Release of Brakes Before Stop.

216. When brakes are set to make a stop they should always be released or nearly so just before the car comes to a standstill.

Water on Track.

217. When there is water on the track run the car very slowly, drifting without the use of power whenever possible.

Sanded Rails.

218. Never run on freshly sanded rails with brakes full on except to prevent an accident. On cars provided with sand boxes, in case of slippery rails, always sand the track for a short distance before applying the brakes.

Spinning of Wheels.

219. Care must be taken particularly during snowstorms to avoid "spinning" of the wheels with no forward or backward movement of the car.

Slippery Rail.

220. On a slippery rail do not allow the wheels to skid; as soon as wheels commence to skid the brake must be released and reset.

Extreme caution must be used to keep car under full control approaching all intersections, junctions, railroad crossings and prominent driveways, being very careful when approaching wagons and other cars, disregarding schedule if necessary.

Do Not Oil Car.

221. Do not oil or grease any part of a car.

VEHICLES.

Passing Vehicles.

222. Motormen are cautioned to exercise great care when a vehicle is passing alongside of track ahead of car. Ring the gong vigorously to attract the attention of the person driving, as a warning not to pull in ahead of car; and run cautiously until the vehicle is passed in safety.

Fire Apparatus.

223. When any fire department vehicles are observed approaching from any direction, cars must be stopped until such vehicles have passed.

Ambulances, Patrol and Emergency Wagons.

224. Ambulances, police patrol and the emergency wagons of the company must be allowed the right of way, and when approaching or passing, cars must be kept under control to avoid collision.

PEDESTRIANS.

Persons Between Cars.

225. Cars moving in opposite directors must not pass at points where persons are standing between the tracks, but must be operated so as not to occupy both tracks at such point simultaneously.

Transportation service on the lines of the Omaha & Council Bluffs Street Railway, Omaha, Neb., has been practically normal since Sept. 28. There have been many desertions from the ranks of the strikers. An effort was made on Sept. 29 to declare a truce with subsequent arbitration, but the company refused to entertain the proposal. On Sept. 18 the employees of the Nebraska Traction & Power Company, operating between Omaha, South Omaha, Ralston and Popillion, went on strike because they were required to operate cars of the company from the eastern limits of South Omaha to the business center of Omaha over the tracks of the Omaha & Council Bluffs Street Railway. The Nebraska Traction & Power Company reinstated the men on Oct. 2 as individuals, restoring their seniority rights, the men waiving their objections to operating cars in Omaha.

SERVICE CARD RECORDS AT OAKLAND

The two railway properties at Oakland, Cal., are operated by one staff. Both city and interurban service is given. One property, the Oakland Traction Railway, has an extensive street railway system centering in Oakland and reaching the nearby suburbs; and the second property, the San Francisco, Oakland & San Jose Consolidated Railway, operates

NAME (in full) BADGE NO.

PLACE AND DATE OF BIRTH (Day) (Month) 19

SERVICE RECORD

Times Emp'd	DATES OF EMPLOYMENT From (Year and Mo.)	DATES OF EMPLOYMENT To (Year and Mo.)	Where Emp'd (Location)	Department	Occupation	Rate of Pay	REMARKS
1st							
2nd							
3rd							
4th							
5th							
6th							
7th							
8th							

Leave Blank

Marine License as

Nationality Citizen

over

Service Card Record at Oakland—Obverse

an interurban train service in connection with its ferry boats running between a pier terminal in Oakland and the principal ferry terminal in San Francisco across the bay. J. Q. Brown, assistant general manager of these two railways, keeps a very complete record of the operation details of the properties. Among the several classes of information filed according to the card index system are service records for all of the company's employes except those working in the gen-

ABSENCE				REMARKS
Under this heading report all absences of over 30 days without pay since first entering service. If no absences of this length of time have occurred, so state				Under this heading give any important information or explanation not otherwise provided for.
NO.	FROM	TO	CAUSE	
1st				
2nd				
3rd				
4th				
5th				
6th				

Leave Blank

DIRECTIONS

1st. This Card to be written in Ink, and not folded.

2nd. Give exact dates near as possible

3rd. Use separate line for each change of occupation

4th. Make entries promptly

Service Card Record at Oakland—Reverse

eral offices. Accompanying illustrations show the obverse and reverse sides of one of these service cards and exhibit the headings of the information as recorded. As old men may be re-employed in or transferred to and from the power stations, ferry steamers, shops, line and track departments, these records, when carefully kept, serve as a valuable index of the class and quality of work which any man has done.

The mayor of Springfie'd, Mass., has written L. S. Storrs, president of the Springfield Street Railway, to ascertain if an agreement could not be reached between the company and the city for re-routing cars. At present 133 cars an hour pass the corner of Main street and Court street. Mr. Storrs replied that he would be glad to meet the mayor at the latter's convenience to discuss transit conditions in Springfield, and at a subsequent meeting on Sept. 24 it was decided that a commission to be composed of representative business men from each section of the city be selected to study transportation matters and make suggestions.

COST OF POWER IN A PLANT WITH A RELATIVELY LARGE RAILWAY LOAD

The return of the Hyde Park (Mass.) Electric Light Company to the Board of Gas and Electric Light Commissioners for the year ending June 30, 1909, illustrates the cost of generating electrical energy in a station of moderate size having a large railway load. Although the Hyde Park Company handles an electric lighting and power business in the suburb of Boston where its plant is established, by far the greater portion of its output is utilized in the operation of trolley lines at the south of Boston. The total normal capacity of the station is 1965 kw, and in the year covered by the return the company generated and delivered at its switchboard 3,990,634 kw-hours. Its total sales were 3,661,372 kw-hours, and of this amount of energy 3,314,076 kw-hours were sold to electric railway lines at a price of practically 2 cents per kw-hour, the exact figure being 1.98 cents, as deduced from the return. Practically 92 per cent of the total generated energy was thus sold—a much higher proportion than is usually encountered in central station work, and due without question in this case to the purchase of the railway power at the direct- current switchboard of the station, with the avoidance by the central station of the usual 15 to 30 per cent distribution losses.

The equipment of the Hyde Park plant, as reported in the return, consists of nine 150-hp Cunningham boilers with Hartford setting, each having a 72-in. shell and 92 3¼-in. tubes; also one 125-hp Dobbins boiler with a Jarvis setting, 72-in. shell and 140 3-in. tubes built for 110-lb. steam pressure. The total rating of the boiler plant is 1475-hp. The engine equipment consists of the following units:

1 Corliss compound, 24x48x48 in., 80 r.p.m., 1250 hp.
1 Green compound, 24x38x48 in., 100 r.p.m., 800 hp.
1 McIntosh-Seymour compound, 13x23x17 in., 200 r.p.m., 200 hp.

Direct connected, respectively to 850, 525 and 100-kw, General Electric, 500-volt, d.c. generators.

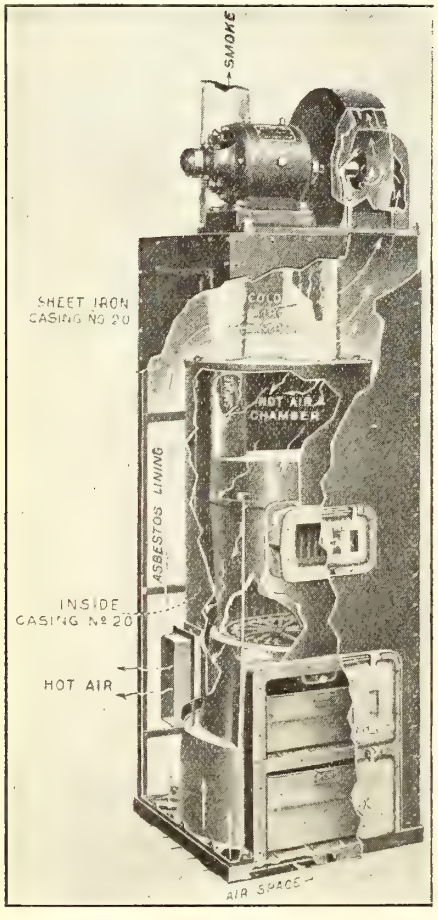
2 Armington & Sims 18½x18 in., 200 r.p.m., 200 hp. belted and one Armington & Sims compound 10½x16½x12 in., 285 r.p.m., 100 hp, belted, driving 6-arc light dynamos, four alternators of a total capacity of 330 kw and two 500-volt, d.c. generators of 100 kw rating each.

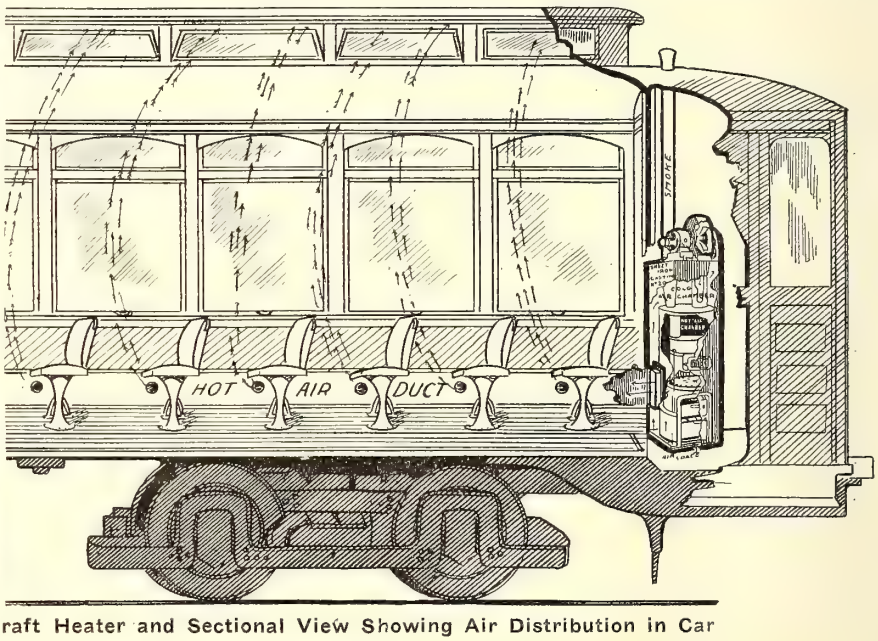
The station was operated by a total force of three engineers, three firemen and two coal-passers. The company burned a mixture of soft coal costing about $4.21 per ton and buckwheat at $3.26, the total fuel cost for the year being stated as $34,471.24. The station wages cost for the year was $9,621.86. These were the two principal items of cost at the switchboard, the total expense of manufacture being about $50,000. The principal repairs tabulated were those of the steam equipment, which came to $2,741.45. The electrical repairs at the station were barely $1,100. The power production cost was as follows in detail:

Kw-hours delivered at switchboard	3,990634
Cost of manufacture at switchboard as follows:	
Fuel	$34,471.24
Oil and waste	778.22
Water	273.06
Wages at station	9,621.86
Repairs, station building	90.59
Repairs, steam equipment	2,741.45
Repairs, electrical equipment	1,101.33
Tools and appliances	698.05
Total	$49,775.80
The cost per kw-hour manufactured in cents was:	
Fuel	0.86
Labor	0.24
Miscellaneous	0.15
Total	1.25

FORCED DRAFT CAR HEATER

The Peter Smith Heater Company, Detroit, Mich., exhibited this week at the convention a novel forced draft method of heating and ventilating city and interurban cars. The heater for cars up to 35 ft. inside measurement is 21 in. square and 60 in. high and can be placed in the vestibule or body of the car. The stove, which is inside the hot air chamber, is of the ordinary type, but has a corrugated fire pot which is 12 in. in diameter. The grate is of simple design, and is shaken with a side to side movement or rocked and dumped at the will of the operator. The base is a rigid plate casting which serves as a foundation and keeps the different parts permanently in line. The stove has an ash box and coal storage chamber located below the grate. These chambers have pans which hold sufficient ash and coal to operate for 18 hours. The doors to the fire box, ash pit and coal storage are all hung on gravity hinges to make full provision against their being left open.





Part Section of Forced Draft Heater and Sectional View Showing Air Distribution in Car

The hot air chamber is circular and has a 2½-in. air space between the stove and casings. It is made of No. 20 sheet iron. The outer casing is also made of No. 20 sheet iron, built over a square angle iron frame, lined throughout with 3/16-in. asbestos mill board, and has a minimum spacing of 1 in. from the hot air chamber. The framing at the top is reinforced with bar iron under the blower bed plate.

The joints of the stove are air tight to prevent any air from the air chamber getting into the stove and interfering with the draft. The base, as shown in the cut, is perforated in the four corners so that when the fan used with the heater is in operation, air is drawn from under the car through a hole cut in the floor beneath the heater. At the upper end of the cold air chamber existing between the walls of the inner cylindrical hot air box and the square heater jacket, this air, now somewhat heated enters the blower intake pipe. After passing through the blower it is forced downward into the air tight hot air chamber surrounding the stove and from there escapes through the distributing pipe outlet at the bottom into the interior of the car. In this way, the economy of the stove heater is still retained and at the same time the heat can be distributed throughout the car in the most efficient manner.

The car in which one of these heaters is now being operated has a distributing pipe or hot air conduit which runs from the front to the rear of the car along the truss plank on the floor. This pipe is rectangular in form, 3 in. by 8 in., and made of light galvanized sheet iron. It lies on edge in a magnesium lined wooden box with square openings under every seat. These openings are cut in the lower portion of the conduit front for all seats forward of the center; for the rear seats the openings are cut in the upper portion of the conduit front. This arrangement permits the hottest air to pass the first openings and be distributed at the back of the car where it is most needed, and also afords a means for an even distribution of warm, fresh air.

The heater has a motor and blower located on the top near its front face. The blower consists of a ¼-hp Browning 500-volt series motor direct connected to an American Blower Company's fan. The fan is designed to handle 200 cu. ft. of air per minute against a pressure of about ⅛-in. water gage. The speed is 1060 r.p.m. The wheel is 10½ in. in diameter by 2¾ in. wide at the periphery. The inlet is 5¾ in. in diameter, and the outlet is 4½ in. by 4½ in. to 5 in. round. The housing is 14⅝ in. high and the weight of the base plate is 14 lb., the motor 75 lb., the shell 5 lb.; total weight of heater 500 lb. The equipment can be removed in summer with no more trouble than is required to take out an ordinary car stove.

The motor is connected to the trolley circuit by a simple snap switch. Actual instrument readings have shown that the blower motor carries far less load than its ¼-hp rating. Under operating conditions the motor takes 0.22 amp at 400 volts. This means an operating cost of 3.5 cents a day of 20 hours, assuming current costs 2 cents a kw-hour. The corresponding cost of operation at 500 volts would be 5.5 cents a day and even at full load capacity the cost would be only 7.4 cents a day. The usual current cost of 5.5 cents added to the cost of 40 lb. of hard coal at $6 per ton, gives an operating cost of 17.5 cents a day, which is very low for the character of heating.

The operating cost of the same car fitted with electric heaters, assuming cost of current at 2 cents per kw-hour, is given as follows:

First point	5 amp	500 volts	$1.00
Second point	7 amp	500 volts	$1.40
Third point	11 amp	500 volts	$2.20

The assumption of 2 cents per kw-hour may be considered high and unjust to the electric heaters, but even at half that

price for current the forced draft heater would show a maximum operating cost of about one-third that of the electric heaters on the first point. Thus, it is possible to operate a forced draft heater for three days of severe weather for no more expense than is required for one day's electric heater operation in mild weather. The initial cost of this equipment will be somewhat higher than electric heaters, but this is more than counterbalanced by the advantage of relieving the power house of an electric heater load which in severe weather might equal 10 per cent of the total station capacity.

The forced draft heater which the company now has in operation is installed in a pay-as-you-enter car running on the lines of the Municipal Traction Company, Cleveland, Ohio. The inside measurement of this car is 35 ft. 6 in. and its seating capacity is 50 passengers. On the day the tests wer made, the outside air was at a temperature of 20 deg. F. There was a moderate fire in the heater, and the following temperatures in degrees F. were taken from

Bell Cord		Seat Back	
Vents Closed	Vents Open	Vents Closed	Vents Open
73 deg.	63 deg.	71 deg.	57 deg.

The car had 14 ventilators 28 in. by 7½ in. in size; 140 sq. in. per vent opening; total outlet of vent air openings, 1960 sq. in.; air volume in car, 1900 cu. ft.

Air from blower per hour, 12,000 cu. ft.

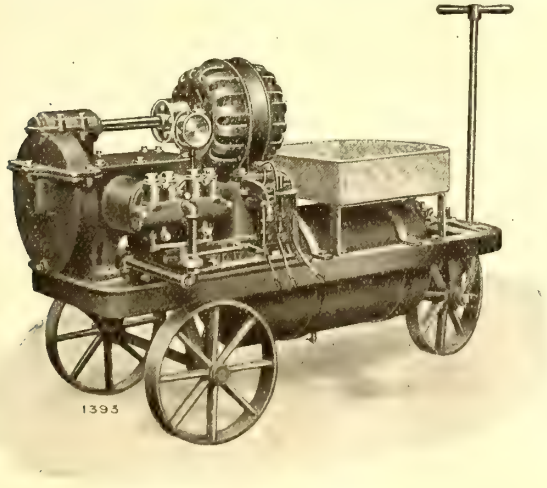
Air changes per hour, 6⅛.

Minutes required for complete air renewal, 9½.

The average temperature of the air coming out of the openings under the seat was 190 deg. F.

NATIONAL PORTABLE COMPRESSOR OUTFITS

To satisfy the demand for a self-contained, reliable, portable compressor outfit shops, power plants and track work, the National Brake & Electric Company has designed a most durable and convenient outfit consisting of a National type "H" compressor and automatic governor, a combined switch and fuse, air gage, reservoirs and all necessary piping. The entire equipment is mounted on a substantial angle iron frame supported on wheels. These portable outfits are built in two styles with three and four-wheel trucks respectively.



Portable Air Compressor

In the three-wheel type the apparatus is drawn around by means of a wrought iron tongue attached to the pivoted fork in which the front wheel is hung. The four-wheel type is fitted with castors on the two front wheels which permit the truck to be turned and moved about as needed. The small width of these portable outfits allows them to be taken through doors and openings of much smaller breadth than the average. These portable compressors are built in six sizes in capacities of from 11 cu. ft. to 50 cu. ft. free air per minute.

ALUMINUM TO COPPER MECHANICAL CONNECTOR

At the Denver convention Dossert & Company, New York, exhibited a new mechanical connector for use in making tap-offs from aluminum feeder cables to copper branches. As shown in the accompanying ilustration the connector is similar to the standard Dossert cable tap with the exception that the hook part of the connector is cast in aluminum while the shank is cast in copper and supplied with copper contact sleeve and compression nut, thus giving contact of



Aluminum to Copper Mechanical Connector

aluminum to aluminum and copper to copper. The two metals are cast together to preclude absolutely the possibility of air or moisture intervening. The connection is so made that it is not necessary to cut the mains in taking off a lead. The hook, with under jaw removed, is placed over the bare cable. The under jaw is then put in place and tight contact obtained by screwing up the jam nut. The shank of the tap is supplied with a compression nut and bushing as previously described by means of which the lead is fastened to the connector. The design has been accepted by the Milwaukee Railway & Light Company which has ordered 1,000 for installation on its new aluminum feeder line.

NEW SHOPS PLANNED BY DENVER CITY TRAMWAY COMPANY

The Denver City Tramway Company is planning the early construction of a general repair and maintenance headquarters on West Forty-eighth Avenue at the terminal of the Moffat Railway. The contemplated plant and adjoining land for extensions, materials and storage will cover about 60 acres. There will be a planing mill, blacksmith shop, paint shop, woodworking shop, foundries and track construction headquarters. These and other facilities will be housed separately. A transfer table 45 ft. wide with a 555-ft. run will separate the woodwork, lumber and paint sections from the general repair shop. Each shop will therefore be equipped with stub tracks in connection with the transfer table. The capacities of the principal sections will be as follows: Paint shop, 33 cars; wood shop, 20 cars; general repair shop, 16 cars. The completed layout will cost about $200,000 and will represent one of the most extensive railway maintenance plants west of the Mississippi River.

W. R. Garton Company, Chicago, Ill., is meeting with great success in the sale of the Universal safety tread in its territory. It is one of the company's latest lines and promises to be one of its best. The lead tread is especially desirable because of its toughness and non-slipping surface. In this tread, the lead is so applied to a steel base as to afford a constantly-increasing hard surface as the tread wears. Hence the tread improves with use.

M. W. Flanagan has been appointed superintendent of Allegheny Division No. 1 of the Pittsburgh (Pa.) Railways. Mr. Flanagan first entered the employment of the United Traction Company, Pittsburgh in June, 1899, as clerk. Early in 1905 he was chosen superintendent of the West Moreland County Street Railway at Derry, Pa. In 1905 he was appointed superintendent of the Allegheny Division of the Pittsburgh Railways. He has held that position continuously since.

News of Electric Railways

Cleveland Traction Situation

Mayor Tom L. Johnson, through the city council of Cleveland, agreed, on Sept. 29, to the proposition of the Cleveland Railway to submit the questions of valuation of the physical property and of maximum fare to Robert W. Tayler, judge of the United States circuit court, as arbitrator. The rapidity with which the administration acted upon this matter caused considerable astonishment among the people of the city. They expected the old excuse that the duties of the city council must not be taken out of the hands of that body would be pleaded as an excuse, but only one vote was cast in the negative. This member still held to the policy mentioned and would not give in. Dr. Walz did not vote, because he wanted to be free to act when the proposed franchise is brought before the council.

Preceding the council meeting a caucus was held behind closed doors. Mayor Johnson had just returned from an automobile tour which consumed two weeks, but he seemed to have been posted on what was transpiring at home, as he was ready to act at once. The letter containing the Cleveland Railway Company's proposal was delivered just the day before his return, so that everything was in shape to proceed. The city's reply to the letter of the company was as follows:

"Replying to your letter received on Sept. 27, the council committee agrees to refer the questions of valuation and maximum fare to Judge R. W. Tayler.

"You agree to accept and we to pass an ordinance embodying Judge Tayler's findings upon these questions, this to the end that the people of Cleveland at a referendum may pass upon the settlement

"In order that the people may have full information before them, we understand that Judge Tayler's valuation shall be by items, to the extent that either the company or the council shall request, the purpose of this itemization being, of course, to enable the voters to discuss and understand it, for the valuation of the property will be the foundation of the ordinance and of the settlement.

"We are ready then for the immediate submission of these questions to Judge Tayler."

Many persons attributed this move to a desire that the matter should be in better shape before the fall election, as there was every evidence that the people were getting tired of waiting for a decisive move. It was argued that this would put the matter in such a light that the administration could say that it had put a 3-cent fare proposition before the people and they had refused to accept. Since there had been a call for an ordinance on the lines suggested by Judge Tayler, the administration has now apparently made it possible for such a proposition to be placed before the people.

F. H. Goff, formerly arbitrator for the Cleveland Railway, stated that he believed the administration was sincere, but that if an attempt was made to have Judge Tayler fix the value of the property and name the maximum fare, so that the administration might attack the conclusions, he would refuse to have anything to do with the matter. Mr. Goff said, also, that a definite agreement should be reached on all other points before Judge Tayler was asked to take up the subject.

It will be noticed that the administration adheres to the idea that Judge Tayler shall value the property by items, if requests should be made to that effect by either party. The company has opposed any limitations upon Judge Tayler in arriving at the value of the property.

Mayor Johnson, however, is quoted in one of the local papers as saying that he reserved the right to oppose any part of an ordinance based on the Tayler plan that he did not like.

On Oct. 1 the directors of the Cleveland Railway framed a reply to the letter received from the city. While the company does not refuse to have the property valued by items, the assertion is made that Judge Tayler should have his own way in the matter and reply or not, as he sees fit, to any inquiries made either by the company or the city. The letter says in part:

"We understand that it is agreed between us that the questions of valuation and maximum rate of fare shall be arbitrated by Judge Tayler, without restriction or limitation, in ascertaining the valuation of our property.

"While we do not think it necessary that Judge Tayler report the value of the property by items, or his method of arriving at the value, we do not object to his being asked by either the city or the company to itemize the values of the property. He should be at liberty, however, to comply with such requests or not, as he may deem proper.

"We are ready to unite with you at once in a communication to Judge Tayler requesting him to fix the value of the property and the maximum rate of fare.

"Inasmuch as there are some other provisions of the proposed ordinance upon which we are not agreed, we suggest that they also be submitted to Judge Tayler for arbitration, so that, when the ordinance has been completed, it may be passed in that form by the city council, and submitted to the people, to the end that it may have the approval and support of the city administration and the company in a referendum election."

Mayor Johnson stated that if the ordinance contained objectionable features, he would point them out, and that the degree of his opposition would depend upon the number of such objectionable features. He added that he would not be bound to approve any property valuation or any rate of fare, until he knew what they were.

Accompanying the letter of the Cleveland Railway was a form of submission to Judge Tayler, which is as follows:

"The city administration, the city council and the Cleveland Railway unite in inviting you to value the property of the Cleveland Railway as of Jan. 1, 1908, except that portion acquired from the Forest City Railway, which is to be valued as of March 25, 1908, and also, having reached a conclusion as to the value of the property, to fix the maximum rate of fare which may be charged by the Cleveland Railway within the term of the proposed so-called Tayler plan grant.

"If you decide to accept this public trust, the city administration, the city council and the Cleveland Railway will, as promptly as possible, unite in submitting to you for your decision any other questions upon which they may be unable to agree, to the end that the ordinance, completed by your arbitration upon these disputed matters, may be submitted to the people at a referendum election at as early a date as practicable."

The city council on Oct. 2 drafted a letter to the company in which it proposed that Judge Tayler be bound to make up the value of the property by items to the extent that might be desired by either the city or the company. The form of the letter of submission to Judge Tayler was so amended by the council as to require this. President Horace E. Andrews of the Cleveland Railway stated at the council meeting that the company had no objection to this form of valuation, except that it was not just to place any limitations about Judge Tayler in the work.

The letter of the council indicated that the other matters upon which agreements had not been reached consisted of differences in the form of the language used and that it was not necessary to ask Judge Tayler to pass upon them. One of these is the so-called safety clause, which both parties agreed to submit to a board of which Judge Tayler is a member. Another relates to East Cleveland and the interurban roads. No agreement has ever been reached on these matters.

Two evening papers of Cleveland, in their Saturday issues, stated that the mayor was attempting to put the blame for any further delay in the submission of the matter upon the company.

In a letter to the Cleveland council committee of the whole, delivered on Sept. 27, the Cleveland Railway has expressed its willingness to allow Judge R. W. Tayler to fix the rate of fare, after he has placed a valuation on the property. The administration contended that the fare should not be fixed until after the valuation had been made. The delivery of the letter has been delayed two weeks because of the absence of Mayor Johnson from the city. The letter follows:

"In regard to the value of our property, we believe that the entire subject should be submitted to Judge Tayler, and that neither party should impose upon him any restrictions or limitations.

"As to the maximum rate of fare, we believe that no ordinance fixing a lower maximum rate than 5 cents cash, including a transfer, or seven tickets for 25 cents with one cent for a transfer, as stated in our letter of Sept. 7, should be passed, but we are willing that Judge Tayler shall fix the maximum rate of fare after he shall have determined the valuation.

"The concessions made in our letter of Sept. 7 were made upon the condition that the valuation be determined as herein stated, and that the maximum rate of fare be the rate herein named. We now consent that Judge Tayler may fix

this maximum rate of fare after the determination of the valuation."

At its regular meeting on the evening of Sept. 27 the City Council did not take up the matter. Mayor Johnson had just returned to the city and had not had time to go over any of the matters that have come up during his absence.

The hearing on the claims against the Municipal Traction Company which are opposed by the Cleveland Railway has been postponed by the Federal Court on account of pressure of other business.

Judge Tayler has written a letter to the City Council and the Cleveland Railway, saying, in part:

"I deem it due to myself and to the community to set down the following conditions upon which I can consent to act as an arbitrator on the subject of the valuation of the property of the Cleveland Railway Company and a determination of the maximum rate of fare:

"(1) I cannot consent to enter upon this arduous and responsible work until all other questions are settled. There must not be left anything to debate about or agree upon before I am called upon to leave for an indefinite and considerable time my public duties as judge. The ordinance ought to be completed in every line except the insertion of the valuation and the maximum rate of fare.

"(2) As to itemizing the valuation of the property, I cannot consent to be required to itemize upon any and every part of the property valued which either of the parties may require. But I am not unwilling to value the physical property in one item, the franchise value in another item, and if any allowance is made at all for good will or growing value, to separately itemize that.

"(3) Even these things I hesitate to consent to do, because neither the mayor nor the council agrees to accept my findings, but both reserve the right to attack them at a referendum election."

Judge Tayler says his position will be difficult because he is to act neither as arbitrator nor referee, but simply as adviser in the matter, as the city has not agreed to accept his decision as final. However, he says he is willing to waive that important point and act, from a sense of public duty. On the subject of fares he holds that the maximum should be 7 tickets for 25 cents, with 1 cent for a transfer.

Philadelphia Transit Talks

In Transit Talk No. 19, dated Sept. 21, 1909, the Philadelphia Rapid Transit Company republished a news item from the Philadelphia North American comparing transit conditions in Frankford of 63 years ago and now. The article in the North American was inspired by an old home celebration in Frankford, and said:

"Sixty-three years ago—or, to be exact, on March 4, 1846—there appeared in an issue of the Frankford Herald and Weekly Advertiser the following notice:

"'The subscribers respectfully inform their friends and the public generally that they have made arrangements to run coaches every evening between Frankford and Philadelphia. For the better accommodation of those who have business to transact and them that visit the city for pleasure the above line of coaches will leave S. C. Paul's, No. 208 Main Street, every evening at half-past 5 o'clock, commencing on Saturday, Nov. 29, 1846. Returning, will leave Philadelphia from the Sign of the Camel, between Vine and Race, in Second Street, allowing sufficient time to reach Frankford at 12 o'clock. Coaches and horses are good, and no pains will be spared to make this the Accommodation Line.'

"W. H. SHALLCROSS & CO."

"What a contrast to the facilities Frankford has to-day in the way of transportation! Not only are there 10 lines of cars reaching the district from various sections, but at Frankford Avenue and Bridge Street is to be found the largest car barn in the world. It is operated by the Rapid Transit Company, which employs 575 men there, and which pays in wages each year at the barn $301,295."

Transit Talk No. 20, dated Sept. 23, 1909, was the subject, "Wissahickon Rambles." The talk says in part:

Hundreds of inquiries are made at the offices of the Fairmount Park Commissioners about the location of places of interest in the picturesque Wissahickon valley.

Nearly everybody knows of these beautiful spots, but not many people know how to reach them. They are not inaccessible, excepting by long walks, as many suppose.

Our Wayne Avenue line parallels the lower end of the Wissahickon ravine for a considerable distance. Several famous points—Devil's Pool, the Livezey homestead, the old Monastery and Walnut lane bridge—are within reasonable walking distance of the cars.

We have prepared a map to show the location of these and other points of interest that you may reach by a stroll of a mile from the cars, along romantic lanes and drives.

Transit Talk No. 21, dated Sept. 28, 1909, was on the subject, "Seven 'Dead' Lines," and said:

There are no less than seven lines in this system that are "dead" as money makers, but the accommodation of riders requires that we operate them.

They once were horse-car lines, such as the Catharine and Bainbridge Streets road, but were electrified along with others. Because of increased costs and comparatively insignificant traffic, these roads could not remain in business today if run separately by the original companies.

But their abandonment would inconvenience thousands of riders. For this reason, and because they are of some service as "feeders" to other lines, we continue to operate them at a loss.

Most of these unprofitable lines run through built-up sections of the city. They have no prospect of becoming profitable.

We have many other lines—extensions that we built after taking over the system—that are not paying, but we do not class them as "dead" ends of the business.

Some day they should make money for us; at present they are helping the city to grow at our expense.

When the average corporation finds that some part of its business is being run at a loss the usual policy is to eliminate the unprofitable department. With a public service corporation it is different.

Transit Affairs in New York

Both the Republicans and the Democrats in New York have selected their candidates for the principal city office to be elected in November, and the municipal campaign has begun. Otto T. Bannard is the choice of the Republicans for mayor and William J. Gaynor the choice of the Democrats. Mr. Bannard is a banker and business man, and Mr. Gaynor is a justice of the State Supreme Court. Mr. Bannard has supplemented the rapid transit plank in the platform of his party with a public expression of his personal opinion, stating:

"All future subways should be owned by the city. They should be built with the city's funds, construction by private capital not being permitted except when it is positively demonstrated that the city is financially unable to keep up with the demands for transit extension, and then only on terms that will preserve strict and effective municipal control.

"The beneficial system of street railway transfers has been practically nullified. We favor such action as will secure as speedily as possible the re-establishment of a universal transfer system.

"A subway built by private capital, to be owned by the city, is a city work. Existing laws prescribe eight hours of labor and the prevailing rate of wages for labor in all city works. No distinction should be made between the city works carried out with the assistance of private capital and those done with city funds. None should be made in contracts for the construction of city's subways. To do so would defeat the intention of existing laws and be unjust.

New Line Opened in Kansas.—The Laurence (Kan.) Street Railway has opened its line in Laurence.

Wire Thieves Arrested in Indianapolis.—Thieves were arrested recently in Indianapolis after having cut down and carried away about $300 worth of copper wire strung by the Indianapolis, New Castle & Toledo Electric Railway.

Demand for Rental for State Land.—The State of Indiana has made a demand on the Louisville & Southern Indiana Traction Company, New Albany, Ind., for a yearly rental for a right-of-way through land owned by the State. When the road was built the owner of the land was not known.

Malden Aldermen Over-ruled on Speed Question.—The Massachusetts Railroad Commission has issued an order revising a set of speed regulations for electric cars recently put in force by the Malden board of aldermen. The municipal authorities limited the speed at crossings to 10 m.p.h., and at other points to 12 m.p.h. The commission raises these limits to 12 and 20 m.p.h. respectively.

Track Laying at Cleveland, Ohio.—The new track being constructed by Receiver Bicknell of the Municipal Traction Company is being laid with 100-lb. steel groved rails resting in Carnegie steel ties embedded in concrete. There are 4 in. of concrete between the upper and lower flanges of the ties which rest upon a bed of concrete 10 in. thick. The rails are riveted and welded with thermit at the joints according to the Clark method.

Woburn Grade Crossing Petition Denied.—The Massachusetts Railroad Commission has denied the petition of the Boston & Northern Street Railway for consent to build a line across the Boston & Maine Railroad at grade in the city of Woburn. The board states that no special conditions exist which would justify such construction, and emphasizes the policy of the State as declared in repeated enactments of legislation in aid of abolition.

Cable Road in Brooklyn Converted.—The cable road on Montague Street, Brooklyn, extending from Court and Fulton Streets to the ferry to Wall Street, New York, at the foot of Montague Street has been reconstructed by the Brooklyn Rapid Transit Company for operation as a trolley line. The Montague Street line was the only cable road remaining in Brooklyn, and in rebuilding it the Continental plan was

adopted of suspending the span wires from the houses on either side of the street, the residents objecting to the use of poles. In reconstructing the line the company also arranged for service between Wall Street Ferry and Fulton Ferry.

New Franchise Placard in Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., has posted in its cars a placard referring to the proposed new franchise extension ordinance which reads: "Union Depot ordinance was almost unanimously adopted, vacating 140 streets and alleys for 200 years. Consideration: New depot. The Metropolitan asks a 16 years' extension of franchise. Consideration: Half net earnings (guaranteed never less than 5 per cent gross receipts); children half fare; paving and maintaining one-half double track streets; makes possible immediate opening Twelfth Street Traffic Way, etc. Do your own thinking."

Rumor Regarding Electrification of Branch of Vandalia Railroad.—A number of officers of the Vandalia Railroad, including Benjamin McKeen, general manager of the company, recently made a tour of inspection of the Michigan Division of the railroad, and as a result of this trip, it was reported that the Vandalia Railroad would electrify its line between South Bend and Logansport, Ind., a distance of 67 miles. In reply to a letter regarding this report addressed to him at St. Louis, Mo., recently by this paper, Mr. McKeen replied under date of Sept. 21, as follows: "There is nothing whatever in the rumor that the tour of inspection of our Michigan Division had any connection with the report that the company was considering the electrification of its line between South Bend and Logansport."

Municipal Ownership to Be Recommended in San Francisco.—The public utilities committee of the Board of Supervisors of San Francisco, which has been considering the question of acquiring the Geary Street, Park & Ocean Railroad and equipping it for operation as a municipal line, has decided to submit to the Board of Supervisors of San Francisco a resolution declaring that public interest and necessity require that the road be acquired and operated by the city and requesting that the city engineer be instructed to prepare plans and estimates on the basis of extending the line from the foot of Market Street to Geary Street, thence to Point Lobos Avenue and thence to the Ocean with a connection to Golden Lake Park. The resolution of the public utilities committee to the Board of Supervisors will also contain a provision for holding an election at which the necessary amount of bonds can be voted by the public.

Meeting of Kansas Gas, Water, Electric Light & Street Railway Association.—The twelfth annual meeting of the Kansas Gas, Water, Electric Light & Street Railway Association was held at Wichita on Sept. 23 and 24. In outlining the work of the association W. A. Scothorn stated that during 1907 there were in Kansas 67 private lighting plants and 26 municipal, while at the present time there are 75 private plants and 36 municipal. The relatively larger percentage increase in the municipal plants may be attributed to their being installed as a matter of convenience and local pride in towns that are too small to be attractive to capital. The following officers were elected: M. T. Flynn, Kansas City, president; J. H. Rathert, Junction City, first vice-president; Charles D. Bell, Independence, second vice-president; W. R. Murrow, Independence, third vice-president; J. D. Nicholson, Newton, secretary-treasurer. Executive committee, W. B. Foshay, chairman, Wichita; T. F. Cole, Pittsburg, and B. F. Eyer, Manhattan.

Street Railway Questions in Politics at Toledo.—Frank L. Mulholland, Republican candidate for city solicitor at Toledo, Ohio, published a letter in the Toledo Blade recently in which he set forth the ideas he will favor in the matter of a new franchise for the Toledo Railways & Light Company. Among other things Mr. Mulholland says: "Good service includes up-to-date cars, kept in repair, properly handled by competent, courteous men attentive to the reasonable wants of the passengers in their charge, and cars in such numbers and with seats sufficient to carry all who may wish to ride. Reasonable rates are such as will cover yearly all actual operating expenses, provide for repairs and depreciation of property used by the street car company in thus carrying the public, and also give the company a fair yearly interest on the money actually invested." The details of the franchise proposed by Mr. Mulholland are substantially those suggested in the Tayler plan at Cleveland, including an initial fare of 3 cents, with a provision for regulation according to the surplus or the loss which may result, and interest at the rate of 6 per cent on the money actually invested. Mr. Mulholland says that the renewal franchise should be approved by the voters.

Financial and Corporate

New York Stock and Money Market

Oct. 4, 1909.

The week in Wall Street has been one of continued advance, led by Steel common, which to-day reached the record price of 94⅞. Marked advances, however, have been recorded only in a few specialties. The advance of call money to 4½ per cent has naturally tended to check the upward movement. It is not so easy to carry stocks with high price money as with low price money. With the exception of Brooklyn Rapid Transit the traction shares have been comparatively inactive and prices have changed slightly. The bond market is not so strong as a few weeks ago since rates for money are higher. Quotations to-day were: Call, 3½ @4½ per cent; 90 days, 4@4¼ per cent.

Other Markets

The features of the Chicago market continue to be the heavy pressure upon Subway stock and the inclination of this issue to decline. During the last week it sold as low as 7 and the quotation was very little better today.

In the Philadelphia market, Rapid Transit and Union Traction continue rather active, but prices remain practically unchanged. There has been some trading during the week in Philadelphia Traction.

In Boston, Massachusetts Electric preferred has been about the only traction issue that has been much fancied There has been no price change.

In the Baltimore market the bonds of the United Railways are still the important traction issue. Considerable blocks of these were cold during the week.

Among the securities sold at auction last week were: $5,000 Brooklyn Rapid Transit, 5 per cent bonds at 104; 80 shares South Shore Traction Company, New York, $100 each, at 41½.

Stock Quotations

Quotations of various traction securities as compared with last week follow:

	Sept. 28.	Oct. 4.
American Railways Company	46	a46
Aurora, Elgin & Chicago Railroad (common)	*50	a48
Aurora, Elgin & Chicago Railroad (preferred)	*95	a92
Boston Elevated Railway	129	124½
Boston & Suburban Electric Companies	*17	*15
Boston & Suburban Electric Companies (pref.)	*74	*72
Boston & Worcester Electric Companies (com.)	a12	10
Boston & Worcester Electric Companies (pref.)	a54	a54
Brooklyn Rapid Transit Company	80	80⅞
Brooklyn Rapid Transit Co., 1st pref., conv. 4s	88⅛	88½
Capital Traction Company, Washington	a140	a140
Chicago City Railway	a190	a180
Chicago & Oak Park Elevated Railroad (com.)	*3	*3
Chicago & Oak Park Elevated Railroad (pref.)	*10	*10
Chicago Railways, ptcptg, ctf. 1	108	a110
Chicago Railways, ptcptg, ctf. 2	36½	a36½
Chicago Railways, ptcptg, ctf. 3	24	a25
Chicago Railways, ptcptg, ctf. 4s	9	a10
Cleveland Railways	*78	*78
Consolidated Traction of New Jersey	76½	77
Consolidated Traction of N. J., 5 per cent bonds	105½	105½
Detroit United Railway	a72	a72
General Electric Company	168	167
Georgia Railway & Electric Company (com)	94	a97
Georgia Railway & Electric Company (pfd)	85	a88½
Interborough-Metropolitan Company (common)	15	16
Interborough-Metropolitan Company (pfd)	48⅜	49
Interborough-Metropolitan Company (4½s)	82⅞	84½
Kansas City Railway & Light Company (com)	a45	a44
Kansas City Railway & Light Company (pfd)	a81	a83
Manhattan Railway	142½	a143
Massachusetts Electric Companies (common)	16¼	a18½
Massachusetts Electric Companies (preferred)	79½	a82½
Metropolitan West Side, Chicago (common)	15	a19
Metropolitan West Side, Chicago (preferred)	50	a51
Metropolitan Street Railway	a22	a24
Milwaukee Electric Railway & Light (pfd)	*110	*110
North American Company	a82½	82
Northwestern Elevated Railroad (common)	18	a20
Northwestern Elevated Railroad (preferred)	68	a71
Philadelphia Company, Pittsburg (common)	48	a48¾
Philadelphia Company, Pittsburg (preferred)	a44½	a44½
Philadelphia Rapid Transit Company	a28¼	a29
Philadelphia Traction Company	a90	a91½
Public Service Corporation, 5 per ct. col. notes	a100¼	100
Public Service Corporation, ctfs	a95½	94½
Seattle Electric Company (common)	114	114
Seattle Electric Company (preferred)	105	105
South Side Elevated Railroad (Chicago)	a55	52½
Toledo Railways & Light Company	a10	09⅜
Third Avenue Railroad, New York	22	21¾
Twin City Rapid Transit, Minneapolis (com)	110½	110⅞
Union Traction Company, Philadelphia	53¼	a53¾
United Rys. & Electric Company, Baltimore	13⅞	a14¼
United Rys. Inv. Co., San Francisco (com)	45½	43¾
United Rys. Inv. Co., San Francisco (pfd)	76	74¼
Washington Ry. & Electric Company (com)	a47⅛	a47¼
Washington Ry. & Electric Company (pfd)	a94¾	a93½
West End Street Railway, Boston (common)	a94	94
West End Street Railway, Boston (preferred)	107¼	a106
Westinghouse Elec. & Mfg. Company	88½	87⅝
Westinghouse Elec. & Mfg. Company (1st pref)	130	144

aAsked.
*Last sale.

Hearing at Boston on Proposed Expansion of Boston Elevated System

The Massachusetts Railroad Commission and the Boston Transit Commission, sitting as a joint board by order of the Massachusetts Legislature continued the hearing in Boston on Sept. 28 on the proposed acquisition by the Boston Elevated Railway of the stock of other electric railways in Massachusetts, notably the Boston & Northern Street Railway and Old Colony Street Railway, the Blue Hill Street Railway, Lexington & Boston Street Railway, Middlesex & Boston Street Railway and the Boston & Worcester Street Railway. Secretary Joseph B. Eastman and Robert B. Luce of the Boston Public Franchise League were heard in opposition, after which Counsel Frederic E. Snow responded for the company.

Mr. Snow said that the Boston Elevated Railway appreciates that its first duty is to provide for transportation in its present territory; that the purchase of the stock of these other companies would benefit the Boston Elevated Railway through the increased earnings, better service and operating economies which would result, and that the plan is to keep each of these companies legally independent, building it up to be both locally prosperous and beneficial to the Boston Elevated Railway. Actual consolidation would not be practicable even if the 5-cent fare restriction upon the Boston Elevated Railway in Section 10 of Chapter 500 of the Acts of 1897 were removed. Administrative and operating economies, with improved service, were sought by the plan. It was not the power to hold the stock of another company but its abuse which was objectionable. Mr. Snow said that a bill which provided all necessary safeguards had been drawn to meet the objections advanced by the Public Franchise League. By the terms of this bill the amount of securities issued for acquiring any stock of other companies would be subject to the approval of the Railroad Commission, and the Boston Elevated Railway would be obliged to secure the board's consent before selling any securities so acquired. Another provision would require the company on securing a controlling interest to offer to purchase all remaining shares at the average price per share paid for the majority of stock acquired.

Mr. Snow cited the purchase of the controlling interest in the Chelsea, East Boston and Quincy gas companies by the Boston Consolidated Gas Company to show how the service had been improved and rates lowered by the association of these properties with the skilfully managed Boston organization. He further cited the value to the Seattle district of the construction of the Puget Sound Electric Railway by a corporation separate from the Seattle Electric Company, the latter having been held back from such a task by a charter restriction.

Effect of Rehabilitation on Earnings in Chicago

The Chicago (Ill.) Railways has issued the following statement showing the effect of rehabilitation and the installation of new cars upon passenger earnings:

	Earnings 1908	Earnings 1907	Increase	Pct. Inc.
December	$ 949,260	$ 833,719	$ 115,541	14
	1909	1908		
January	$ 917,357	$ 794,388	$ 122,969	15
February	850,200	716,023	134,177	19
March	963,655	840,743	122,912	15
April	975,440	847,220	128,220	15
May	1,032,511	884,775	147,736	17
June	1,021,582	913,594	107,988	12
July	1,049,277	939,943	109,334	12
August	1,061,364	959,167	102,197	11
September	1,033,961	939,048	94,913	10
Total	$9,854,697	$8,668,620	$1,185,987	14

Boston Suburban Electric Companies, Boston, Mass.—The stockholders of the Boston Suburban Electric Companies voted on Sept. 30 to reduce the capital stock of the company by retiring 4694 shares of preferred stock and 1173 shares of common stock originally issued for the purchase of the property of the Waltham Gas & Electric Company which was recently sold to retire additional common and preferred shares for which tenders are asked at the Boston Safe Deposit & Trust Company. Not more than $600,000 in cash is to be used and not more than $2,000,000 of 4 per cent 10-year notes. Mention of the plan of the company to reduce its capital was made in the issue of Sept. 25, 1909, page 482.

Consolidated Traction Company, Chicago, Ill.—Various interests in the Consolidated Traction Company are understood to have agreed on the main outline of the plan of the reorganization committee of the company to be placed before the City Council for ratification. For more than two months suits for foreclosure had been pending for most of the underlying companies. The default on bond interest was made more than a year ago for the majority of these companies. Several bondholders' committees were appointed, but the committee representing the largest interest was composed of Messrs. Hoover, Cook and Ford of the Harris Trust & Savings Bank, Chicago, and E. K. Boisot of the First Trust Company, Chicago. This committee has acted for the North Chicago Electric Railway, the Chicago Electric Transit Company and the North Chicago Electric Company. About 98 per cent of the bonds of these companies has been deposited with the Harris Trust & Savings Bank. Of the $6,750,000 of general mortgage 4½ per cent bonds, $4,200,000 are owned by the Yerkes Estate. The committee representing these bonds consist of Charles G. Dawes, Chicago; James N. Wallace, president of the Central Trust Company, New York; Hans Winterfeldt of Speyer & Company, New York; Fred W. Upham, Chicago, and E. W Harden, New York. The Payne committee represents the minority interest in the general mortgage bonds.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—The Chattanooga Railway & Light Company, which is a consolidation of the Chattanooga Railways and the Chattanooga Electric Company, paid its first dividend on the preferred stock on Oct. 1. The payment was 1¼ per cent for the quarter. Hodenpyl, Walbridge & Company, New York, N. Y., offer for subscription at 96½ and interest, $1,600,000 of the first and refunding mortgage 5 per cent gold bonds of the company dated Aug. 1, 1909, and due on May 1, 1956, but subject to redemption after May 1, 1916, at 105 and interest. The first coupon is payable on Nov. 1, 1909, for the period from Aug. 1; thereafter interest will be paid semi-annually in May and November at New York or Philadelphia. The Fidelity Trust Company, Philadelphia, Pa., is trustee.

Columbus, Delaware & Marion Railway, Marion, Ohio.—Eli M. West has been appointed sole receiver of the property of this company by Judge Kinkead of Columbus. Originally George Whysall and Mr. West were appointed co-receivers; the former was appointed by Judge Young of Marion and the latter by Judge Kinkead.

Columbus, Magnetic Springs & Northern Railway Company.—The following officers and directors have been elected by the stockholders: President, W. L. Galbreath, Pittsburgh; vice-president and treasurer, Christopher Magie, Jr.; secretary, H. E. Beck; manager, C. J. Fifer; auditor, B. W. Loveless; directors, W. M. Galbreath, Christopher Magie, J. L. Hord, B. Cahill and W. F. Dodge.

Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Ind.—Harry J. Milligan, receiver for the Indianapolis, Crawfordsville & Western Traction Company has filed his first report with the United States Court at Indianapolis. The report is for July and August. The earnings for July were $12,809; operating expenses were $9,642, leaving net earnings of $3,167. For August the report shows total earnings of $18,910 and expenses of $12,791 with net earnings of $6,119.

Metropolitan Street Railway, New York, N. Y.—Argument was heard on Sept. 24 by Judge Lacombe, in the United States Circuit Court, on the motion of counsel for the directors of the Forty-Second Street & Grand Street Ferry Railroad to recover from the receiver of the Metropolitan Street Railway $200,000 for the payment of franchise taxes and other expenses. The Forty-second Street & Grand Street Ferry Railroad is operated by the Metropolitan Street Railway and the directors seek to recover the money for the payment of rent and franchise taxes for the past two or three years. Judge Lacombe reserved decision.

Northern Ohio Traction & Light Company, Akron, Ohio.—The Northern Ohio Traction & Light Company will expend $225,000 for improvements in 1910. Fifteen new cars will be purchased at a cost of $100,000. Six of these will be for limited service and will cost in the neighborhood of $10,000 each. The remaining $125,000 will be expended for various betterments. It is stated that the company has power capacity sufficient for the next two or three years, and that nothing will be done toward enlargement of the power stations at present.

Oregon Electric Railway, Portland, Ore.—Perry, Coffin & Burr, Boston, Mass.; N. W. Harris & Company, New York, N. Y., and the Harris Trust & Savings Bank, Chicago, Ill. are offering for subscription $2,000,000 of first mortgage 5 per cent bonds of the Oregon Electric Railway at 96½ and interest. The bonds are dated May 1, 1908, and are due May 1, 1933, but are subject to call on and after Nov. 1, 1910, at 107 and interest. Principal and interest are pay-

able at the office of the trustee, the Columbia Trust Company, New York, N. Y., the interest payments falling due on May 1 and Nov. 1. The circular announcing the issue contains an estimate of the earnings of the company for the year ending June 30, 1910, made by G. W. Talbot, vice president of the company. This estimate follows: Gross earnings, $435,000; operating expenses and taxes, $234,900; net earnings, $200,100; bond interest, $100,000; surplus, $100,000.

Philadelphia, Bristol & Trenton Street Railway, Philadelphia, Pa.—John Redwood and Carl N. Martin, who purchased the property of the Philadelphia, Bristol & Trenton Street Railway under foreclosure on Aug. 2, 1909, for $380,000 for a committee representing the bondholders, have transferred the property of the Philadelphia, Bristol & Trenton Street Railway to the Trenton, Bristol & Philadelphia Street Railway. The consideration was $325,000 in the capital stock of the Trenton, Bristol & Philadelphia Street Railway and an obligation of $350,000, which, it is understood, will probably be converted into an issue of bonds.

Public Service Corporation of New Jersey, Newark, N. J.—The stockholders of the Public Service Corporation at a meeting on Sept. 27 approved the proposal to turn the gas properties of the company over to the Public Service Gas Company, as outlined in the Electric Railway Journal of Sept. 11, 1909, page 415. They also authorized the execution of a new mortgage for $50,000,000 to secure an issue of bonds of like amount which will be issued from time to time as deemed necessary. This proposed issue of new securities was mentioned in the Electric Railway Journal of Sept. 25, 1909, page 483.

Scioto Valley Traction Company, Columbus, Ohio.—The annual meeting of stockholders of the Scioto Valley Traction Company was held on Sept. 28. The only change in the board of directors was the election of I. B. Cameron, president of the Columbus Savings & Trust Company, to succeed J. C. Hooven of Cincinnati.

Second Avenue Railroad, New York, N. Y.—Justice Blanchard, of the State Supreme Court, has authorized George W. Linch, receiver of the Second Avenue Railroad, to accept the offer of the Guaranty Trust Company, New York, for the purchase of receivers' certificates for $500,000 to be used for improvements. The certificates are to draw interest at the rate of 6 per cent and are to mature in one year. It is announced that formal notice has been issued by the Second Avenue Railroad to the holders of the general consolidated mortgage bonds maturing on Nov. 1, asking them to extend the life of the bonds to Nov. 1, 1910. Bondholders not willing to extend the date of maturity of their holdings will be paid on and after Nov. 1 upon surrender of their bonds at the office of the Guaranty Trust Company, New York.

Southwestern Traction Company, London, Ont.—The property of the Southwestern Traction Company will be offered for sale at auction in the offices of the London & Western Trust Company, London, Ont., on Oct. 20. The road extends from London, Ont., to Port Stanley, passing through St. Thomas, a distance of 28 miles. Thomson, Tilley & Johnson, 59 Yonge street, Toronto, Ont., are the attorneys.

Toledo & Findlay Railway Company, Toledo, Ohio.—This is a company incorporated for the reported purpose of uniting the Toledo Urban & Interurban and the Toledo, Bowling Green & Southern roads. The incorporators are B. L. Kilgour, Anthony B. Dunlap, Morris McGrew and Frank H Simpson. The property of the Toledo Urban & Interurban road was purchased at receiver's sale recently, presumably for the owners of the Toledo, Bowling Green & Southern Traction Company.

Waynesboro & Monongahela Street Railway, Waynesboro, Pa.—A mortgage for $1,500,000 in favor of the Carnegie Trust Company, New York, N. Y., has been filed by the Waynesboro & Monongahela Street Railway to cover the property which the company has recently acquired in Greene County.

A large balloon sent up from the Indianapolis speedway park on Oct. 1 descended so near the earth that its anchor struck the high-tension wires of the Indianapolis, Columbus & Southern Traction Company at a point near Columbus, Ind.

The Columbus, Delaware & Marion Railway, Columbus, Ohio, has decided to attach freight and express cars heretofore operated separately over its lines to its regular passenger cars.

Traffic and Transportation

Decision Favorable to Company in New Bedford Fare Case

The Massachusetts Railroad Commission has issued an order dismissing the petition of citizens and taxpayers of New Bedford relative to street railway fares within that city. The board states:

"The city of New Bedford is principally served by the Union Street Railway Company. The Old Colony Street Railway Company operates a line from a connection with the Union Street Railway from Lund's Corner, so-called, to the Freetown boundary. The petitioners request a 5-cent fare to and from all points served by these street railways within the city of New Bedford. It is obvious that if the petition were granted it would cause a reduction in many instances in the cost of a single ride and in a return of less than 5 cents to one or both of the companies. Indeed, an equal division between the companies would mean a gross return to each of 2½ cents per passenger.

"The board is of the opinion that there is no present occasion for a recommendation that the companies reduce the unit of fare, in view of the limited amount of travel on the Old Colony Street Railway and the maximum distance of a single ride on the two lines of railway.

"At the hearing complaint was made of the service between the city proper and the Freetown boundary over the lines of both companies. The board has made an investigation of the riding between Lund's Corner and the city proper, on the Union Street Railway, and between Lund's Corner and the Freetown line on the Old Colony Street Railway, and is in receipt of returns for the weeks ending Dec. 19, 1908, March 13 and July 13, 1909, respectively, together with a statement showing the time cars were due according to the schedule and the time they arrived at and left Lund's Corner for the six days ending September 19, 1909, with reasons for delays. These disclose no occasion for any recommendation with respect to service. The managements of both companies, in our opinion, are fairly meeting the present demands of the traveling public, and while delays necessarily incident to the operation of street railways occur here as elsewhere, the service as a whole is reasonably satisfactory. The petition must therefore be dismissed."

Subsequently to the hearing counsel for the Old Colony Street Railway Company filed with the board a statement of all trips on the Old Colony Street Railway between Lund's Corner, New Bedford, and Freetown, showing the number of inward and outward passengers for three selected weeks, in December, 1908, March and July, 1909, as mentioned in the order of the commission; a similar statement covering the same periods, of the total number of passengers on each trip on each of the cars of the Old Colony Street Railway Company while on the tracks of the Union Street Railway Company between Lund's Corner and the center of New Bedford; and a statement showing the time when cars were due at Lund's corner for all trips during the six days ending Sept. 19, 1909, with the time of their actual arrival and departure from that point. In transmitting these statements, Counsel Bentley W. Warren stated that there are few places in the State of Massachusetts in which more than the seating capacity of the cars is so seldom occupied.

A review of the statements filed shows that during the week ending Dec. 19, 1908, on the Old Colony line between Lund's Corner and the city line (Freetown), 136 inward and outward trips were made, upon 6 of which the normal seating capacity of the cars (40 passengers each) was equaled or exceeded. During the week ending March 13, 1909, there were a total of 241 inward and outward trips, and in 6 cases was the seating capacity attained or surpassed. During the week ending July 23, 1909, a period of heavy traffic, representative of the company's maximum business in the summer season, there were 247 regular total round trips, inward and outward, and on 35 trips the normal seating capacity was reached. During this week, however, 70 extra trips were made, and on these, in 24 cases, the seating capacity was attained or exceeded. On the line of the Union Street Railway Company, between Lund's Corner and New Bedford, with substantially the same number of regular trips in each direction as between Lund's Corner and the city line, the week ending Dec. 19, 1909, showed 23 trips on which the seating capacity was filled or exceeded. The week ending March 13 showed 14 such trips, and the week ending July 24, 1909, showed an equal absence of overcrowding, the schedule not permitting the classification of car types, but indicating in general ample facilities. Regarding the alleged lack of punctuality at Lund's Corner, the records for the week ending Sept. 19,

1909, showed that out of 130 arrivals, 29 were 5 minutes late or over, waits for connections being indicated as a common cause for delays.

Prevention of Accidents to Children in Boston

The Boston Elevated Railway advertises a letter which it has sent to the school committees of Boston and surrounding communities in relation to the prevention of accidents to children. The company states:

"Action has been, or is about to be, taken by all of them in co-operation with the company. The company desires, also, the co-operation of parents and others having charge of children. It is believed that much injury may be avoided by such action."

The letter of the company to the school committee is as follows:

"The Boston Elevated Railway Company wishes to call your attention to its desire to prevent as far as possible injuries to children resulting from the operation of its cars in and around.....and if possible to enlist your active co-operation to this end. In spite of every reasonable precaution taken by the company and the generally careful operation of the cars by its employees, distressing accidents happen more often than we believe they would, if the children were carefully instructed by those in authority concerning the danger of careless playing in the streets and of stealing rides on the cars.

"The fact that thus far in the experience of the company the courts have not in a single instance held the motorman responsible for the death of a child, would seem to justify one in assuming that greater care on the part of the injured would result in lessening the number of such accidents.

"The company, therefore, respectfully suggests and believes that such warning to the children attending the schools of.....as you may see fit to have given will tend to diminish these accidents and the sufferings and grief resulting therefrom.

"If agreeable to you will you kindly have the matter brought before the teachers and scholars in such form as you deem best?"

Influence of Interurban Lines on Business in Indianapolis

During the last few years many inquiries have been addressed to the Commercial Club of Indianapolis regarding the interurban electric railways operating out of that city and the effect of travel over these lines of the business of the merchants and trades people in Indianapolis. So numerous did the requests finally become that the Commercial Club placed the matter of studying the subject in the hands of R. G. McClure, its secretary, and instructed him to formulate as far as he could a reply which would cover the requests for information contained in most of the letters received. In his study Mr. McClure was assisted by the companies themselves and by the merchants who estimated for him as nearly as possible the effect of the interurban lines on their business. As a result he has formulated a report from which he draws at length in answering inquiries from outside sources about Indianapolis and its interurban lines. Following is the substance of the typical reply by Mr. McClure to an inquiry for information concerning the interurban roads:

"Referring to your personal inquiry on the subject of the advantages of the interurban railways to Indianapolis, beg to advise that on account of the variety of industries it would be very difficult to secure figures showing the actual increase in business to our retail, wholesale, manufacturing and professional interests.

"Such figures as were obtainable however show that during the first six years interurban roads were operated into Indianapolis the average rate of increase from year to year to the retail business was 40 per cent—the lowest increase was 15 per cent and the highest 77 per cent. These figures prove to me conclusively that, allowing for a natural increase of, say, 10 per cent, we can safely place the increase due to the interurban railways at 40 per cent.

"In investigating the wholesale business we secured various figures from leading houses. A conservative estimate of the increase in this business on account of interurban railways is 15 per cent to 25 per cent. The manufacturing business shows a healthy growth, but figures are not obtainable to show the extent of the increase. Manufacturers, however, freely say that the interurban railways are largely responsible for the increase in their business and that they have greatly improved the facilities for transporting the products of their factories.

"The educational and professional life of Indianapolis receives probably more benefit than is shown by the business interests, but it would be extremely difficult to ascertain and define this benefit. It is easy to note, however, that physicians, dentists, attorneys, and professional men prosper by the millions of people who come into the city from the rural districts yearly who would probably not come only for the convenient transportation of the interurban systems.

"The State now has more than 1500 miles of interurban electric railways, two-thirds of which are in direct connection with Indianapolis. Hourly service in both directions is given on all these lines in modern cars, roomy, comfortable and operated on fast time. Passengers on the interurban railways are conveyed to a commodious terminal station within a square of the business center of the city. This terminal also combines a large freight station which is used by the 12 lines which carry freight and express matter thus facilitating shipments in either direction

"Territory within a radius of 150 miles comes under the influence of the interurban railways and in some instances patronage has been traced to neighboring states. For a number of years the merchants rebated the interurban fares of patrons who came to Indianapolis to trade, but the tax grew to such proportions that it had to be abandoned."

Mr. McClure also cites the effect of the interurban railways upon the immediate vicinity of Indianapolis in the increase in suburban residences.

Articles That May Be Carried on Cars in Cleveland

Brief mention was made in the Electric Railway Journal of Sept. 25, 1909, page 485, of the new order of the Municipal Traction Company, Cleveland, Ohio, to its conductors specifying the articles passengers are to be permitted to carry on cars. The complete order follows:

"Passengers must not be allowed to carry dangerous or bulky packages aboard cars. The following are excepted:

"Washerwomen's baskets.

"Carpenter's small tool boxes. (12 in. x 12 in. x 36 in. maximum.)

"Surveyor's instruments.

"Small tools which can be conveniently carried in the hand.

"Suit cases and valises.

"Two market baskets to each person paying fare.

"Folded go-carts.

"Harps, bass drums and bass viols will only be carried when persons accompanying them are provided with permits.

"No article which is too long to stand under rear hood will be allowed on car.

"Employees must not carry packages, letters or newspapers without an order from proper authority, and must not assume responsibility for any package that a passenger may bring upon the car except such articles as are turned into the Lost Article Department.

"They must not hang nor allow articles to be hung on the brake handles."

In addition the company issues permits to florists, milliners, and musical houses, specifying the size and type of packages they may carry under the permit, and also issues permits for dogs, but does not allow dogs from different kennels on the same car.

Freight Franchise Granted in Easthampton.—The selectmen of Easthampton, Mass., have granted the Northampton (Mass.) Street Railway a 25-year franchise to carry freight in Easthampton.

Agreement for Freight Station in Dayton, Ohio.—An agreement has been reached between the city of Dayton, Ohio, and the Ohio Electric Railway and the People's Railway Company of Dayton, the result of which will be the construction of a freight station.

Milwaukee Western Electric Railway, Milwaukee, Wis.—This company has secured 80 per cent of the right-of-way for its interurban railway, which is to extend 60 miles west from Milwaukee to Beaver Dam via Hartland. J. W. Barber, 914 Majestic Building, Milwaukee, secretary.

Conductor Sentenced for Theft of Car Fares.—John J. Sweeney, formerly a conductor of the Boston (Mass.) Elevated Railway has been sentenced to serve 90 days in the House of Correction by Judge Fallon of the South Boston District Court for the larceny of car fares.

Fairmont & Northern Traction Company, Fairmont, W. Va.—This company announced that bids would be received by the company until Oct. 8 for the construction of 5 miles of electric railway on the proposed route from Fairmont to Fairview. Construction is to be started on the Fairview end not later than Oct. 10.

Thermopolis & Hot Springs Street Railway, Thermopolis, Wyo.—The project of building an electric railway from Thermopolis to Hot Springs has been taken up by George D. Miklejohn, Omaha, Nebr., who will investigate and report on the proposition to the interests he represents. Col. S. A. Broadwell, Thermopolis, president. [E. R. J., Dec. 19, '08.]

Private Car Converted Into Touring Car.—Warren Bicknell, receiver of the Municipal Traction Company, Cleveland, Ohio, has placed in service Parlor Car 99, which was formerly Senator Hanna's private car, seating about 35 persons. This car is finely upholstered, has rattan chairs and is heated by electricity. Besides making the regular "Seeing Cleveland" trips, it will be held for evening charters.

Resolutions Against Car Gates Introduced in Birmingham Council.—A resolution introduced into the City Council of Birmingham, Ala., instructing the Birmingham Railway, Light & Power Company to discontinue the use of gates on its cars, has been referred to the railway committee of the Council. The resolution describes the gates as "dangerous and a nuisance because they delay the getting on and off of cars."

Petition to Compel Full Vestibules in New York.—The Public Service Commission of the First District of New York has ordered a hearing for Oct. 12 upon the complaint of the Congress of Knights of Labor, at Albany, against the street railways operating in Brooklyn and Queens, to determine whether the companies should be required completely to enclose the vestibules of their cars. The vestibules now in use are not enclosed at the sides.

Traffic in New York.—During the week from Sept. 25 to Oct. 1, inclusive, when the Hudson-Fulton celebration took place, the Interborough Rapid Transit Company of New York reports that it carried 12,964,716 passengers on its subway and elevated lines. This number does not include last Saturday's record. In recognition of the strenuous work of the gatemen and ticket choppers, the company has ordered that a bonus of $25,000 be distributed among the men actually concerned in handling the crowds.

International Railway Given Permission to Appeal Fare Case.—The Court of Appeals at Niagara Falls, Ont., has granted leave of appeal to the International Railway, Buffalo, N. Y., from the order of the Ontario Railway & Municipal Board fixing the fare on cars between Bridge Street, Niagara Falls, Ont., and the upper steel-arch bridge at 5 cents. The ruling by the Ontario Railway & Municipal Board followed a protest by the Board of Trade of Niagara Falls, Ont., against the 10-cent fare.

New Bulletin Boards in Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company has recently placed in each of its barns a bulletin board of special design for use in connection with the work of its accident bureau. Upon these boards are posted every 10 days notices dealing with some feature of accident work. Employees of the company have been requested to look the bulletins over from time to time and to make any suggestions which they think might be used to advantage in connection with the notices.

Tum Tum Mountain Railway, Vancouver, Wash.—A. Arntson writes that this company has made surveys of its electric railway which is to connect Ridgefield, La Center, View, Amboy and Tum Tum, a distance of about 32 miles, and will start construction about Jan. 1, 1910. The company's power station will be located at the base of Tum Tum Mountain, and it is its intention to furnish power. Capital stock, $250,000. Officers: E. M. Meach, Vancouver, president; A. Arntson, Ridgefield, vice-president and general manager; F. R. Whelan, Vancouver, secretary, and T. O. Hilstrom, Vancouver, treasurer. [E. R. J., Sept. 18, '09.]

Hearing on Fares on Westchester Electric Railroad.—A hearing has been ordered for Oct. 11 before the Public Service Commission of the First District of New York upon the complaint of the Tax & Rent Payers' Organization of Wakefield against the Westchester Electric Railroad, Mt. Vernon, N. Y. In the complaint it is alleged that the company charges a 10-cent fare from the subway station at 177th Street, New York, to Larchmont, and the complainant wants the fare reduced to 5 cents, at least to the city limits. The company admits that it is collecting two fares and that the second fare is collected at 233d Street, New York, or 19th Avenue, Williamsbridge. From this point there is a stretch of about one mile of track which is within the city limits, and on this ground it is maintained that the company is violating the law by charging a double fare within the city limits.

Storm Damages Mississippi Line.—The storm which swept over New Orleans and gulf cities recently did considerable damage to electric light and railway properties. One of the companies which suffered was the Gulfport & Mississippi Coast Traction Company, Gulfport, Miss. About 10 miles of the roadbed of the company was washed away, but the company lost no rails or ties More than 550 poles were down, and the transmission line was so tangled in wreckage that the company was able to recover only about two-thirds of the insulators and cross-arms. According to an estimate furnished by the company, it will cost $50,000 to repair the line and the revenue from traffic will be lost for about 40 days.

Chicago & Milwaukee Electric Railroad Menu.—The Chicago & Milwaukee Electric Railroad, Highwood, Ill., has printed the menu of its Chicago & Milwaukee limited service in the shape of a four-page folder. The cover contains a reproduction in colors of the interior of one of the company's dining cars with the insignia of the company in red and white in the upper left hand corner. The back of the menu contains the schedule of the eight limited trains which are run daily between Milwaukee and Chicago. The second page of the folder contains the a la carte list and the third page the wine list. Liquors are sold only in bottles. Playing cards cost 15 cents and 25 cents. An extra charge is made for single orders served for two. All orders must be written out by guests. A copy of the menu has been received from E. H. Vivian, traffic agent.

Through Service Established by Hudson & Manhattan Railroad.—The Hudson & Manhattan Railroad established through service between the Pennsylvania Railroad station in Jersey City and Twenty-third Street and Sixth Avenue, New York, on Sept. 20. Connection is also made with the Erie station at Jersey City and the Hudson Terminal Building, at Church and Cortlandt Streets, New York. Trains are run at intervals of five minutes, the running time between Twenty-third Street and Sixth Avenue and the Pennsylvania Railroad station being 13 minutes. It requires only 16 minutes to go from Twenty-third Street and Sixth Avenue, New York, to the Hudson Terminal Building. The company announces that work has been started on the extension of its lines in Jersey City to connect with the Pennsylvania Railroad, so that through trains can be operated between Newark and the Hudson & Manhattan Railroad's terminal at Church and Cortlandt Streets, New York.

Public Service Commissions Exhibit at New York Fair.—In the Electric Railway Journal of Sept. 18, 1909, page 443, mention was made of the exhibit of the Public Service Commission of the First District of New York at the State Fair at Syracuse, which opened on Sept. 13. The exhibit received considerable attention from visitors to the fair who studied the charts and maps carefully. Commenting on the interest thus displayed in the exhibit, James Blaine Walker, second assistant secretary of the commission, said upon his return to New York: "The charts and statistics shown were such as to emphasize the greatness of New York City, especially in the number of passengers carried on its transit lines and the amount of gas and electric current produced annually. Photographs of the subway during construction and in its completed state were eagerly scanned by thousands, many of whom had never been in New York City. Perhaps the feature which attracted most attention was the profile chart of Manhattan and the Bronx showing the largest ticket sales in one hour at the different stations on the subway and elevated lines as well as at the Brooklyn and Williamsburg bridges and the East River ferries Profile blocks whose height indicated the number of tickets sold were attached to the map at each station and the block representing the Manhattan terminal of the Brooklyn bridge, with its record of 29,411 tickets sold in one hour, caused many an exclamation of amazement at the gigantic total. Next in interest were the photographs showing the results of fender and wheelguard tests held by the commission last Fall in Schenectady and Pittsburg. Charts showing the tide of travel in New York City towards work for the 24 hours and towards home for an equal period also commanded great attention, as illustrating the great fluctuations in the amount of traffic between the rush hours and the non-rush hours. The pride of Americans in their greatest city was repeatedly shown by many who took the time to read the comparative statistics showing that the transportation lines of New York City carry more persons in one year than those of any other large city in the world. These statistics showed that the roads in London, with a population of more than 7,000,000 in the year 1907, carried only about 800,000,000 pasengers as against 1,300,000,000 in New York City with a population of a little more than 4,000,000."

Personal Mention

Mr. John De Lowry has been appointed superintendent of the Birmingham Division, No. 3, of the Pittsburgh (Pa.) Railways in charge of the operation of cars from the Tunnel, Thirtieth Street and Surburban car houses. Mr. De Lowry entered electric railway work as a conductor on the Consolidated Traction division of the Pittsburgh Railways and was promoted to dispatcher and inspector. In 1907 he was appointed acting superintendent at the Highland car house and in 1908 became superintendent of the Ardmore Street Railway. When the Ardmore Street Railway was absorbed by the Pittsburgh Railways Mr. De Lowry was appointed superintendent of the Highland Division and in May, 1909, he was transferred to the Birmingham Division with jurisdiction to Washington Junction.

Mr. E. C. Fitch has been appointed superintendent of the Interurban Division, No. 6, of the Pittsburgh (Pa.) Railways, in charge of the operation of cars on the Washington, Canonsburg and Charleroi routes of the company. Mr. Fitch entered the service of the United Traction Company, Pittsburgh, as a motorman, and later became a conductor. In 1897 he resigned and became a motorman on the Hill Top division of the Birmingham Traction Company, remaining with the company until 1902, when it was absorbed by the Pittsburgh Railways. He was then appointed night dispatcher at the Hill Top car-house. At the end of three months he became day dispatcher, retaining this position until 1903, when he was appointed inspector of the newly opened Pittsburgh and Charleroi line. In October, 1906, Mr. Fitch was appointed acting superintendent of the Charleroi Division and has since continued in that capacity.

Mr. J. M. Loftis has been appointed superintendent of the Consolidated Division, No. 5, of the Pittsburgh (Pa.) Railways, in charge of the operation of cars from the Oakland, Homewood, Ardmore, Highland, Herron Hill and Butler Street car houses and will also have charge of cars of the Monongahela Division from Craig Street to the city limits. Mr. Loftis entered the service of the Citizens' Traction Company, Pittsburgh, on Nov. 9, 1899, as repairman on the cable road. Later he became night watchman at the Penn Avenue car-house of the company and a few months later night receiver at the same place. He became a gripman on the cable road and in 1896, when the Citizens' Traction Company became a part of the Consolidated Traction Company and was electrified, Mr. Loftis became a motorman. He remained at this one year, when he was appointed inspector, and in about 18 months he was appointed superintendent of the Butler Division of the Consolidated Traction Company. Mr. Loftis held this position after the absorption of the Consolidated Traction Company in 1902 by the Pittsburgh Railways, and on May 15, 1904, he was transferred to the Homewood Division as superintendent. He has since retained this position.

Mr. T. J. Brennan, who has been appointed general superintendent of the Dayton, Covington & Piqua Traction Company, West Milton, Ohio, to succeed Col. Edward C. Spring, began his electric railway career in 1901, when he entered the employ of the Dayton & Xenia Traction Company as a conductor. After a short term of service with the company in this capacity Mr. Brennan became connected with the Boston Industrial Company, Boston, Mass., as a timekeeper. The Boston Industrial Company was at that time building a 60-mile line of railroad, and after serving for a short period as timekeeper Mr. Brennan was made assistant superintendent of the company. When the construction of the Dayton-Covington Traction Company's line was begun by the Boston Industrial Company, Mr. Brennan returned to the West in the employ of the company, and when the road was completed he entered the service of the Dayton, Covington & Piqua Traction Company as a conductor. In November, 1906, he was appointed car house foreman and train dispatcher of the company and in November, 1907, he was appointed assistant superintendent of the company.



T. J. Brennan

Construction News

Construction news notes are classified under each heading alphabetically by states.

RECENT INCORPORATIONS

Highland Pacific Railroad, Lakeport, Cal.—Incorporated to take over the Sonoma & Lake County Railroad, which proposes to build an electric railway from Upper Lake to Lakeport, and a branch of 3 miles from Kelseyville to the nearest point on the main line in Big Valley, in addition to the route heretofore mapped out, viz., from Lakeport to Preston and on to Santa Rosa, the total length of the railway being estimated at 70 miles. Practically all rights of way have been secured. Capital stock, $2,500,000. Incorporators of the company are Col. J. E. Fulton, R. M. Beattie, A. E. Dickinson and Henry Eickoff, San Francisco. [E. R. J., Sept. 11, '09.]

Murphysboro & Southern Railway, Murphysboro, Ill.—Incorporated to build an interurban railway from Murphysboro to Shawneetown. Capital stock, $250,000. Incorporators: A. B. Minton, W. C. Alexander and J. G. Hardy.

Wahpeton & Breckenridge Street Railway, Breckenridge, Minn.—Incorporated to build an electric railway to connect Breckenridge and Wahpeton, N. D. Capital stock, $50,000. Incorporators: D. J. Jones, secretary; Joseph Gunn, Breckenridge, and F. L. Strum. [E. R. J., June 19, '09.]

Fostoria & Fremont Railway, Fostoria, Ohio.—Application for a charter has been made by F. D. Carpenter, J. D. McDonel, F. R. Havens, A. H. Jackson and Charles Ash, to build an electric railway from Fostoria to Fremont. The railway will connect the Lake Shore Electric Railway, which is to furnish the power, and the Western Ohio Railway, of which F. D. Carpenter is general manager, over the tracks of the Toledo, Fostoria & Findlay Railway. [E. R. J., Oct. 2, '09.]

Toledo & Findlay Railway, Findlay, Ohio.—This company has been incorporated to take over the properties of the Toledo, Bowling Green & Southern Traction Company and the Toledo Urban & Interurban Railway. Capital stock, $10,000. Incorporators: B. L. Kilgour, Anthony B. Dunlap, Morris McGrew and Frank H. Simpson.

Mid-Continent Traction & Power Company, Tulsa, Okla.—Incorporated to build an electric railway from Miami to Shawnee, a distance of about 200 miles. Estimated cost, $4,000,000. Capital stock, $100,000. Incorporators: L. J. Weatherwax, Sapulpa; F. C. Brown, Red Fork; J. L. Harnage, Graham Burnham and J. Robert Burnham, Tulsa.

Coos Bay Electric Railway, Marshfield, Ore.—Incorporated to build an electric railway between Roseburg, Marshfield and Coos Bay. Capital stock, $150 000. Incorporators: James H. Flanagan, C. F. McColl and W. S. Chandler. [E. R. J., Jan. 2, '09.]

FRANCHISES

Claremont, Cal.—The City Council has granted a 50-year franchise to the Ontario & San Antonio Heights Railroad to extend its electric railway through Claremont from Upland to North Pomona, 6 miles distant.

Los Angeles, Cal.—The Board of Supervisors has passed an ordinance authorizing the sale on Oct. 22 of a 50-year franchise to build a street railway on West Adams Street, from Washington Street to the city limits.

Santa Barbara, Cal.—The City Council will receive sealed bids up to Oct. 21 for a franchise applied for by the Santa Barbara Consolidated Railway to build an electric railway over certain streets of Santa Barbara.

Champaign, Ill.—The Illinois Traction System has applied to the City Council for a 25-year franchise to extend its railway in Champaign.

Glasgow, Ky.—The Fiscal Court of Burren County has granted a franchise to Charles Van-Den-Burgh to build an electric railway through that county to Hart County. The railway will extend 18 miles from Glasgow to Horse Cave. J. Lewis Williams, Glasgow, attorney. [E. R. J., Sept. 25, '09.]

St. Louis, Mo.—The St. Louis County Belt Railroad, which was recently granted a franchise to build an electric railway in St. Louis County, accepted the franchise. James D. Houseman, in whose name the franchise was secured, states that work will be started at once. [E. R. J., Oct. 2, '09.]

Albuquerque, N. M.—M. P. Stamm and associates write that they have been granted a 50-year franchise to construct a 2-mile electric railway in Albuquerque, and a 25-year franchise to furnish power for lighting, etc. [E. R. J., June 6, '08.]

Ironton, Ohio.—The County Commissioners of Laurence County have granted a franchise to Chester Sanborn and William Lemley, Huntington, W. Va., representing A. E. Cox and associates, also of Huntington, to construct an electric railway through the county. The railway is to extend from Pittsburgh, Pa., to Cincinnati, Ohio. [E. R. J., Aug. 14, '09.]

Waynesburg, Pa.—The Pittsburgh, Monongahela & Washington Railways has applied to the City Council for a 99-year franchise to build its railway over the streets of Waynesboro. The franchise has been referred to the corporation committee.

Knoxville, Tenn.—The City Council has extended the franchise granted to Charles Dawes, representing the Knoxville-Kingston Interurban Railway, to build an electric railway over certain streets of Knoxville. The amendments provide that the railway shall be in operation two years from date of passage. [E. R. J., June 5, '09.]

Seattle, Wash.—The Corporation Committee of the City Council has recommended for passage the franchise of the Seattle Electric Company to extend its railway on Fourteenth Avenue, northwest, in Ballard.

Wheeling, West Va.—The County Commissioners have granted a franchise to the Rapid Transit Company, Wheeling, to build an electric railway through Ohio County, with the provision requiring $40,000 cash payment on its acceptance. It is stated that the company will not accept the franchise. [E. R. J., July 31, '09.]

TRACK AND ROADWAY

Edmonton (Alta) Radial Railway.—This company expects to place contracts within the next six months for constructing 10 miles of single and double track.

British Columbia Electric Railway, Vancouver, B. C.—This company has let the contract for constructing 4 miles of single track in South Vancouver to the firm of Christian, Hartney & Christian, Vancouver. Operations will begin within two weeks, and the lines are to be completed before the end of the year.

Central California Traction Company, San Francisco, Cal.—This company has started the grading on its 3½-mile extension between Sacramento and Agricultural Park. Following this work the company will commence the construction of the Sacramento-Lodi extension for which bonds have been disposed of and all right of way practically secured.

Los Angeles & San Francisco Short Line Railway, Los Angeles, Cal.—It is stated that the project of connecting Los Angeles with San Francisco, by means of a double track electric railway will be rushed to an early fulfillment. Practically all the right of way has already been secured and property for a terminal in Los Angeles has been purchased. A preliminary survey has been made and engineers are to begin the final survey immediately. Capt. John Cross, 416 American National Bank Building, Los Angeles, president, and M. K. Miller, 40 Bacon Building, Oakland, chief engineer. [S. R. J., April 4. '08.]

Grand Junction Electric Railway, Colorado Springs, Col.—This company has started the final survey for its proposed electric railway from Grand Junction to Fruita, via Palisades, a distance of about 25 miles. Entire right-of-way has been secured. E. A. Sunderlin, general manager. [E. R. J., July 24, '09.]

Macon, Ga.—Frederick Kauffmann, who is projecting the electric railway from East Macon to Recreation Club, 4 miles, advises that franchises have been granted and charter is being advertised, the same requiring the lapse of 30 days before being issued. [E. R. J., Sept. 25, '09.]

Valdosta (Ga.) Street Railway.—This company will within two weeks place contracts for 600 ties to repair its roadbed in addition to 400 ties already placed.

Rockford & Interurban Railway, Rockford, Ill.—This company has placed orders for 5 miles of 70-lb. 7-in. rails, to be used for renewing city track.

Rock Island Southern Railway, Monmouth, Ill.—This company advises that it expects to have its new extension between Monmouth and Rock Island, 50 miles, in operation by Jan. 1, 1910. About three-fourths of the grading has been completed and rails have been laid for a distance of 25 miles. The following contracts have been recently awarded: Wisconsin Bridge Company, for 615 ft. steel viaduct, 70 ft. high, across Cedar Creek; Myers Construction Company, St. Louis, Mo., 950 ft. wood trestle, 70 ft. high and a wood pile trestle 2500 ft. long and from 20 to 30 ft. high; A. M. Skinner, St. Louis, Mo., 870 ft. wood trestle, 75 ft. high, across Pope Creek; E. J. Peterson, Davenport, Ia., grading between Monmouth and Gilchrist, except steam-shovel work, consisting of about 600,000 yds. The contract for all the overhead material has been let to the Ohio Brass Company. The railway will be equipped with 9-in., 45-ft. poles outside of the city limits and 55-ft., 60-ft. and 65-ft., 10-in. poles in the city. The company is also building an extension from Gilchrist to Aledo and Viola. W. W. McCullough, Monmouth, general manager.

Cincinnati, Louisville, Lexington & Maysville Traction Company, Dry Ridge, Ky.—This company, which is to build an interurban railway between Cincinnati, Ohio, and Lexington, Ky., a total distance of more than 200 miles, has arranged with the Reliance Engineering Company, Cincinnati, to design and construct the entire system. The estimated cost is $3,000,000. The Reliance Engineering Company has started a party of twelve engineers to make the preliminary surveys of the first section, which will extend from Dry Ridge to Owenton, Ky., and when that is completed, the engineers will begin the survey from Dry Ridge to Cincinnati, Ohio. Actual construction, it has been decided, will commence about Dec. 1. Grants of land for the right of way have already been made through several counties. W. T. Blackburn, Dry Ridge, president. [E. R. J., May 15, '09.]

Lake Charles Railway, Light & Water Works, Lake Charles, La.—This company has started construction on its Rodger Street extension to Hi Mount addition, 1½ miles. It is to be completed within 30 days.

Boston, Lowell & Lawrence Electric Railroad, Boston, Mass.—Hearings have been resumed by the Massachusetts Railroad Commission on the proposed high-speed electric interurban railway of this company, from Sullivan Square, Boston, to the cities named in the title of the company. The testimony was confined to statements of parties residing along the route in favor of the project, with vigorous cross-examination in opposition by counsel for the Boston & Maine Railroad and the Boston & Northern Street Railway. [E. R. J., June 19, '09.]

Middlesex & Boston Street Railway, Framington, Mass.—This company has petitioned the railroad commissioners for extension of time on construction work in Natick and Wellesley and for approval of a location on Central Street, Natick.

Worcester & Providence Street Railway, Worcester, Mass.—This company is surveying the proposed route of its electric railway from Worcester to Providence, R. I., and work is being hastened in order to make some progress before the franchise expires, on Dec. 1, so as to have it extended. Wagner Fisher, chief engineer. [E. R. J., May 29, '09.]

Escanaba (Mich.) Electric Street Railway.—This company is said to have commenced construction on its proposed extension from Escanaba to Gladstone. It is expected to have the line completed within a year. R. L. Utley, general manager.

Kansas City, Ozarks & Southern Railway, Mansfield, Mo.—This company purchased 600 tons of rails for an extension in Douglas County.

Mexico, Santa Fé & Perry Traction Company, Mexico, Mo.—This company has awarded general contract for construction of its interurban railway to Burns & Company, 705 Isabella Building, Chicago. The line is to extend south from Mexico to Columbia and Fulton, and north to Santa Fé, Perry and Hannibal, a total of 103 miles. Construction will be started at Mexico about Nov. 1 in both directions. Burns & Company will purchase all material and let all subcontracts. [E. R. J., Aug. 14, '09.]

New York & North Shore Traction Company, Mineola, N. Y.—Construction on the roadbed for the extension of this electric railway from Flushing through Whitestone to the central north shore sections of Queens Borough has been started at Broadway, Prince Street and State Street, Flushing. At this point connections will be established with the New York & Queens County Railway, which will transport north shore passengers over the Queensboro Bridge to Manhattan. The cost of the 7 miles of tracks will be $1,250,000.

Minot, N. D.—It is reported that the Fisher Construction Company, Chicago, Ill., is making preliminary surveys for an electric railway to extend from Minot to Boscurvis, Sask., and that $150,000 has been subscribed. H. F. Bartling, Minot, is said to be interested. [E. R. J., July 24, '09.]

Northern Ohio Traction & Light Company, Akron, Ohio.—The board of directors of this company has authorized the expenditure of $225,000 for improvements to its property in 1910. Of this, $100,000 is to be spent for new rolling stock, and $125,000 for underground work and for general maintenance and betterment.

Dayton & Xenia Traction Company, Dayton, Ohio.—This company has filed a bond for $5000 to insure the completion of its proposed extension between the Xenia route and the rapid transit division in Dayton, for which a franchise was recently granted by the County Commissioners.

Oklahoma City, Okla.—Homer S. Hurst, Holdenville, president of a company which has been formed to build an electric railway from Oklahoma City to Shawnee via intermediate towns, totaling 100 miles, announces that the railway is under construction. The company has not yet incorporated, but is in the market for usual equipment for an electric railway. There are to be two power stations, the locations of which are yet to be ascertained, in connection with the North Canadian River Water Power Company. The repair shops are to be located at Oklahoma City and the amusement parks at Oklahoma City Park, Jones City Park and others yet to be selected. Officers elected are: W. F. Harn, vice-president; Alfred Hare, secretary, general manager, superintendent and purchasing agent, and J. F. Winans, treasurer, all of Oklahoma City. [E. R. J., Sept. 25, '09.]

Mid-Continent Traction Company, Tulsa, Okla.—The contract for constructing this electric railway from Tulsa to Sapulpa via Shawnee, 22 miles distant, has been let and a forfeit of $35,000 posted. J. Robert Burnham, chief engineer, has a party of surveyors in the field.

Ottawa & St. Lawrence Electric Railway, Brockville, Ont.—This company has organized to build an electric railway from Ottawa, Ont., through Metcalf, Kenmore, Vernon, Ormond, Winchester, Williamsburg to Morrisburg along the St. Lawrence River, through Iroquois, Cardinal, Prescott, Maitlands, Brockville and Perth to Lanark; north through White Lake to Arnprior, Fitzroy Harbor to Ottawa, with branches from Ottawa to Morrisburg; from Kenmore to Russel, and from Darling to High Falls, a total distance of 193 miles. The estimated cost of the line is $3,000,000. C. S. Cossett, Brockville, president, and A. H. N. Bruce, Ottawa, chief engineer. [E. R. J., March 27, '09.]

Port Arthur, Ont.—J. McTeigue, city clerk, advises that the City Council is endeavoring to organize a company to build an electric railway from Port Arthur through the townships of McIntyre and Oliver to Kakabeka Falls on the Canadian Northern Railway. J. J. Carrick, Port Arthur, is said to be interested. [E. R. J., Sept. 18, '09.]

Coos Bay Electric Railway, Marshfield, Ore.—Messrs. Knettener & Haas, Portland, promoters of the proposed railway from Marshfield to Roseburg via Coos Bay, are said to have agreed with the Commercial Club, Roseburg, to deposit a bond of $100,000, to be forfeited if they fail to construct the railway within three years after the preliminary surveys are completed. Half of the survey has been completed, and the Commercial Club has decided to raise $6000 to complete the rest. [E. R. J., Jan. 2, '09.]

Westmoreland & Red Boiling Springs Railroad, Lafayette, Tenn.—It is announced that the preliminary survey has been completed and that rights of way are being secured for this electric railway, which will extend from Westmoreland via Lafayette to Red Boiling Springs, Tenn., 36 miles distant, and later into Kentucky, to connect with the Queen & Crescent Route. Bright Brothers Construction Company, Nashville, contractors. Officers: W. A. Smith, president; E. K. Lamb, secretary; Albert Dean, treasurer; A. J. Bright, chief engineer, and J. D. Holland, Lafayette, corresponding secretary. [E. R. J., May 29, '09.]

Corsicana (Tex.) Transit Company.—This company is ballasting and placing drain tile for sub-drainage on its track, and also putting on improved rail joints. J. W. Carpenter is superintending the work.

Wichita Falls (Tex.) Traction Company.—J. A. Kemp, president of the company, writes that the construction on this electric railway is completed and that the road was placed in operation on Sept. 15. The railway, which extends from Wichita Falls to Lake Wichita, 7 miles distant, is standard gage, and 8 cars are operated over the line. The shops and power station are located at Wichita Falls, and there is an amusement park at Lake Wichita, which is controlled by the company. The company has not yet determined whether to furnish power for lighting purposes. Capital stock, authorized and issued, $150,000. Officers: Frank Kell, vice president; W. T. Van Brunt, secretary, general manager and purchasing agent; M. M. Murray, treasurer; and F. P. St. Clair, general superintendent and electrical engineer; all of Wichita Falls. [E. R. J., Aug. 28, '09.]

Bellingham, Wash.—Samuel Alsop has suggested to the merchants and business men of Bellingham a plan to construct a 20-mile electric railway in Bellingham and through the Nooksack Valley.

***Waterville (Wash.) Railway.**—This company has closed a contract with Frank McKean, Seattle, for constructing an electric railway in Waterville, for a sum of $80,000. The railway is to be completed in 90 days.

SHOPS AND BUILDINGS

Edmonton (Alta) Radial Railway.—This company expects to place contracts during the next six months for erecting a new car house, with a capacity of 20 cars.

Fresno (Cal.) Traction Company.—Announcement is made that this company will begin work at once on a new car house in Fresno to cost $25,000. The building will be 138 ft. × 160 ft., and will be situated near the Pollasky depot. It will be of concrete and brick construction and will have a storage capacity of 44 cars. The building will contain an inspection pit 98 ft. × 95 ft., also a store room and armature room. The offices of the company will be located here. A blacksmith shop and oil house will be built adjoining the car house.

Los Angeles & Mt. Washington Railway, Los Angeles, Cal.—This company expects to place contracts for constructing a terminal station during the next 60 days.

Rockford & Interurban Railway, Rockford, Ill.—This company expects to build new repair shops next year.

Lawrence (Kan.) Street Railway.—This company has let the contract for its car house to C. E. Varnum, Lawrence. The building is located on South Massachusetts Street and will be of concrete and steer, 70 ft. × 190 ft. In addition to the stalls for the cars there are to be offices and rooms for the employees. [E. R. J., April 17, '09.]

Corsicana (Tex.) Transit Company.—It is reported that this company's car house, with some electrical supplies and two street cars, has been consumed by fire at an estimated loss of $4000.

POWER HOUSES AND SUBSTATIONS

Edmonton (Alta) Radial Railway.—This company has purchased 5000 hp in generators, including lighting generators, which are being installed in the power station. The company expects during the next six months to build a new power station.

Los Angeles & Mt. Washington Railway, Los Angeles, Cal.—This company expects during the next 60 days to place contracts for constructing a power house.

Rock Island Southern Railway, Monmouth, Ill.—This company has recently placed contracts with the Westinghouse Electric & Manfacturing Company for two 1250-kw turbo-generators and condensers complete, also a steam outfit consisting of five 550-hp Babcock & Wilcox boilers with coal hopper and carrier.

Sioux City Service Company, Sioux City, Ia.—This company has recently purchased new equipment for its power station, consisting of boilers, pumps, heaters, etc. An addition to the boiler room is now in course of construction. E. L. Kirk, general manager.

Boston (Mass.) Elevated Railway.—This company is building a new substation at Washington Street and Brady Street, Boston, to furnish current for the extension of the elevated railway through Washington Street to Forest Hills. The structure will be 93 ft. × 50 ft., one story high and will be concrete and brick construction.

Vicksburg (Miss.) Traction Company.—This company expects to purchase within the next year coal handling machinery to be installed in its power station.

New York & North Shore Traction Company, Mineola, N. Y.—It is stated that a site for a power house has been purchased by this company, and contracts for erecting the plant awarded to Westinghouse, Kerr, Church & Company.

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.—It is announced that this company will begin at once the work of remodeling and improving its power station at Marietta.

Manufactures and Supplies

ROLLING STOCK

Cincinnati (Ohio) Traction Company, it is reported, has ordered four pay-as-you-enter cars from the Cincinnati Car Company.

Northern Ohio Traction & Light Company, Akron, Ohio, is reported to be in the market for 15 new cars, 6 of which will be for limited service.

Corsicana (Tex.) Transit Company suffered a loss of two cars in a fire which entirely destroyed the company's car house. The cars will be replaced.

Springfield (Mo.) Traction Company has ordered from the American Car Company the six cars for which it was reported in the issue of this paper for Sept. 4, 1909, to be in the market. Two of the cars will be double-truck and four will be single-truck.

Kansas City, Ozark & Southern Railway, Mansfield, Mo., is in the market for two storage-battery cars for section gangs. The company desires a small generating unit to charge the batteries of these cars and a locomotive and some cars to be used until its hydro-electric plant is completed.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., reported in the Electric Railway Journal of July 31, 1909, as having ordered 100 double end closed motor city cars from the St. Louis Car Company, has specified that the cars shall be of semi-steel construction in addition to the pay-as-you-enter feature. Details of the cars follow: Seating capacity, 50; weight (car body only), 23,000 lb.; bolster centers, length, 24 ft. 6 in.; length of body, 35 ft.; over vestibules, 50 ft.; width, over sills, 8 ft. 5⅛ in., sill to trolley base, 8 ft. 3¾ in.; height from top of rails to sills, 3 ft. 3 in.; body, wood; interior trim, oak, sanitary type; underframe, steel; bolsters, body, truss type; curtain fixtures, Curtain Supply Company; curtain material, Pantasote; heating system, Peter Smith; roofs, monitor type; sanders, Nichols-Linterns; sash fixtures, Edwards; step treads, Mason; trucks, type, St. Louis; varnish, Chicago Varnish Company; ventilators, St. Louis special; wheels, St. Louis 34 in.

TRADE NOTES

Grip Nut Company, Old Colony Building, Chicago, Ill., is in the market for 2500 tons of Bessemer steel for the manufacture of grip nuts, 1910 delivery.

Acheson Oildag Company, Niagara Falls, N. Y., announces that F. H. Banbury, engineer of the company, has sailed for Europe to further the patent interests of the company. Mr. Banbury is an Englishman by birth. He came to America about five years ago, and was for a time connected with the Commonwealth Edison Company, Chicago, Ill.

Cooper Heater Company, Dayton, Ohio, reports the sale of its car heaters to the following companies: Oklahoma Railway, Atlantic Shore Line Railway, Cincinnati & Columbus Traction Company, Benton Harbor-St. Joe Railway & Light Company, Johnstown Passenger Railway, Indiana Union Traction Company, and the Western Ohio Railway.

Dearborn Drug & Chemical Works, Chicago, Ill., announce that Edward C. Brown, their manager in the Hawaiian Islands and the Orient, has been elected president of the Commercial Club of Honolulu, an organization which is similar to the chamber of commerce and association of commerce organizations in the large cities of the United States. Mr. and Mrs. Brown recently made a trip in the interests of the Dearborn Drug & Chemical Company to the Orient, spending several months in China, Japan, Korea and the Philippines.

Electric Service Supplies Company, Philadelphia, Pa., and Chicago, Ill., announces that the Denver (Colo.) City Tramway recently ordered from it Automotoneers for 15 new cars. These controller regulators are of a new design, made to fit the GE K-36 controllers. All of the cars of the Denver City Tramway are completely equipped with Automotoneers. The Philadelphia (Pa.) Rapid Transit Company is now installing on all of its cars the new type of Automotoneer furnished by the Electric Service Supplies Company. The Philadelphia Rapid Transit Company some years ago equipped all of its cars with a controller regulator, but the improvements made in the Automotoneer were found to be of such advantage that the company is now replacing the old regulators with the new type of Automotoneer. The machines are being shipped and installed as fast as the Electric Service Supplies Company can furnish them.

Westinghouse Electric & Manufacturing Company, Pittsburg, Pa., announces that C. B. Humphrey, manager of the retail and supply sales department of the company, has resigned to become a vice president and director of the White Investing Company, New York, N. Y., which will finance, develop and operate enterprises based on natural resources, and deal in bonds and securities. Among the interests of the company are the Aguacate Gold Mines in Costa Rica, which are now being developed and will be in operation in the near future; the development and operation of a slate mine for the production of slate for roofing, electrical and industrial purposes will be undertaken at once, and a number of properties of other character acquired. W. F. White, president of the company, was formerly manager of the Cincinnati (Ohio) Edison Electric Company, and later vice president of the North American Company.

General Electric Company, Schenectady, N. Y., has received grand prizes (highest award) at the Alaska-Yukon-Pacific Exposition in each class of electrical apparatus in which an exhibit was made by the company. G. E. apparatus was ranked first in the following divisions: Apparatus for cooking by electricity, apparatus for heating by electricity, automatic motor starters, arc lamps, bonds, cabinets, circuit breakers, cut-outs, fans, indicating instruments, integrating instruments, insulated wires, insulated cables incandescent lamps, mine locomotives, motor generators, motors for direct current, motors for alternating current, recording instruments, rectifiers (mercury arc), sockets, switches, transformers, wiring devices. G. E. turbines were also entered in the Government exhibit, in which no awards were made.

McConway & Torley Company, Pittsburgh, Pa., attracted much attention at the Denver convention with the Janney radial coupler. This coupler is of the standard M.C.B. type, which this company was the first to manufacture and apply to both freight and passenger cars of the steam railroads in the United States. These M.C.B. couplers have been applied to over one million cars on the railroads of the United States and foreign countries. The radial coupler is an adaptation of the well known Janney passenger car coupler, which is in use on thousands of steam railroad equipments, and is especially adapted to meet the service requirements of interurban cars. The success of the radial equipment on the several hundred cars on which it has already been applied is the practical proof of its efficiency. This company is now engaged in getting out a large number of these equipments for several large lots of new cars being built for various important lines, which is proof of the recognition of its desirable features. Any railroad officer interested in the coupler problem who did not have an opportunity to examine the demonstration of the coupler at the convention should write the company in Pittsburgh, Pa., for its booklet describing this equipment. On receipt of blue prints showing car platform framing, this company will make application designs of the equipment to suit requirements.

ADVERTISING LITERATURE

Packard Motor Car Company, Detroit, Mich., is mailing a card showing two 3-ton Packard trucks used for hauling merchandise in New York City.

U. S. Metal & Manufacturing Company, New York, N. Y., has just issued a small illustrated booklet describing the merits of the Wolfe automatic rail joint lock.

McGuire-Cummings Manufacturing Company, Chicago, Ill., is distributing an illustrated folder descriptive of its snow sweepers and snow plows, which contains a list of the cities where the company's snow fighting machines are in use, and letters from railway officials who have had experience with the company's snow equipment.

General Electric Company, Schenectady, N. Y., has issued bulletins Nos. 4692, 4693, 4694, 4699 and 4701, all of which relate to railway apparatus. They are entitled in the order of their numbers: "G. E. 210 Railway Motor," "G. E. 88-A and -B Railway Motors," "Portable Substations for Electric Railways," "Motor Driven Air Compressors—Geared Type," and "Emergency Straight-Air Brake System."

Rockwell Furnace Company, New York, N. Y., has printed a 40-page catalog, in which the various types of furnaces which it manufactures are illustrated and described. These include furnaces for heating any material, for forging and welding. They are adapted for either hand or machine work, where high temperatures are required. Specifications accompany the descriptions of each type of furnace. The publication also describes the various furnace appliances manufactured by the company.

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Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

Fare Increase on a Pennsylvania Road

The Philadelphia & West Chester Traction Company, an interurban line operating 33 miles of track, is added to the increasing list of properties which find a higher rate of fare necessary to provide a proper degree of service and afford a reasonable return on the investment.

In the letter addressed recently to the patrons of the road by A. M. Taylor, the president of the company, which is published on another page in this issue, the facts bearing upon the changes which the management decided to make are discussed with frankness. Operation of the West Chester division, upon which an increase of fare was made effective on Sept. 27, was started in January, 1899. It appears from the letter of the company that a low rate of fare was established at the outset with the idea that development of the territory would follow the introduction of new rapid transit facilities at an inviting level of fare. In the ensuing years the company has continued to improve its service and equipment, but without making an advance in the rate of fare commensurate with the additional facilities offered.

The position in which this railway finds itself at present, therefore, is that its investment, which was made with full expectation that increased settlement of the territory would result, stands as a fixed outlay of capital. An experiment of 10 years in the operation of the line has proved the existence of two fundamental conditions which cannot be ignored: First, that expenditures resulting both from increases in the legitimate costs of operation and from the provision of additions and betterments, were larger than the projectors of the property had anticipated; and, second, that without a change in the system of fares upon which the revenue of this division was based the total gross earnings would not be adequate.

The patrons of the line have been enlightened as to the detail causes for this situation. Mr. Taylor directs particular attention to the advance in the wages of employees and to the provision of facilities designed to promote efficient and safe operation of the property. In addition to this array of strong arguments, the letter states that the outstanding securities on the property represent its true value.

Every community which enjoys modern transportation facilities should see that it is to its advantage to have the property which affords such conveniences earn an adequate return on the amount of money reasonably invested in the enterprise.

Employer's Liability in New York State

A decision rendered recently by Justice Wheeler of the New York Supreme Court in the case of Forton against Crosstown Street Railway Company, 116 N. Y. Sup., 746, is one of the first to be handed down relating to the Railroad Law as amended in 1906 and is important, partly because it includes street railway companies under the employers' liability provisions of that law, and partly because the law states that a proof of the presence of defects in railroad equipment shall be considered *prima facie* evidence of negligence of the company in actions for personal injuries brought by employees.

The case hinged upon the fact that the motorman injured claimed he was unable to hang a curtain over the window in the front door, because of the absence of curtain hangers,

and that as the vestibule was flooded with light he was unable to see far ahead and on a stormy night collided with a vehicle on the track. On the trial the court entertained doubt as to whether plaintiff was not guilty of such contributory negligence as would bar a recovery in not leaving the window of the vestibule ahead of him fully open instead of raising it only 2½ in., and also whether negligence on the part of the railroad had been proved. But there was none in the mind of the judge that the provisions of the statute included street railway companies, although it mentions "railroad corporations" only. As there are decisions in the States of Texas, Missouri and Minnesota which hold that statutes substantially like the one in question apply only to steam roads, it is worth while to consider the reasons which led Judge Wheeler to adopt the broader interpretation.

The employers' liability law in New York State was not passed as an independent act, but as an amendment to and as a part of the general railway law, under which the street railway companies may incorporate. Another section of the statute refers specifically to "a driver, conductor, motorman or gripman," so that the court considered that in this amendment it was the intention of the Legislature to apply the law to all railways, whether electric or steam.

On the other hand, the Minnesota act reads:

Every railroad corporation owning and operating a railroad * * * shall be liable for damages sustained by an agent or servant by reason of negligence of any other agent or servant, etc.

This act was held not applicable to a street cable railway corporation, the court saying that, as there were no cable or electric railways in the State of Minnesota when the law was passed, the Legislature could not have intended to apply the law to such corporations, and argued that the law should not apply to street railways, because street cars are more readily managed than long steam railroad trains, carry no freight, and are operated with less hazard and danger of personal injury.

The Missouri statute provides:

That every railroad corporation owning or operating a railroad in this State shall be liable for all damages sustained by any agent or servant thereof while engaged in the work of operating such railroad by reason of the negligence of any other agent or servant thereof, etc.

This article is followed immediately by another which relates to street railways, and the Missouri court held that running all through the State statutes an obvious distinction was shown between steam railroads and street railroads, and that no one can read the article just quoted "and gather the idea that it has any reference to street railroads." There was, however, a dissenting opinion in the decision of the Missouri court.

Iowa has an employers' liability act which applies in terms to "every corporation operating a railway," and this has been held by the courts of that State in its broadest and most general sense sufficient to include a street railway corporation. It seemed to Judge Wheeler, however, that in ordinary parlance the word "railway" or "railroad" has a special reference to the larger, more expensive and more permanent lines or systems extending from town to town, accommodating a permanent and more miscellaneous traffic, and requiring larger forces of employees, who are exposed to greater risks than is the case with street car lines.

This point has and doubtless will continue to afford many opportunities for argument. Dictionary definitions afford little help, but note must be taken particularly of the exact words and the position of the statute with relation to others, especially those of a general nature. The question is as interesting as it is important, and future decisions may be confidently looked for.

Profitable Operation of Parks

The closing of the electric railway park season suggests that now is an excellent time to take account of stock and ascertain if possible what were the chief factors in the success or failure of the amusement resort during the past summer. Leaving out the debatable question of the conditions under which the establishment and maintenance of a park are desirable, we may consider some of the points which have proved to be effective in attracting patronage and enabling this class of business to be handled without undue cost. Probably nothing contributes more to the success of a park enterprise than the character of the service which the company provides to and from the premises. In more than one instance during the past season it has been shown that wherever a double-track line is operated, or else a loop circumscribing the park in such a way that long delays are avoided when the travel is heavy, the conditions have been vastly superior to those introduced by the necessity of handling all the traffic on a single line of rails. It is an actual situation that in one noteworthy case the advertisement of a prominent park had to be curtailed greatly on account of insufficient trackage; but in this particular case the installation of a second track would be almost prohibitive in cost. The company was unable to force travel into the park to anything like the extent which would have prevailed had the transportation facilities been equal to the possibilities of the grounds. Strict supervision of the loading and unloading of passengers at the park entrance is another point which it pays to insure.

Experience shows that inside the park there is room for the practice of no little diplomacy in handling patronage, if all are to be satisfied and if the concessions are to be well treated by the public. Thus, if a large picnic party arrives on the grounds in the middle of the forenoon, the wise manager will endeavor to exhaust as many of the free features as possible before the afternoon theatrical performance begins, and will make careful arrangements for the use of such portions of the property as the base ball field, the swimming pool, race course, etc., for a definite period, so that succeeding parties may be scheduled for the use of these features in their proper turn. These points are familiar enough to amusement men of experience, but they are not always appreciated by street railway officers administering parks, and they are far more important than appears offhand. Again, the separation of different parties of patrons, so far as practicable, is desirable. Most groups of patrons appreciate even semi-privacy, and the manager who attends to this wins new patronage every year.

The general practice of renting concessions is undoubtedly a good one, so long as the control of the situation is vested in the railway company. The detailed operation of these features may well be left to the concessionaires; but the railway company can help matters materially by providing suitable lighting in the vicinity of these centers. It is a wise policy to group the lighting in a rather concentrated

way near the principal concessions, and to light the rest of the premises well, but not with the same emphasis that obtains at the points where selling is to take place. Finally, the use of all the local facilities and the avoidance of outside purchasing, so far as practicable, help to save money. Many little conveniences, costing a trifling sum, can be included in the park with noteworthy effect in attracting patronage. One park secured a liberal amount of business by the simple expedient of maintaining its own cows and selling milk by the bottle to mothers with visiting children. A free stove for the use of picnic parties is another feature well worth while, provided the fuel is gathered on the premises. By avoiding large expenditures in the operation of the park, and by installing numerous facilities of little initial expense, but large convenience, certain attraction of patronage is the result.

Training Men for Executive Positions

A question frequently raised by those responsible for the efficient administration of large manufacturing and operating companies is, "Why is it so difficult to secure satisfactory men for executive positions?" Capable, civil, electrical and mechanical engineers are to be had in fair abundance, thanks to the many excellent technical schools throughout the country and to their well-planned engineering courses. But from where are the prospective superintendents, secretaries, managers and presidents, who will have to administer the affairs of these companies, to come? Are they to be drafted from the ranks of those in the engineering, accounting or legal departments of the companies, or should there be a special technical training for such work corresponding in thoroughness to that required for an engineering degree, or should the men for the higher executive positions be chosen by a system of promotion and selection from the purely operating department?

The question is one which applies in large industrial as well as in large transportation undertakings, and is far more serious now than at any time in the past, because the enterprises of both classes are conducted upon a much larger scale than ever before. On the other hand, it is possible that the country has a new class of men from which executive officers can be drawn. Never before have there been so many good technical schools or so many men trained in engineering. Is it safe to assume that these schools will supply in whole or in part the raw material from which the officials we have been considering will be made? This question is one which should be answered, if that is possible, in justice to those who are thinking of making electric railway work a life career. If the most lucrative positions in the service are always to go to those who enter the service through the transportation department the young man planning to acquire an engineering degree may well question the wisdom of spending years in absorbing the special knowledge taught at the technical schools or universities.

It is proper, we believe, before considering the question further to accept first the postulate that the candidate for any responsible position must have had experience in the business, and at least be generally familiar with all branches of the work. The more familiar he is with them, the better is he fitted for his office. It is fair to say also that the duties of a manager require him to possess qualifications and a knowledge of men and affairs which are to a certain extent innate in the man. The true manager, like the true poet, is born, not made. These qualifications can be developed to a considerable extent, but cannot be acquired by everyone; neither can they very readily be taught apart from the work itself. It is no disparagement to the engineer to say that the knowledge needed by him in his work is more susceptible of being codified than that required of the manager. The materials and forces with which he has to deal are controlled by scientific laws which are more or less known, but in most, if not all, of the problems of the manager the human element is an almost overpowering factor.

It is difficult to define all of the essential qualifications of a successful executive, but the following stand out with particular prominence: First, he must be able to secure cheerful co-operation from subordinates and must have an acquaintance with their work; second, he must be able to inaugurate new plans to fit new requirements, that is, he must be possessed of initiative; third, he must be able to secure reasonable profits on the investment in the undertaking for which he is responsible; in other words, he must have that quality which is sometimes called a financial sense. If an engineering or an accounting or a legal training develops these powers in any man, it aids in fitting him for executive work.

In view of the growing inclusion of engineering problems in electric railroading, surprise has many times been expressed that more engineers do not develop into railway managers. One reason may be that while they are good engineers they have not the special ability or abilities already mentioned. Another may be that young men of the desired characteristics do not go to the technical schools. They may feel a strong impulse to attack business problems and a revulsion from what appears to them the tedious "grind" of four more years of school. The attraction of a quick financial return for their services may also appeal strongly to them. A third, and, we believe, a more important reason than either of the other two, is that the technical schools have been graduating engineers in large numbers and by modern methods only during the past 20 or 30 years. Hence their influence is just being felt, because they are only now reaching an age when they have acquired mature experience. As these men grow older and as the younger men from the engineering schools take the places of those promoted, we believe that the proportion of engineering graduates in executive positions will be much larger than formerly.

This theory, even if absolutely true, does not mean that all the prizes of the future will go to the engineering graduate, or even the college graduate, because natural ability, especially in positions of the kind we are considering, will count for more than mere knowledge. But no matter how much natural administrative talent and knowledge a man may possess, his executive ability should be greatly enhanced by a systematic pursuit of engineering studies, not only because of the mental training and ability to weigh theories and methods which it imparts, but also because engineering questions are certain to be of increasing importance in all industrial and transportation enterprises.

THE BEEBE SYNDICATE INTERURBAN SYSTEM IN CENTRAL NEW YORK—POWER SUPPLY, EQUIPMENT AND TRAFFIC FEATURES

The principal construction features of the Beebe Syndicate interurban lines in Central New York were illustrated and described in the ELECTRIC RAILWAY JOURNAL of Sept. 25, 1909, page 456. The power supply and distribution scheme, rolling stock, shops and traffic of the system are described below.

POWER SUPPLY

Electricity for the operation of the Beebe Syndicate lines is obtained from Niagara Falls and from two steam plants



Beebe Syndicate Lines—Power House at Lyons, N. Y.

Niagara power is used on the Syracuse & South Bay and the Syracuse, Lake Shore & Northern also is operated with Niagara power as far as Fulton, the present terminus. The Auburn & Syracuse and the Rochester, Syracuse & Eastern are supplied, respectively, by a 1300-kw reciprocating steam plant at Auburn and by a 3000-kw turbine plant at Lyons. The standard transmission potential is 33,000 volts, three-phase, 25 cycles, except on the older Auburn & Syracuse line, which uses 16,500 volts. However, in order to tie all transmission lines together, 16,500-33,000-volt transformers have been installed at Port Byron.

POWER STATIONS

The older of the two steam power stations is at Auburn. It contains two 650-kw generators direct-connected to Westinghouse cross-compound Corliss engines. The transformers step up from 360 volts to 16,500 volts. The steam equipment consists of Heine boilers without superheaters, a Green economizer, Deane feed pumps and Deane jet condensers. One of the heaters in the Auburn plant is placed between the low-pressure exhaust of the engines and the condenser, while another heater takes all the exhaust from the auxiliaries.

The Lyons plant was erected about three years ago, in accordance with the plans of Scheaff & Jaastad, Boston, Mass., who also designed the standard substations. The building and stack are of brick, as shown in one of the illustrations. This station now contains two 1500-kw, 3300-volt Westinghouse turbo-generators, which have given such satisfactory service that a contract has been made to install a 3500-kw unit before Jan. 1. The transformer units are 650-kw each and step up the current from 3300 volts to 33,000 volts.

As in the Auburn station the boilers are of the Heine type, but they are equipped with superheaters. The other steam apparatus includes a Sturtevant economizer, Deane feed pumps, Cochrane heaters taking steam from the auxiliaries and Alberger surface condensers.

It is interesting to note that in the Lyons turbine plant the operating expense during the first year was only 0.6 cent per kw-hour, delivered at the a.c. side of the switchboard, and as low as 0.55 cent per kw-hour during the second year. These figures are based on load factors of 50-55 per cent and 65-70 per cent, respectively. It was assumed that the maximum output of the turbines for a month was 1,000,000 kw-hours and that the ratio between this figure and the actual output for the month should be considered the load factor percentage.

The cost of power at the Lyons station is about 20 per cent less per kw-hour than the reciprocating plant at Auburn. This is due to the larger size of the former station and the lower labor cost, no oilers being required in the turbine plant.

SUBSTATIONS

The substations generally are located 10 miles apart. Most of them are equipped with Westinghouse rotary converters of 400 kw capacity to permit the convenient interchange of apparatus. The transformers in all stations are of the oil-cooled type. These are installed in 150-kw capacities for 400-kw rotaries. Integrating wattmeters are installed only in the power houses and where power is purchased. The Auburn steam station contains two 400-kw rotaries for the city lines, while the interurban line is supplied by two equipments of like capacity at Skaneateles and Howlett Hill. The Syracuse & South Bay has one substation with two 400-kw units at North Syracuse, midway between terminals. The Syracuse, Lake Shore & Northern has two stations of 800-kw capacity each at Phoenix and Fulton and a station near Syracuse having one 500-kw rotary. The Rochester, Syracuse & Eastern now has 800-kw stations at Lyons, Macedon, Port Gibson and Savannah



Beebe Syndicate Lines—Standard Substation

and two stations, each containing two 500-kw units, at East Rochester and Port Byron. The latter substation now feeds part of the Auburn & Northern. In addition to these stations the extension from Port Byron to Syracuse will require an 800-kw plant at Jordan and a 1000-kw plant near Syracuse.

All of the substations except those on the Auburn & Syracuse line are of neat brick design with arched windows, as shown in an accompanying illustration. It will be seen from the plan and elevation that the building is divided into two rooms, the smaller of which has an ultimate capacity for three rotaries and switchboard and the larger for the high-tension wiring and transformers.

The high-tension room has a 4-in. concrete floor. In the rotary room the concrete is covered with hardwood flooring. Other details of construction are shown on the drawing. There is only one case where a ticket office is combined with a substation, for in general the waiting rooms are in the towns and the substations are on the right-of-way outside of town limits.

LIGHTNING PROTECTION

The high-tension lines are not protected by the usual grounding wire, but all power plants and substations have Westinghouse low-equivalent arresters on the transmission circuits. The d.c. lines ordinarily are furnished with Westinghouse multiple-gap arresters spaced five to the mile. The car equipments are protected by the lightning arresters furnished with the motors. In addition, the motor fields are so connected that the current passes through them before reaching the armatures. The fields thus act as choke coils. This method has been used for the past eight years, during which period not a single armature has been injured by lightning.

ROLLING STOCK

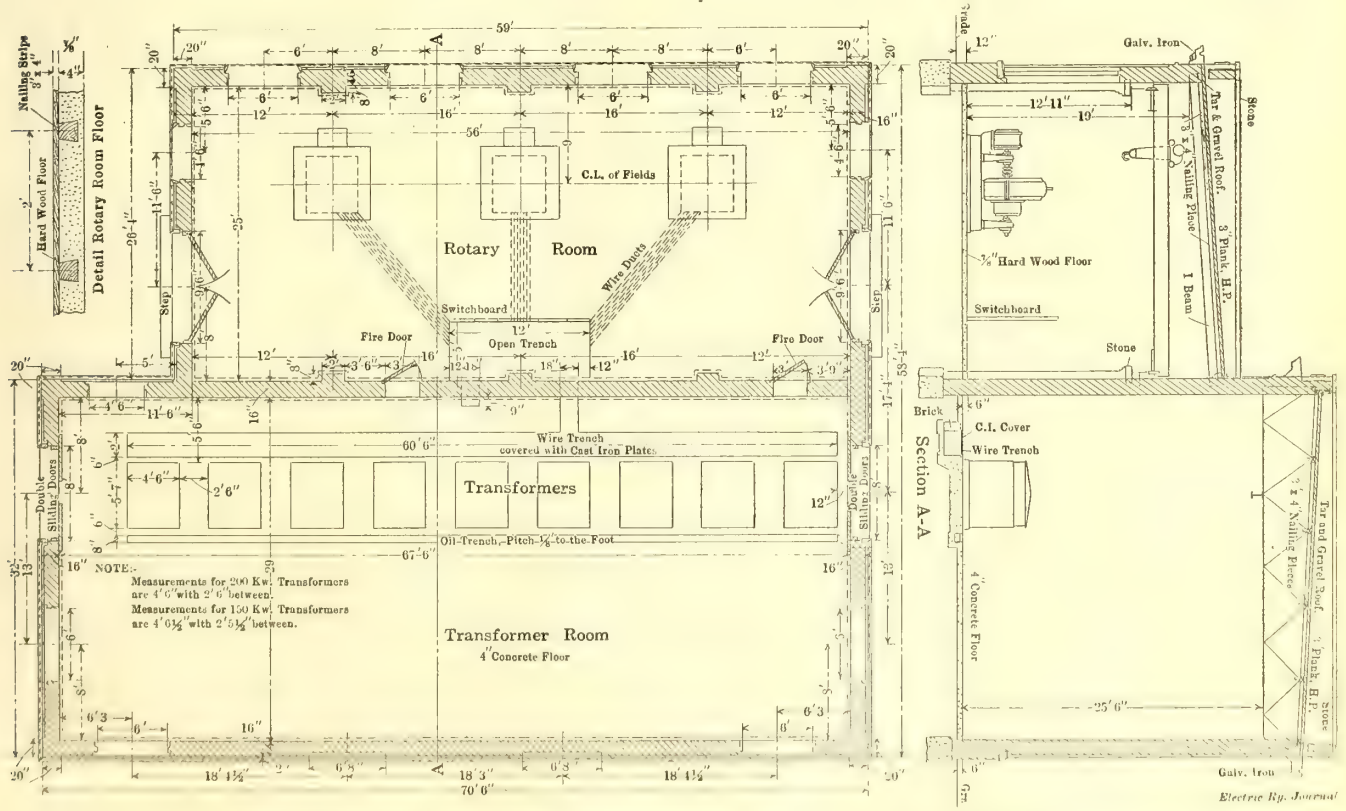
The interurban cars of the Beebe lines are of the most modern type, as will be apparent from the accompanying view of a Rochester, Syracuse & Eastern car, which is typical of the latest practice. This car was built by the Cincinnati Car Company. It is 35 ft. over all, seats 58 passengers, and is divided into passenger, smoking and toilet compartments, with mahogany interior finish. The body is mounted on Baldwin trucks, which carry four Westinghouse No. 119 motors of 125 hp each, geared to 55 miles per hour. The electrical control is of the unit-switch type. Westinghouse air brakes, and Peacock hand brakes are used. The same type of car is in service on the Syracuse, Lake Shore & Northern. The Syracuse & South Bay cars are 50 ft. over all and are equipped with four General Electric 60-hp motors. The Auburn & Syracuse cars are also 50 ft. over all, but are equipped with four Westinghouse No. 76 motors, rated at 75 hp each.



Beebe Syndicate Lines—Standard Interurban Car of the Rochester, Syracuse & Eastern

TRAFFIC

The Beebe lines are operated in a district abounding with steam railroads, so that fast and frequent service was necessary to get the bulk of the passenger travel between the towns reached by the lines. The Rochester, Syracuse & Eastern parallels the New York Central & Hudson River and the West Shore Railroads; the Syracuse, Lake Shore & Northern parallels the Delaware, Lackawanna & Western and the Rome, Watertown & Ogdensburg Railroads; and the Auburn & Syracuse parallels the Auburn branch of the New York Central & Hudson River Railroad. In general, the electric fares are slightly less than on the steam lines, and in the summer tickets are sold to parties of pleasure seekers at a reduction of about 25 per cent. On the Roch-

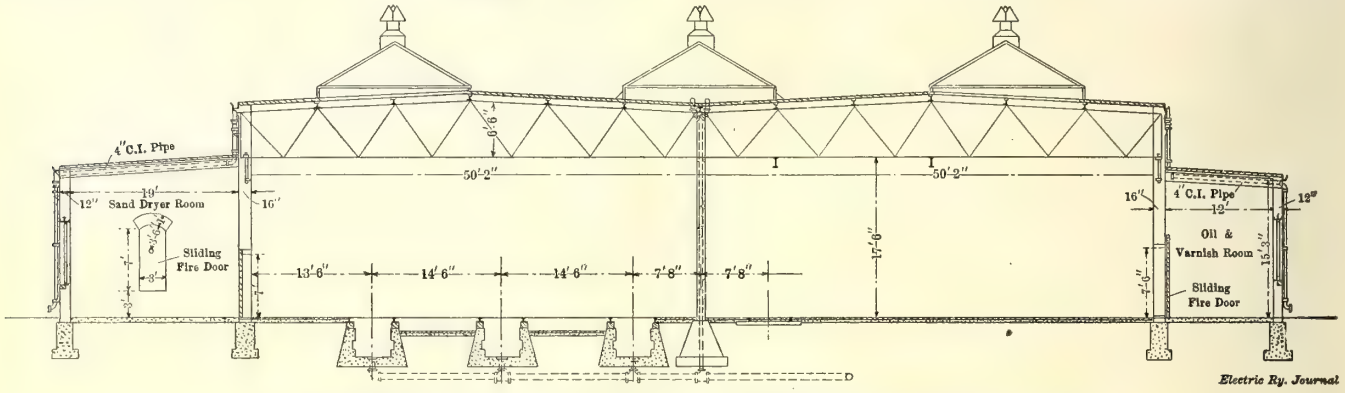


Beebe Syndicate Lines—Floor Plan and Cross Section of Standard Substation

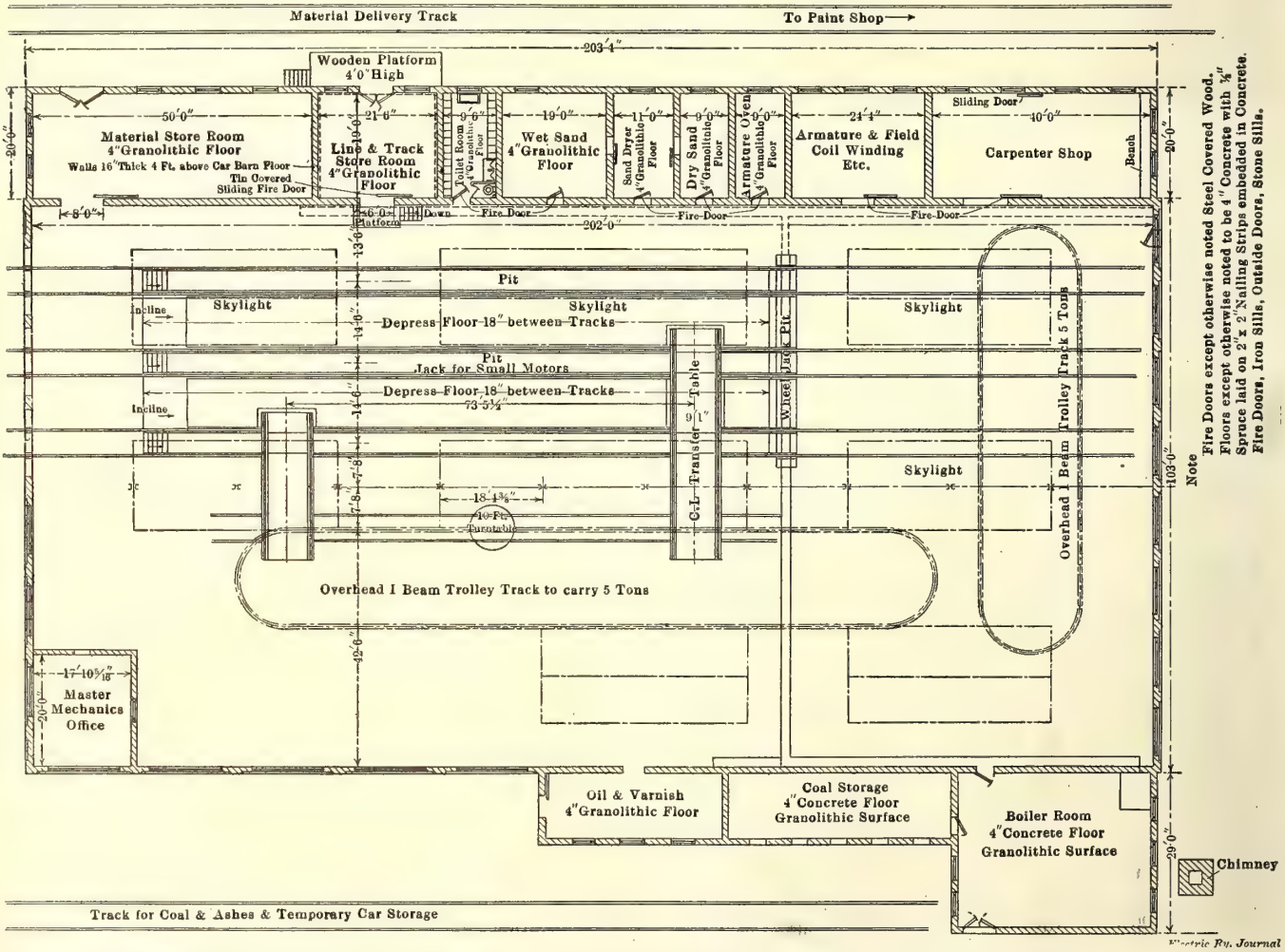
ester, Syracuse & Eastern the local cars make as good time as the steam trains, and the electric limiteds are 45 minutes faster between Auburn and Rochester.

The schedules throughout call for frequent cars. On the Auburn & Syracuse line the winter time table calls for a car every 40 minutes, and the summer card for one about every 20 minutes. The Rochester, Syracuse & Eastern runs an hourly service, including eight limiteds, between Rochester and Port Byron, and a half-hourly summer service between Lyons and Rochester. Locals are also run all the year round between Rochester and Fairport, which is eight miles distant. The Syracuse & South Bay line gives an hourly service, with extras in summer, and the Syracuse, Lake Shore & Northern has a normal 30-minute headway between Syracuse and Fulton, with necessary summer additions. All lines with heavy service are double-tracked, and hence the headway can be as short as the traffic and number of cars permit.

As this portion of Central New York contains plenty of hills and lakes, pleasure riding does not require much incentive in the way of artificially beautified parks. The only pleasure resorts owned by the associated lines are Lakeside Park, on Owasco Lake, which is within 5-cent riding distance via two Auburn lines, and "The Islands," in Oneida Lake, reached by the Syracuse & South Bay road. These places are maintained as beautiful gardens, and draw an excellent class of people, who want to enjoy boating, fishing, dancing and other sports in refined, natural surroundings. There is no admission fee or charge for dancing. The orchestra, which is engaged by the season, represents the only large outlay, except that for the care of the grounds. Owasco Lake is advertised by framed photo-



Beebe Syndicate Lines—Cross Section of New Repair Shop Near Syracuse



Beebe Syndicate Lines—Plan of New Repair Shop Near Syracuse, Building for Syracuse, Lake Shore & Northern

graphs of its principal features which are displayed in all waiting rooms and ticket offices.

The Beebe lines have not attempted to build up a heavy freight and express service. Nevertheless, the Auburn & Syracuse and the Syracuse, Lake Shore & Northern lines give a regular express service once a day. The express rates are slightly in excess of those made by the steam lines, but the electric roads get the business because of faster service. No deliveries or collections are made. Owing to the fact that the Rochester, Syracuse & Eastern Railroad is not permitted to enter Rochester with express cars, that line does no express business, although in the future it may give service from Syracuse to the city line of Rochester.



Beebe Syndicate Lines—Pavilion and Flower Beds at Owasco Lake

SHOP FACILITIES

Owing to the great amount of construction work which the Beebe Syndicate has been doing, little has been done to centralize the maintenance of the rolling stock in an up-to-date shop. At present cars are inspected approximately every four days at the repair shops of each road, but with the advent of better facilities the mileage basis will be adopted. Scheaff & Jaastad, of Boston, Mass., are the architects for a repair shop which is now being built for the Syracuse, Lake Shore & Northern Railroad, which will also do all wheel work, winding, etc., for the other companies. The building, which is being erected near Syracuse, will cover an area of approximately 200 ft. x 223 ft. The walls are of brick, the floors of concrete, the roof of steel trusses with a liberal skylight area, and the window framing of metal.

As shown in the plan, a series of rooms 30 ft. wide extend along the entire length of the building opposite the delivery track. These rooms will include car, line, track and sand storage, armature oven, winding department and carpenter shop. All of these sections, except the two sand rooms, are to be isolated from one another by solid 12-in. brick walls, but inter-communication will be established through the swinging or sliding fire doors which lead to the main portion of the building. Further fire protection will be afforded by steel rolling doors at the track entrances.



Beebe Syndicate Lines—A Summer Crowd at Owasco Lake

The truck shop will be 103 ft. wide, and will be arranged for three through tracks, with steam-heated pits and one shorter track. The floor between the pit tracks is to be depressed 18 in. for convenience in carrying on truck work. It will also be noted from the plan that there are two transfer tables and a 10-ft. turntable on the track without a pit. The wheel jack pit is also shown. The equipment in this

truck shop will include two 5-ton travelers carried on I-beams. The boiler plant, coal storage, and oil and varnish room are on the opposite side of the truck shop and near the office of the master mechanic. A paint shop, now also under construction, is an isolated building 300 ft. x 50 ft., and the painting of all cars of the system will be done therein.

EMPLOYEES

The Rochester, Syracuse & Eastern the Auburn & Syracuse, the Syracuse, Lake Shore & Northern, and the Syracuse & South Bay roads have employees' benefit associations, to each of which the syndicate has contributed special donations for reserve funds. All employees in good health and between 21 and 45 years of age are eligible for membership on payment of an initiation fee of $1 and 50 cents a month for sick and death benefits. Special assessments may be levied in 50-cent installments, but the total of such assessments must not exceed $3 a year. The members also pay $1 a year for the maintenance of club rooms. No dues are paid during periods of sickness. When a member reports ill his application for benefit must be endorsed by the head of his department and by the examining physician. Members on sick leave or in quarantine are entitled to receive $1 a day for 90 days, except that only 50 cents per diem is given during the first seven days. No payments are made for illness lasting less than seven days, and the total benefits in a year must not exceed $90. The death benefit is $100, and is paid to the proper heirs within 30 days after proof of death. It is provided in the constitution of the association that when the reserve fund exceeds a certain limit there shall be a pro rata distribution of the excess. The benefit societies are governed by boards of trustees made up of representatives elected by a majority vote of the members. Trustees serve for one year and meetings are held monthly.



Beebe Syndicate Lines—Shaded Lawn at Owasco Lake



Beebe Syndicate Lines—One of the Handsome Flower Beds at Owasco Lake

STUDY OF OPERATING EXPENSES OF MASSACHUSETTS ELECTRIC RAILWAYS

A careful study of the operating expenses of the electric railways located in the State of Massachusetts was made recently by Messrs. Stewart and Loud, senior students in electrical engineering at the Massachusetts Institute of Technology. The object of the study was to make available some figures on operating expenses which could be used as a first basis of comparison when considering the expenses of any particular road operating in the State or in territory where conditions are similar to those in Massachusetts. The results obtained are given in the tables on the opposite page.

The expenses of 62 roads were considered for the period of five years, beginning on Oct. 1, 1903, and ending Sept. 30, 1908. In choosing this period the following points were considered: It would be unwise to go back too many years, lest advances in the art or general changes in the habits of the people or methods of operation should have too large an influence. On the other hand, the study must include enough years to insure that unusual conditions in any one year will have no more than their proper effect. For example, in many cases large expenditures for repairs or reconstruction are made in one year, resulting in low cost of repairs in the years just following. The year of high expenses for this item must be included, but its effect must be distributed over several years. The five-year period appeared to be of sufficient length to give good averages.

In the annual report of the Board of Railroad Commissioners of Massachusetts giving the returns for the year ended Sept. 30, 1908, there are given the statistics of 82 electric railway companies operating in the State. Of these three had not begun operation, 16 were operated under lease by other companies and one was consolidated with a larger system soon after the beginning of that year. By omitting the statistics given for the roads not yet in operation and combining the expenses of roads operating under lease by other companies with the expenses of the company holding such lease, a total of 62 companies remained.

The car-mile was found to be the most satisfactory unit to use, but in some instances additional figures based on a mile of track are given. The term "miscellaneous expenses" is used to include matters listed in the reports under the following heads: Insurance, other general expenses, repair of miscellaneous equipment, provender and stabling, tolls for trackage rights, rents of buildings and other transportation expenses. A single heading was used to include all of these items because it was found that individual values for the separate items differed considerably from an average

value, while the general average for the group of expenses was more satisfactory.

The averages given in the tables are obtained from approximately 300 individual values. The cost for individual roads for each item listed was shown graphically for each year and then averaged for the period of five years. In obtaining the final results the five-year averages for all of the 62 roads were not always considered. For instance, the Conway Electric Street Railway was omitted in obtaining all averages because of the fact that it has an income for freight traffic more than twice that for passenger service, and thus there were introduced conditions much different from those found on any other of the roads. Again, when obtaining the cost of repairs, the roads which began operation as new roads within the five-year period have been omitted for obvious reasons.

When the five-year average of any item for a company showed values extremely high or extremely low compared with the other companies, the value of that particular company has been omitted in obtaining the final figures. As an example: One road showed an average value for "miscellaneous expenses" of 8.88 cents per car-mile while the next lower value is but 5.35 cents per car-mile, while the average is only 1.58 cents per car-mile. The road showing the extremely high value was omitted in obtaining the average of 1.58 cents.

AVERAGE OPERATING EXPENSES FOR ELECTRIC RAILWAYS IN MASSACHUSETTS.

	Cents.	Per Cent.
Operating expenses per car-mile:		
Repairs of cars	1.05	6.4
Repairs of electric equipment of cars	0.88	5.4
Repairs of electric line construction	0.305	1.8
Repairs of roadbed and track	1.12	6.8
Removing snow and ice	0.212	1.3
Cost of electric power	4.29	26.2
Wages of transportation employees	5.14	31.4
Salaries of officers and clerks, and office expenses and supplies	1.02	6.2
Legal expenses and damages for injuries	0.80	4.9
Miscellaneous expenses	1.58	9.6
Operating expenses per car-mile	16.40	100.0
Charges and deductions from income per car-mile	5.43	
Gross earnings from operation per car-mile	21.9	
Receipts from passengers per car-mile	21.2	
Cost per mile of track operated:	Dollars per annum.	
Repairs of electric line construction	82.8	
Repairs of roadbed and track	293	
Removing snow and ice	50.9	
Total operating expenses per passenger	3.81 cents.	
Total passengers carried per car-mile	4.32	

The individual items grouped under "general expenses" have not been averaged separately.

The averages of all returns to the Board of Railroad Commissioners for the period of five years are as follows:

CENTS PER CAR-MILE.

Repairs of cars	1.057
Repairs of electric equipment of cars	0.90
Repairs of electric line construction	0.353
Repairs of roadbed and track	1.121
Removing snow and ice	0.222
Cost of electric power	4.26
Wages of transportation employees	5.39
Salaries of officers and clerks and office expenses and supplies	1.124
Legal expenses and damages and injuries	.800
Miscellaneous expenses	1.704
Total	16.93

PROPOSED DANISH INTERURBAN ELECTRIC LINE

It is reported in *Elektrische Kraftbetriebe und Bahnen* that the municipalities of Aarhus and Randers, of Jutland, Denmark, are to furnish a guarantee capital of over $275,000 for the construction of an electric interurban railway between the two cities named. Aarhus is the second largest city in Denmark and Randers is also of considerable commercial importance. These places are about 38 km (23.56 miles) apart as the crow flies. The power station will also supply energy for illumination and industrial purposes. Orders have already been received for about 35,000 lamps and 2500 hp in motors.

THE OHIO ELECTRIC RAILWAY

Recent extensions have made the Ohio Electric Railway the largest system of electric railway in the world; it operates now a total of 617 miles of track. The property comprises a line extending north from Cincinnati to Toledo, passing through Dayton, Springfield, Bellefontaine, Lima and other centers and a line from Dayton west to Richmond, Dayton to Union City, Ind., from Springfield east to Columbus and Zanesville, from Lima west to Fort Wayne, Ind., and from Lima northwest to Defiance. The extent of the system is shown by the accompanying map. In addition to the interurban lines indicated the company operates the city lines in Zanesville, Newark, Hamilton, Lima and Bellefontaine and provides lighting and power service at Zanesville and West Alexandria and lighting and power service and steam heat at Lima. The local street railway and interurban properties supplement each other to a marked degree in the development of passenger business.

The present system was formed by consolidation and construction of various properties. The Ohio Electric Railway Company was incorporated in May, 1907, with $100,000 capital stock. In August, 1907, the authorized capital stock was increased to $25,000,000, divided equally between preferred and common, but only $8,000,000 common and a like amount of preferred have been issued. Following this increase in capitalization the company purchased on Sept. 1, 1907, the property of the Lima & Toledo Traction Company and leased the property of the Lima Electric Railway & Light Company and the Fort Wayne, Van Wert & Lima Traction Company. The Lima & Toledo Traction Company had been formed to build a line from Lima to Toledo, 75 miles, and continued the construction of this property through the panic of 1907 and the uncertain financial times which followed in 1908. The other two properties named operated respectively the Lima city property and the line from Lima to Fort Wayne, Ind. The Ohio Electric Railway acquired by lease at the same time the property of the Indiana, Columbus & Eastern Traction Company, which operated 259 miles of track, and purchased, on Feb. 1, 1908, the property of the Cincinnati Northern Traction Company. With the acquisition of both of the latter-named railway properties leases on several important underlying roads were secured.



Ohio Electric Railway Trade Mark

The operating mileage as stated includes the city lines in the five cities where such properties are operated by the company. At Union City, Ind., connection is made with the Indiana Union Traction Company for Muncie, Anderson and Indianapolis, Ind. At Richmond, Ind., connection is made with the Terre Haute, Indianapolis & Eastern Traction Company for Indianapolis. The financial interests identified with the Ohio Electric Railway Company also control both of these Indiana properties. One subsidiary Ohio company owns Buckeye Lake Park, which is on the largest lake in Ohio.

The nucleus of this extensive interurban system was obtained by purchase at receiver's sale of the properties centering in Columbus, formerly known as the Appleyard lines and their rehabilitation; subsequently other lines of road were acquired or built as the advantage of expansion became plain. One of the earliest electrically operated rail roads in this country is included in the system. D. J. Cable, the present counsel of the company at Lima, states that he was made attorney for the street railway line in Lima

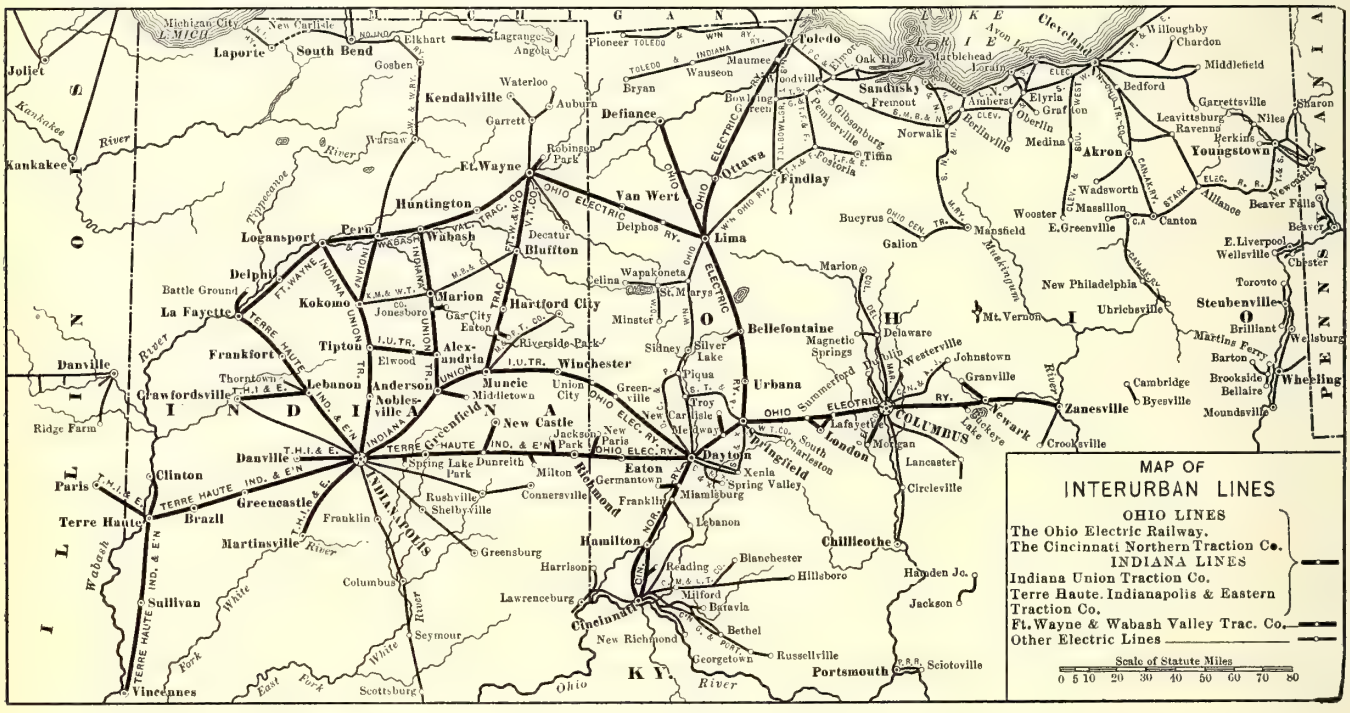
between 1883 and 1885. It was operated by horse-power at that time, but the property was reorganized and electricity was adopted as a motive power not later than 1885. The Vanderpoele overrunning trolley system was used. Mr. Cable states that the lines in Lima, Ohio, and Scranton, Pa., were equipped within a month or two of the same time.

Practically every mile of interurban road owned by the company is built on private right of way usually 50 ft. in width, but varying in places from 30 to 100 ft. Provision has been made throughout the system for the construction eventually of double tracks; at the present time the larger part of the line between Cincinnati and Dayton, where the greatest density of passenger traffic exists, is double tracked. Trains are run between these two cities on a half-hour schedule during the day. There is also a good volume of travel between Columbus and Dayton. The line of the Ohio Electric Railway between these points is 70 miles in length, while that of the competitive Cleveland, Cincinnati, Chicago & St. Louis Railway is 69 miles. A train on the electric line leaving Columbus at 3:45 p. m. arrives at Dayton at 5:55 p. m.; the steam train leaves Columbus at 3:55 and arrives at Dayton at the same hour as the electric line. The regular rates for single-trip passenger fares throughout the system are practically 2 cents a mile and commutation rates vary according to conditions in each locality.

Steam railway practice is followed generally in the operation of the interurban lines. Every officer has been in steam road service. Although methods of discipline for violations of rules by trainmen and the rule books of the company are substantially the same as those of steam roads, the motormen of interurban lines are appointed only by advancement from the city lines, where they must have had an experience of two years or more.

Included in the Ohio Electric Railway system is a steam division constituting the line between Lima and Defiance, a distance of 40 miles. This is called by the name of the system and presumably will be electrified in time. Through this steam division the Ohio Electric Railway interchanges cars with various steam lines as follows: At Defiance with the Baltimore & Ohio Railroad and Wabash; at Continental, with the New York, Chicago & St. Louis Railroad and the Toledo, St. Louis & Western Railroad; at Jones City with the Northern Ohio Railway, a subsidiary of the Lake Erie & Western Railroad; at Lima with the Cincinnati, Hamilton & Dayton Railway and through this line with other steam roads entering the same city. The company also owns and operates the old Cincinnati & North Western Railroad from Cincinnati north to College Hill and Mt. Healthy, formerly operated by steam, but now operated by heavy electric locomotives, which handle the freight cars of steam roads.

Among the improvements now being built by the Ohio Electric Railway is a new passenger terminal station at Lima, Ohio, which, including the land, will cost $90,000. This will be used jointly with the Western Ohio Railway. A similar improvement is under construction at Springfield, which will be used by the different lines entering that city, the cost of which will be about $100,000. It is also planned to erect a building in Columbus to serve as a freight and passenger station for the joint use of the lines entering that city. This structure, with the land, will cost $350,000.


MAP OF
INTERURBAN LINES
OHIO LINES
The Ohio Electric Railway.
The Cincinnati Northern Traction Co.
INDIANA LINES
Indiana Union Traction Co.
Terre Haute, Indianapolis & Eastern Traction Co.
Ft. Wayne & Wabash Valley Trac. Co.
Other Electric Lines
Scale of Statute Miles
0 5 10 20 30 40 50 60 70 80
Toledo
Cleveland
Columbus
Dayton
Cincinnati
Springfield
Lima
Defiance
Ft. Wayne
Indianapolis
Akron
Youngstown
Zanesville
Portsmouth
Chillicothe
Hamilton
Richmond
Terre Haute
Logansport
Peru
Wabash
Huntington
Marion
Bellefontaine
Urbana
Xenia
Middletown
Muncie
Anderson
Lebanon
Greencastle
Clinton
Danville
Frankfort
Delphi
Kokomo
Hartford City
Bluffton
Van Wert
Ottawa
Findlay
Fremont
Sandusky
Norwalk
Medina
Wooster
Mansfield
Galion
Bucyrus
Delaware
Marysville
Mt. Vernon
Newark
Lancaster
Circleville
Chillicothe
Hillsboro
Blanchester
Georgetown
Russellville
Sciotoville
Portsmouth
Jackson
Hamden Jc.
Lawrenceburg
Aurora
Batavia
Milford
Reading
Harrison
Greensburg
Columbus
Seymour
Scottsburg
Vincennes
Sullivan
Brazil
Martinsville
Franklin
Shelbyville
Rushville
Connersville
Greensburg
Richmond
Eaton
Germantown
Miamisburg
Springfield
Xenia
Spring Valley
Troy
Piqua
Sidney
Minster
St. Marys
Celina
Wapakoneta
Lima
Findlay
Fostoria
Tiffin
Bowling Green
Wauseon
Bryan
Waterloo
Auburn
Garrett
Kendallville
Wolcottville
Angola
Lagrange
Elkhart
South Bend
Laporte
New Carlisle
Michigan City
Joliet
Kankakee
Ridge Farm
Danville
Paris
Terre Haute
Brazil
Martinsville
Greencastle
Crawfordsville
Thorntown
Lebanon
Noblesville
Anderson
Elwood
Tipton
Alexandria
Riverside Park
Winchester
Union City
Greenville
New Carlisle
New Paris
Jackson Park
Milton
Dunreith
Spring Lake Park
Danville
Frankfort
La Fayette
Battle Ground
Delphi
Logansport
Peru
Wabash
Huntington
Decatur
Bluffton
Van Wert
Delphos
Ottawa
Findlay
Fostoria
Tiffin
Norwalk
Fremont
Sandusky
Bellevue
Clyde
Amherst
Elyria
Oberlin
Grafton
Medina
Akron
Wadsworth
Massillon
Canton
Alliance
Beaver Falls
Youngstown
Niles
Sharon
Leavittsburg
Ravenna
Garrettsville
Bedford
Middlefield
Willoughby
Chardon
Cleveland
Avon Lake
Oak Harbor
Marblehead
Lorain
Toledo
Maumee
Wauseon
Bryan
Pioneer

The Dayton, Springfield & Urbana Electric Railway Company, the Urbana, Bellefontaine & Northern Railway Company and the Springfield & Western Railway Company, Dayton to Bellefontaine, with a branch to New Carlisle.

The Columbus, London & Springfield Railway Company, Springfield to Columbus, Ohio.

The Columbus, Grove City & South Western Railway Company, Columbus to Morgans, Ohio.

The Columbus, Buckeye Lake & Newark Traction Company, consolidated with the Columbus, Newark & Zanesville Electric Railway Company and the Newark & Granville Street Railway Company and the Zanesville Railway, Light & Power Company, Columbus to Zanesville, with branches to Buckeye Lake and Granville, Ohio.

The Columbus & Lake Michigan Railroad Company (steam), Lima to Defiance, Ohio.

The Fort Wayne, Van Wert & Lima Traction Company, Lima to Fort Wayne, Ind.

The Lima Electric Railway & Light Company—Lima city lines, light, power and steam heat.

The Lima & Toledo Traction Company, Lima to Toledo, Ohio.

The Indiana, Columbus & Eastern Traction Company, which constructed the line from Bellefontaine to Lima, Ohio, thereby connecting the whole system.

The general officers of the Ohio Electric Railway are:

W. Kesley Schoepf president, Cincinnati, Ohio.
Dana Stevens, vice-president and general manager, Cincinnati, Ohio.
J. B. Foraker, Jr., vice-president, Cincinnati, Ohio.
F. A. Healy, secretary and treasurer, Cincinnati, Ohio.
M. W. Glover, auditor, Cincinnati, Ohio.

The operating officials are:

A. Benham, assistant general manager, Dayton, Ohio.
B. J. Jones, district manager, Springfield, Ohio.
F. J. Moore, superintendent, Columbus, Ohio.
B. M. Brown, superintendent, Dayton, Ohio.
N. C. Draper, superintendent, Zanesville, Ohio.
H. G. Gilpin, superintendent, Lima, Ohio.
H. F. Dicke, superintendent, Lima, Ohio.
D. A. Faut, master mechanic, Columbus, Ohio.
James Warren, master mechanic, Trenton, Ohio.
B. K. Alderman, superintendent power plants, Springfield, Ohio.

The traffic officials are: W. S. Whitney, general passenger agent, Springfield, Ohio; J. C. Forester, general freight agent, Springfield, Ohio; Gaylord Thompson, Springfield, Ohio, is chief engineer; J. M. Boyer, Columbus Ohio is claim agent.

The legal department consists of the following:

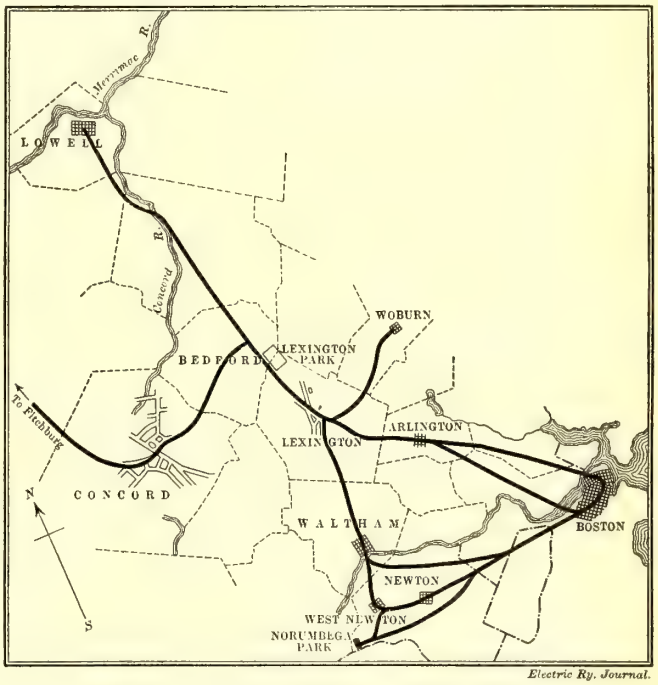
Geo. H. Warrington, counsel, Cincinnati, Ohio.
W. C. Shepherd, counsel, Hamilton, Ohio.
McMahon & McMahon, counsel, Dayton, Ohio.
Martin & Martin, counsel, Springfield, Ohio.
W. R. Pomerene, counsel, Columbus, Ohio.
J. R. Fitzgibbons, counsel, Newark, Ohio.
F. A. Durbin, counsel, Zanesville, Ohio.
D. J. Cable, counsel, Lima, Ohio.
W. B. Richie, counsel, Lima, Ohio.
Smith & Beckwith, counsel, Toledo, Ohio.
Judge Walter Olds, counsel, Fort Wayne, Ind.
F. P. Edson, tax and land agent, Van Wert, Ohio.

When the new terminal station is completed at Springfield all of the principal operating officials, including the auditor's office, will be located at that point.

It is sometimes difficult when necessary to use a car jack on unpaved sections of the line to find a firm foundation upon which to work. To avoid trouble from this condition, the motormen of the Grosse Berliner Strassenbahn have been advised to take a motor trap-door from the car for a jack base. The men are also provided with small wooden blocks to keep the door in a horizontal plane where the roadway is very uneven.

SOME FEATURES OF LEXINGTON PARK, MASSACHUSETTS

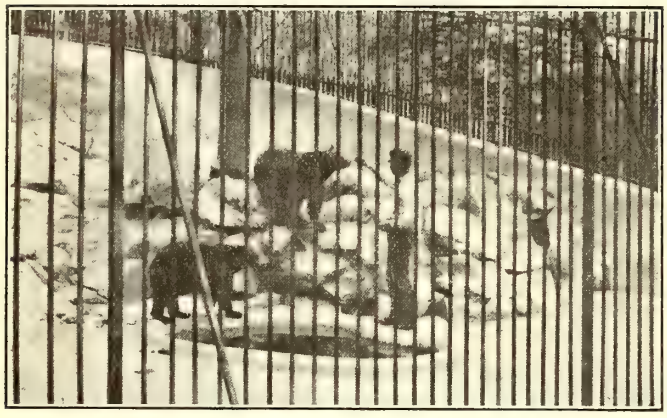
Among the newer electric railway amusement resorts which have been created in recent years in the vicinity of Boston, Lexington Park, on the lines of the Lexington & Boston Street Railway Company, occupies a distinctive place. Located in the northwest corner of one of the most historic towns of America, and accessible via the route made famous by Paul Revere in his midnight ride of April 19, 1775, the park possesses an atmosphere of its own which has been a potent force in drawing traffic and attracting patronage ever since its creation some half-dozen years ago. The Lexington and Boston lines are a part of the Boston Suburban Electric Companies' organization, a system serving about 22 cities and towns lying to the west of Boston proper, and noted throughout the East as a property catering largely to residential and pleasure travel. In general, the lines of these companies traverse a zone extending from about 7 miles west of Boston to points about 20 miles from the center of the city, delivering traffic to and receiving it from the Boston Elevated Railway Company at the western termini of the latter system. Norumbega Park, located on the lines of the Suburban companies at Auburndale, on the Charles River, is operated by the management which maintains Lexington Park, and in general the policy of avoiding the White City or miniature World's Fair idea prevails, the natural attractions of the park being relied upon in each case to furnish a suitable background for the pleasures offered to the public.



Map of Lexington & Boston Street Railway

In the accompanying map the relative locations of Lexington and Norumbega parks are shown, with the main lines of service by which the tributary territory is brought in touch with each resort. Through cars are operated from the center of the Boston surface car system to Norumbega Park and from the Sullivan Square elevated railway terminal to Lexington Park, round trip tickets, including admission to the park, being sold by the conductors at the beginning of the Boston Suburban Electric lines at a net rate of 15 cents each. Single admission tickets to each park are sold at 10 cents each. Each park is therefore accessible to any resident of Boston for a total round trip rate of 25 cents, including admission to the grounds and

the use of many free attractions provided in each case. The distance from the city is roughly the same in each case, Norumbega being 10 miles west of Park Street subway station, at the end of the Commonwealth Avenue boulevard, and Lexington Park being about 12 miles from town. Aside from its historic surroundings, Lexington Park is several times larger in area than Norumbega, and is more



Lexington Park—Bear Pit

of a woodland resort, in the absence of the boating facilities which distinguish the latter playground.

Lexington Park is in immediate touch with Lowell, Chelmsford, Concord, Bedford, Woburn, Cambridge, Waltham and Arlington, while frequent service connecting with it is maintained throughout the year from the Newtons, Watertown and Winchester. The park is located on the through lines between Boston and Lowell, and Boston and Concord, single-track service being provided, with automatic block signal control of car movements. At the park a siding is provided, with a capacity of about 20 cars, no other special trackwork being in service. In general, a 15-minute service is maintained to and from the park in each direction, although extra cars are operated as sections of the regular movements as traffic requirements dictate. The season begins about May 30 and closes Sept. 12.

The area of Lexington Park is about 48 acres, approximately half the tract being woodland and half occupied by concessions of different kinds, the whole being under the management of J. T. Benson and operated by the Norumbega Park Company. The entire park is surrounded by a wire fence 8 ft. high. At the main entrance are located a ticket and office building, two entering turnstiles with pass meters, and two exit turnstiles. Close at hand is an automobile and carriage entrance to a storage park, where machines are checked and looked after by an attendant at a price of 50 cents each, including admission of the party to the park. The entrance turnstiles are set beneath a canopy to facilitate comfortable passage in warm or rainy weather. An extra gate is provided for employees, without a turnstile. Parcel checking facilities are available inside the office building, with telephone pay station service connected with the Bell lines in the Boston & Suburban system. The office contains a ticket safe, manager's desk, accounting table and correspondence file, in addition to the parcel division. In addition to the Bell service mentioned above, a private telephone line is installed for purely company business. A ticket chopper is provided at the main entrance, inside the grounds. The attendants are neatly uniformed in brown. About 37 persons are employed on the property, including waiters and girls in charge of the various concessions.

The extent of the grounds enables large groups of patrons to scatter through the park without personal contact or crowding, and as many as 11 different church picnics have been handled in a single day without mutual interference. The attractions of the park include an open-air theater, zoological garden, base ball field, observatory, restaurant and casino, dancing pavilion, swings, merry-go-round, toboggan slide, picnic tables, music, women's building, "country store," electric arcade, popcorn store, soda fountain, lawns, walks and groves. The open-air theater is



Lexington Park—Open-Air Casino

of the rustic type and seats about 1540 persons. Several rows of free rear seats are provided in the afternoons, the charges elsewhere in the auditorium varying from 5 cents to a maximum of 25 cents for an orchestra seat at the evening performance. The vaudeville performances are given under the personal direction of the park manager, and a high standard is maintained. During the four years' incumbency of the present management not an arrest has been necessary. A single police officer is sufficient to handle the crowds.

The theater is equipped with a stage 45 ft. long by 35 ft. wide, property and dressing rooms, scenery storage space, spot light apparatus and moving picture machine. Above the center of the stage and slightly forward, a group of five 100-watt tungsten lamps is installed in a single globe, while the footlights consist of 30 incandescents of 16 candle-power each. Parallel to the footlights and above the stage are installed 30 incandescents, and at the wings 15 incandescents are installed in a vertical row on each side. Two rows of 20 incandescents each are installed at the sides of the stage, passing from the front to the rear, so that the total stage illumination, exclusive of the spot light, consists of the tungsten group and 130 incandescents. In a room at the side, knife switches are provided to cut each circuit in and out, the lamps in general being operated five in series on the railway power circuits. All the electrical energy for the park service is supplied by the Lexington power station of the railway company, which is located on a site adjoining a division car house 2½ miles to the eastward. There are 48 direct-current enclosed arc lights and 3684 incandescents on the park. The theater gives two performances daily, the afternoon show beginning at 3:30 and lasting 1½ hours, and the evening show beginning at 8:05 and lasting 1¾ hours. The park itself is open from 10 a. m. to 10:30 p. m. At 10:20 p. m. a large gong is rung as a signal for all patrons to leave the park. A night watchman and the police officer then make a tour of the grounds, starting from the end most distant from the main entrance,



Lexington Park—Souvenir Booth

and warning all persons to leave the property. At 10:25 p. m. the lights in the park are cut off for three minutes—a proceeding which tends to hasten all tardy patrons to the gate with maximum speed as soon as the light returns.

The zoological garden contains one of the best collections of herbivorous animals in New England and covers a total area of 4 acres. Mr. Benson has succeeded in increasing the buffalo herd from two to six specimens during the past five years, the animals being full-blooded and descendants from those of the famous Corbin preserve in New Hampshire. Three axis deer were purchased from India on account of their superior attractiveness over the common varieties. There are five Virginia deer, three elk, two turkey



Lexington Park—Stage of Open-Air Theater

buzzards, 33 parrots, two Siberian camels, two zebu and two black bears in the zoo, as well as other animals. The bears occupy a den 60 ft. long by 40 ft. wide, with natural rock backgrounds and two individual dens with doors controlled from without, the entire premises being drained to a common outlet. A concrete bottom 6 in. thick is installed, the base below being cinders 2 in. deep. A pool 8 ft. deep is provided in the den, and each individual den, which runs 11 ft. into the rocks, is equipped with a hole at the rear, through which a hose stream can be turned when it is desired to bring the animals out into the open or for cleaning. An iron fence with inturned pickets, 18 ft. high, surrounds the den, and the total cost of the bear quarters was about $2,400. The grass which is fed to the different animals is cut upon the grounds, usually upon the base ball field. The property also owns four cows for the milk supply of the restaurant, and a hennery of 359 fowls for the egg supply. The animals at Norumbega Park are also under the personal charge of Mr. Benson, who takes them all to Havana, Cuba, in the winter season, where they are exhibited. The maintenance cost of the animals at Lexington Park is $140 per week, total.

The restaurant has accommodations for about 300 persons; the cooking is done upon the grounds, and the milk and water, egg and vegetable supplies are all taken from the premises, the latter being purchased from an adjoining farm, however. An orchestra stand is provided outside the restaurant, and an out-of-door platform, surrounded by greenery is equipped with tables for the use of patrons. The café is run upon both the American and the European plans, a country steak and vegetable dinner being served at practically cost to automobilists and others, at $1 per plate, while the a-la-carte service is run at popular prices. The restaurant is operated mainly as a convenience to park patrons, and not as a money-making establishment, the manager's experience indicating that high prices in the café discourage attendance at the park and consequent poor

patronage of the other concessions. The soda fountain is run upon a home-made basis, with water carbonated on the premises, and all ice creams are made on the property. A number of private dining rooms have recently been provided, and features of each of these are colored lighting and picture aquaria designed by the park manager. It consists essentially of a thin aquarium containing gold fish, and is hung upon the wall in each private dining compartment to form a living picture to entertain the diner while his order is being filled.

Other features of this park are the free base ball field, with 2 acres of cleared space, bleachers, running track, space for tug-of-war, horse shows and other field sports; a monkey house, reached only through an electric arcade equipped with a large number of penny-in-the-slot machines; free toboggan slide of maple boards, 80 ft. long and waxed; free kitchen, stove and firewood gathered on the grounds for the use of picnic parties; a merry-go-round, driven by a 5-hp motor; women's pavilion, with rest room,



Lexington Park—Band Stand and Refreshment Tables on Porch of Casino

matron, reclining chairs, two cribs, modern lavatory conveniences; a free library for use by park patrons upon payment of a returnable deposit of 10 cents per volume; a dancing pavilion, with an outside circumference of 365 ft., with central bandstand and illumination by festooned incandescent lamps hung from the trees, and the observatory. The latter is built on top of the main storage water tank of the park, which has a capacity of 20,000 gal. A straight stairway renders the ascent of the tank easy, and the top is about 400 ft. above sea level. Views of distant mountains in New Hampshire are obtained in clear weather. The water supply is pumped into this tank from a spring 20 ft. deep by a 3-hp electric pump. A small motor is also used to operate a corn popper in one of the concessions, gasoline burners being used for heating. At the so-called "country store" post cards are sold of park scenes, and four collections of mail are made daily from this point. The management has made a collection of representative extracts from the post cards mailed here as a test of public sentiment toward the park and its attractions, the names, of course, being omitted. It feels that in this way the real sentiments of its patrons can be ascertained, and the character of comments has been distinctly favorable to date. In the present year over 182,000 post cards of the park have been sold on the grounds.

All the lights in the park are controlled by a single cut-off switch located in a box near the entrance of the grounds. In general, the lighting is by circuits of five lamps each in series. There are three electric fountains on the green near the dancing pavilion, and the colors of these are altered once a week. The maximum number of patrons who have entered the park in a single day is 11,000. The present year's patronage is estimated at about 200,000. The park is advertised extensively on the folders of the Boston Suburban Electric Companies; by the "follow-the-flag" idea used on the trolleys of the line, a red flag with a center "L" being used in place of the blue "N" of the Norumbega lines; and in the newspapers and on car dashers and interior signs. This year there have been 383 large picnics at the park. The property of the company is under the general management of Carl A. Sylvester, general manager of the Boston Suburban Electric Companies, who succeeded Matthew C. Brush as general manager of the property on Oct. 1.

HEARING ON VALUATION OF CONEY ISLAND & BROOKLYN RAILROAD

The hearing before the New York Public Service Commission, First District, in the case involving valuation of the Coney Island & Brooklyn Railroad, was resumed on Sept. 27.

Bion J. Arnold was recalled as a witness and presented a list of corrections of the transcript of his testimony at the preceding hearing. The cross-examination of Mr. Arnold was then begun by W. N. Dykman, of counsel for the Coney Island & Brooklyn Railroad.

During this part of the proceedings Mr. Arnold testified that he was first employed by the commission about a year and a half ago to make an exhaustive study of the New York subway and report upon methods of increasing its capacity, and such other changes as he saw fit to recommend. In his investigation of the subway situation, so far as it related to the question of the 5-cent fare, he computed the return upon the investment in the road as nearly as he could get at it, without allowance for depreciation, obsolescence or inadequacy, and not upon the capitalization of the company. He had pointed out very carefully in his report that in financing any future subway an allowance should be made to provide for depreciation.

The next work taken up by Mr. Arnold for the commission was that of director of appraisals. The first work of this character upon which Mr. Arnold entered for the commission was the appraisal of the Metropolitan Street Railway System, which was begun about July, 1908, and has not yet been completed. He had also been employed to appraise the property of the Brooklyn Rapid Transit Company, but had not yet finished this work. For the present the work on these appraisals had practically been stopped, pending the preparation of certain information by the Metropolitan Street Railway and the Brooklyn Rapid Transit Company. The examination of the properties of the Brooklyn Rapid Transit Company was comparable to the investigation of the Coney Island & Brooklyn road so far as principle was concerned, but not so far as values were concerned.

The general instructions given by the commission were to complete the appraisals as rapidly as possible and with as little expense as possible, and that policy had been fol-

lowed. Mr. Arnold did not wish to state that he was hampered by lack of funds in the work. The commission did not attempt to define the amounts to which the expense was to be limited. About two months were required to arrive at the first figures which were submitted regarding the cost to reproduce the physical property. From the records it appeared that 1068 men days, or the equivalent of 1068 men working one day, were put upon the work from December, 1908, up to the time when the appraisal on the cost to reproduce the physical property new was completed. Then, if Mr. Arnold's recollection was correct, the commission thought that further information might be necessary regarding the present value of the property. The work on this latter feature of the appraisal had continued, off and on, up to the time the hearings began in September. The valuations of the Brooklyn Rapid Transit Company, the Metropolitan system and the Third Avenue Railroad progressed at the same time.

In the work of ascertaining the reproduction cost of the physical property, the witness would have proceeded in the same way had no limit of time or money been fixed by the commission. He stated,however, as to the cycle of maintenance and 50 per cent depreciation theory, that this was the first time that he had used this theory or had known of its use; and that its use had saved some time and expense. [This theory is described in the abstract of the testimony published in the issue of Sept. 25, 1909.—Eds.] He had discussed principles with different members of the commission, but had never received any instructions to eliminate or to include any item. He was left entirely to his own judgment, so far as his reports and valuations were concerned, and the commission would approve or disapprove of his decisions later. The production of maximum or minimum values to cover development expenses and working capital was agreed to as a possible way of getting at the truth. Great difficulty had been experienced in securing information on that subject from the engineering representatives of the Coney Island & Brooklyn Railroad. Mr. Arnold's intention was not to determine these values, but to leave them to the commission to fix.

Answering questions as to whether he could take the maximum and minimum values and ascertain figures which he could consider correct values and the time that would be required, the witness said he supposed he could, but would not state what time would be needed. It depended upon what information could be secured from the experts of the railroad company bearing upon the subject. He had hoped the company would submit information which would enable him, as an engineer representing the commission, to arrive at some fair conclusion. He did not wish to be understood as attempting to keep the figures either down or up; he was open for information and hoped the engineers of the company would produce it.

No figures of the physical value of the railroad were submitted to the commission prior to the beginning of the case. Approximate figures were given once or twice, but it was understood that no final figures had ever been given until a few days ago. The witness had discussed the depreciation figures with Commissioner Bassett, so as to give him some idea as to the present value of the property. Certain items included under development expenses and working capital were also discussed with the commissioner.

Mr. Dykman asked what the cost had been of making the examination of the property. Commissioner Bassett said he did not at present see the relevancy of that information in this inquiry, and objected to it. Mr. Dykman therefore stated that his object was to show that the company was not financially able to duplicate the work. On that account he thought the question proper. Commissioner Bassett then ruled that the witness need not answer the question; that he was under cross-examination, and so far as he was an expert witness, he was not obliged to give testimony on new matters that were not proper under cross-examination. Mr. Arnold then stated that the force on this work had varied from 10 to 50, of whom only two had been in his employ, the remaining men being in the employ of the commission, under the direction of himself or his assistants, and that these men placed tentative values on the property, which had been reviewed by him or his assistants.

WORK OF EMPLOYEES OF THE COMMISSION.

Mr. Dykman then asked for information regarding the use of employees of the commission under the direction of Mr. Arnold's assistants in the work of appraisal, and said he could not tell where they ended and Mr. Arnold began, or where Mr. Arnold ended and they began. He would therefore take exceptions to the ruling of Commissioner Bassett.

Commissioner Bassett then said that the commission was having valuations placed before the company because the law required that a hearing be given to the company. The commission was giving the company the fullest opportunity to inquire by cross-examination as to the nature and methods of the valuation. It was not a case that was made entirely by the complainant on one side and the company on the other. If that had been the fact, the commission would not have gone into the matter of valuation or, later, into the matter of operating statistics. The commission was placing the entire matter before the company for objection and sifting.

Mr. Dykman said the trouble was that the commissioner was ruling upon his own objection. He therefore took exception to the objection. Commissioner Bassett replied that it seemed to him that there was nothing especial of which to complain so long as the commission placed before the company the entire matter of the valuation and method of doing the work.

Mr. Dykman said the commissioner was withholding by this ruling something which it seemed to him was very important. The commission was acting as prosecutor and as judge, its employees were witnesses and did not come on the stand for cross-examination, but somebody who had collated their work and changed some of it went on the stand to give opinion evidence. He could not find the men who had placed the value or that their value had not been changed. Here was a witness who was employed by the commission, directed by the commission, witness, prosecutor, judge, all combined in one person, and the company was precluded from finding out what part the employees of the commission took in valuing the property. Commissioner Bassett said that Mr. Dykman should be given every reasonable opportunity the very fullest opportunity, to make inquiries from those who worked under Mr. Arnold. It was not necessary to separate the work which had been done by men in the employ of the commission and by the assistants of Mr. Arnold, because they were all working under Mr. Arnold for the purpose of getting a result. Mr. Dykman stated that, as he viewed it, the men were not under Mr. Arnold at all.

Mr. Arnold then gave a list of 50 employees of the commission who were engaged in the work. All of the men did not make valuations. Some were engaged in drawing

off quantities, examination of property and plants and taking measurements, which were handed to Mr. Arnold's assistants.

Mr. Arnold explained that the property owners' consents included in his allowance of 15 per cent in previous testimony did not include frontage consents. He stated that the cost of certain improvements made since Feb. 1, 1909, to date should be added to give reproduction cost as of present date.

Mr. Dykman said that from 1861 to 1909 the average rate of dividend paid by the company was 5.7 per cent, and the last dividend was paid before the stock was increased from $2,000,000 to $3,000,000, so that no dividend had ever been paid on the stock represented by the last $1,000,000 of capital, for which 100 cents on the dollar, cash, was paid. The subscribers for the last $1,000,000 of capital stock were far from any return now, according to the order of the commission. Mr. Arnold said that, accepting those conditions, he would not regard 5.7 per cent as an excessive return.

An adjournment was then taken to Oct. 8.

HEARING ON OCT. 8

The complaint of Jonas Monheimer against the Coney Island & Brooklyn Railroad for a 5-cent fare to Coney Island on week days was taken up by Commissioner Bassett at the hearing on Oct. 8. George H. Backus represented the commission as counsel and W. N. Dykman represented the Coney Island & Brooklyn Railroad in a similar capacity. Frank R. Ford, of Ford, Bacon & Davis, engineers, and John A. Thake, assistant secretary and cashier, were also in attendance in the interest of the company, but only Mr. Thake was called to testify at this hearing.

Mr. Backus, for the commission, asked permission to introduce as evidence the complete pleadings and testimony in the previous case against the company before the commission regarding the 10-cent fare charged on Saturdays, Sundays and holidays, which charge the commission held to be justifiable. Commissioner Bassett said his idea was to keep the two cases entirely separate, and as he was unable to see any advantage to be gained from the introduction of the full testimony in the former case it was not admitted. He recommended that Mr. Backus pick out such material from the former case as might be applicable to the one in hand and file such transcript at the next hearing.

George P. Watkins, of the statistical department of the commission, was then called as a witness to identify certain reports of the company, and in so doing passed on transcripts of monthly reports made to the directors of the Coney Island & Brooklyn Railroad by the officers which had been supplied to the commission as a matter of courtesy and to minimize the work of the employees of the commission in preparing reports from the company's books. Mr. Backus sought to have these reports accepted as evidence, but Mr. Dykman protested against this, as the reports are confidential statements, which go into details for the benefit of the directors, and contain material that competitors of the company might use to their advantage if the reports were made public. A conference was then held between Mr. Dykman, Mr. Backus and Mr. Bassett, and it was finally decided that Mr. Watkins, for the commission, should be permitted to take from the report such figures as he deemed necessary, these figures to be submitted to the company for certification and then offered as evidence at the next hearing.

Mr. Thake was asked by Mr. Backus, for the commission, to compile a record of the numbers of second fares from 1901 to date. Mr. Backus also desired a record of passengers who board the cars in the second fare zone, as a means of showing how many residents of Coney Island are affected by the second fare, but Mr. Thake said that the identification slips issued to such passengers are treated as transfers and destroyed, and that no record of them is kept. At the request of Mr. Backus, Mr. Thake agreed to prepare a summary of the boundaries fixed upon from time to time for the collection of the second fare.

The hearing was then adjourned to Oct. 14.

JOINT PASSENGER TARIFF OF THE CENTRAL ELECTRIC TRAFFIC ASSOCIATION

The Central Electric Traffic Association has just completed the compilation of a new joint passenger tariff, No. 3, giving the one-way and round-trip selling and basing fares. The tariff was issued Oct. 14, 1909, and is effective for interstate traffic Nov. 24, 1909; intrastate traffic in Indiana, Oct. 24, 1909, and intrastate traffic in Ohio, Oct. 24, 1909. This is the first tariff of its kind to be filed with the Interstate Commerce Commission, and is considerably larger than any of the previous tariffs issued by the electric lines. It is also larger than the tariffs issued by the steam roads in the Central States. The tariff contains full data and instructions to enable any agent to properly advise a prospective passenger the rate and routing to any station reached by the electric lines within the territory of the Central Electric Traffic Association. The mileage of the various lines which are parties to the tariff aggregates 2713 miles.

The tariff contains 32 headline points and quotes both single and round-trip rates to and from 450 stations to each headline point, making 900 computations or rates to each headline point, or 28,800 computations or rates in the tariff. There are an average of five routings to each station, and this necessitated five times 28,800, or 144,000 computations in compiling the rates used in the tariff in order to ascertain the lowest combination which would establish the through rates, not including the trial computations of rates via routes which were found to be impracticable.

As this tariff was not preceded by another, the compilers were compelled to build up the entire compilation by using the local tariffs of the 30 electric lines that are represented therein. After this work was done the several sheets were run off in duplicate and copies sent to the traffic departments of each road for checking and approval. At the monthly meetings of the Central Electric Traffic Association the representatives of the various lines called attention to any corrections or new rates and routes which were discovered or were covered by local or joint traffic arrangements not shown in local tariffs. After all headline points were similarly treated the checked proof sheets were rewritten on the typewriter and printer's copy prepared. The printer's proofs were checked and revised three times.

The tariff contains a table of contents, an alphabetical list of headline points, list of the participating carriers, showing the number of powers of attorney and concurrences, the general rules and regulations, an alphabetical list of stations, showing roads on which located, and the tariff of rates. The printed pamphlet contains 296 pages, two columns to the page, and weighs 2 lb. A total of 1100 copies of the tariff was printed by an Indianapolis printing

company on a monotype press. The entire type will be kept standing for printing future issues made necessary by the opening of new lines or by the preparation of supplements.

The tariff was compiled in the office of the Central Electric Traffic Association, 306 Traction Terminal Building, Indianapolis, Ind., by the chairman, A. L. Neereamer, and J. T. Brittson, secretary.

VISIT OF PACIFIC COAST TRAIN PARTY TO SALT LAKE CITY AND BUTTE

The party which is making the tour of the Far West by special train under the auspices of the officers of the American Street & Interurban Railway Association left Denver at 2 a. m., Oct. 9. Several persons joined the party at Denver, including Thomas N. McCarter, of Newark, N. J., and Mrs. McCarter; E. C. Foster, of New Orleans, and Mrs. Foster, and R. T. Laffin, of Seattle.

Salt Lake City was reached about 1 p. m., Sunday, Oct. 10. The party was met at the railroad station by the following officials of the Utah Light & Railway Company: L. L. Dagron, chief engineer; G. S. Gannett, treasurer; O. A. Honnold, electrical engineer; G. W. Manning, assistant superintendent; B. W. Mendenhall, commercial agent, and W. C. Baker, chief clerk. Luncheon was served at the Commercial Club, and the party then boarded a steam train which took them to Saltair, on the Great Salt Lake, 18 miles distant. Several members of the party took a swim in the lake and enjoyed the novel sensation of bathing in water in which they could not sink. Following the trip to the Great Salt Lake, the party was escorted on a sightseeing trip around the city in three special cars. Several points of interest were inspected, including the handsome new car house of the Utah Light & Railway Company. The party re-embarked on the special train about 6 o'clock in the evening and proceeded northward to Butte, Mont., which was the next stop.

After leaving Salt Lake City the party sent a telegram to the officials of the Utah Light & Railway Company, thanking them for the many courtesies extended during the brief visit in Salt Lake City, and complimenting them on the excellence of the street railway system under their charge.

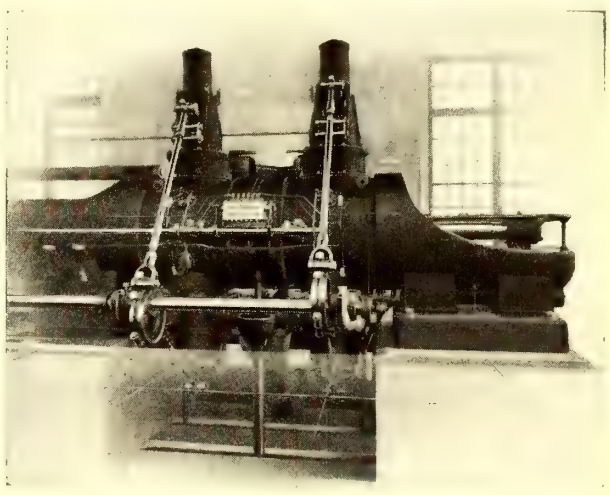
The train reached Butte, Mont., at 1:30 p. m. on Monday, Oct. 11. The party was met at the station by J. R. Wharton, manager of the Butte Electric Railway Company and other officials of the company. Electric cars were waiting to take the party to a copper mine in the vicinity of Butte, owned by Senator Clark. On reaching the entrance to the mine the party was transported 2100 ft. under ground to one of the galleries in the mine, where an elaborate luncheon was served. The Mayor of Butte presided at the luncheon, during the course of which a number of humorous telegrams purporting to come from distinguished persons, were read. After luncheon the party was escorted through the mine, and later was transported by electric cars to the railroad station. All of the ladies in the party were presented with bunches of violets with the compliments of the officers of the Butte Electric Railway Company. After leaving Butte, about midnight, a telegram of thanks was dispatched to the officers of the Butte Electric Railway Company for the many courtesies extended to the party during its stop in Butte. The experience in that city was most unique and enjoyable.

The party reached Calgary, Alta., on its way westward on Oct. 12.

A NEW DOUBLE-ACTING FOUR-CYCLE GAS ENGINE

Several years ago the C. & G. Cooper Company, Mt. Vernon, Ohio, began a careful investigation of the gas-engine situation in this country and in Europe, and after examining existing designs, finally decided to design its own gas engine, and unite, if possible, all the best engineering features which modern practice had proved to be sound and desirable. To this end the company retained Martin A. Thiel, a well-known German gas-engine expert and designer, to supervise this important work. Little publicity has been given the extensive gas-engine development carried on by the company, pending endurance tests in service of the new machines. These tests have thoroughly demonstrated the success of the design, which, it is believed, will be a valuable acquisition to the gas-engine field. Its regulation, running qualities and general reliability have been proved to be equal to that of a steam engine of the highest grade, while the thermal efficiency is, of course, far superior to that of any steam engine.

The new Cooper engine is a double-acting, four-stroke cycle machine, working on the constant mixture principle



Valve Mechanism of Gas Engine

from the center of the engine so that the pistons travel an equal distance and with equal resistance to the respective intake valves of the cylinders. The mixtures in the various cylinders, therefore, must be identical in volume and composition under all conditions of load. Upon a similar principle the cooling water is introduced into the piston rods from a central point and passes through each piston and piston rod, without reversing the flow, to the outlets at the forward and rear ends of the engine. The overhanging counterbalanced type of crank has been adopted.

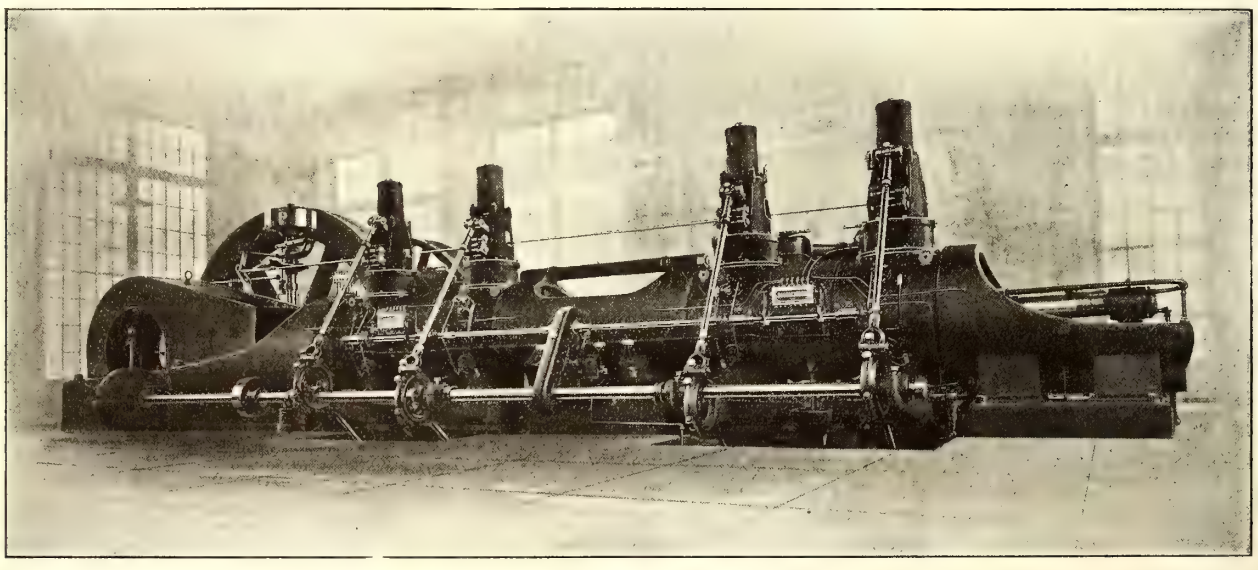
The bed is of the heavy-duty rolling-mill type, having an open top, permitting access to the crosshead, and easy removal of the cylinder head and piston through the bed. The bed is rigidly bolted to the foundation, while the distance pieces and tail-rod supports, which are of cylindrical construction, rest on base plates in machined ways. The main bearing is of special design. The lower shell rests in a bored seat, and may be easily removed after relieving it of the weight of the shaft. This shell is babbitted and cored for water cooling. The side gibs are provided with wedge adjustment on either side and are lined with babbitt. The cap is babbitted at the ends only, and is used to clamp the quarter boxes and the bottom shell into place. In addition there is a transverse rib on either side of the cap extending the length of the bearing, which provides a retaining wall for the oil and compels it to enter the bear-

ing above the side gibs. The crosshead is fitted with an improved flat shoe, the top face of which is bored to allow the crosshead pin to align itself with the crankpin should the latter be thrown out of the horizontal plane by shaft deflection.

All pistons and piston rods are similar, and are interchangeable. The pistons contain no ribs and float on hollow rods between the main, intermediate and supplementary crossheads. The rods are drilled for water circulation and are forced into the pistons. The cylinder is a one-piece barrel, with inlet and exhaust chambers bolted to it so as to remove all cooling strains in the castings. The water jacket is closed at its center by a belt in three segments. The cylinders are supported only at the ends by the main bed and guide castings, and as the piston and rods are carried by their respective crossheads, the cylinder barrels are permitted to expand and contract with freedom. The exhaust piping is of flexible construction throughout, insuring free movement for expansion and contraction due to changes of temperature.

The ignition is of the "make and break" mechanically operated type, and two or more igniters are operated simultaneously at each end of each cylinder. This system is connected with a safety stop, which automatically breaks the electric circuit when the engine speed exceeds 10 per cent above normal or the cooling water supply fails. The engine is regulated by varying the quantity of a constant mixture controlled by the governor through an automatic relay. The lay shaft is driven by spur and bevel gears and is supported by bearings on the engine bed and baseplates, thus avoiding the common practice of supporting it on bearings from the cylinders, where these bearings are subjected to the changes due to expansion and contraction. This plan has the additional advantage of permitting the removal of the cylinders without disturbing the lay shaft bearings. The inlet and exhaust valves at either end of each cylinder are actuated by a single eccentric on the lay shaft. The gas exhaust valve is of the separate cage, water-cooled type. The gas regulator is of a special oil-sealed, inclosed construction with balanced valve.

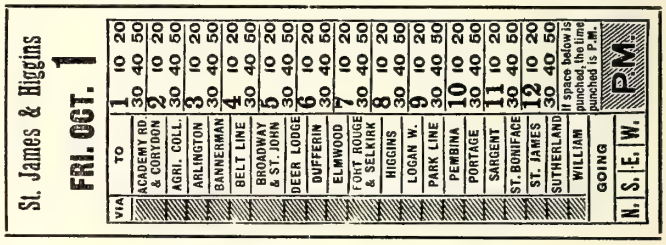
Aside from the remarkable combination in this engine of features essential to the best results in a gas engine, the construction details common to all reciprocating engines, such as bearings, connecting rods, etc., have been worked out with unusual painstaking and skill. The design and performance of the engine are stated to have been regarded as very remarkable by many prominent gas engineers who have inspected it. It will be built in single-tandem and double-tandem units of from 150-hp to 3000-hp capacity.



General View of Gas Engine

NEW TRANSFERS AT WINNIPEG

In order to lessen the losses which it has suffered for some time through the misuse of transfers by its patrons, the Winnipeg (Man.) Electric Company has adopted a new transfer, 5½ in. long by 2 in. wide, which contains the name of the issuing line and the date of the issue at the top. The lines on which the slip will be honored are printed on the left-hand side of the transfer and the time by hours divided into periods of 10 minutes is printed on the right-hand side. At the bottom on the left-hand side is the direction, north, south, east or west. At the bottom on the right-hand side is a shaded space to indicate p. m. The transfers are punched for the hour and the nearest 10 minutes, the direction, and p. m. if the slip is issued after 12 m. No a. m. indication is necessary. If the p. m. space is not punched the conductor understands that the slip was issued in the morning. The color of the tickets of one line differs from all the others. It is proposed to change the colors frequently so that passengers will never be certain what color slip they will receive, thus making them cautious about trying to foist old transfers upon conductors. One of the transfer slips is reproduced herewith.



New Transfer Used in Winnipeg

The monthly report of passenger train performance on the New York steam railroads for August, 1909, shows that 65,312 trains were operated, of which 87 per cent were on time at division terminals. In August, 1908, there were operated 62,397 trains, of which 78 per cent were on time.

News of Electric Railways

Cleveland Traction Situation

The week ended Oct. 9 was marked by a series of rapidly transpiring events in traction circles at Cleveland, but at its close several obstacles still remained in the way of a final settlement. Two matters yet to be arranged are new terms with the interurban railways and the modification of the contract with East Cleveland.

In connection with the letter of Judge Tayler, setting forth the conditions upon which he would act as arbitrator of the questions of valuation and fare, made public on Oct. 4, action was taken at once by both the city and the Cleveland Railway which resulted in the acceptance of his terms by both sides. Directors of the company met that afternoon and framed a letter to the City Council. Among other things the company said:

"We acknowledge receipt of your communication of Oct. 2.

"We have received also a letter from Judge Tayler setting forth the conditions under which he is willing to act as arbitrator, and we understand that a duplicate of his letter was sent at the same time to you. We, on our part, will gladly meet the Judge's conditions, and proceed immediately upon the lines indicated by him.

"Besides valuation and rate of fare, the questions undetermined between us, and which Judge Tayler says must be settled before he can begin the work of fixing the value of the property are, as we understand them:

"1. The East Cleveland situation. As to this, we are to meet the Council of East Cleveland on Oct. 5.

"2. The interurban question. We have arranged a meeting with representatives of the interurban companies on Oct. 5.

"3. The 'invalidity clause.' This we have all agreed to leave to the determination of Judge Tayler, the city solicitor, Mr. Tolles and Judge Lawrence.

"4. The provision with reference to the company having a right to continue to serve the city upon the same terms as any intending purchaser who may make a bid after the lapse of eight years from the taking effect of the ordinance. We accept your suggestion that this also be referred to Judge Tayler, Mr. Tolles, Judge Lawrence and the city solicitor.

"We desire to urge upon you and upon Judge Tayler that if the gentlemen named are unable to agree upon the phraseology of the provisions to be written by them, or if you and we are unable to agree as to provisions covering the East Cleveland situation and the interurban question, or if any other differences arise between us in the preparation of the ordinance, every such difference be submitted to Judge Tayler for final determination."

This letter was referred to the street railway committee of the City Council at a session held that evening and a reply was framed to the communication from Judge Tayler, which was as follows:

"The Council of Cleveland has received your letter of Oct. 4 and accepts at once the conditions interposed by you upon your willingness to act as an arbitrator.

"The Council is ready now to proceed, in any order agreeable to the railway company, to complete an ordinance in every line except the insertion of the valuation and the maximum rate of fare.

"As to the itemization of the value of the property, the Council calls attention to the fact that the letter drafted by it and submitted to the railway company says: 'We concur in requesting that the valuation reached by you shall be by items, etc.' In the presentation of this subject to you we believe there will develop some claimed elements of value and some species of property as to which you will desire to make separate findings to the end that the public interest in them can be satisfied and intelligent consideration be given to the results reached.

"The Council has understood that in your view the maximum rate of fare should be as stated in your letter. We ask only that you will give our views on this subject such consideration as they seem to you to merit after the valuation shall have been determined by you as in the opinion of the Council an intimate relation exists between the amount of the valuation and an appropriate maximum rate of fare."

On motion of Councilman Koch, the city solicitor was instructed to prepare a reply to the letter of the Cleveland Railway, expressing the willingness of the city to submit the question of fare and valuation to Judge Tayler and suggesting that the Council prepare a formal letter of submission. The letter was also to express a willingness to proceed at once to the adjustment of other differences and to allow the committee in charge of the invalidity clause to arrange the conditions of competitive bids at the expiration of eight years. The company has insisted that it should retain its property if it is willing to make terms as favorable as the best bidder. The administration did not answer the request of the company that all disputed questions be left to Judge Tayler or this committee and the interurban and East Cleveland matters were still unsettled at the end of the week.

On the forenoon of Oct. 5 Horace E. Andrews, president of the Cleveland Railway, met with representatives of the interurban companies in an endeavor to arrive at some method of compensation for the use of the local tracks by the interurban cars. Nothing was given out for publication, as the participants feel that everything can be made public when the matter has been finally adjusted. The main point is the car-mile cost of operating these cars. The Cleveland Railway has been requested by the city to make some arrangement so that the people on the West Side streets will not have to pay two fares for a ride. As it is, the Cleveland, Southwestern & Columbus Railway owns a part of the track on Lorain Street and the Cleveland Railway will either be compelled to lease this or build another track, under the present plan.

The Cleveland Railway in its reply to the latest communication of the city stated that the formal letters enclosed with the city's communication and addressed to the members of the proposed committee to draft an invalidity clause had been signed and forwarded to them by messenger. The reply also expressed the hope that if this committee failed to agree upon the language of the clause or if any other questions were found impossible of settlement by the company and the city, all be submitted to Judge Tayler as final arbitrator.

The letters addressed to the members of the proposed committee on the invalidity clause request that the clause be so drafted as to make the safeguards to the city as good as the grant to the company in the ordinance. The request is also made that a clause be formulated giving the company substantial preferences over any other bidder at the end of eight years, without preventing competition, Judge Tayler, Judge Lawrence, S. H. Tolles and City Solicitor Baker are the members of this committee.

On the evening of Oct. 5, J. J. Stanley, vice-president of the Cleveland Railway, and Attorney Harry J. Crawford appeared before the Council of East Cleveland and requested that the existing contract between the company and the village be modified as insisted upon by Mayor Johnson, who refused to renew the franchise on Euclid Avenue if the company was forced to carry out the obligation to the village to carry East Cleveland passengers at the rate of fare existing on the Euclid Avenue line inside the city. Asked what he had to propose in return for the surrender of the contract, Attorney Crawford replied that he had no suggestions to make, but wished the Council to consider the matter. Mayor McQuigg stated that it would be taken under advisement and a special meeting was set for the evening of Oct. 7 when Mr. Andrews could be present.

The second meeting was productive of results in that a reply, declining to modify the contract, was made by resolution. Mr. Andrews proposed that, in return for an extension of the franchise 25 years from the present time, the company would be willing to make a cash fare of 5 cents or six tickets for 25 cents and to extend the Superior Street line to a connection with the Euclid Avenue line at Windermere or possibly through to the eastern limits of the village north of the Nickel Plate tracks, thus giving service on two lines instead of one. He said, however, that the service would probably not be as good on either line as at present on Euclid Avenue. Mr. Andrews declared that it embarrassed him to ask a change in the contract, and that only the stand of the administration in Cleveland had induced him to do so. He said that the company is ready to carry out its contract, but that the city administration has threatened to refuse a renewal of the franchise on Euclid Avenue if the company does not agree to a modification. The company, he said, could not accept a grant from the city with this line omitted, as it is one of the best owned by the company. In order to carry out its contract, Mr. Andrews stated that the people of the village may have to be taken down town over the Superior or Cedar lines, after the expiration of the Euclid Avenue franchise in 1913. Mayor McQuigg of East Cleveland said that people had built homes in East Cleveland on the assurance that the fare would always be the same as on other portions

of the Euclid Avenue line and that it would be a breach of faith on the part of the Council to consent to a modification of the contract. He said the old Cleveland Electric Railway had been the means of building up the village and that the people had the greatest faith in and respect for Mr. Andrews and his fellow officers. They do not ask a modification of their own accord, he said, but under pressure from the Cleveland city administration. He further stated that, notwithstanding the good intentions of the officers of the company, the present administration, if retained in power, will have much to do with the schedules and operation of cars and that any change might result in the service to East Cleveland being curtailed. Mr. McQuigg also said that he could not see why it was all-important that East Cleveland give up its contract and submit to a higher fare, when the haul is no longer than on the St. Clair Street and Broadway lines. The vote on a resolution refusing to entertain a proposition to modify the contract was unanimous.

Mr. Andrews made a verbal report of this matter to the City Council on Oct. 8. He stated that from his view of the temper of the people, the contract with the village could not be modified. The administration was asked to make a concession on this point and allow the contract to stand, as the company could not accept a grant that necessitated the breaking of a contract which it has been willing at all times to execute. Neither can it afford to accept a grant that does not include Euclid Avenue. He also made a verbal report on progress in the negotiations with the representatives of the interurban railways.

Mayor Johnson refused to say what would be done regarding the East Cleveland matter, but requested Mr. Andrews to put his report on both this question and the interurban negotiations in writing. Mr. Andrews agreed to do this, but said that he felt he should have some idea of the disposition of the question on the part of the city. The company desires that the matter be referred to Judge Tayler. In the draft for a grant made by Judge Tayler months ago Euclid Avenue was included without any conditions relating to the East Cleveland contract.

The report of Warren Bicknell, receiver of the Municipal Traction Company, for September shows a surplus of $102,639.65, a sum smaller than the surplus for June, July or August.

Wage Increase in Detroit

The Detroit (Mich.) United Railways has announced an increase in the wages of its motormen and conductors, dating from Oct. 1. The men were apprised of the change in four bulletins applying to the different divisions of the company. These communications were signed by Henry Bullen, general superintendent, and F. W. Brooks, general manager. Each of the bulletins concluded with this statement: "In thus increasing the rates of pay the company, while under the burden of a constantly increasing cost of doing business, recognizes the increased cost of living, and particularly desires to aid those who, by their length of service, have demonstrated their capability and loyalty to the service. It is hoped that this action will be justified by greater effort on the part of the men to safeguard the property and interests entrusted to them."

The new rates of pay to conductors and motormen of the Detroit, Pontiac and Flint city lines and the Flint, Pontiac, Orchard Lake and Wyandotte divisions follows: First year, 23 cents an hour; second year, 25 cents an hour; third year and thereafter, 27 cents an hour. The former rate of pay was 23 cents, 24 cents and 25 cents an hour for the first, second and third years, respectively.

The new rates of pay to conductors and motormen of the Rapid Railway System, including the Shore Line division and the Port Huron and Mt. Clemens city lines, follows: First year, 23 cents a hour; second year, 25 cents an hour; third year and thereafter, 27 cents an hour. To conductors and motormen on city cars in Port Huron and Mt. Clemens, including baggage, mail, express and freight cars, the following scale applies: First year, 18 cents an hour; second year, 20 cents an hour; third year and thereafter, 22 cents an hour. The former rate of pay was 23 cents, 24 cents and 25 cents an hour on the interurban lines and 18 cents, 19 cents and 20 cents an hour on the city lines for the first, second and third years of service, respectively.

The rate of pay to conductors and motormen of the Detroit, Jackson & Chicago Railway, including baggage, mail, express and freight cars follows: First year, 23 cents an hour; second year, 25 cents an hour; third year and thereafter, 27 cents an hour. The rate of pay to conductors and motormen on city cars in Ypsilanti and Ann Arbor, including baggage, mail, express and freight cars on city lines, follows: First year, 18 cents an hour; second year, 20 cents an hour; third year and thereafter, 22 cents an hour. The former rate of pay was 23 cents, 24 cents and 25 cents an hour and 18, 19 and 20 cents an hour, respectively.

The rate of pay to conductors and motormen of the Detroit, Monroe & Toledo Short Line Railway follows: First year, 23 cents an hour; second year, 25 cents an hour; third year and thereafter, 27 cents an hour. The former rate of pay was 23 cents an hour, 24 cents an hour and 25 cents an hour.

The rate of pay for probationary, or first year, employees has not been changed. It is recognized that only a limited percentage of such employees qualify for continued service and accordingly do not earn any special reward. Those who do qualify are encouraged to look forward to an advance.

Proposal for Entrance of Radial Railway to Toronto

The question of the entrance of the cars of the Toronto & York Radial Railway to Toronto, Ont., is again receiving attention. At present passengers and freight on the Toronto & York Radial Railway are transferred at the outskirts of the city. A meeting of prominent merchants and city and county officials was held recently to consider this matter, and W. H. Moore, general manager of the Toronto & York Radial Railway, outlined a plan for the Toronto Railway to operate the cars of the Toronto & York Radial Railway within the city limits. Those present at the meeting expressed themselves as being in favor of the proposition. Mr. Moore has since submitted to the property commissioner of Toronto the following offer on behalf of his company:

"The position of the Toronto & York Radial Railway is that, up to the year 1921, the Toronto Railway should take possession of the Radial cars at connecting points between the lines of the two companies, carrying the cars into the center of the city, and, after discharging passengers and goods, return them to the Toronto & York Radial Railway, upon terms which can be arranged between the companies.

"The terms upon which these cars would be carried within the city of Toronto, so far as the city is concerned, is a matter which would require to be worked out with the Toronto Railway. Under this arrangement the Toronto & York Radial Railway would not secure any franchise in Toronto, nor would it have running rights in Toronto. It would possess simply the right to have its cars operated in and out of the city by the Toronto Railway.

"I have explained the position prior to 1921, in that it has a bearing on the position after that date. The Toronto & York Radial Railway expects an assurance that after 1921 whoever shall operate the street railway system of Toronto —whether it be the city, the Toronto Railway or another company—shall continue to operate the cars of the Toronto & York Radial Railway to and from the market, or such place as may now be agreed upon, not necessarily upon the same terms, but upon conditions to be then determined, and, if it be found impossible to agree to these conditions, the matter to be left to an arbitration tribunal—the Ontario Railway Commission would be acceptable—with provision for such periodical revisions as may be necessary."

Transit Affairs in New York

The resolution of the Public Service Commission for an additional issue of $1,150,000 bonds by the Interborough Rapid Transit Company for the lengthening of the subway stations to permit the operation of 10, instead of eight-car trains has been adopted by the Board of Estimate and Apportionment on the recommendation of Controller Metz.

When the application of the Third Avenue Bridge Company for a franchise to construct a railway from Third Avenue and Fifty-seventh Street to and over the Queensboro Bridge came up, Controller Metz informed the board that it had been denied by the Public Service Commission, and the application was referred to a select committee.

New Road Opened in Portland.—The Kenton Traction Company, Portland, Ore., has opened its line between Kenton and the new Swift packing plant on Columbia Slough. The road is about 2½ miles long and connects with the Mississippi Avenue line of the Portland Railway, Light & Power Company at the city limits at Killingsworth Avenue.

Hearing on Heating Cars in New York.—The Public Service Commission of the First District of New York has adopted a resolution calling upon street railways to submit at the hearing to be held on Oct. 21 any objections to a peremptory order requiring that all street cars be equipped with an electric heating apparatus which shall maintain a temperature of not less than 45 and not more than 65 deg.

Fahr. between Oct. 15 and April 15 of each year. It is also proposed that a thermometer be kept in each car.

Meeting of American Society of Mechanical Engineers.—At the meeting of the American Society of Mechanical Engineers, to be held on Nov. 9 in the Engineering Societies Building, 29 West Thirty-ninth Street, New York, at 8.15 o'clock, Prof. Gaetano Lanza and Lawrence S. Smith of the Massachusetts Institute of Technology, will present a paper, "Reinforced Concrete Beams," and Prof. Walter Rautenstrauch of Columbia University, will present a paper, "Stresses in Curved Machine Members."

Hearing on Elevated Extension in Boston Continued.—The Railroad Commission of Massachusetts and the Boston Transit Commission, sitting as a joint board under authority of the Legislature of 1909, continued the hearing on Oct. 5 on the proposed extension of the elevated lines of the Boston (Mass.) Elevated Railway from Sullivan Square to Medford. The company was not heard, arguments being presented by representatives of each city for and against the project. The sentiment expressed from Somerville favored the construction of a subway or a new surface line along Mystic Avenue, while the need of an elevated service was voiced by the representatives of Medford.

Terre Haute Franchise Suit Concluded.—On page 635 of the ELECTRIC RAILWAY JOURNAL of Oct. 2, 1909, mention was made of the injunction suit of the city of Terre Haute against the Terre Haute, Indianapolis & Eastern Traction Company. The argument in the suit was concluded at the State House in Indianapolis on Oct. 9. The case was tried at Rockport before Judge Robinson and then transferred to Indianapolis for argument. The company claimed that the city remained passive for six years while it expended $4,500,000 in buildings and equipment to enter the city only to attempt to exact an excessive price for a franchise permitting the operation of interurban cars for passenger and freight service, thus indicating conspiracy. Judge Robinson promised a decision by Nov. 1.

Milton J. Foreman on Transportation Abroad.—Milton J. Foreman, chairman of the transportation committee of the Chicago City Council, has returned to Chicago after several months spent in Europe. He was asked for an expression of opinion regarding conditions abroad, and is reported to have said: "I have heard a great deal about the transportation systems of European cities, but no city that I visited, either in England or on the Continent, has as adequate transportation facilities as we have in Chicago. There is no comparison between us in that respect. In some respects, however, I think European cities are far ahead of us. They centralize their governing powers and do not have a lot of boards working at cross purposes, as we do. Every improvement they make is made with a knowledge of its relation to some other improvement. They do not have a West Park board and a South Park board and a board of education and a library board and a sanitary district and others too numerous to mention. With a central authority it is easy to fix responsibility and get the best results. We have some things to learn from them, although not in the way of transportation."

Franchise Ordinance Introduced in Kansas City.—The ordinance extending the franchise of the Metropolitan Street Railway, Kansas City, Mo., has been introduced in the upper house of the Council. It was read by title and referred to the committee on streets, alleys and grades. The ordinance was accompanied by the report of the Traffic Way Commission made last July, which recommends the passage of the ordinance in the form in which it has since been printed and circulated by the Metropolitan Street Railway. In that form the ordinance was also given the Mayor's approval in a speech at the time the report was agreed upon. After the ordinance had been introduced five Republican members of the upper house offered 22 amendments which had been agreed upon by them all. These were supplemented by eight more offered by Alderman Edwards which had not been agreed to by the other four Republicans. Both sets of amendments were referred to the committee with the ordinance without reading. The 22 amendments seek to eliminate the partnership and reduce the rate of fare, but do not remove the company's valuation of $33,500,000. One of the amendments offered by Mr. Edwards demands a physical valuation of the system when the franchise is to expire, another provides for the payment of 2 per cent of the gross receipts to the city and the reduction of fares to six for a quarter, and another removes the restrictions on extensions south of Forty-eighth Street. One of the principal amendments offered in the name of the five Republicans reduces fares after three years, the company in the meantime to build the Twelfth Street Traffic Way at a cost not to exceed $1,315,000.

Financial and Corporate

New York Stock and Money Market

October 12, 1909.

The stock market was closed to-day, on account of the new Columbus Day holiday. On Oct. 11 the market was weak and lower, after several days of liquidation and declining prices. The sudden advance in the price of money has caused an absolute check to the upward movement and has forced the closing out of many speculative accounts. The long period of cheap money encouraged speculation and made stock carrying easy. The tractions suffered slightly, along with the balance of the list.

The money market has tightened both at home and abroad. The discount rate of the Bank of England has been advanced to 3 per cent and that of the German Imperial Bank to 5 per cent. Money was quoted here yesterday: Call, 4 @ 5 per cent; 90 days, 4¾ @ 5 per cent.

Other Markets

Continued selling and weakness in subway stock was the feature of the Chicago market during the past week. The low mark reached was 4¾, and there has been less than one point recovery since.

In the Boston market, Massachusetts Electric and Boston Elevated Railway have each displayed some activity, although there is no significance in the movement of either. Other tractions were not in the market.

There continues to be some trading in Rapid Transit and Union Traction in Philadelphia, but the volume is small. The price of the former has remained about stationary while the latter has shown a slight decline.

There is nothing doing in the Baltimore market save in the bonds of the United Railways Company. These are still active at unchanged prices.

At an auction of securities in New York last week, $3,000 of the 5 per cent bonds of the Lexington Avenue & Pavonia Ferry Railroad were sold at 94½.

Quotations of various traction securities as compared with last week follow:

	Oct. 4.	Oct. 11.
American Railways Company	a46	a46
Aurora, Elgin & Chicago Railroad (common)	a48	*48
Aurora, Elgin & Chicago Railroad (preferred)	a92	*92
Boston Elevated Railway	124½	130
Boston & Suburban Electric Companies	*15	a17½
Boston & Suburban Electric Companies (preferred)	*72	a73
Boston & Worcester Electric Companies (common)	10	10½
Boston & Worcester Electric Companies (preferred)	a54	a55
Brooklyn Rapid Transit Company	80⅞	77¾
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	88½	87
Capital Traction Company, Washington	a140	a140
Chicago City Railway	a180	180
Chicago & Oak Park Elevated Railroad (common)	*3	*1¾
Chicago & Oak Park Elevated Railroad (preferred)	*10	*7
Chicago Railways, ptcptg, ctf. 1	a110	109¾
Chicago Railways, ptcptg, ctf. 2	a36½	36½
Chicago Railways, ptcptg, ctf. 3	a25	24½
Chicago Railways, ptcptg, ctf. 4s	a10	9
Cleveland Railways	*78	*78
Consolidated Traction of New Jersey	77	a78
Consolidated Traction of N. J., 5 per cent bonds	105½	a107
Detroit United Railway	a72	69
General Electric Company	167	163
Georgia Railway & Electric Company (common)	a97	a98
Georgia Railway & Electric Company (preferred)	a88½	*88½
Interborough-Metropolitan Company (common)	16	15¼
Interborough-Metropolitan Company (preferred)	49	47¼
Interborough-Metropolitan Company (4½s)	84½	82⅞
Kansas City Railway & Light Company (common)	a44	41
Kansas City Railway & Light Company (preferred)	a83	82
Manhattan Railway	a143	a144
Massachusetts Electric Companies (common)	a18½	a18
Massachusetts Electric Companies (preferred)	a82½	80
Metropolitan West Side, Chicago (common)	a19	17¾
Metropolitan West Side, Chicago (preferred)	a51	52
Metropolitan Street Railway	a24	a24
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	82	78
Northwestern Elevated Railroad (common)	a20	20
Northwestern Elevated Railroad (preferred)	a71	70
Philadelphia Company, Pittsburg (common)	a48¼	48
Philadelphia Company, Pittsburg (preferred)	a41½	41
Philadelphia Rapid Transit Company	a29	28
Philadelphia Traction Company	a91½	90
Public Service Corporation, 5 per cent col. notes	100	a101
Public Service Corporation, ctfs	94½	a95½
Seattle Electric Company (common)	114	a114
Seattle Electric Company (preferred)	105	105
South Side Elevated Railroad (Chicago)	52½	51
Toledo Railways & Light Company	09¾	9¼
Third Avenue Railroad New York	21¾	19⅛
Twin City Rapid Transit, Minneapolis (common)	110⅞	a109½
Union Traction Company, Philadelphia	a53¾	52½
United Rys. & Electric Company, Baltimore	a14¼	14⅛
United Rys. Inv. Co., San Francisco (common)	43½	41
United Rys. Inv. Co., San Francisco (preferred)	74¼	70¾
Washington Ry. & Electric Company (common)	a47¼	a47¼
Washington Ry. & Electric Company (preferred)	a93½	a94
West End Street Railway, Boston (common)	94	95
West End Street Railway, Boston (preferred)	a106	104
Westinghouse Electric & Manufacturing Company	87⅝	85⅛
Westinghouse Elec. & Mfg. Company (1st pref.)	144	a140

aAsked. *Last sale.

Hearing on Proposed Expansion of Boston Elevated System

The Massachusetts Railroad Commission and the Boston Transit Commission gave a joint hearing on Oct. 8 upon the terms of consolidation proposed in the Massachusetts Legislature of 1909 between the Boston Elevated Railway and the West End Street Railway. Frederic E. Snow, counsel for the Boston Elevated Railway, made a brief statement urging the necessity for the consolidation and the willingness of the company to meet any reasonable conditions. For the West End Street Railway H. Heustis Newton and F. S. Mead emphasized the financial strength of the company, which owns the surface lines in Boston, the latter being operated by the Boston Elevated Railway under a lease. They urged the right of the stockholders of the West End Street Railway to good returns from the consolidation, and claimed that the Boston Elevated Railway is not in as strong a position financially as when the West End Street Railway was in direct control. It is probable that the Boston Elevated Railway will present its side of the question at a later hearing. Since the acceptance of the lease of the West End Street Railway the cost of operation has increased greatly; the free transfer privilege has grown far beyond the bounds originally anticipated; the average length of haul per passenger has risen without fare increase, and large burdens of fixed charges have been entailed by committals to subway, elevated and tunnel construction in Boston and its suburbs. The joint board will consider these points and will report to the next Legislature its conclusions regarding the desirable terms of consolidation. The proposed terms now before the joint board have already been abstracted in the Electric Railway Journal.

American Light & Traction Company, New York, N. Y.—The directors of the American Light & Traction Company have declared the regular quarterly dividends of 1½ per cent on the preferred stock and 2 per cent on the common stock of the company, payable Nov. 1 to stock of record Oct. 20, and also an extra stock dividend of 2½ per cent on the common, payable on or before Nov. 15 to stockholders of record Oct. 20.

Albany & Hudson Railroad, Hudson, N. Y.—On application of counsel for the Trust Company of America, Supreme Court Justice Betts has appointed John W. Searing, New York, receiver of the Albany & Hudson Railroad, which formerly operated an electric railway between Albany and Hudson, and which was recently sold under a mortgage foreclosure. The property recently was taken over by a reorganization committee, and now is owned by the Albany Southern Railroad.

Capital Traction Company, Washington, D. C.—Shareholders of the Capital Traction Company of record Nov. 1 are offered the right to subscribe at par for a block of $1,440,000 of 5 per cent bonds of the company, part of the first mortgage issue of 1907 (of which $2,520,000 is outstanding), to the extent of 12 per cent of their holdings of stock.

Cleveland & Chagrin Falls Railroad, Cleveland, Ohio.—An agreement has been reached, it is announced, whereby the Cleveland & Chagrin Falls Railroad, part of the property held by the Eastern Ohio Traction Company, will be disposed of at foreclosure sale. It is said further that a reorganization will take place after the sale and that this line may be permanently disassociated from the Eastern Ohio Traction Company.

Connecticut Valley Street Railway, Greenfield, Mass.—The Massachusetts Railroad Commission on Oct. 4 issued an order approving an issue of coupon or registered 5 per cent bonds by the Connecticut Valley Street Railway to an amount not exceeding at par value $700,000, payable not more than 20 years from date thereof for the following purposes: 1. The proceeds of bonds amounting to $500,000 shall be applied exclusively to the payment and refunding of bonds of the Greenfield & Turners Falls Street Railway, $130,000 of the Greenfield Deerfield & Northampton Street Railway $150,000, of the Northampton & Amherst Street Railway $180,000, severally assumed in the consolidation and of bonds of the Connecticut Valley Street Railway to the amount of $40,000. 2. The proceeds of bonds amounting to $200,000 shall be applied to the payment of floating debt properly incurred in making certain permanent additions and improvements.

Edmonton Radial Railway, Edmonton, Alberta, Can.—The Edmonton Radial Railway, operated by the Municipality, on Oct. 1 completed its first three months of operation. During this period 609,170 passengers were carried and the gross receipts were $25,540.

Erie, Cambridge, Union & Corry Railway, Erie, Pa.—The property of the Erie, Cambridge, Union & Corry Railway has been sold under foreclosure to A. O. Chapin, representing the bondholders, for $300. The Erie Trust Company, Erie, Pa., was trustee under the mortgage securing the bonds.

Grand Junction & Grand River Valley Railway, Grand Junction, Col.—The Grand Junction & Grand River Valley Railway has filed for record a mortgage of $2,000,000 in favor of the Colorado Title & Trust Company, Grand Junction, Col., as trustee.

Hornell Traction Company, Hornell, N. Y.—On Oct. 1 the Hornellsville Electric Railway and the Hornellsville & Canisteo Railway were consolidated as the Hornell Traction Company, with officers as follows: Charles Adsit, president; George T. Rehn, secretary, treasurer and general manager; D. J. Haren, superintendent; Charles Adsit, George T. Rehn, M. M. Acker, J. B. Day, F. E. Bronson, W. H. Walbridge, R. Page, Hornell, N. Y.; D. L. Magruder and M. E. Rehn, Philadelphia, directors.

Metropolitan Street Railway, New York, N. Y.—Adrian H. Joline and Douglass Robinson, receivers of the Metropolitan Street Railway, recently asked Judge Lacombe of the United States Circuit Court for instructions as to what action they should take on the petition of the Forty-second Street & Grand Street Ferry Railroad that they elect within a time to be fixed by the court whether or not they, as receivers, should adopt the lease of the road made April 6, 1893, by the Metropolitan Crosstown Railroad providing for a rental of $134,640 and taxes and assessments. In the petition the Forty-second Street & Grand Street Ferry Railroad urged that the receivers have practically assumed the lease by their failure to reject it after having been in possession of the property for a period of two years. Replying to the request of the receivers, Judge Lacombe, in an opinion filed recently, said: "The rent reserved upon the lease, 18 per cent upon the outstanding capital stock, may have been reasonable when the lease was executed, but under existing conditions it is grossly exorbitant. The court is not without hope that before many months the property may pass out of the receivers' hands. Upon sale or otherwise it would seem very unwise to encumber it with any such burdens for the future. If petitioners think that they can show that there are some special reasons why they continue the stipulated rental without adopting the lease, even at a preposterous price they may take an order sending the matter to a special master to take testimony. The papers submitted on this motion are not convincing. In the interim between now and foreclosure sale and subsequent delivery the receivers may continue the stipulated rental without adopting the lease and without prejudice to any subsequent motion by any party interested."

Ottumwa Railway & Light Company, Ottumwa, Ia.—The directors of the Ottumwa Railway & Light Company have declared a quarterly dividend of 1¾ per cent upon the preferred stock, payable on Oct. 15, to stockholders of record on Oct. 5.

Tarrytown, White Plains & Mamaroneck Railway, White Plains, N. Y.—The sale under foreclosure of the property of the Tarrytown, White Plains & Mamaroneck Railway, which was to have been held on Oct. 8, has been postponed until Nov. 29.

Tri-City Railway & Light Company, Davenport, Ia.—G. Trowbridge Hollister, of Mackay & Company, New York, N. Y., has been elected a director of the Tri-City Railway & Light Company to succeed F. W. Kendrick, resigned.

Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa.—The newly organized Trenton, Bristol & Philadelphia Street Railway has filed its acceptance of the Constitution of Pennsylvania in the State Department, also a record of the reorganization following the purchase of the property of the Philadelphia, Bristol & Trenton Street Railway at foreclosure sale in Doylestown on Aug. 2 by John Redwood and Carl N. Martin, the foreclosure proceedings having been instituted by the Union Trust Company of Maryland. The capital stock of the company is $325,000 and the directors are Edward D. Toland, president, John Redwood, Carl N. Martin, George Blakestone, Grier Hursh, Jos. S. Clark, Wm. L. Chrisman.

United Railways, Portland, Ore.—It is stated that the control of the United Railways of Portland has passed to J. H. Hulburt, Fontanelle, Ia., and C. L. Dunbar, Vancouver, B. C.

Worcester & Holden Street Railway, Worcester, Mass.—Perry, Coffin & Burr, Boston, Mass., offer for subscription $100,000 of the Worcester & Holden Street Railway's first mortgage 5 per cent gold bonds dated Oct. 1, 1903, and due Oct. 1, 1923. They are coupon bonds of the denomination of $1,000 with interest, payable April 1 and Oct. 1 at the Worcester Trust Company, Worcester, Mass., trustee, and are redeemable at any coupon date at 105.

Traffic and Transportation

Handling Celebration Traffic in New York

The arrangements made in advance of the Hudson-Fulton celebration in New York, which extended from Sept. 25 to Oct. 2, by the railways in New York for handling traffic were all carried out and the very large volume of traffic offered was handled promptly and expeditiously. The Interborough Rapid Transit Company featured the events of the celebrations on a poster printed in colors which it displayed on its subway and elevated stations, and installed extra ticket sellers and choppers at stations where traffic was heaviest, as it announced previous to the celebration it would. The warship fleet was stretched along the Hudson River from Spuyten Duyvill to Fiftieth Street, and most of the traffic of the Interborough Rapid Transit Company was over the Broadway subway division and the Sixth and Ninth Avenue elevated lines, which parallel the river in the northern part of the city. The stations on the elevated lines and subway near the tomb were enclosed with canvas so as to prevent passengers from converting them into vantage points from which to view the fleet by day and the fireworks and the illuminated ships by night. The record of passengers carried on the subway and elevated divisions of the Interborough Rapid Transit Company during the celebration follows:

SATURDAY, SEPT. 25.	
Elevated	961,023
Subway	1,177,951
Total	2,138,974
SUNDAY, SEPT. 26.	
Elevated	666,750
Subway	667,938
Total	1,334,688
MONDAY, SEPT. 27.	
Elevated	978,645
Subway	882,866
Total	1,861,511
TUESDAY, SEPT. 28.	
Elevated	1,037,944
Subway	956,722
Total	1,994,666
WEDNESDAY, SEPT. 29.	
Elevated	892,484
Subway	867,553
Total	1,760,037
THURSDAY, SEPT. 30.	
Elevated	1,121,207
Subway	1,036,782
Total	2,157,989
FRIDAY, OCT. 1.	
Elevated	870,965
Subway	845,896
Total	1,716,861
SATURDAY, OCT. 2.	
Elevated	1,077,066
Subway	1,074,815
Total	2,151,881
Total Elevated	7,606,084
Total Subway	7,510,523
Grand total	15,116,607

The effect of the celebration on the surface lines was felt several days in advance of the ceremonies. For instance, the Metropolitan Street Railway experienced four days of heavy traffic immediately preceding the first day of the celebration, Sept. 25. On Sept. 21 this company carried 1,175,125 passengers; on Sept. 22, 1,204,337; on Sept. 23, 1,246,481, and on Sept. 24, 1,231,647. The total of passengers carried by the company from Sept. 21 to Oct. 2 was 15,660,526, and the total of passengers carried from Sept. 25 to Oct. 2 was 10,802,936. The Third Avenue Railroad and its branches for the period from Sept. 25 to Oct. 2 carried 4,312,261 passengers. Of this total 1,510,796 persons were transported over the Third Avenue Railroad, 1,119,967 over the Forty-Second Street, Manhattanville & St. Nicholas Avenue Railway, 324,468 over the Dry Dock, East Broadway & Battery Railroad, and 1,357,030 over the Union Railway, which operates largely in the Borough of the Bronx. The record of passengers carried by the Metropolitan Street Railway for four days preceding the celebration and for the celebration period from Sept. 25 to Oct. 2 follows:

Date.	Total Passengers.
September 21	1,175,125
September 22	1,204,337
September 23	1,246,481
September 24	1,231,647
September 25	1,526,169
September 26	916,381
September 27	1,320,526
September 28	1,467,682
September 29	1,298,487
September 30	1,519,372
October 1	1,251,161
October 2	1,503,158
Total, Sept. 21—Oct. 2	15,660,526
Total, Sept. 25—Oct. 2	10,802,936

The record of passengers carried during the celebration by days by the Third Avenue Railroad follows:

	3d Ave. R.R.	42d St.	Dry Dock.	Union.	Total.
Sept. 25	260,590	182,954	32,129	171,575	
	19,166	16,420	9,336	41,755	733,925
Sept. 26	164,771	118,320	24,289	129,236	
	16,515	16,139	8,682	40,216	518,168
Sept. 27	157,594	100,321	37,882	113,073	
	16,347	16,291	9,304	39,017	489,829
Sept. 28	154,423	123,305	32,630	117,865	
	16,729	16,305	8,530	38,624	508,471
Sept. 29	159,314	110,625	32,530	139,379	
	16,932	16,089	8,624	39,096	522,589
Sept. 30	156,027	124,184	32,003	124,200	
	16,574	16,333	8,314	38,412	516,047
Oct. 1	140,896	99,629	29,972	107,066	
	16,293	16,014	8,412	37,922	456,204
Oct. 2	180,591	130,697	33,056	139,928	
	18,034	16,281	8,775	39,666	567,028
Total	1,510,796	1,119,967	324,468	1,357,030	4,312,261

Thus the total of passengers carried by the Interborough Rapid Transit Company, the Metropolitan Street Railway and the Third Avenue Railroad, operating practically all the lines in New York, for the period from Sept. 25 to Oct. 2 was 30,231,804. The totals by days for these three systems follow:

Sept. 25	4,399,068
Sept. 26	2,769,237
Sept. 27	3,671,866
Sept. 28	3,970,819
Sept. 29	3,581,113
Sept. 30	4,193,408
Oct. 1	3,424,226
Oct. 2	4,222,067
Total	30,231,804

The operation of the surface lines was not interfered with materially by the parades. The plan was adopted of holding cars at places where the parades crossed a line until there were 10 to 12 cars on either side of the line of march. Between divisions of the parade the police cleared away the crowd and cars would be permitted to cross the line of march. In order not to have people board the cars for the purpose of riding to the point of crossing of the car line with the parade so as to secure an advantageous place from which to view the parade, the gates of the closed cars were shut three or four blocks before the line of march was reached and the bars of the open cars were similarly lowered and no passengers were taken on. After crossing the line of march the cars were not stopped until they had covered a distance of two or three blocks, when the gates were opened and the bars raised again.

It was generally agreed that the police acquitted themselves very creditably. They exercised good judgment in handling both the crowds at the parades and the passengers on the railways. Extra men were assigned to the subway, and in conjunction with the regular employees of the Interborough Rapid Transit Company performed excellent service. In recognition of the assistance the police rendered this company in handling the crowds, it sent a check to the police commissioner for $5,000 as a contribution toward the police pension fund. The letter accompanying this contribution was signed by Frank Hedley, vice-president and general manager, and approved by T. P. Shonts, president of the company. In addition, Mr. Shonts took occasion to thank the commissioner for the assistance which had been rendered the company. The letter signed by Mr. Hedley and Mr. Shonts, addressed to W. F. Baker as police commissioner, follows:

"The undersigned desire to express our appreciation to you as the Police Commissioner for the City of New York and to your assistants, officers and men, for the highly satisfactory manner in which you aided this company in transporting over 15,000,000 people during the Hudson-Fulton Celebration, from Sept. 25 to Oct. 2, inclusive.

"The accomplishment of safely handling on the subway and elevated an unparalleled number of passengers was in no small measure due to the untiring and intelligent efforts on the part of the City Police Department, and we assure you the directors and officers of this company, through you, would be glad to have our appreciation and thanks expressed to the men individually and collectively.

"As a further substantial appreciation of the creditable work done by New York City's Police Department, the board of directors authorized the officers of this company to forward you a check for five thousand ($5,000) dollars, requesting that it be applied to the Police Pension Fund."

The letter from Mr. Shonts to the Police Commissioner follows:

"I want to express to you, and through you to Deputy Commissioner Bugher, who was especially assigned to this

work, and to all the officers and men of the Police Department of the City of New York, the sincere thanks of this company for the hearty and efficient co-operation rendered it in the handling of the tremendous passenger traffic on its lines during the Hudson-Fulton Celebration.

"We have handled on the subway and elevated lines of this company during the celebration more than 15,000,000 of passengers, and your prompt response to the request of this company for detail of officers and men to aid in this work contributed in no small way to making possible the meeting of the tremendous strain upon the transportation facilities of the city in the safe and satisfactory manner in which it has been accomplished."

Besides contributing $5,000 to the Police Pension Fund, the Interborough Rapid Transit Company took occasion formally to thank its own employees for the faithful way in which they performed their duties and the board of directors of the company voted its thanks to the men and set aside $25,000 which had been distributed pro-rate among the employees who were directly in charge of handling the extra traffic. The communication from the company to its employees, follows:

"The management takes this means of expressing to the employees of this company its high appreciation of the efficient and faithful manner in which the employees performed, individually and collectively, their work during the Hudson-Fulton Celebration from Sept. 25 to Oct. 2, inclusive. During this period we transported 15,124,141 passengers without a single accident of any consequence. The management appreciates that this unparalleled accomplishment in the transportation of passengers is due very largely to your untiring and intelligent efforts, which made possible the safe transporting of such large numbers of passengers under the most trying circumstances.

"The board of directors of this company are heartily in accord with the management's expression of its thanks to the employees, and as a further expression of their appreciation, authorized the payment of one day's extra pay to all employees who participated in any wise in aiding and making possible the safe transporting of passengers on the elevated and subway during the Hudson-Fulton Celebration."

As stated in the Electric Railway Journal of Sept. 25, the principal ceremonies in Brooklyn occurred on Friday, Oct. 1, Saturday afternoon, Oct. 2, and Saturday, Oct. 9. On Oct. 1 the parade with floats was held on Eastern Parkway, and was the principal event of the celebration in Brooklyn. It was intended that this parade should duplicate the land pageant held on Sept. 28 in New York, but through a misunderstanding some of the floats which were to have participated in the parade were not on hand and the spectacle therefore was not as brilliant as the one in New York. Despite this, however, the Brooklyn Rapid Transit Company and the Coney Island & Brooklyn Railroad were called upon to carry a very large number of people to the line at the parade. For the parade on Oct. 1 and the carnival on Oct. 9 the Brooklyn Rapid Transit Company had to cut its wire at 10 places, and this work required the almost constant attention of 10 emergency crews and nine construction gangs. A record by days of the passengers carried by the Brooklyn Rapid Transit Company during the celebration is not available, but the total of passengers carried from Sept. 25 to Oct. 2, inclusive, has been furnished. This record shows that 13,285,000 passengers were carried during this period, or an average of 1,660,000 a day. This is between 7 per cent and 8 per cent above the normal number of passengers transported by the company, but does not approach the high record established by the company on Aug. 8, 1909, when 2,220,000 passengers were transported. In recognition of the work done by its employees during the celebration and especially during the parades in Brooklyn, the Brooklyn Rapid Transit Company has contributed $5,000 to the benefit fund of the Brooklyn Rapid Transit Employees' Association.

Reasons for Fare Increase of the Philadelphia & West Chester Traction Company

A. M. Taylor, president of the Philadelphia & West Chester Traction Company, has addressed the following letter to the patrons of the company:

"In January, 1899, the West Chester division of the Philadelphia & West Chester Traction Company began operations between Sixty-third and Market Streets, Philadelphia, and West Chester. At that time a very low rate of fare was established, because it was the desire of the management of this company to offer every advantage which might result in building up the territory along the line. Though this low rate of fare has been maintained up to the present time, there has been practically no new development along the West Chester division, west of the Eagle Hotel, since it was opened for traffic, and the increase in population of the Borough of West Chester has been very slight. The result has been that while the company has during this period steadily improved its service with regard to the safety, comfort and convenience of its patrons, it has not secured the necessary annual increase in gross enarnings on its West Chester division to yield a reasonable return on the actual amount of capital invested.

"It has been our policy to maintain the property in a high state of efficiency and to render punctual, frequent and satisfactory service. The cost of maintenance and operation of the line between Philadelphia and West Chester has increased greatly since the line was opened, and is far beyond the cost of operation of similarly located interurban lines, owing to the high grade of service which has been rendered. In 1899 the wage rate paid to motormen and conductors was 12.5 cents per hour; to-day the average rate paid is 22.127 cents per hour, an increase of over 77 per cent. In 1899 the cars used by the company cost $4,658 and weighed 26,000 lb.; the new standard cars of the company cost $11,111 and weigh 68,000 lb. The new standard type of car was adopted after very careful investigation and consideration, notwithstanding the fact that the cost thereof is about double the cost of the standard cars used on similarly located interurban lines, and the amount of current consumed thereby is 100 per cent greater than the amount of current consumed by the double-truck cars which were in operation in 1899. It is built with heavy longitudinal steel 'I' beams in the under-frame, and is so solidly and substantially built as to render the possibility of a serious smashup extremely remote. In several instances these cars have collided with obstructions without resulting in injury to passengers, while a serious list of casualties would have been inevitable with cars of the old type.

"Numerous other improvements have been added to the property of the company, and in the method of operation thereof, many of which have been costly, but nevertheless necessary to the safety and comfort of our patrons.

"The roadbed has been rock-ballasted from end to end of the line; the dangerous curve at Ridley Creek has been eliminated by the construction of a costly viaduct, and with the modification of several grades and curves at other points the safety of our passengers has been materially increased.

"We have abandoned the sub-station which was formerly maintained at Ridley Creek and substituted therefor a new power plant at that location. The operation of the sub-station was unsatisfactory, as the high potential current for the operation of the same was drawn from the power house at Llanerch and was subject to frequent interruptions owing to the falling of small twigs across the three wires from the large number of trees along the line and consequent short-circuiting. The cost of this new power plant, which was erected in the interest of punctual service free from interruption on the West Chester division, was $114,586.

"Furthermore, in the interest of punctual service, and to minimize the possibilities of delay, the sidings have been lengthened and cars are enabled to pass without stopping, and the entire West Chester division has been equipped with telephones. An instrument is maintained in the box at each siding, and an instrument is carried on each car. Facilities have been provided at points 1500 ft. along the entire line to connect the instruments carried on the cars with the telephone system; therefore, if a car becomes disabled in the middle of a block, the conductor always has telephone facilities within 750 ft. A regular dispatcher is always on duty during all hours when the road is in operation, and the cause of any delay is reported to him immediately and he issues the necessary instructions to relieve the same.

"An unusually comfortable, commodious terminal station has been erected at Sixty-ninth Street, where passengers pass conveniently to and from the Market Street elevated trains without exposure and whence passengers are carried directly into the great department stores along Market Street and to the eastern end of Market Street and to South Street for 5 cents, without exposure, including the privilege of free transfer on the Sixty-third, Sixtieth, Fifty-second and Fortieth Streets cross-town lines. Costly yards and automatic signal devices, operated from the tower, have been established at Sixty-ninth Street terminal, and the comfort and safety of the traveling public has been greatly increased thereby.

"It has been our policy to operate the road accurately and scientifically, and the cost of our operation along these lines has been high, and the increase in the efficiency of the service rendered has more than justified this policy.

"Taking into consideration the fact that the par value of every share of stock of the Philadelphia & West Chester Traction Company represents actual investment of capital in equal amount, and as the stock and securities are not 'watered' and represent the true value of the property, we

feel that our stockholders are entitled to a reasonable return on the capital invested, which they have not secured up to the present time.

"Our first aim has been to give our patrons good and safe service, as we considered this to be our primary duty. We had hoped that the increase in traffic on the West Chester division, resulting from development along the line, and from the travel originating on the interurban lines extending beyond West Chester, would prove sufficient to yield a reasonable return on the capital invested, without increasing the present rate of fare, and in this hope our stockholders have waived a reasonable return on their capital invested in stock for many years. This hope, however, has not been realized and for this reason we are confronted with two alternatives:

"1. To cheapen the character of service rendered and to operate a less frequent schedule, thereby decreasing the cost of operation.

"2. To increase the rate of fare on the West Chester division by making six 5-cent fare collections between Sixty-third and Market Streets and West Chester, instead of five.

"The board of directors has determined upon the latter alternative, believing that with the cordial support of our patrons it will produce results which will obviate the necessity of a reduction in the efficiency and frequency of service rendered between Philadelphia and West Chester, the maintenance of which is of the greatest importance to the welfare of our patrons and this increase in the rate of fare on the West Chester division will be effective on and after Sept. 27, 1909, until further notice.

"We ask our patrons to lend their hearty support to this readjustment of fare rates, which is entirely reasonable, and we particularly request our patrons to compare this new rate with rates of fare charged by other interurban lines similarly located and operated. Only one logical conclusion can be reached, namely, that the Philadelphia & West Chester Traction Company will give more proportionately in the way of accommodation and service to its patrons at the new rate of fare than any other company operating a similar railway in this section of the country.

"We have, in no instance, shirked our duty in furnishing to our patrons the best possible facilities, even though this policy has resulted in depriving our stockholders of a reasonable return upon their money for many years. And now, having given the old rate of fare a long trial, we ask our patrons to see that it is to their interest to support this readjustment of rates, which will result in the continued maintenance of the present high standard of service rendered and in the stockholders of our company receiving a reasonable return upon their investment."

Hearing on Full Vestibules in New York

A hearing was held before Commissioner Bassett, of the Public Service Commission of the First District of New York, Oct. 12, on the petition asking the commission to compel the full vestibuling of the street cars operated in the boroughs of Brooklyn and Queens. At the present time, a one-third vestibule is in use on the cars operated in these boroughs. Thomas Surpless represented the complainants as attorney; A. M. Williams, the Brooklyn Rapid Transit Company; A. G. Peacock, the New York & Queens County Railway; Francis L. Durk, of Dykman, Oeland & Kuhn, the Coney Island & Brooklyn Railroad.

In introducing the case, Mr. Surpless referred to the passage of the law compelling the companies to adopt the present type of vestibule, and said that the Public Service Commission of the Second District of New York had entered a general order requiring the full vestibuling of cars throughout the territory within its jurisdiction. John J. Wilton, who was a motorman for 12 years, was called as a witness by Mr. Surpless for the complainants. Mr. Wilton said that he considered the unprotected platform better than the vestibule now in use, which encloses the front of the car but leaves the sides exposed, as with a car without a vestibule the motorman is exposed on all sides, whereas with the one-third vestibule he is subjected to drafts from either side of the car which affect his back and subject him to frequent colds. Mr. Wilton had never operated a full vestibule car, but said that he did not think such a car would be any more dangerous than one merely protected at the front and not on the sides. He had operated one-third vestibule cars on the Coney Island & Brooklyn Railroad, and said that he had suffered frequently from colds and had experienced considerable distress in inclement weather when running cars so equipped. Mr. Surpless said that he had expected other witnesses to be present in the interest of his case, but that their testimony would be introduced at the next hearing.

W. S. Menden, assistant general manager of the Brooklyn Rapid Transit Company, said that ordinarily his company operates about 1600 cars a day in the winter. The work of equipping the rolling stock of his company to comply with the act of the Legislature requiring partial vestibuling of cars, Mr. Menden said, was completed in 1908 at a cost of approximately $250,000. He said that he had not estimated the cost of changing the cars to meet the ideas about vestibuling advanced by the complainants, but that the expenditure for such a change would be very great and would require the withdrawal of a considerable number of cars from service. Subsequently Mr. Menden said that estimates of the cost of converting the present equipment of the Brooklyn Rapid Transit Company for operation with the pay-as-you-enter system with full vestibules placed the expenditure at $600 a car. A photograph of a car of the Hudson Valley Railway, Glens Falls, N. Y., fully vestibuled, was offered as evidence by Mr. Surpless, but Mr. Menden said that he could form no idea of the cost of applying such a vestibule to his cars.

Mr. Menden said that with the cars equipped with a vestibule with either double doors or a door that would slide into the car or into the hood, it would be quite a tax on the motorman to go into the street to turn switches. He also said that the present vestibule on the Brooklyn Rapid Transit Company's cars had been especially designed to overcome the objection to which Mr. Wilton had called attention. They overhang the dash at the center several inches thus forming a recess in which the motorman stands, and no complaints have been entered from the employees regarding the vestibule. Mr. Menden said that accidents on the lines of the Brooklyn Rapid Transit Company decreased the last few years, but that no special cause could be assigned for this. He expressed the opinion that traffic in lower Fulton Street, Brooklyn, is equally as congested as many thoroughfares in Manhattan.

Mr. Bassett asked Mr. Menden if latitude governed in vestibuling cars. Mr. Menden said that so far as he knew it did not; but, coming from the South, where no vestibules are required, it seemed to be the practice of the companies to vestibule cars according to the local climatic conditions, and that no line of demarkation could be drawn between the territory in which cars are vestibuled and that in which cars are not vestibuled. Mr. Bassett asked Mr. Menden to prepare drawings of the most inexpensive vestibule which would comply with the complaint and furnish an estimate in detail of the cost of such a vestibule. He also asked the representatives of the other companies to do the same, and suggested that Mr. Surpless have someone prepare an estimate of the most inexpensive vestibule which he thought would meet the requirements of his client. Mr. Menden promised to give Mr. Surpless access to the cars of his company for this purpose. As there are four different types of cars in operation on the lines of the New York & Queens County Railroad, and considerable expense would be entailed in preparing plans and estimates of vestibules for all of these different cars, it was suggested by Mr. Bassett that W. O. Wood, president of the New York & Queens County Railroad, consult with E. G. Connette, transportation engineer of the commission, with the view to preparing a plan and estimate of one type of vestibule which might be applicable to all of the cars, thus lessening the labor and expense to the company.

Mr. Bassett suggested to Mr. Surpless that he introduce before the commission as many experts and street railway men holding positions as possible, stating that while he prejudged the case in no way, the fact that cars were vestibuled throughout New York State and on suburban lines generally and in the smaller cities, furnished no criterion for practice in New York City. The hearing was then adjourned until Nov. 16, as Mr. Surpless said that he realized it would be a physical impossibility for the companies to do anything in the matter this winter, even if an order was entered by the commission in his favor. Another thing, it was desired to give the companies sufficient time before the next hearing to prepare the estimates of the cost of fully vestibuling their cars.

Freight Service in Memphis.—In accordance with its plan to transport freight in Memphis the Memphis (Tenn.) Street Railway has placed the first of its freight cars in operation. Permission was secured from the city to operate the car during the Tri-State Fair for the benefit of exhibitors.

Directors to Study Transfers in Philadelphia.—At a meeting of the directors of the Philadelphia (Pa.) Rapid Transit Company on Oct. 4 the transportation committee, composed of J. J. Sullivan, George H. Earle, Jr., and George D. Widener, was authorized to make a thorough study of the transfer system now in use on the various lines of the company.

Winter Schedule on Spokane & Inland Empire Railroad.—The Spokane & Inland Empire Railroad, Spokane, Wash., put the winter schedule in force on its Coeur d'Alene division on Sept. 19. Two trains each way to Coeur d'Alene and five trains each way to Liberty Lake have been discontinued. One more train is provided for the winter business than has been operated on the division heretofore. No changes have been made on the Palouse division.

Omaha Strike Ended.—The employees of the Omaha & Council Bluffs Street Railway, Omaha, Neb., who recently went on strike are being received back into the employ of the company as individuals at the same pay they received before the strike was called. A majority of the men have already returned to work and others are coming back daily. The strike has not been officially declared off, but complete service has been restored on all of the company's lines; in fact, service was interrupted only for about one week, during which time a partial service was maintained.

Public Service Commission Questions Authority of Board of Estimate.—The Public Service Commission of the First District of New York has summoned the officials of the New York & Queens County Electric Railway to appear before the board to show cause why they should not be fined $5,000 for running cars across Queensboro bridge without first obtaining the consent of the commission. The company is running its cars over the bridge on a permit granted by the Board of Estimate. The commission has contended that the Board of Estimate has no right to grant such permits without the approval of the commission, and in case a fine is imposed on the company to-day there will undoubtedly be an appeal to the courts.

Transfers Ordered as an Experiment in Boston.—The Massachusetts Railroad Commission has issued an order establishing an experimental free transfer service between Park Street and the South Station, via Boylston Street subway station, on the lines of the Boston Elevated Railway. The service is to last until March 1, 1910, and the company is to submit a record to the commission showing the volume of traffic which developed. This service is regarded as a temporary expedient and it is probable that legislation will be enacted in the near future extending the Cambridge subway from Park Street to the vicinity of the South Station, and then by furnishing direct and rapid transit from points on the westerly side of Boston to the railroad terminal.

Advertising Tunnel Facilities in Boston.—The Boston (Mass.) Elevated Railway has begun the publication of a series of newspaper advertisements with the object of educating its tributary population to utilize the Washington Street Tunnel to a larger degree than heretofore. This tunnel was opened to traffic about 11 months ago, and it supplements the previous facilities much more completely than has been wholly appreciated. The advertisement of the company emphasizes the nearness of the 30 entrances and exits of the tunnel to points of importance in the business center, stating that the tunnel practically amounts to a continuous station under the busiest street of the city. In the first advertisement of the series a map is given of the territory tributary to the so-called "Milk Station," with tabulations of the distances in yards of important hotels, newspaper offices, clubs, department stores, and public buildings from the exits of this particular station, with a brief statement of the sources of travel to these points. The locations of entrances to this station and the points served by connecting trains are also described. Similar advertisements illustrating the use of the other stations of the tunnel will follow.

Freight Service in Pittsburgh.—The Pittsburgh (Pa.) Railway maintains freight and express service on only two of its suburban lines—that connecting Pittsburgh and Charleroi, 36 miles distant, and that connecting Pittsburgh, Cannonsburg and Washington, 30 miles distant. One freight car is being used on each line at present, each car making two round trips daily. Milk is brought in on the first trip in the morning and freight of all sorts is sent out on the return trips. On one of the trips the company handles bundles of afternoon newspapers for suburban points. A freight station has been established in downtown Pittsburgh, to which deliveries are made by wagon, and the deliveries to merchants in the suburban towns are made in front of their business places. The business is in its infancy and permanent freight stations at various points are not yet required. The company's freight rate schedule has not been completed and at present a temporary rate sheet is in use. The freight service was established largely for the convenience of the merchants and farmers along the routes, as in many sections the residents of the districts served are without steam railroad connections. So far the service has proved satisfactory and merchants are able to secure quick deliveries of perishable freight.

Personal Mention

Mr. W. M. Graham has been appointed auditor of the Honolulu Rapid Transit & Land Company, Honolulu, Hawaii.

Mr. George W. Whysall and Mr. Eli M. West have retired as receivers of the Columbus, Delaware & Marion Railway, Columbus, Ohio.

Mr. T. P. Gallagher has been appointed traveling freight and passenger agent of the Illinois Traction System, with headquarters at Urbana, Ill.

Mr. A. L. Castle has been elected secretary of the Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, to succeed Mr. W. Williamson.

Mr. J. B. Castle has resigned as second vice-president of the Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, and that office has been abolished.

Mr. Fred E. Guthery has been appointed receiver of the Columbus, Delaware & Marion Railway, Columbus, Ohio, to succeed Mr. Geo. W. Whysall and Mr. Eli M. West.

Mr. F. A. Tilton has resigned as auditor of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., to become connected with the Security Trust Company, Detroit, Mich.

Mr. Frederick L. Pantel has been appointed auditor of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., to succeed Mr. F. A. Tilton, who has become connected with the Security Trust Company, Detroit.

Mr. W. C. Cram has been appointed superintendent of the Aurora, DeKalb & Rockford Electric Traction Company, Aurora, Ill. Mr. Cram is an engineer and will supervise the civil engineering and construction work on the line.

Mr. M. C. Carpender has resigned as general manager of the Plattsburgh (N. Y.) Traction Company to become mechanical engineer of the Hudson Valley Railway at Glens Falls, N. Y. Mr. Carpenter was appointed general manager of the Plattsburgh Traction Company in June, 1909.

Mr. John A. Glover has been appointed division freight and passenger agent of the Illinois Traction System, with headquarters at Urbana, Ill., in charge of all freight, passenger and express traffic, and matters pertaining thereto, with jurisdiction over all lines east of Decatur, vice Mr. J. D. White, assigned to other duties.

Mr. A. Von Schrenk has been appointed general manager of the Plattsburgh (N. Y.) Traction Company, to succeed Mr. M. C. Carpender, who has become connected with the Hudson Valley Railway. Mr. Von Schrenk was graduated from Columbia University, New York, in June, 1901, and in August, 1901, he entered the testing department of the General Electric Company, Schenectady, N. Y. He was transferred to the construction department of the company in July, 1903, and engaged in construction work at the Fiske Street station of the Commonwealth Electric Company, Chicago, Ill., and the Waterside station of the New York Edison Company, New York, N. Y. Mr. Von Schrenk became connected with the New York Central & Hudson River Railroad in July, 1905, as draftsman and inspector, and was promoted to chief draftsman in December, 1906, and to assistant engineer in December, 1907. His work with the New York Central & Hudson River Railroad was in connection with the electrification of the company's lines in New York City and vicinity. Mr. Von Schrenk spent the summer of 1908 in Europe studying the leading foreign railway systems and other examples of foreign engineering. In the spring of 1909 he entered the engineering department of the United Traction Company, Albany, N. Y., where he engaged in general work until his recent appointment as general manager of the Plattsburgh Traction Company.

OBITUARY

G. W. Dickinson, a former manager of the Seattle (Wash.) Electric Company, is dead.

Martin Wulstein, superintendent of the surface lines of the Brooklyn (N. Y.) Rapid Transit Company for its eastern division, died suddenly on Oct. 2 as the result of a paralytic stroke. Mr. Wulstein was 36 years of age. He began his career with the Brooklyn Rapid Transit Company 12 years ago as a conductor. In a very little time he was made an inspector. From inspector he was advanced to depotmaster at Ridgewood and subsequently was made assistant superintendent of the Eastern division. When Mr. William Seibert was appointed superintendent of surface lines of the company three years ago, Mr. Wulstein was appointed district superintendent to succeed Mr. Seibert.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Tidewater Northern Railway, Los Angeles, Cal.**—Incorporated to build an electric railway from Santa Monica along the coast to Ventura. Capital stock, $800,000. Incorporators: R. N. Hart, R. H. Barr and J. S. Wallace.

Macon (Ga.) Traction Company.—Application for a charter has been made by this company to build an electric railway from East Macon to Recreation Club, 5 miles distant. The charter includes the right to operate electric plants also steam-heating plants. Capital stock, $150,000, of which amount $140,000 will be preferred stock. Incorporators: Frederick Kauffmann, Jesse B. Hart, C. C. Foor, H. V. Napier, Jr., Roland Ellis, N. J. Ethridge, H. M. Smith, L. S. Dure, J. F. Hart and J. J. Quinlan. [E. R. J., Oct. 9. '09.]

***Delphi, Flora & Burlington Traction Company, Delphi, Ind.**—Incorporated to construct an electric railway from Delphi to Burlington via Flora, 24 miles distant. Headquarters, Delphi. Capital stock, $125,000. Incorporators: E. W. Bowers, president; J. C. Smock, secretary, and others.

Louisville, Blue River & French Lick Traction Company, New Albany, Ind.—Incorporated to construct an interurban railway to connect New Albany, Mooresville, Galena, Greenville, Palmyra, Fredericksburg, Hardinsburg, Chambersburg, Paoli, West Baden and French Lick. Headquarters, New Albany. Capital stock, $10,000, preliminary. Incorporators: Jacob H. Fawcett, Charles D. Kelso and Walter A. Gadient. [E. R. J., Oct. 2, '09.]

***St. Joseph & Savannah Railway, St. Joseph, Mo.**—Incorporated to build an electric railway from St. Joseph to Savannah, a distance of 15 miles. This company is said to be an auxiliary of the St. Joseph Railway, Light, Heat & Power Company. Capital stock, $350,000. Incorporators: J. H. Van Brunt, C. E. Foster, Jas. N. Burnes, J. I. McDonald, Chas. Pasche, John Donovan, G. G. Lacy, J. G. Schneider, and R. A. Brown.

***Texas, New Mexico & Pacific Railway, Las Cruces, N. Mex.**—Incorporated to build a street railway, 3 miles long from Mesilla Park to Sunny Slope, and passing through Las Cruces. Headquarters, Las Cruces. Capital stock, $50,000. Incorporators: James T. Smith, Edward Ehle, Charles K. Atkinson, Allen J. Papen and Frank A. Jones, all of Las Cruces.

***Columbus & Cincinnati Air Line Traction Company, Columbus, Ohio.**—Incorporated to build an electric railway between Columbus and Cincinnati, via Washington C. H., and Wilmington. Capital stock, $10,000. Incorporators: Frank E. Ruth, E. B. Thompkins, Randolph W. Walton, W. L. McVey and M. B. Recob.

New Castle & Beaver Valley Street Railways, Beaver Falls, Pa.—Application for a charter has been made by Stewart S. Neff, Gerald Holsman, Hiram G. Miller, Robt. W. Cunningham, John H. Norris, Leonard M. Uber and Jos. V. Cunningham to construct an electric railway from New Castle to Beaver Falls. [E. R. J., Sept. 18, '09.]

Bedford, Fulton & Franklin Street Railway, Bedford, Pa.—Incorporated to build an electric railway through Bedford, Fulton and Franklin Counties to connect Bedford and Chambersburg, 50 miles distant. Capital stock, $300,000. Incorporators: M. J. Murphy, Pittsburgh, president; H. D. Tate, George W. Rook, John B. Fay, M. H. Sheats and J. Y. Daly. [E. R. J., Oct. 2, '09.]

Center County Traction Company, Bellefonte, Pa.—Incorporated to build an electric railway from Bellefonte to State College, a distance of 15 miles. Capital stock, $100,000. Incorporators: W. C. Hagan, Pittsburgh, president; Wm. H. Furey and L. T. Munson. [E. R. J., Oct. 2, '09.]

***Hanover & Warrior Run Street Railway, Hanover, Pa.**—Incorporated to build an electric railway from Hanover, through Wilkesbarre to Warrior Run, 6 miles distant. Capital stock, $100,000. Incorporators: J. R. Scouton, Wilkesbarre, president; L. F. Camp, H. H. Davenport and M. T. Rees.

***Royersford Interurban Traction Company, Royersford, Pa.**—Incorporated to build a 4-mile electric railway in Royersford. Capital stock, $25,000. Incorporators: Joseph A. Buckwalter and R. S. Raiser, Royersford; A. B. Eddowes, W. W. Levering and W. H. Houston, Philadelphia.

Slippery Rock & Grove City Street Railway, Slippery Rock, Pa.—Incorporated to build an electric railway from Slippery Rock to Grove City, connecting with the Buffalo & Lake Erie Railroad, a distance of 9 miles. Capital stock, $55,000. Incorporators: John P. Barr, Grove City, president; W. Henry Wilson, James A. Jolliffe, S. L. McClure, C. S. Shrubb, John Carruthers and W. M. Graham. [E. R. J., May 1, '09.]

Glen Rose & Walnut Springs Railway, Walnut Springs, Tex.—Incorporated to build an electric railway from Glen Rose to Walnut Springs, a distance of 15 miles. Capital stock, $100,000. Incorporators: Judge Sadler, J. H. Farr and others. [E. R. J., Sept. 18, 09.]

Skagit, Cascade & Chelan Railway, Tacoma, Wash.—Incorporated to build an electric railway from Rockport via Lake Chelan to Spokane with branch routes from Rockport. Power will be generated on Thunder Creek. Headquarters, Banker's Trust Building, Tacoma. Capital stock, $25,000,000. Incorporators: W. W. Shenk, W. E. Everett, A. M. Richards, George Senior and C. E. Phoenix, Tacoma; J. W. Shenk, Los Angeles, Cal.; Thomas Armitage and Giles Shaw, Huddersfield, England. [E. R. J., Jan. 9, '09.]

FRANCHISES

San Bernardino, Cal.—It is said that the Northwestern Street Railway, which proposes to build a railway from San Bernardino to Rialto, has notified the City Council that it will drop the project entirely. The application for a franchise was denied by the Council. [E. R. J., Sept. 11, '09.]

San Diego, Cal.—The City Council has sold to G. W. Pursell, general manager of the San Diego, El Cajon & Escondido Electric Railway, the franchise granting the right to enter San Diego, the amount paid being $5,100. The company is to commence work within six months from the time the franchise is granted, and the railway is to be completed to El Cajon in one year and to Escondido within two years. [E. R. J., Sept. 25, '09.]

San Diego, Cal.—The City Council has sold four franchises to the San Diego Electric Railway, granting rights to extend and to change the route of its electric railway over certain streets of San Diego. The company paid $2,850 for the franchises.

Macon, Ga.—The County Commissioners have granted a 50-year franchise to the Macon Traction Company to build an electric railway from East Macon to Recreation Club, 5 miles. Frederick Kauffmann, Macon, is said to be interested. [E. R. J., Oct. 9, '09.]

Champaign, Ill.—The City Council has granted a 25-year franchise to the Illinois Traction System to extend its electric railway in Champaign. The franchise provides that $10,000 is to be paid by the company.

Lexington, Ill.—The City Council has granted a 50-year franchise to the Bloomington, Pontiac & Joliet Electric Railway to extend its railway through Lexington. The extension runs from Pontiac to Chenoa.

Madison, Ind.—The City Council of Madison and the Town Board of Hanover have each granted a franchise to the Cincinnati, Madison & Western Traction Company to construct an electric railway through those towns and for terminal facilities. Surveyors began work on Oct. 4 on the line from Madison to Scottsburg, via Hanover and Lexington. [E. R. J., Sept. 4, '09.]

Marshfield, Ore.—The City Council has approved the petition of J. M. Blake for a franchise to build an electric railway in Marshfield and it will be voted upon by the people in December. [E. R. J., June 19, '09.]

Charleroi, Pa.—The West Side Electric Street Railway has applied for a franchise to change the route of its electric railway in Charleroi. The company contemplates an extension to Bentleyville.

Chambersburg, Pa.—The Town Council has granted an extension of time to the Chambersburg, Greencastle & Waynesburg Street Railway for the completion of its extension to Shippensburg.

***Greensburg, Pa.**—John B. Brunot, Frank Good and H. J. Brunot, Greensburg, have applied to the City Council for a franchise to build an electric railway in Greensburg.

Lebanon, Pa.—The City Council has granted a franchise to the Ephrata & Lebanon Street Railway. The company will construct a 23-mile railway from Ephrata to Lebanon. S. D. Erb, Ephrata, president. [E. R. J., Sept. 11, '09.]

***Quanah, Tex.**—W. R. Du Puy and associates have applied for an extension of their franchise granting them the right to build an electric railway in Quanah.

Mannington, W. Va.—A franchise has been granted the Morgantown & Dunkard Valley Electric Railway to extend its railway from Blackville, W. Va., to Mannington. Work to be started at once and to be completed in two years.

TRACK AND ROADWAY

Heber Light & Power Company, Heber, Ark.—This company advises that it has completed the survey and estimates for the proposed street railway in Heber. The route will be about 1½ miles in length. W. H. Horton, secretary. [E. R. J., Nov. 28, '08.]

Denver, Colorado Springs & Pueblo Interurban Electric Railroad, Denver, Col.—This company has completed its permanent line survey between Denver and Colorado Springs, a distance of 73 miles, for the proposed railway. Arrangements with the Denver City Tramway and the Colorado Springs & Interurban Railway have been completed, the company operating over the terminal tracks from the city limits both of Denver and Colorado Springs. L. E. Briggs, Cooper Building, Denver, chief engineer. [E. R. J., June 12, '09.]

Rome, Ga.—Wright Willingham, Rome, denies the report of a plan to build an electric railway to extend from Rome to Chattanooga, Tenn. [E. R. J., Aug. 28, '09.]

Bluffton, Geneva & Celina Traction Company, Bluffton, Ind.—Grading on this railway between Bluffton and Geneva has been completed as also the bridge at Linn Grove. The track will be laid at once. Bears, Brown & Company, contractors. [E. R. J., Aug. 7, '09.]

***Greensburg, Ind.**—It is said that Mayor Thompson, George Little, Edward Day, William Fleming, Greensburg, are promoting the construction of an electric railway from Greensburg to Batesville, a distance of 16 miles.

Cincinnati, Madison & Western Traction Company, Indianapolis, Ind.—Subsidies aggregating $67,000 have been voted for this company in Madison, Hanover and Republican Townships. This added to the amount previously voted will total $110,000. The proposed railway will connect Madison and Scottsburg. [E. R. J., Sept. 4, '09.]

Winona Interurban Railway, Winona Lake, Ind.—This company advises that the extension between Mentone and Chili, a distance of 23 miles, is under construction, with grade work and bridging nearly completed. C. O. Johnson, vice-president and general manager.

Tri-City Railway, Davenport, Ia.—This company contemplates building approximately 5 miles of new line in Moline, Ill. F. W. Reimers, electrical engineer, Moline.

Iowa Light & Traction Company, Eldora, Ia.—It is announced that this company has withdrawn, through its representative, J. H. McBride, the proposition made to the City Council of Marshalltown, to build an interurban railway from Marshalltown to Grundy Center and from Marshalltown to Ames, Ia. The company, however, expects to construct a railway between Waterloo and Des Moines as originally planned. [E. R. J., Sept. 18, '09.]

Fitchburg & Leominster Street Railway, Fitchburg, Mass.—The Massachusetts Railroad Commission has approved the location of a line of this company over Daniels Street and Clarendon Street, Fitchburg.

Springfield (Mass.) Street Railway.—The Railroad Commissioners have granted a certificate of operation to this company to connect its railway with the Western Massachusetts Street Railway in West Springfield.

***St. Joseph & Savannah Railway, St. Joseph, Mo.**—It is stated that the preliminary surveys for this proposed electric railway between St. Joseph and Savannah are under way. J. H. Van Brunt, of the St. Joseph Railway, Light, Heat & Power Company, is interested.

Albany Southern Railroad, Albany, N. Y.—It is announced that this company, which is a reorganization of the Albany & Hudson Railroad, will let contracts at once for double-tracking and straightening of 13 miles of its railway. Headquarters, Rensselaer. A. C. Smith, 100 Broadway, New York, N. Y., president.

Brooklyn Rapid Transit Company, Brooklyn, N. Y.—This company has agreed to reconstruct the Nostrand Avenue bridge over the Long Island Railroad near Avenue H, so as to extend its railway to Avenue O and Avenue U. The improvement will cost approximately $10,000.

New York Central & Hudson River Railroad, New York, N. Y.—The New York & Harlem Railroad, a subsidiary company of the New York Central & Hudson River Railroad, has begun laying the third-rail between Mt. Vernon and White Plains for the extension of its electric zone out of New York.

Hickory (N. C.) Railway.—This company has secured practically all the right of way for its electric railway, which will connect Catawba Springs, Newton, Brookford, Hildebran and Cliffs, a distance of about 83 miles. The survey over the route is well under way. M. E. Thornton, Box 443, Hickory, president and general manager. [E. R. J., May 15, '09.]

Wheeling, Cadiz & Tuscarawas Traction Company, Cadiz, Ohio.—This company is said to have commenced grading near Cadiz on its electric railway from Uhrichsville to Wheeling, W. Va., via Cadiz, 55 miles distant. A. Evans Townsend, president. [E. R. J., Aug. 28, '09.]

***Columbus & Cincinnati Air Line Traction Company, Columbus, Ohio.**—This company, which was recently incorporated to build an electric railway between the two cities named in the title, has awarded the contract for the preliminary engineering work to Riggs & Sherman Company, Toledo. The survey has been started.

Muskogee (Okla.) Electric Traction Company.—This company expects to place contract during the next week for constructing 2½ miles of track. The company has purchased 500 ties, and also 60-lb. rails from the Illinois Steel Company.

***Barrie, Ont.**—John W. Moyes, Toronto, Ont., has made a proposition to the City Council to construct an electric railway in Barrie and to the suburbs. He also proposes to build several suburban lines.

Coos Bay & Inland Railroad, Portland, Ore.—This company, which was recently incorporated to build an electric railway from Roseburg to Marshfield and Coos Bay, has effected an organization with Jacob Haas, president; Chas. Ringler, secretary and treasurer, and Frederick D. Kuettner. Headquarters, McKay Building, Portland. [E. R. J., July 10, '09.]

Columbia Power, Light & Railways Company, Bloomsburg, Pa.—Announcement has been made that work would soon be started on the extension of the Columbia & Montour Electric Railway from Berwick to Wilkesbarre, a distance of 32 miles, and the Dansville & Bloomsburg Street Railway, from Danville to Sunbury, 14 miles, both of which railways are controlled by the Columbia Power, Light & Railways Company. It is probable that further extensions will be made to Shamokin and then throughout the West Branch.

Greensburg & Southern Electric Street Railway, Greensburg, Pa.—This company has been given permission to extend its railway from Arch Street, Greensburg, to Hannastown, Shieldsburg and New Alexandria, 8 miles; also 1½ miles in Greensburg.

Latrobe (Pa.) Street Railway.—This company is authorized to extend its electric railway from Latrobe to the line of Unity and Salem Townships, a distance of 5½ miles, doubling the mileage of its system.

West Penn Railways, Pittsburgh, Pa.—This company has been authorized to extend its railway from Hempfield to Mill Grove, West Newton, Gratztown, Suterville and Blythesdale, a distance of 15 miles; from Dunbar Township to Uniontown, a distance of 9 miles, and about Uniontown for 3 miles distant, making a total of 27 miles.

Pan Handle Electric Railway & Power Company, Spokane, Wash.—It is reported that this company, which proposes to build an electric railway from Priest River, Idaho, to Priest Lake, 30 miles, has secured all right-of-way except through the Raniksu reserve. It is also stated that a contract has been let calling for the completion of the grade by Oct. 1, 1910. Vernon M. Smith, Spokane, president. [E. R. J., May 22, '09.]

Spokane, Walla Walla & Western Railroad, Walla Walla, Wash.—It is stated that this company, which proposes to build an electric railway from Dayton to Wallula, 63 miles distant, has completed the preliminary surveys. E. S. Keating, engineer. [E. R. J., Aug. 28, '09.]

***Cameron, W. Va.**—T. B. Cox, Sherrard, is said to be promoting a plan for an electric railway between Cameron and Wheeling, 20 miles distant.

Fairmont & Northern Traction Company, Fairmont, W. Va.—This company has awarded the contract for constructing 12 miles of electric railway between Fairmont and Fairview, to Robert & D. F. Talbot, Fairmont. Construction has been started at Fairview.

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.—This company, which is to extend its railway across the Little Kanawha River in Parkersburg and from Marietta past Lowell and Coal Run to Beverly, Ohio, has awarded the contracts on the railway between Lowell and Beverly as follows: Grading, to R. T. Martin; concrete to Canner & Battersby; steel to McClintic-Marshall Construction Company, Pittsburgh, Pa.

Chicago & Wisconsin Valley Railway, Portage, Wis.—This company has been organized to construct an electric railway from Janesville to Merrill, through Madison, Lodi, Briggsville, Friendship, Grand Rapids, Stevens Point and Wausau. Capital stock, $40,000. Officers elected are: E. G. Frost, Stevens Point, president; J. W. Powers, Friendship, first vice-president; J. P. Barnes, Waupaca, second vice-

president; A. J. Bermeyer, Indianapolis, Ind., secretary; J. E. Jones, Portage, treasurer; F. G. Tyndoll, Briggsville, assistant treasurer, and Allen P. Russell, Baltimore, Md., general manager. [E. R. J., Sept. 11, '09.]

Sheboygan Light, Power & Railway Company, Sheboygan, Wis.—This company is relaying the track on its railway between Sheboygan and a point about 2 miles north of Riverside with 60-lb. rails, in place of 45-lb. rails. The Lackawanna Steel Works, Buffalo, N. Y., was given the contract for the steel, which amounted to 500 tons.

SHOPS AND BUILDINGS

Birmingham Railway, Light & Power Company, Birmingham, Ala.—This company will erect a brick building 140 ft. x 30 ft. at Bessemer. Plans are being prepared by D. O. Whilldin, 711 Title Guarantee Building, Birmingham. G. C. Estill, engineer.

Mason City & Clear Lake Railway, Mason City, Ia.—This company is reported to have awarded the contract for the construction of its car house, at Emery, to Fred Lippert, Mason City. The building will be built of concrete, 210 ft. x 55 ft. [E. R. J., Sept, 18, '09.]

Topeka (Kan.) Railway.—This company has been given permission to build an addition to its car house on Jackson Street, Topeka. The new building will be 75 ft. x 104 ft., and will cost about $8,000. [E. R. J., Aug. 7, '09.]

Hudson & Manhattan Railroad, New York, N. Y.—This company has commenced work on the car house to be located at Henderson Street and Steuben Street, Jersey City, N. J. The plan is to connect this structure with the tunnel at Henderson Street and Railroad Avenue, where the cars come to the surface from the tunnel.

Oklahoma (Okla.) Railway.—This company, it is reported, will start construction on a 6-story terminal building at Grand Street and Hudson Street on Nov. 1. The building will be 50 ft. x 100 ft., fronting on Harvey Street, and will cost approximately $200,000. The first floor will be composed of store rooms, a general waiting room and ticket office. One entire floor, probably the second, will be occupied by the Oklahoma Railway, and the remaining floors by office tenants. A smaller building will be erected opposite the train sheds for the use of the transportation department of the railway, and for employees' rooms. For the present the first wing of the building only is being considered.

POWER HOUSES AND SUBSTATIONS

Illinois Traction System, Champaign, Ill.—It is stated that this company is to install a substation at Harristown.

Metropolitan Street Railway, Kansas City, Mo.—This company has constructed a new substation, 100 ft. x 34 ft., at Tenth Street and State Avenue, adjoining the car house at Tenth Street and Minnesota Avenue, Kansas City, Kan. The building is equipped with a transformer and converter. Room has been provided for two more converters and two generators.

Utah Light & Railway Company, Salt Lake City, Utah.—This company has commenced work on its new power house, on the Davis and Weber Counties Canal, in Weber Canyon. The building, which will be constructed on concrete with a structure of steel and brick, is to be 53 ft. x 73 ft. The plant and equipment will involve an expenditure of nearly $400,000. One 2500-kw generator, directly connected to a 5000-hp Pelton turbine, will be installed, and sufficient space will be allowed for another generator, which can be installed later. The plant will be fully fitted with traveling cranes and other equipment. It is estimated that the building will be completed within the next 60 days. The water supply for the plant will be through a 9000-ft. pipe line, 2000 ft. being of 84-in. concrete pipe, and 7000 ft. of 74-in. wood-stave pipe. The plant will be operated under a head of 180 ft. The dam, which is to be constructed of reinforced concrete, will be 14 ft. high and 125 ft. wide, causing a backwater of approximately three-quarters of a mile. The power generated at this plant will be carried, by means of a steel tower line, a distance of about 5 miles to the present transmission line from Ogden to Salt Lake City. P. J. Moran, Salt Lake City, contractor.

Winchester & Washington City Railway, Winchester, Va.—It is stated that this company will build a large auxiliary steam power plant at Millville. The new plant will have a capacity of 1500 hp and will supplement the current generated by the water power furnished by the Shenandoah River. D. M. Swink, superintendent. [E. R. J., Feb. 13, '09.]

Spokane, Walla Walla & Western Railway, Walla Walla, Wash.—It is announced that this company has located a power site on the Tucannon River, 33 miles from Dayton, capable of developing 4000 hp. The proposed route of the railway is from Dayton to Wallula, 63 miles. [E. R. J., Aug. 28, '09.]

Manufactures & Supplies

ROLLING STOCK

Yakima Valley Transportation Company, North Yakima, Wash., has ordered two 20-ft. closed cars from the Danville Car Company.

Connecticut Valley Street Railway, Greenfield, Mass., has ordered two 30-ft. closed cars from the Wason Manufacturing Company for November delivery. These cars will have a seating capacity of 44, have wooden bodies with metal underframes and will be finished inside with mahogany. National AA-1 air brakes, Peacock hand brakes, Smith hot-water heaters, Crouse-Hinds headlights, four Westinghouse 101-B motors, New Haven registers, Murphy sanders, Heywood Brothers & Wakefield plush seats, Sterling-Meaker trolley bases and Taylor trucks and journal boxes were specified.

Interborough Rapid Transit Company, New York, N. Y., Manhattan Division, has drawn up the following specifications for the 20 trailers ordered from both the St. Louis Car Co. and Wason Manufacturing Company, the 20 motor cars from Jewett Car Company and the 40 motor cars from Barney & Smith Car Company, as reported in the ELECTRIC RAILWAY JOURNAL of June 5, 1909:

Seating capacity.....48
Weight.....21,000 lb.
Bolster centers....33 ft. 2 in.
Length of body....39 ft. 8 in.
Length over vestibule .....47 ft. ½ in.
Width over sills... 8 ft. 6 in.
Width over posts at belt ..... 8 ft. 8 in.
Sill to upper deck 9 ft. 6⅜ in.
Height rail to sills....40⅛ in.
Body.....Wood, with metal posts and sash
Interior trim.....Mahogany
Underframe .....Wood
Air brakes.....Westinghouse
Axles....Cambria & Midvale
Brakeshoes..National Brakeshoe Company
Control system..GE & West
Couplers.....Van Dorn
Curtain fix....Curtain S. Co.
Curtain material...Pantasote
Gears and pinions.....West
Heating system.Consolidated
Journal boxes....Symington
Motors....Westinghouse 302
Sash fixtures, Forsythe Bros. Co.
Seats.....Heywood Bros. & Wakefield Co.
Seating material.....rattan
Springs.....Union Spring & Mfg. Co.
Trucks, type..Hedley patent under St. Louis cars; Manhattan standard under others built by St. Louis Car Company, Wason Manufacturing Company and Standard Motor Truck Company
Wheels..Midvale, steel-tired

The company has called for the following details on the 110 cars ordered for its subway division from American Car & Foundry Company, the 40 from Standard Steel Car Company and the 100 from the Pressed Steel Car Company, as mentioned in the ELECTRIC RAILWAY JOURNAL of June 12, 1909:

Type of car.....Center door
Seating capacity.....48
Bolster centers.....36 ft.
Length of body...39 ft. 4 in.
Length over vestibule .....51 ft. ½ in.
Width over sills... 8 ft. 7 in.
Width over posts at belt ..... 8 ft. 7 in.
Sill to upper deck 8 ft. 8⅜ in.
Height rail to sills 3 ft. 2⅛ in.
Body .....steel
Interior trim.....steel
Underframe .....steel
Air brakes.....Westinghouse
Axles....Cambria & Midvale
Brakeshoes..National Brakeshoe Company
Control system..GE Type M
Couplers.....Van Dorn
Curtain fix....Curtain S. Co.
Curtain material...Pantasote
Gears and pinions.....GE
Heating system.Consolidated
Journal boxes....Symington
Motors.....GE 212
Seats.....Heywood Bros. & Wakefield Co.
Seating material.....rattan
Springs .....Union
Trucks.Hedley patent motor, Hedley patent trailer, American Locomotive Company and Standard Motor Truck Company
Wheels...Schoen solid rolled steel

TRADE NOTES

M. L. Newman & Company, New York, N. Y., announce that they have moved their office from 25 Broad Street to the United States Express Building at 2 Rector Street, New York City.

Perry Ventilator Corporation, New Bedford, Mass., announces the receipt of an order from The J. G. Brill Company, Philadelphia, Pa., for ventilators for the equipment of the 80 cars now building for the Pittsburgh (Pa.) Railways.

Hill Clutch Company, Cleveland, Ohio, which manufactures power transmission machinery, announces the appointment of G. W. Hoffman as sales engineer in charge of the company's Chicago office, which is located at room 610, Marquette Building.

H. H. Gerhard, manager of the C. A. Wood Preserver Company, Austin, Tex., and Dr. E. P. Schoch, chemist

of the company, have returned from a trip through Europe, during which arrangements were made to double the output of the C. A. Wood Preserver Company to meet the increasing demands of electric railway companies for this product. Mrs. Gerhard accompanied her husband on his tour.

S. E. Bastow, of Bruce, Peebles & Company, Ltd., was entertained at dinner recently by a number of his friends in Edinburgh, preparatory to leaving for a tour around the world on behalf of Bruce, Peebles & Company. Mr. Bastow left by the "Tunisian" from Liverpool for Canada, and will proceed to Australia, New Zealand and South Africa. He expects to be away for at least six months.

National Railroad Trolley Guard Company, 37 Wall Street, New York, N. Y., advises that it has closed the following contracts recently: Buffalo & Lake Erie Traction Company, 1000 ft.; Utica & Mohawk Valley Railway, 200 ft.; Cortlandt County Traction Company, 400 ft.; Middlesex & Boston Street Railway, 100 ft.; York Railway, 600 ft., and the Philadelphia & West Chester Traction Company, 250 ft.

Power Specialty Company, New York, N. Y., announces that it has removed its St. Louis office to Chicago, Ill., and that R. D. Nutting has been made manager at Chicago and Robert H. Wyld, who was with the company in St. Louis, has been made assistant manager. Alexander Bradley, Chicago, has been transferred to the works of the company at Dansville, N. Y. All correspondence heretofore addressed to the company at St. Louis should now be addressed to the company at 450 The Rookery, Chicago, Ill.

Western Electric Company, New York, N. Y., reports that gross sales for September show little variation from the July and August totals. Compared with a year ago, however, September orders increased 50 per cent, and were practically identical with those for September, 1907. The Western Electric Company has now completed 10 months of its current fiscal year. During this period orders have been running at the rate of $47,000,000 per annum, compared with $33,000,000 of gross business for the fiscal year ended Nov. 30, 1908, an increase of about 45 per cent.

Sheffield Gas Power Company, Kansas City, Mo., has purchased the entire assets, factory and good will of the former Weber Gas Engine Company. The factory of the Weber Gas Engine Company was operated throughout the term of the receivership, and has been operated by the Sheffield Gas Power Company without interruption, with the result that the company is in position to furnish the entire line of Weber gas engines and gas producers without delay to any customer. The management of the business, as well as the sales and factory departments, are in new hands. George M. Hawes, the president of the company, is a graduate of the Massachusetts Institute of Technology and has been interested in machinery and electrical work for a number of years, giving particular attention to central station power plants. He has also devoted much time to gas engine and producer design. Freeman Field, vice-president and treasurer of the company, has devoted the past 12 years exclusively to the gas engine business, both in the manufacturing and selling branches, and for the last seven years has been connected with the Olds Gas Power Company as general sales manager and Western manager. W. H. Spiller, assistant manager of the company, studied engineering at Harvard and Brown University and is well informed on power-plant work, having installed both steam and gas power in many industries. During the past six years he has been affiliated with gas power interests in both the selling and manufacturing lines.

ADVERTISING LITERATURE

Pacific Electric Heating Company, Ontario, Cal., is mailing an illustrated booklet entitled "Hot Points," which contains facts about its line of electrical cooking utensils.

Enterprise Supply Company, Chicago, Ill., has printed a folder containing directions for applying Enterprise varnish renovator. The company is also distributing circular matter on its vestibule curtain rod rubber tips.

Nelson Valve Company, Philadelphia, Pa., has issued a 12-page catalog which contains an article entitled "Gate Valve Design" by Carlisle Mason, in which the subject "Solid Wedge versus Double Disk Valves" is considered. The publication is illustrated.

Pettingell-Andrews Company, Boston, Mass., has issued the October number of *Juice*. It contains notes on opalux reflectors, tungsten lamps for sign and decorative lighting, a new type of condulet and an article entitled "Transformer Bushings," by H. W. Young.

American Vulcanized Fiber Company, Wilmington, Del., is distributing a catalog and price list on vulcanized fiber. Illustrations are presented of the different forms of vulcanized fiber, accompanied by a complete description and price list. Two views of the company's plants at Wilmington and Newark are also shown.

American Blower Company, Detroit, Mich., has just issued a little folder called "A Little Noise," showing a number of its engines which have been installed in different parts of the country. Accompanying the illustrations are presented letters and reports received by the company as the result of its system of following up periodically every engine shipped from its plant.

Electric Storage Battery Company, Philadelphia, Pa., has issued bulletin No. 116, dated October, which contains a reprint of the paper entitled "Some Points on the Operation and Care of Exide Vehicle Batteries," read by H. M. Beck, engineer operating department of the Electric Storage Battery Company, at the convention of the Society of Automobile Engineers, held in Chicago on Aug. 5, 6 and 7, 1909.

Dearborn Drug & Chemical Works, Chicago, Ill., have issued a souvenir booklet entitled "Water Treatment." The publication is a very artistic one and, besides illustrating and describing the facilities of the company for the work which it does in treating water so as to prevent boiler scale, it takes up separately the questions of the treatment of water for locomotive boilers, stationary boilers and marine boilers, and shows by the reproduction of photographs the corrosion and destruction which are caused by untreated boiler water. A section of the publication is devoted to the work of the department which handles lubricants.

Henry W. Brooks, Jr., & Company, 15 Wall Street, New York, N. Y., are distributing a pamphlet on the Corporation Tax Law passed by Congress with the Tariff Law containing a full text of the Act. The Corporation Tax Law is applicable to practically all corporations earning $5,000 a year, net. The method of arriving at the so-called "net income" under the law is complex and not in accordance with the manner in which corporation books are generally kept. The first tax report for the year ended Dec. 31, 1909, will soon be due and corporation officers will find the pamphlet by Brooks & Company of considerable interest.

Fairbanks, Morse & Company, Chicago, Ill., have issued a very complete catalog on windmills, tanks and pumps. The theory and details of construction are analyzed and published completely for the first time in this publication. Pumping systems and the new Femco underground force pump are described in detail. Fairbanks, Morse & Company have also issued a new catalog of their small engines from 1 to 12 hp, in which they describe for the first time their new 1-hp engine "Jack Junior." The cover is printed in colors and is illustrated with a view of a model farm equipped with up-to-date machinery.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has issued a booklet entitled "How the Telephone Helps the Farmers," a short story in which one of the characters is without telephone service being used to impress readers with the necessity of the telephone. A model constitution and by-laws for a rural telephone company are also published. A few pages are devoted to a description of telephone lines and their construction. The rest of the booklet contains description of the different types of telephones and switchboards manufactured by the company. It is profusely illustrated with views of the company's buildings and of different departments in which the apparatus is manufactured.

The J. G. Brill Company, Philadelphia, Pa., in the September issue of *Brill's Magazine* published the ninth of a series of articles on conditions which govern the type of car used in large cities. The articles in the current issue describe the conditions in Boston, Mass. Among the other articles are descriptions of new cars for the Illinois Traction System, the Pittsburgh & Kansas City Railway and the Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company, also an article entitled "Something About Snow Removing." The company has also printed a 24-page catalog devoted to single trucks. The principles of design and operation of the different types of these trucks are fully described and illustrated. The publication also contains a number of half-tones showing the recent types of cars mounted on Brill single trucks and line drawings accompanied by dimensions for the Brill single trucks Nos. 22, 22E, 22 Special and No. 39E. The company has also issued a catalog descriptive of its half-ball brake hangers. In connection with the descriptive matter there are a number of illustrations showing the hanger adjusted to different types of Brill trucks with inside and outside-hung shoes. A drawing gives the details of the half-ball brake hanger and method of attaching it. The parts of this hanger and shoe holder for Brill trucks are also illustrated.

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Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

Effect of Fare Change in Philadelphia

The last annual report of the Philadelphia Rapid Transit Company, covering the operations for the year ended June 30, 1909, contains an interesting analysis of the results of passenger traffic as compared with those of the preceding 12 months. Withdrawal early in May, 1909, of the arrangement by which the company sold tickets permitted a notable improvement in the showing. While the new scheme was in effect during less than two months of the fiscal year, its influence is indicated by the average gross revenue per passenger carried of 3.94 cents for the year, as compared with 3.57 cents for the year ended June 30, 1908. This is an increase in the revenue per passenger carried of 10.6 per cent. It is evident that if so material a change is produced in the yearly comparison when the improvement in the fare situation was in force during less than two of the entire 12 months, a more impressive showing should be made in the future. There were corresponding changes in other respects, bearing upon the final result. The decline in the total number of passengers carried is indicated by the figures presented for the two years, 464,264,656 and 512,869,023 for 1909 and 1908, respectitvely. Of the total for 1908-09 cash was paid by 37.3 per cent, as compared with a corresponding figure of 14.8 per cent in the previous 12 months. These figures disclose to some extent the improvement which has been made, but the real financial benefits which the company will receive from the changes should be made plainer in the next annual report.

Standardizing Details of Electric Railway Apparatus

An electric railway company on the Pacific Coast recently found that it had on hand a large number of trolley clamps which had been removed during the reconstruction of one of its overhead lines. They could have been used over again by renewing the screws, but when new screws were sought in the storekeeper's stock none could be found to fit. The original screws were not of any standard size, and it would have cost more to send East to the makers of the clamps for new screws than the second-hand clamps were worth. This same company had a similar experience in renewing a broken cap screw on a motor-generator set. The machine was out of commission for more than two weeks while a new screw was being shipped from the Atlantic Coast in response to an urgent telegram. Many other companies, doubtless, have experienced similar annoyances. No company can afford to fill its stock room with special sizes of nuts and bolts, screws and other small hardware which in general practice are well standardized, yet this is the only recourse for those which are situated far from the source of supply of their apparatus.

The trouble originates probably with the engineers who work out the designs of the apparatus and apply pure theory to attain the desired result. By a slight divergence from theory, which would in no essential affect the design, some standard part could be made use of. In the design of railway motors, for example, it would be difficult to find two different types of motors in which the same bearings could be used. The individuality of the designer is apparent in every detail. The men who design the apparatus are seldom sent out to install it, and even if they are they

rarely stay on the ground long enough to deal with the problem of making repairs and trying to replace parts which can be obtained only in a factory thousands of miles away.

The manufacturers of electric railway supplies and their customers are constantly getting closer together and working more and more in harmony. It is as much the duty of the railway companies to advise the manufacturers of their troubles in such matters as the one under discussion as it is the duty of the manufacturers to use every effort to avoid the possibility of creating similar difficulties in the future. Progress can be made only by the interchange of the results of experience.

Spending Dimes to Earn Dollars

The operation of an electric railway involves so many engineering questions that a manager whose technical training overshadows his commercial instincts often fails to secure the best results, measured in net earnings, because of too keen a desire to handle the equipment in his charge from the standpoint of theoretical efficiency instead of adapting it to attract the greatest possible number of passengers. The chief engineer of a large system recently proved by experiment that if the motors under the cars were operated exactly in accordance with their characteristics, the power consumption could be cut down from 10 per cent to 20 per cent without affecting the schedule speeds then in force. When these figures were placed before him, the general manager admitted without hesitation that the economies outlined were perfectly feasible. He pointed out, however, that it might prove more profitable to raise the schedule speed of the cars so that more patronage might be obtained without increasing the amount of rolling stock required to handle it. Although the directors were anxious to keep the power expense to a minimum, the general manager even recommended the installation of extra lamps at all stations to make them more prominent and attractive. After some opposition, both recommendations were put into practice, with the result that the passenger traffic within a year grew far beyond the normal increase of preceding years. The public had been quick to recognize the improvement in the service, and the manager was able to demonstrate to his directors that the company could well afford to spend more money for power and lighting in view of the large increase in gross earnings.

Exposing the Reckless Handling of Equipment

In looking over the daily "pull-in" list of any railway company the most conspicuous item is that under the heading of "Motor Failures." This is natural enough, since the armature, commutator and bearings require constant scrutiny. The car motors are in the joint care of the transportation and mechanical departments, both of which must perform their duties conscientiously if trouble is to be avoided, but where such a division of responsibility exists there are bound to be more or less acrimonious disputes as to what share of guilt should be assigned to each. Most disagreements of this kind may be avoided, and a healthful discipline may be instilled in both departments by following the unique photographic method started a couple of years ago by a Canadian railway company. Whenever a broken-down motor is brought into this company's shops the defective part is removed at once and a photograph is taken of it if it is apparent that the trouble arose from an employee's negligence. Should the piece examined be a burnt-out armature which shows no evidence of poor winding or defective insulation, the failure may be justly ascribed to fast feeding; on the other hand, if the armature has fallen on the pole pieces because of low bearings, careless inspection is manifest. The photograph, with a brief explanation underneath, is then posted in the shop or division headquarters where the culprit is employed. In the same way, photographs could be taken of other objects, like dropped gear cases which have been dragged along the pavement for needlessly long distances. This practice has had such a salutary effect on the motormen and shopmen in showing them how bad work soon betrays itself that the occasions for making these photographs have become very rare.

Carbon Brush Progress

Many electric railways are not in a position to assume the expense of making elaborate tests to determine the life and quality of different kinds of equipment. Such a task necessarily must be taken up either by the larger companies which possess the expert engineers and the proper research facilities or by some special committee of one of the electric railway associations. The great improvements in carbon brushes during the past two years afford a striking proof of the value of both the pioneer brush experiments made by several large companies and of the specifications drawn up last year by the committee of the American Street & Interurban Railway Engineering Association. Perhaps the most elaborate practical tests of carbon brushes were made by the Interborough Rapid Transit Company, of New York, and the Brooklyn Rapid Transit Company. The unusually severe operating conditions on the lines of these two companies not only developed the need for higher grade brushes, but also showed that even in normal service it pays to use the costlier brushes, because of the great decrease in commutator troubles. These private experiments were worthily supplemented by the standards prepared by the committee of the Engineering Association, and all the data so gathered have proved of the greatest educational value in making clear to the average railway man the qualities which are essential in a satisfactory brush and how to know that the brushes furnished fulfill the requirements. That the interest thus awakened in the carbon brush question has been cordially appreciated by the manufacturers is demonstrated by their production of higher grades, which can be sold on the sound basis of long life and freedom from trouble rather than lowest first cost.

Electric Car Repairmen

The creation of a new trade of electric car repairman, suggested by W. H. Evans in a resolution presented to the American Street & Interurban Railway Engineering Association at Denver, has many arguments in its favor. The lack of good all-around repairmen in electric railway shops, especially in the smaller cities, is a serious handicap to economical maintenance. Specialization in all trades has obliterated the handy man who could do anything from painting to watch repairing. Men who can manipulate a

lathe or a drill press, do a little carpentry work, make a forging, splice a wire and clean windows are hard to find. The average electrical workman knows nothing of the construction and operation of railway motors and control apparatus, his electrical training having been received generally in the employ of some contractor who installs electric bells and house wiring for lights. To expect such a man to assume the responsibility of inspecting and repairing a motor armature is out of the question until he has had at least a few months' experience in the shops. In the established trades a journeyman can usually be depended upon to assume at once any duties of his trade, without more than perfunctory instructions. If it were possible to create a condition in the electric railway shops throughout the country whereby a new man presenting a certificate of previous employment as a car repairer could be given responsible work immediately, the problem of shop organization and management would be greatly simplified.

To establish such a trade and train a large number of capable and efficient workers would require the expenditure of much time and some money. Naturally, the larger companies, with their big shop organizations, would have to be depended upon to begin the work. After a time, however, the smaller shops could turn out well-trained journeymen who, in some respects, might be superior to the product of the large shops. The training of apprentices in steam railroad shops, as practised by the Pennsylvania, New York Central, Santa Fe and other large railroad systems, affords a good example of how the work might be started. Mr. Evans' suggestion is well worth careful consideration by the association and all the member companies.

Kansas City Ordinance Introduced

The proposed extension ordinance of the Metropolitan Street Railway, of Kansas City, has been introduced formally into the City Council and referred to a committee of that body for proper consideration. Attention has been called in these columns heretofore to the argument of the company in answer to the criticism against the ordinance that it extends for 16 years a franchise which does not expire until 1925, and this argument gains strength as time passes. The tedious progress of the negotiations in other cities, and especially the interminable controversy in Cleveland, support the assertion of the management of the Kansas City company that postponement of action until near the date of expiration of existing rights has "brought about conditions which were highly detrimental, both to the interests of the company and to the interests of the community."

A reading of the text of the ordinance shows a close analogy between some of its provisions and those embodied in the Chicago contracts. While amendments have been offered since the introduction of the ordinance, the original measure provided that fares were not to be reduced before June 1, 1925, but from that date the city should have the right to regulate the rates by ordinance subject to the conditions that no rate should be fixed or allowed to remain in force "the effect of which is to reduce below 6 per cent the annual return upon the then capital investment," and that a fund should be established to amortize the capital investment. The fares, however, may be reduced under a provision outlining a method whereby the city may apply its share of the earnings in this manner. The division of the net receipts between the city and company is to be on the basis of 50 per cent to each, with credit to the company for city license fees, if any are exacted and also with deduction, prior to the division, of 4 per cent of the net receipts for application to the credit of the capitalization account. The share of the city must be equal to at least 5 per cent of the gross receipts.

An effort is made in the language of the section relating to transfers to guard against the improper use of the privilege, which is intended to be universal. Existing privileges of this character are to be continued unless circumstances shall render them unreasonable, but under no construction are passengers to be enabled to make a "loop" trip with the payment of one fare. Important provisions are those reserving to the city the regulation of transfers and, at its election at any time, the right to confine the transfer privileges to the limits of Kansas City, Mo., or any one or more of several cities mentioned, which are tributary to that municipalty. Power to restrict the use of transfers and to prevent, so far as possible, the abuse thereof, is clearly in the interest of the city, since it shares in the earnings.

The city may require extensions and connections where reasonably necessary for the convenience of the inhabitants of the city, but the aggregate prescribed shall not exceed on the average more than 2½ miles of double track, or 5 miles of single track.

Respecting "maintenance, repairs, renewals and depreciation" it is provided that the company "at all times shall maintain" the "system and its entire equipment, plant and appurtenances in first-class condition" by such expenditures "for maintenance, repairs or renewals as may be necessary or appropriate to give the public first-class street railway service in all respects." The expenditures for maintenance and repairs shall be equal to at least 12 per cent of the gross receipts. In addition thereto, the company, after Jan. 1, 1914, shall set aside monthly a sum equal to 4 per cent of the gross receipts to constitute a reserve fund to take care of renewals, betterments and depreciation. This is a minimum amount and does not lessen the obligation of the company to expend whatever sum may be necessary for maintenance, repairs, renewals and betterments to keep the system in first-class condition.

The city may purchase the property after 1924, but only for municipal operation in case of purchase prior to June 1, 1941. The present value in the event of purchase is fixed at $33,500,000, and there would be added the value of additions and betterments properly chargeable to property account. The city may purchase subsequent to 1924, free from any restriction as to operation, at an equivalent price plus 10 per cent. The Kansas lines and property may be omitted by the city, if desired, in exercising the right to purchase. The beneficial interest of any licensee that may enter into a contract if purchase is made by the city shall be limited to a return of the actual money invested therein by the licensee and not exceeding 5 per cent in addition and interest upon the money and the additional per cent at a rate not exceeding 5 per cent per annum, all net profits in excess of the beneficial interest, as limited, to belong to the city.

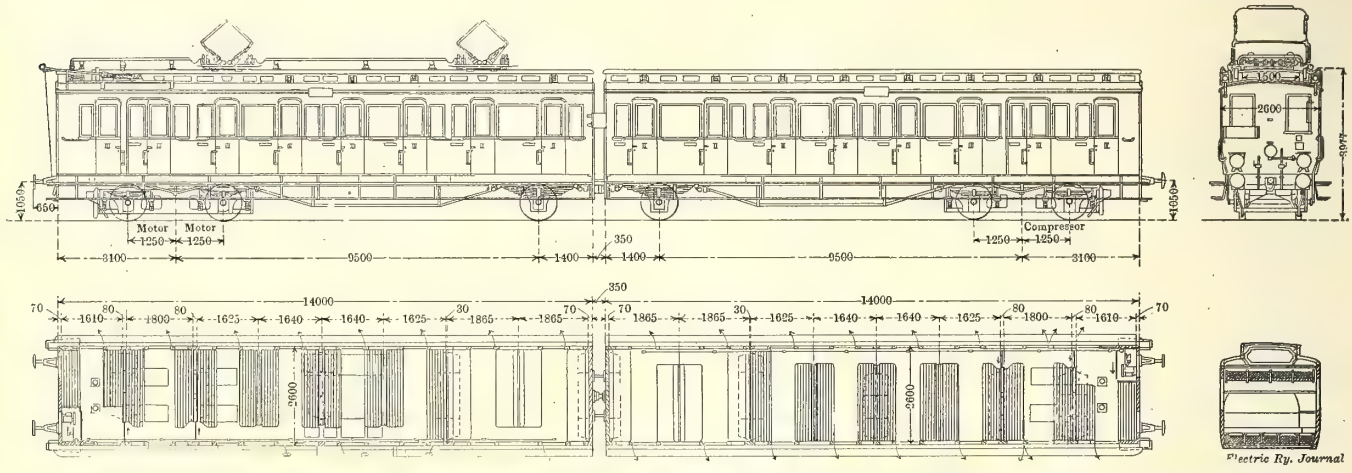
RECENT IMPROVEMENTS ON THE HAMBURG-BLANKENESE-OHLSDORF HIGH TENSION, SINGLE-PHASE RAILWAY

The Hamburg-Blankenese-Ohlsdorf Railway, which is a single-phase line connecting the city of Hamburg with both eastern and western suburbs, was completed on Jan. 29, 1908, and its main constructional features were described in the Street Railway Journal for April 6 and Oct. 12, 1907. The original rolling stock consisted of 60 motor cars, 54 of which were furnished by the Allgemeine Elektricitäts-Gesellschaft and 6 by the Siemens-Schuckert Werke. The coaches were of the so-called twin-car type; that is, a double body close-coupled and without intermediate platforms. Each of the Allgemeine cars carried three 115-hp Winter-Eichberg motors, two of which were carried on the forward truck of the first half and one on the rear truck of the second half. The intermediate portion of the double car was mounted on two single axles. Since installing this equipment the railway management has ordered 42 additional motor cars from the Allgemeine company and eight from the Siemens-Schuckert Werke.

The new A. E. G. coaches have the same side arrangements as the original ones, but differ in other respects, particularly in the use of two 200-hp W E-70 motors per car instead of three 115-hp motors. These larger motors are placed on the forward truck, while the rear truck is used only for the compressor apparatus. All trains are made up of motor cars only.

MECHANICAL FEATURES OF THE NEW CARS

The first half of an A. E. G. motor car contains the high-tension chamber, the motorman's cab with five third-class and two second-class passenger compartments. The third-class compartment nearest the motorman's cab has folding seats, so that it can be used for express packages when necessary. The second half comprises a motorman's cab, four third-class and three second-class compartments. The motorman's cab is really a two-seated partitioned chamber in one of the third-class compartments, and is used by passengers when the car is operated from the front end. The compartments of the same class are joined by a corridor, but there is no communication between the two classes or the two halves of the car. The average seating capacity of a complete car 28 m (91 ft.) over all is 120, and the weight without passengers 62 metric tons.



Hamburg-Blankenese-Ohlsdorf Railway Improvements—Elevation, Plan and Sections of New A. E. G. Car (All Dimensions Are in Mm.)



Hamburg-Blankenese-Ohlsdorf Railway Improvements—Latest Type of A. E. G. Motor Car

The roof is covered with grounded, leaded sheet iron, which is nailed to wood covered with duck cloth. The floor consists of a double layer of wood to which asbestos plates are nailed. A sheet-iron floor covering is also applied where there are no conduits. As in the case of the

original cars, the wiring was installed right side up before the floor was attached to the rest of the car body. This method was illustrated in the souvenir issue of the Street Railway Journal dated Oct. 12, 1907. The cross-beams under the new cars are about 3 in. from the floor to allow the conduits to be attached to the floor throughout. The trucks have wheels 39.37 in. in diameter and a wheel base of 8 ft. 2 in. The Knorr compressed air brake system used on all cars applies the brake shoes only on the eight truck wheels. Hand brakes are also provided and a short-circuiting brake may be used in emergencies.

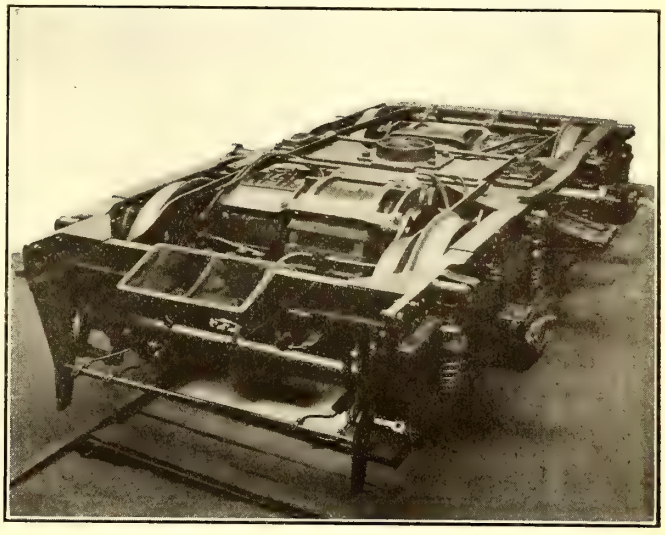
ELECTRICAL FEATURES OF THE NEW CARS

The cars are normally operated with current taken at 25 cycles, 6000 volts, but at the stations the trolley potential is only 300 volts. The high-tension, double-catenary trolley is zigzagged above the center of the track at heights varying from 15 ft. 9 in. under bridges to 17 ft. in the open; the low-tension trolley is 14 ft. 9 in. above the rails and from 4 ft. to 6 ft. off center. The high-tension current is collected by two bows on the first half of the car. These bows have aluminum contact pieces 4 ft. 3 in. long and are raised and lowered by air. The low-tension wheel collectors are mounted along opposite sides of the first car half, and as they cannot attain a height greater than 15 ft., there is no possibility of their coming into contact with the high-tension line.

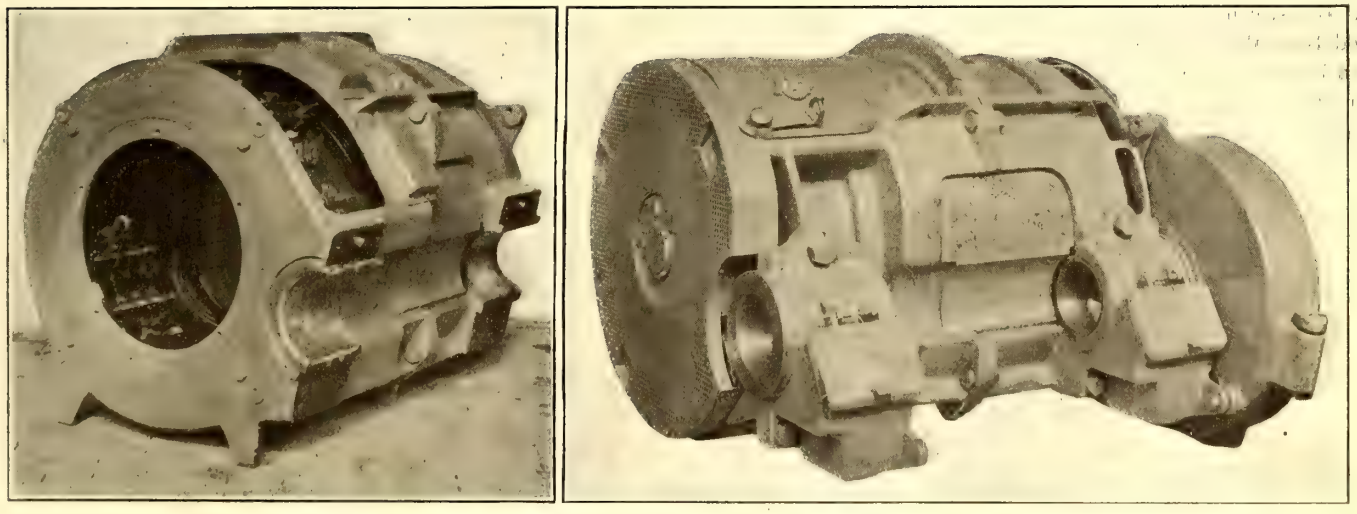
The new W E-70 motors are of the interpole type and rated at 200 hp each on a one-hour basis when running at 500 r.p.m. with closed covers and rated at 100 hp each for continuous running. The weight of a motor alone is 6490 lb. and with gearing 7260 lb. The stator is a one-phase winding without crossings from other phases and consists simply of main and interpole coils connected in series. The interpole winding is joined to taps from the exciter transformer, by which it is so influenced that it delivers a practically correct cross-field to counterbalance the so-called transformer electromotive force. The latter is generated by the alternating magnetic field in the armature coils short circuited under the brushes. At the same time these interpoles also give a component field to take up the commutation voltage which occurs in a single-phase just as in a direct-current motor. The electrical qualities of this motor permit larger air gaps than hitherto without affecting the efficiency. The stator winding has six main poles, each of which consists of three coils. There are three commutating poles for the six main poles. The armature has windings of the normal d.c. form made of copper ribbon which are held in the half-closed slots with wooden wedges. The gear side of the armature has a centrifugal ventilator which drives air through the armature and commutator. There is no danger from dampness, as this air is not permitted to come into contact with current-carrying parts. The motor is lubricated with oil pads, which have been found effective and economical.

One of the accompanying drawings is a simplified diagram of the motor car connections. The high-tension current, after passing through a choke coil and automatic oil switch, goes to the high-tension winding of the load transformer and is then grounded. This transformer has two low-tension coils, one with a maximum potential of 780 volts for the motor circuit and another of 300 volts for the control, lighting, compressor and heating circuits. The main low-tension coil is grounded and also has an automatic cut-out to prevent abnormally high potentials. The motorman's cab contains an oil switch which has one connection on each side to a grounding switch. When the door of the high-tension compartment is opened this switch immediately grounds all apparatus therein through a copper bar which is connected to the metal car framing.

The motor current travels from the main transformer

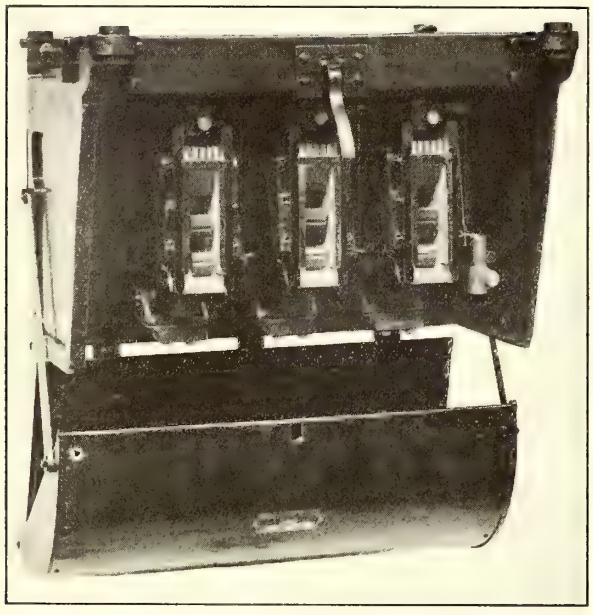


Hamburg-Blankenese-Ohlsdorf Railway Improvements—Truck Carrying Two of the New Single-Phase Motors



Hamburg-Blankenese-Ohlsdorf Railway Improvements—Two Views of the New Single-Phase Motor

through certain contactors and safety devices to the leads of the stator winding, from whence it proceeds in order to the exciter transformers, to the motor separating switches, and thence to another group of contactors, where the circuits are united before they return to the transformer. A branch of the motor current is conducted to the voltage selector. The exciter current goes from the exciter transformers to the reversers, from which it passes to the exciter



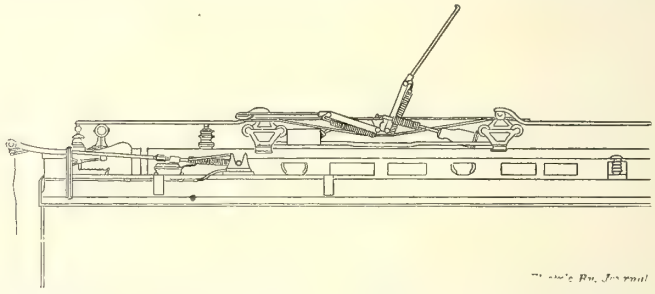
Hamburg-Blankenese-Ohlsdorf Railway Improvements—Group of Three Contactors with Cover Down

brushes of the armature and returns in the opposite order. The contactor which takes care of the interpole winding is connected to certain points of both the motor stator and exciter transformer windings. When this contactor is closed that portion of the stator winding which serves for the interpole winding receives part of the voltage of the exciter transformer. The contactors and reversers are operated from the controller.

When it is necessary to change from high-tension to low-tension operation the bow collectors are pulled down and the wheel collectors raised by means of a voltage changer. This device embraces two magnet coils, one of which is connected through a fuse to the 300-volt coil of the main transformer and the other is connected through a second fuse to a point which receives current from the low-tension trolley line. The action of the corresponding magnet coil of the voltage changer will keep one collector up whenever the other is down. The voltage changer is connected to the low-tension trolley and the low-tension coil of the main transformer. The latter coil is connected to the contactor circuit only when current is being collected at the higher potential. When the motors are on the low-voltage trolley the contactors are in that circuit.

With the 300-volt trolley potential in use, the controller can be operated only on the first and second running points as follows: The low-tension current on leaving the collector passes through a separating switch, cable connection-box, main fuse, voltage changer, contactor and motor separating switches to the exciter transformers. Thence the current goes to the motor connections of the stator windings, motor fuses and through a contactor set for the first and second positions to the voltage changer to ground.

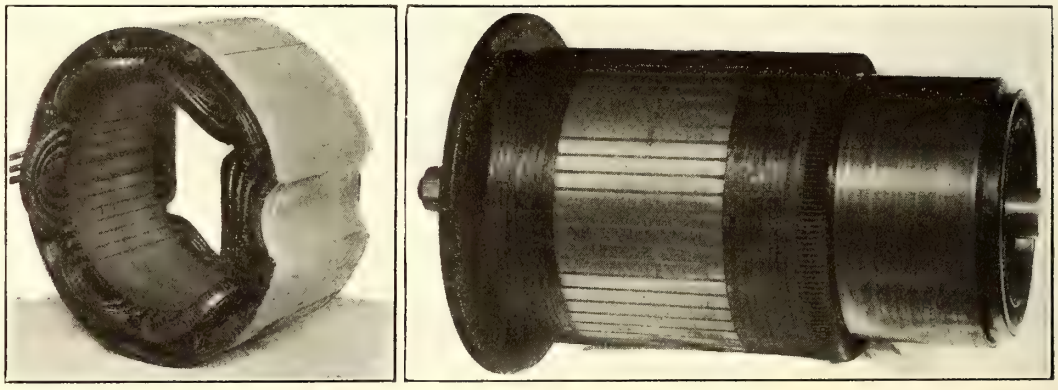
As previously mentioned, the auxiliary circuits are supplied from a separate low-tension coil of the main transformer when the high-tension trolley is in service. One end of this coil is grounded and the other, or 300-volt end, joined to the voltage changer, from which it branches into circuits for compressors, control and light, all of which are fused in a box under the car body. From this fuse box two feeder cables are led to the low-tension panels in the motorman's cabs and then divided in the usual way. The compressor circuit goes from the panel in the rear half of the car over a switch common to both the compressor and



Hamburg-Blankenese-Ohlsdorf Railway Improvements—High-Tension and Low-Tension Collector

control circuits, through the compressor fuse and compressor contactor to the motor, from which it is led to grounding busbars on the low-tension panel. The compressor contactor will be discussed later.

The control circuit passes from the two panels mentioned through switches and fuses to the controller. If the controller is in the "off" position the control circuit is broken. The various pieces of apparatus receive control current over two cylinders in the controller. The current which goes through the larger of these cylinders passes through the contacts of a snap-finger or dead-man's button, the current being interrupted whenever the button springs up. This cylinder also supplies current to the reverser over the contacts of the reverse cylinder whenever the latter is in the full forward or backward position. If the reverse cylinder is in a half-way position the reverser receives control current direct without the intervention of the main



Hamburg-Blankenese-Ohlsdorf Railway Improvements—Stator and Rotor of New Single-Phase Motor

cylinder and dead-man's contacts. Hence the reverser will take the proper position as soon as the reverse cylinder reaches the half-way point. The reverser has two magnet coils, one for forward running and the other for reverse running.

The control current circuits, which run to the connection board in the first half of a motor car, pass through a so-called group release. The function of the latter is to cut out all control devices on one car as soon as a defect occurs in the control circuits.

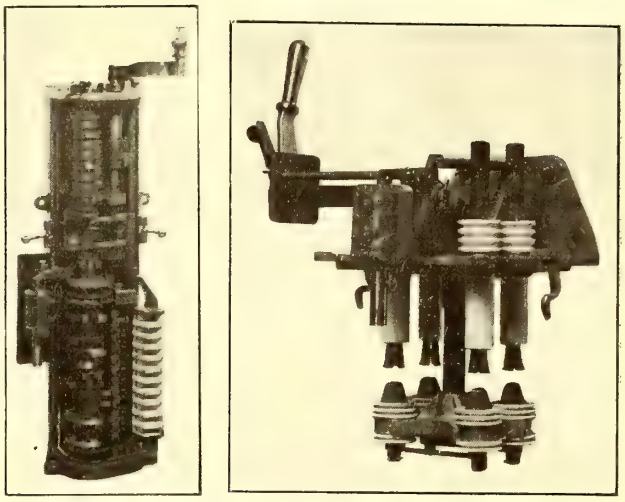
To keep down the power station peaks the heater contactors are only in circuit when the motors are not receiving current. They are controlled for all cars from a control circuit connection board in the motorman's cab, but a special switch on the main low-tension panel makes it possible to cut out the heater contactors of individual cars. The compressor motors are also supplied through contactors by current which passes over the reverse cylinder of the controller, but not through the contacts used in connection with the dead-man's handle. All compressors are controlled from the motorman's cab.

The heater current after leaving the contactor goes to a heater switch under the car body. There are three groups of heaters in each car half, with six fuses in one box. When the third or highest degree of heat is on 43 kw is used per car. The lighting circuit is in two parts—that for regular illumination and that for signals. The lighting wires of each car half are connected up to the respective low-tension panels. After leaving the combined control, lighting and compressor feeder, the lighting circuit passes through the main lighting switch and fuse and thence to the lamps. The signal lamps and motorman's cab lights are controlled through a reversing switch according to the direction of running. The signal circuit then passes through double-pole switches and fuses to the signal lamps. A red-lens oil lamp is carried at each end.

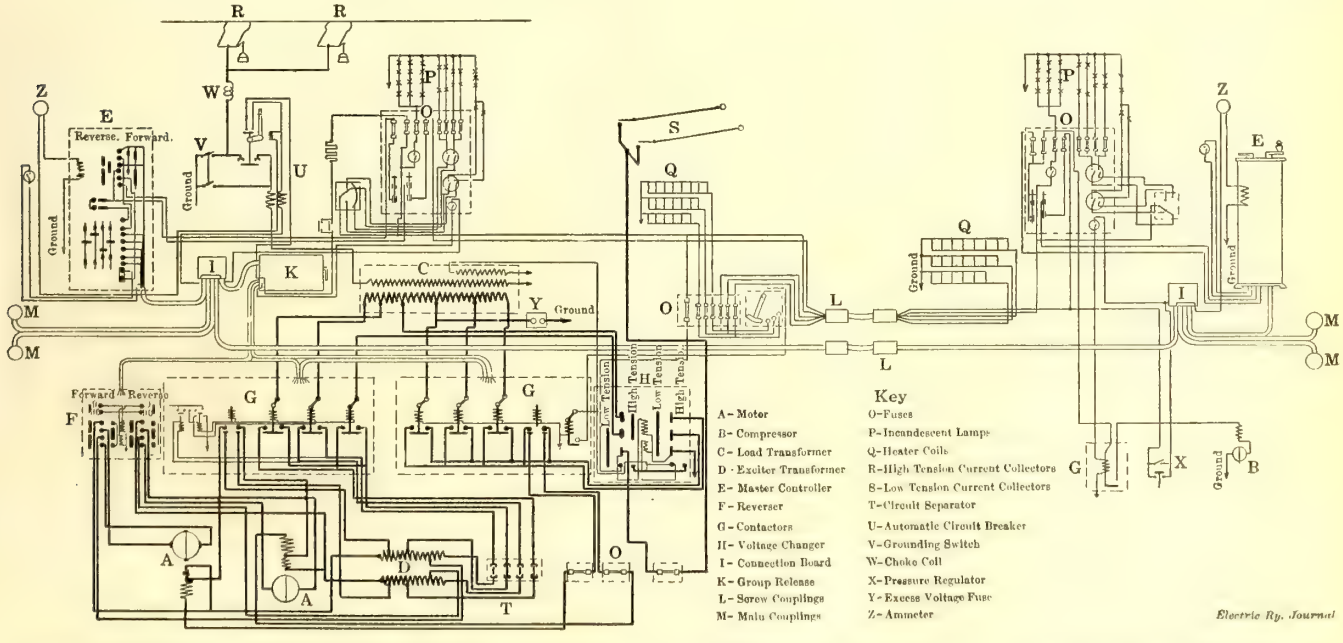
The low-tension coil of the voltage changer feeds an auxiliary circuit which will cut out the main oil switch when the current reaches a predetermined maximum and prevent the further operation of the controller until the current has fallen far enough. The course of this current is as follows: From the grounded side of the controller, through a coil in the controller, through an ammeter, through the release magnet of the oil switch, through the low-tension coil of the voltage changer and to the connection board. The current then passes through the control circuit cable to the other connection board, through the ammeter and special controller coil to ground.

OPERATING STATISTICS

During hours of light traffic the Hamburg-Blankenese-Ohlsdorf line is operated with single cars and at other times with trains of two or three motor cars. The shortest headway is five minutes, which is used on the Altona-Hasselbrook division. The average daily run of a car is 279 miles; an average total for a working day's operation is 432 trains, 7812 car-miles and 930,000 seat-miles. The average week-day train consists of 1.56 cars. When these lines were operated by steam there were only 127 trains, 1860 train miles and 930,000 seat-miles per day. It has been found through numerous measurements that the power station must deliver about 42,000 kw-hours for 8000 car-miles when the heaters are in circuit on the first step. In this case the heaters take at least one-sixth of the power,



Hamburg-Blankenese-Ohlsdorf Railway Improvements—Master Controller and Automatic Oil Switch Without Casing



Hamburg-Blankenese-Ohlsdorf Railway Improvements—Part Diagram of Connections for Car, with Two Motors and One Compressor

thus leaving for running and lighting 35,000 kw-hours, or about 4.3 kw-hours per car-mile, equivalent to 36 watt-hours per metric ton-km (57.6 watt-hours per metric ton-mile). As about 4 per cent may be allowed for transmission losses and lighting, the actual amount required for propulsion is 34.5 watt-hours per metric ton-km (55.2 watt-hours per metric ton-mile). On several experimental runs made exactly in accordance with the schedule and correct controller manipulation, the power consumption was as low as 33 watt-hours per metric ton-km (52.8 watt-hours per metric ton-mile). Cars are operated up to 31 m.p.h. The schedule speeds are 19.2 m.p.h. for station intervals averaging 1.03 miles. The line potential conditions are extremely favorable, as the four 125-kw Brown-Boveri steam turbines maintain their voltage very well. Although the motor cars are arranged for 6000-volt line potential, they could run safely at 4500 volts. So far, however, even in the heaviest service the voltage at the collectors has averaged 5500 volts when the potential in the power station was varying from 6300 volts to 6000 volts.

No details are yet available of the comparative maintenance cost with the present electric and former steam operation of this line. It is plain, however, that the cleaner cars and better train service with electricity have produced a great increase in travel. Between May, 1907, and May, 1908, the sale of monthly commutation tickets increased from 10,900 to 15,200, but dropped again as soon as it was necessary to operate part of the line with steam. During the period mentioned the number of single-trip tickets sold per month increased from 640,000 to 1,207,127. The traffic is of suburban character, being particularly heavy between Hamburg and Dammtor during the hours of 7 a. m. to 9 a. m., when many workmen's tickets are presented. The rapid growth of passenger travel has resulted in the order for additional rolling stock, as mentioned earlier in this article.

GEAR AND PINION GREASE IN DETROIT

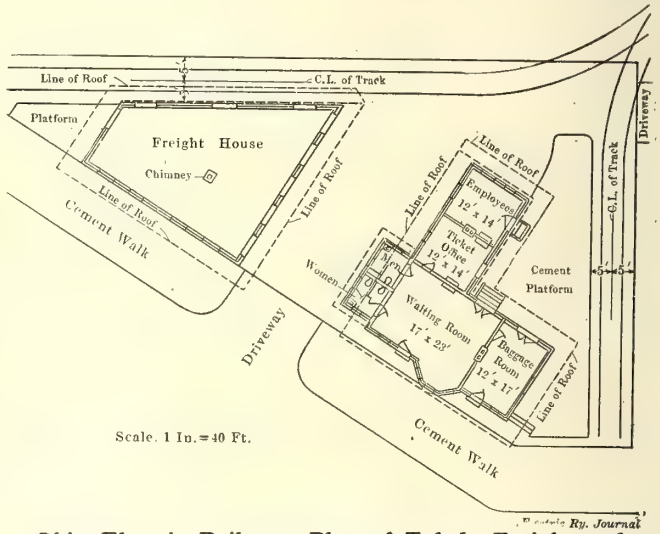
The Detroit United Railways is using on its cars a gear and pinion "dope" grease that is giving very satisfactory service. Through its use Sylvester Potter, master mechanic, has reduced the cost of lubricating gears to from 56 to 80 cents per 1000 miles and the cost of lubricating pinions to from 32 to 40 cents per 1000 miles. About 25 lb. of the lubricant is packed in each gear case. The ingredients and the proportions used in mixing this dope are as follows:

18	per	cent	animal fat (tallow and lard).
3	"	"	oleic acid.
3	"	"	lime.
8	"	"	Dixon's best graphite.
48	"	"	special paraffin stock.
20	"	"	650 fire cylinder stock, extremely viscous.
100			

The visit of the American fleet to Melbourne, Australia, last winter was largely responsible for an increase in the gross earnings of the Melbourne Tramway & Omnibus Company for the year ended June 30, 1909, of £22,800. After paying 20 per cent dividends, allowing £45,000 for sinking fund and making liberal appropriations for depreciation and extraordinary renewals, the sum of £30,500 was carried forward to surplus. The company's reserves now amount to £675,000. Unfortunately for the stockholders, in seven years' time their profitable enterprise will revert to the municipality.

FREIGHT SERVICE OF THE OHIO ELECTRIC RAILWAY

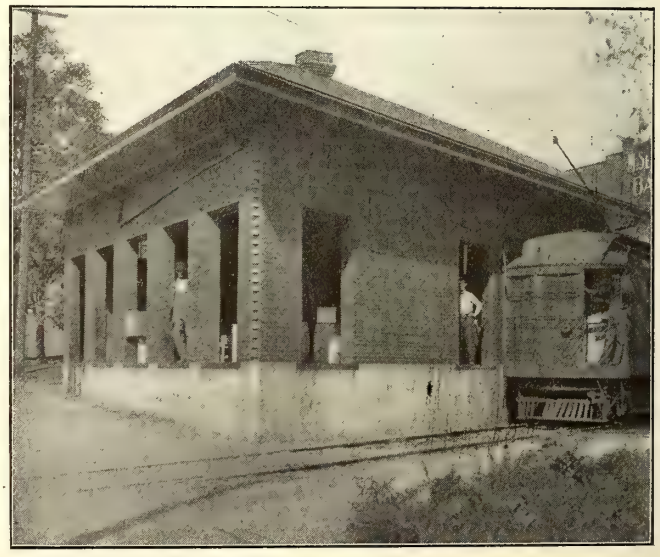
The Ohio Electric Railway has had as large a volume of freight business as it could conveniently handle with the existing equipment, and has recently let contracts for additional rolling stock in order that it may extend this branch of the service. With the present development of the freight business, the revenues from this source amount to about 10



Ohio Electric Railway—Plan of Toledo Freight and Passenger Terminal

per cent of the total gross revenue from operation, while the other 90 per cent is derived from passenger and mail service.

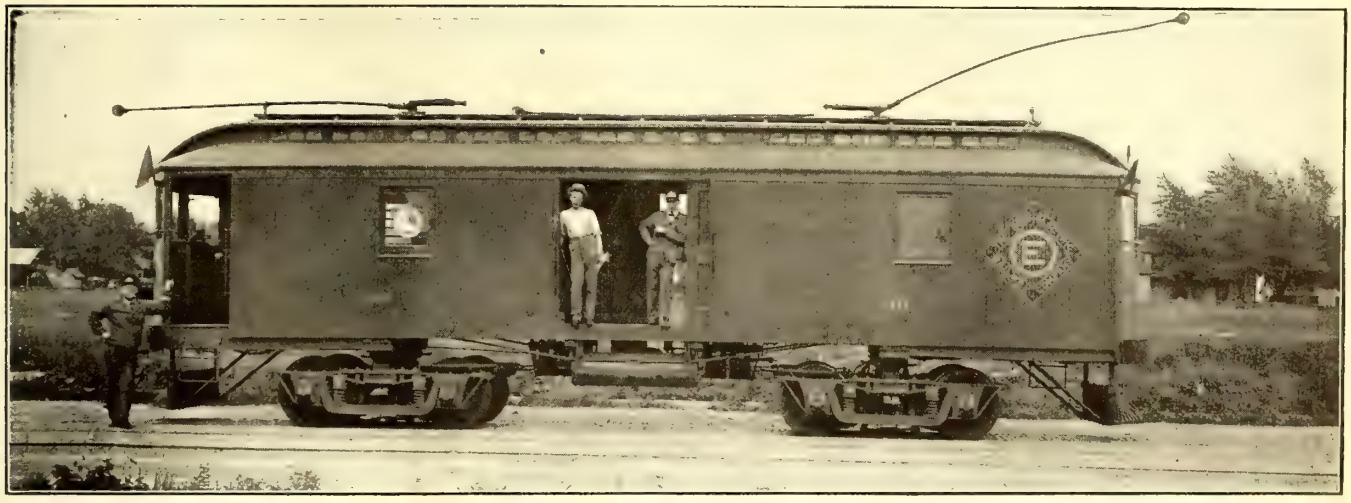
By a change that became effective on June 1, 1909, this company, which had previously conducted an express service with wagon delivery through the Southern Ohio Express Company, transferred this business to the United States Express Company under a practically perpetual contract. The decision to dispose of the express business was



Ohio Electric Railway—Exterior of Freight House at Toledo

reached after an experiment lasting two years, which demonstrated that the hauls were so short and the revenue per package so low in consequence that the expense of the wagon delivery and pick-up service absorbed too much of the revenue. Practically no long-haul express business was secured. The business now handled directly by the company, apart from its passenger and mail service, is there-

fore divided between regular freight service and what is termed merchants' dispatch freight service. The rates for regular freight service are as nearly as possible identical with those charged by the steam lines reaching the same territory. Merchants' dispatch freight, however, is handled on passenger cars only between points on the various divisions of the lines of the company, and the rates charged are a little higher than those for freight handled on the



Ohio Electric Railway—Typical Freight Car

regular freight cars. Only a small quantity of material can be transported in this way at any one time, but the company takes the position that it is an accommodation to its patrons to offer them for the transportation of packages the service afforded by the frequent headway of the passenger trains.

There is no conflict between the merchants' dispatch freight service and the express business, as the company



Ohio Electric Railway—Layout of Toledo Passenger and Freight Houses

undertakes no delivery or collection of articles. The merchants' dispatch freight service has been in effect on the Ohio Electric Railway with satisfactory results for about two years. The commodities offered for transportation in this way consist largely of ice cream, fruits and bread, although all conceivable articles of merchandise from a pair of kid gloves to a talking machine or lawn mower are occasionally offered. The illustration on page 904 shows the local tariff applying between points on the Springfield-Lima, Lima-Toledo and Lima-Fort Wayne divisions for dispatch freight handled on passenger cars.

Following are the conditions under which merchants' dispatch freight is handled:

This company will accept for transportation on first regularly scheduled passenger car, which is equipped with baggage compartment, after receipt of property, any merchandise between points to which rates are published herein, on the following conditions:

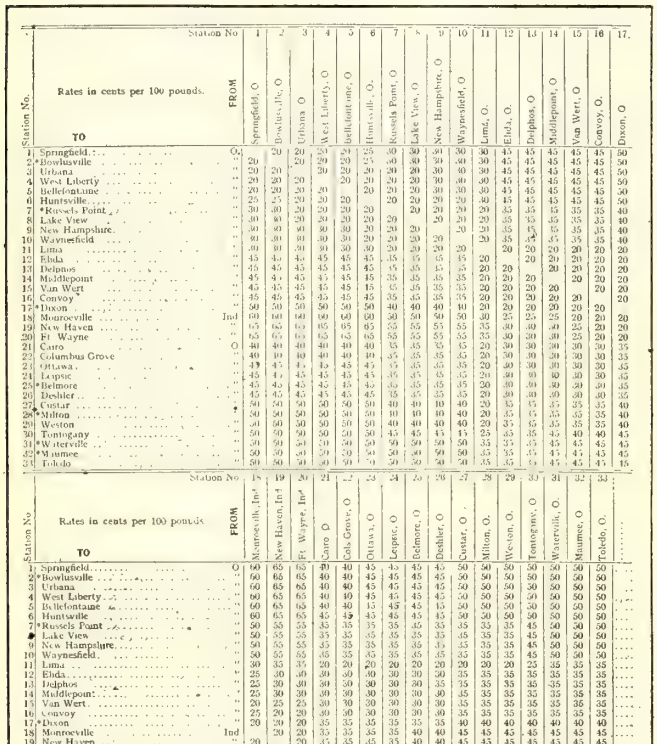
No single package to weigh to exceed 150 lb.
No single package to exceed 3 ft. 6 in. in length.
No single package to exceed 2 ft. 6 in. in width.
No single package to exceed 2 ft. 4 in. in height.

Minimum charge—In no case will the charge for a single consignment be less than 25 cents.

On the eight electric divisions of the system two freight trains are operated six days in the week, one in each direction. All the freight equipment resembles the passenger equipment. A motorman and a conductor comprise the crew on every freight train. At some places but one car is used, and at others the amount of business justifies one motor and one or more trail cars. The business is largely package

freight, but under a new plan of organization for the traffic department which became effective on July 1 several district passenger and freight agents have been appointed who will solicit other classes of business, for which the new equipment already ordered and other cars in contemplation will provide service. One solicitor is at each of the following cities: Toledo, Lima, Columbus and Dayton. Prior to their employment by the Ohio Electric Railway these officials were with steam roads and had not had previous experience on electric railways.

The company has exclusive freight agents at Cincinnati, Toledo, Lima, Urbana, Columbus, Zanesville, Hamilton and Dayton. An agent at Fort Wayne, Ind., represents also the other lines at the terminal used by the various interurban companies reaching that city. At every other point on the lines of the Ohio Electric Railway where there is a representative of the company, the man or woman agent, which-



Station No.

Station No.	Rates in cents per 100 pounds. FROM / TO	1 Springfield, O.	2 Bowlusville, O.	3 Urbana, O.	4 West Liberty, O.	5 Bellefontaine, O.	6 Huntsville, O.	7 Russells Point, O.	8 Lake View, O.	9 New Hampshire, O.	10 Waynesfield, O.	11 Lima, O.	12 Elida, O.	13 Delphos, O.	14 Middlepoint, O.	15 Van Wert, O.	16 Convoy, O.	17. Dixon, O.
1	Springfield, O.		20	20	20	20	25	30	30	30	30	30	45	45	45	45	45	50
2	*Bowlusville	20		20		20	25	30	30	30	30	30	45	45	45	45	45	50
3	Urbana	20	20		20	20	20	20	20	30	30	30	45	45	45	45	45	50
4	West Liberty	20	20	20		20	20	20	20	30	30	30	45	45	45	45	45	50
5	Bellefontaine	20	20	20	20		20	20	20	30	30	30	45	45	45	45	45	50
6	Huntsville	25	25	20	20	20		20	20	30	30	30	45	45	45	45	45	50
7	*Russells Point	30	30	20	20	20	20		20	20	20	20	45	45	45	45	45	50
8	Lake View	30	30	20	20	20	20	20		20	20	20	45	45	45	45	45	50
9	New Hampshire	30	30	30	30	20	20	20	20		20	20	45	45	45	45	45	50
10	Waynesfield	30	30	30	30	20	20	20	20	20		20	45	45	45	45	45	50
11	Lima	30	30	30	30	30	20	20	20	20	20		20	20	20	20	20	20
12	Elida	45	45	45	45	45	45	45	45	45	45	20		20	20	20	20	20
13	Delphos	45	45	45	45	45	45	45	45	45	45	20	20		20	20	20	20
14	Middlepoint	45	45	45	45	45	45	45	45	45	45	20	20	20		20	20	20
15	Van Wert	45	45	45	45	45	45	45	45	45	45	20	20	20	20		20	20
16	Convoy*	45	45	45	45	45	45	45	45	45	45	20	20	20	20	20		20
17	*Dixon	50	50	50	50	50	50	50	50	50	50	20	20	20	20	20	20	
18	Monroeville Ind	60	60	60	60	60	60	60	60	60	60	30	30	30	25	25	20	20
19	New Haven	65	65	65	65	65	65	65	65	65	65	35	30	30	30	30	25	20
20	Ft Wayne	65	65	65	65	65	65	65	65	65	65	35	30	30	30	30	25	20
21	Cairo O.	40	40	40	40	40	40	40	35	35	35	20	30	30	30	30	30	35
22	Columbus Grove	40	40	40	40	40	40	40	35	35	35	20	30	30	30	30	30	35
23	Ottawa	45	45	45	45	45	45	45	35	35	35	20	30	30	30	30	30	35
24	Lopsic	45	45	45	45	45	45	45	35	35	35	20	30	30	30	30	30	35
25	*Belmore	45	45	45	45	45	45	45	35	35	35	20	30	30	30	30	30	35
26	Deshler	45	45	45	45	45	45	45	35	35	35	20	30	30	30	30	30	35
27	Custar	50	50	50	50	50	50	50	40	40	40	20	35	35	35	35	35	40
28	*Milton	50	50	50	50	50	50	50	40	40	40	20	35	35	35	35	35	40
29	Weston	50	50	50	50	50	50	50	40	40	40	20	35	35	35	35	35	40
30	Tontogany	50	50	50	50	50	50	50	45	45	45	25	35	35	35	40	40	45
31	*Waterville	50	50	50	50	50	50	50	50	50	50	35	35	35	45	45	45	45
32	*Maumee	50	50	50	50	50	50	50	50	50	50	35	35	35	45	45	45	45
33	Toledo	50	50	50	50	50	50	50	50	50	50	35	35	35	45	45	45	45

Station No.	Rates in cents per 100 pounds. FROM / TO	18 Monroeville, Ind.	19 New Haven, Ind.	20 Ft. Wayne, Ind.	21 Cairo, O.	22 Columbus Grove, O.	23 Ottawa, O.	24 Lopsic, O.	25 Belmore, O.	26 Deshler, O.	27 Custar, O.	28 Milton, O.	29 Weston, O.	30 Tontogany, O.	31 Waterville, O.	32 Maumee, O.	33 Toledo, O.
1	Springfield, O.	60	65	65	40	40	45	45	45	50	50	50	50	50	50	50	50
2	*Bowlusville	60	65	65	40	40	45	45	45	50	50	50	50	50	50	50	50
3	Urbana	60	65	65	40	40	45	45	45	50	50	50	50	50	50	50	50
4	West Liberty	60	65	65	40	40	45	45	45	50	50	50	50	50	50	50	50
5	Bellefontaine	60	65	65	40	40	45	45	45	50	50	50	50	50	50	50	50
6	Huntsville	60	65	65	45	45	45	45	45	50	50	50	50	50	50	50	50
7	*Russells Point	50	55	55	35	35	35	35	35	35	35	35	45	50	50	50	50
8	Lake View	50	55	55	35	35	35	35	35	35	35	35	45	50	50	50	50
9	New Hampshire	50	55	55	35	35	35	35	35	35	35	35	45	50	50	50	50
10	Waynesfield	50	55	55	35	35	35	35	35	35	35	35	45	50	50	50	50
11	Lima	30	35	35	20	20	20	20	20	30	30	30	35	35	35	35	35
12	Elida	25	30	30	30	30	40	30	30	30	35	35	35	35	35	35	35
13	Delphos	25	30	30	30	30	30	30	30	30	35	35	35	35	35	35	35
14	Middlepoint	25	30	30	30	30	30	30	30	30	35	35	35	35	35	35	35
15	Van Wert	20	25	25	30	30	30	30	30	30	35	35	35	35	35	35	35
16	Convoy	25	20	20	30	30	30	30	30	30	35	35	35	35	35	35	35
17	*Dixon	20	20	20	35	35	35	35	35	35	40	40	40	40	40	40	40
18	Monroeville Ind		20	20	35	35	35	40	40	40	45	45	45	45	45	45	45
19	New Haven	20		20	35	35	35	40	40	40	45	45	45	45	45	45	45
20	Ft Wayne	20	20		35	35	35	40	40	40	45	45	45	45	45	45	45
21	Cairo O.	35	35	35		20	20	20	20	20	20	20	20	20	35	35	35
22	Columbus Grove	35	35	35	20		20	20	20	20	20	20	20	20	30	30	30
23	Ottawa	35	35	35	20	20		20	20	20	20	20	20	20	25	25	25
24	Lopsic	35	35	35	20	20	20		20	20	20	20	20	20	20	20	20
25	*Belmore	45	45	45	20	20	20	20		20	20	20	20	20	20	20	20
26	Deshler	45	45	45	20	20	20	20	20		20	20	20	20	20	20	20
27	Custar	45	45	45	20	20	20	20	20	20		20	20	20	20	20	20
28	*Milton	45	45	45	20	20	20	20	20	20	20		20	20	20	20	20
29	Weston	45	45	45	20	20	20	20	20	20	20	20		20	20	20	20
30	Tontogany	45	45	45	20	20	20	20	20	20	20	20	20		20	20	20
31	*Waterville	45	45	45	35	30	25	20	20	20	20	20	20	20		20	20
32	*Maumee	45	45	45	35	30	25	20	20	20	20	20	20	20	20		20
33	Toledo	45	45	45	35	30	25	20	20	20	20	20	20	20	20	20	

*No Agent. Charges must be prepaid.

Ohio Electric Railway—Merchants' Dispatch Local Tariff

ever it may be, acts jointly for the freight and passenger departments. Freight sent to prepay points must be prepaid and it is unloaded at risk of the consignee and shipper.

It is intended to operate soon through freight cars from Toledo to Fort Wayne, also from Toledo to Zanesville and Toledo to Cincinnati. The running time of the freight trains is nearly equal to that of local passenger trains. Interline business is conducted with all connecting electric roads. No interline business with steam roads, however, has been done, except through the steam division of the Ohio Electric Railway.

The 15 electric carriers participating with the Ohio Electric Railway in the joint tariff are as follows: Columbus, Delaware & Marion Railway; Dayton & Troy Electric Railway; Dayton, Covington & Piqua Traction Company; Dayton & Xenia Transit Company; Fort Wayne & Springfield Railway; Fort Wayne & Wabash Valley Traction Company; Indianapolis, Crawfordsville & Western Traction Company; Indiana Union Traction Company; Scioto Valley Traction Company; Springfield, Troy & Piqua Railway; Springfield & Xenia Railway; Terre Haute, Indianapolis & Eastern Traction Company; Toledo Urban & Interurban Railway; Toledo & Chicago Interurban Railway; Western Ohio Railway.

A local service has been developed by the company which is of advantage to shippers located on the line between Lima and Bellefontaine. The Ohio Electric Railway hauls cars delivered by the Toledo & Ohio Central Railway at Russell's Point and carries loaded cars from its territory to the junction point, where the steam line takes the business. This traffic is handled as a local matter and a charge is made by the Ohio Electric Railway direct to the shipper or the consignee to cover the expense of transportation between Russell's Point and the place of destination or shipment on the electric line.

J. C. Forester, general freight agent of the Ohio Electric Railway, was identified with a steam railroad before he took the position with the Ohio Electric Railway. He believes that the possibilities of freight businesss on electric lines are large, and states that his company has not made more than a fair beginning up to the present time in the direction of upbuilding freight traffic.

The methods followed by this company in accounting for the freight and express business were described in an article by M. W. Glover, auditor, published in the Electric Railway Journal of Sept. 5, 1908, page 584. The company is still using the daily forwarded and received freight reports as indicated in the article. Steam railroads, as a rule, have a monthly report, but this company considers a daily report of great advantage over either the weekly or monthly form of report. The company adopted on Jan. 1, 1909, the new form of bill of lading recommended by the Interstate Commerce Commission, which the majority of the interurban lines of the Central West are now using.

About one-half of the agents of the Ohio Electric Railway, both freight and passenger, are paid on the commission basis; the other agents are at larger points, where the volume of business makes it advisable to use a regular salary basis. The commission varies according to the amount of business, and the agents, therefore, are under constant incentive to increase the traffic by all legitimate means.

The most thoroughly equipped new freight house of the company is at Toledo. It is shown in accompanying illustrations.

The plans and layout in connection with the passenger and freight stations at Toledo were made by the engineering department, of which Gaylord Thompson is the chief engineer.

The success of other mountain railways in Europe and the great increase in the number of tourists to the Southern Tyrol mountains have induced a company to undertake the construction of a new electric rack and adhesion railway near Botzen, Austria. The new line is to be of 1-m gage and in a length of 7¼ miles will rise 3228 ft. The rack sections will be built on the Strub system. High-tension current is to be purchased from the Botzen Electricity Works and converted by a motor-generator set to 750-volt direct current. The rolling stock will include three locomotives, four motor cars, several passenger trail cars and four freight trail cars.

TRAMWAY CONDITIONS IN ENGLAND

In his annual address, delivered at the September conference of the Municipal Tramways Association, President A. L. C. Fell, chief officer of the London County Council Tramways, presented some interesting statistics of street railway operation in Great Britain at the present time. He said that there were 305 street railway systems in the United Kingdom, 177 of which were owned and operated by municipalities and 128 by stock companies or private individuals. The tramways consisted of 1522 miles of double-track lines and 941 miles of single-track lines. This represented an increase of 69 miles, measured as single track, over the preceding year. The total capital invested was £68,199,918, compared with £64,092,091 in the preceding year. Other increases were as follows: Passengers carried, 2,625,532,895, against 2,454,807,487; gross receipts, £12,439,625, against £11,849,175; operating expenses, £7,792,663, against £7,363,762. Mr. Fell stated that these returns clearly indicated that the period of rapid construction of electric street railways was over, and that the increases shown were due chiefly to the gradual development of existing systems and the abolition of horse, cable and steam tramways. For some time now no important projects had been brought before Parliament for its sanction.

Mr. Fell said that a popular fallacy existed that the construction of a tramway line increased the traffic congestion in streets, although experience had clearly shown that congestion was relieved by the operation of electric railways. One reason was that the vehicular traffic was formed into straight lines, the slow traffic keeping more to one side and the fast traffic following the tramway. Another reason was that a tram car took up less space in the street per passenger carried than any other type of public conveyance. One double-deck electric car, seating 78 passengers, was 33 ft. 10 in. long, whereas a motor omnibus 23 ft. long carried only 16 passengers under cover. Double-deck omnibuses were not permitted by the London police authorities.

Mr. Fell presented some interesting statistics of traffic on some of the large street railway companies in the United Kingdom which clearly indicated that the majority of passengers travel considerably less than two miles. The following particulars bore out this statement: Glasgow Corporation Tramways carried 221,744,569 passengers. Of these 28.04 per cent paid ½d. and 59.65 per cent paid 1d.; Liverpool Corporation Tramways carried 121,927,883 passengers, of whom 89.679 per cent paid 1d.; London County Council Tramways carried 412,913,841 passengers, of whom 24.22 per cent paid ½d. and 48.04 per cent paid 1d.; London United Tramways Company carried 59,255,919 passengers, of whom 73.37 per cent paid 1d.; Manchester Corporation Tramways carried 155,011,844 passengers, of whom 7.35 per cent paid ½d. and 67.04 per cent paid 1d. The total number of passengers carried on the five lines mentioned was 970,854,096. Of these 760,942,125 paid ½d. and 1d. fares. This represented 78.38 per cent of the total fares paid.

The average distance which the passengers paying ½d. fares, therefore, could have traveled was 1152 yd., and the average distance which the passengers paying 1d. traveled was 1 mile, 1747 yd. As a matter of fact, although the ½d. passengers took advantage of the full stage, the average penny passenger did not do so. As these figures proved that the tramways in large cities were used chiefly by short-distance passengers, Mr. Fell thought that the interurban and steam railways should not attempt to handle purely local traffic. He thought that much might be done to increase traffic by selling through tickets between all railways and tramways, and suggested that the association take the initiative and endeavor to arrange a conference with representatives of some of the railway companies.

Mr. Fell thought that all municipalities should insist on their officers inspecting other systems, as it was impossible to keep up with the times unless this practice was followed. An attempt had been made during recent years to have the Municipal Tramways Association get into closer touch with the International Street Railway Association, but, owing to the fact that in the latter organization the dues were based on the capital outlay of the various properties represented, the subscription of the British body under this plan would be out of proportion to the benefits derived. The president therefore suggested that no further action be taken in this direction, but that the tramway boards be recommended to occasionally send their officers and representatives abroad to investigate street railway operation and report to their employers and to the association. He also suggested that the association should bear the cost of circulating among its members the data obtained in this way.

Mr. Fell referred to the necessity for standardization, not only in the matter of track, cars and equipment, but also in the form of annual reports of the various properties. A standard form of accounts had been prepared some time ago by the Municipal Tramways Association, but this had not been strictly adhered to, and therefore the comparative statistics quoted were not formulated on the same basis. He thought the car-mile was most unsatisfactory as a unit for making comparisons. It was very misleading to use it in comparing systems with different types of cars, average speeds and number of stops. What was really wanted was the cost per passenger-mile or per seat-mile. In his opinion, the term "seat-mile" should be used in all comparative figures. It was interesting to note in this connection that the Board of Trade and the police authorities had recently agreed to an experimental operation of trailers on one route in London. Mr. Fell was certain that the advantages of trailer operation would be speedily recognized.

The speaker described the conciliation boards formed by the London County Council Tramways to handle all questions relating to rates of pay and hours of labor. The Board of Trade in the first instance issued ballots to all employees except those holding official positions and those under 21 years of age, to ascertain if they were in favor of conciliation boards. The result of the vote was a large majority in favor of the proposal. The next step was to ask employees in each department to nominate representatives for election to department boards. It was arranged that each nominee representing motormen and conductors should be proposed by at least 20 employees entitled to vote, and nominees representing other departments by six voters. Four separate boards were formed to deal with the traffic, rolling stock, electrical and permanent way and building departments. These boards, it was hoped, would adjust differences between the corporation and the men in a friendly and equitable manner by bringing the broad-minded views of the elected representatives of the employees to bear on the subject. Mr. Fell's experience was that much more could be done by a round-table discussion in this manner than by the sudden presentation of lists of grievances a few days before a holiday or on the eve of a municipal election. Under the new plan if an agreement cannot be reached, the matter will be settled by an inde-

pendent arbitrator. If the London experiment was satisfactory, he hoped that it would be extended to all municipal tramways, and that it would be possible in time for the various conciliation boards to co-operate. Personally, he thought that these boards would do much to smooth over difficulties in regard to rates of pay and hours of labor, but matters of discipline should not be settled through such a channel. In this connection he was glad to note that recreation rooms for employees were receiving very strong support on the part of municipal authorities. He felt certain that this attention to the comfort of employees had done more than anything else to improve the good feeling which existed between the municipalities and their men.

In conclusion, Mr. Fell spoke about steel wheels. He recalled that in 1902 he had written a paper on that subject and strongly urged the adoption of wheels of that type. At that time his suggestion had met with much opposition, but there had been a great change in opinion and practice since. From replies received from 53 municipal tramways it appeared that of 35,600 wheels in use, 33,064, or 93 per cent, had steel tires and the rest were of chilled iron. He thought that the steel makers of England were to be congratulated on the results, especially as they are now able to produce tires having a life which exceeded the most sanguine anticipations of seven years ago.

CENTRAL ELECTRIC TRAFFIC ASSOCIATION JOINT PASSENGER TARIFF

Announcement of the publication of joint passenger tariff No. 3 of the Central Electric Traffic Association was made in the Electric Railway Journal last week, page 880. The general rules and regulations contained in the tariff for the guidance of agents are abstracted below. The rates quoted in the tariff apply to and from the following 32 headline points in Indiana, Ohio and Kentucky: Bluffton, Ind.; Cincinnati, Ohio; Cleveland, Ohio; Columbus, Ohio; Crawfordsville, Ind.; Dayton, Ohio; Findlay, Ohio; Fort Wayne, Ind.; Fostoria, Ohio; Goshen, Ind.; Indianapolis, Ind.; Kendallville, Ind.; Kokomo, Ind.; Lafayette, Ind.; Lima, Ohio; Logansport, Ind.; Louisville, Ky.; Marion, Ind.; Michigan City, Ind.; Muncie, Ind.; Norwalk, Ohio; Peru, Ind.; Piqua, Ohio; Richmond, Ind.; Sandusky, Ohio; South Bend, Ind.; Springfield, Ohio; Terre Haute, Ind.; Toledo, Ohio; Union City, Ind.; Wabash, Ind.; Zanesville, Ohio.

GENERAL RULES AND REGULATIONS

1. Routes via Which Rates Apply.—Rates quoted herein apply only via authorized routes as shown opposite each station.

2. Manner of Constructing Through Rates When Not Quoted in this Tariff.—Where through routes from your station are not shown, take rate from first junction or headline point nearest to your station from which rates are named, and add your local rate to the rate from that junction, either one way or round trip, as desired.

(Example—In finding the rate from Chambersburg, Ohio, to Greencastle, Ind. (neither of which is a headline point), refer to the nearest junction or headline point, which would be Dayton. Under this headline point you will find rate quoted to Greencastle, as well as a basing rate to Chambersburg. Add these two rates together and you will have the through rate.)

3. Explanation of Reference Marks.—Rates marked thus (*) are for basing purposes only, and may be used as part of a combination in constructing a through rate as shown under rule 2, but *not* for selling purposes.

Rates marked thus (†) are *intrastate* rates only, and must not be used by combination or otherwise on interstate traffic. They may be used by combination in constructing through rates that are wholly *intrastate*.

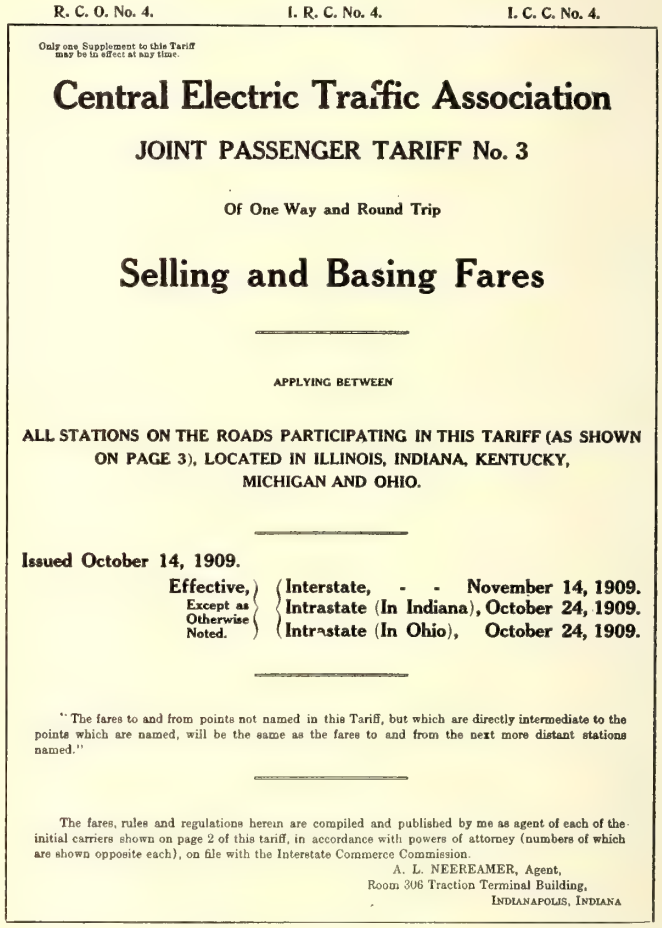
Rates marked thus (‡) do not become effective until Jan. 1, 1910, and tickets must not be sold to points so marked, or via routes in connection therewith, before that time.

4. Selection of Route.—After finding rate to destination, and where two or more routes are shown, route ticket according to line requested by passenger. In the absence of any specific routing selected by passenger, agent will route ticket according to best train service and connections.

5. Number of Coupons to be Used.—Where skeleton form of ticket is used write one coupon for each line over which the ticket is issued and show routing plainly on auditor's stub and on each coupon.

6. Apply in Either Direction.—The rates shown herein apply in either direction over lines of participating carriers.

7. Transfer at Junctions.—In ticketing via junction or headline points where transfer service is necessary between



R. C. O. No. 4. I. R. C. No. 4. I. C. C. No. 4.

Only one Supplement to this Tariff may be in effect at any time.

Central Electric Traffic Association

JOINT PASSENGER TARIFF No. 3

Of One Way and Round Trip

Selling and Basing Fares

APPLYING BETWEEN

ALL STATIONS ON THE ROADS PARTICIPATING IN THIS TARIFF (AS SHOWN ON PAGE 3), LOCATED IN ILLINOIS, INDIANA, KENTUCKY, MICHIGAN AND OHIO.

Issued October 14, 1909.

Effective, Except as Otherwise Noted.
Interstate, - - November 14, 1909.
Intrastate (In Indiana), October 24, 1909.
Intrastate (In Ohio), October 24, 1909.

"The fares to and from points not named in this Tariff, but which are directly intermediate to the points which are named, will be the same as the fares to and from the next more distant stations named."

The fares, rules and regulations herein are compiled and published by me as agent of each of the initial carriers shown on page 2 of this tariff, in accordance with powers of attorney (numbers of which are shown opposite each), on file with the Interstate Commerce Commission.

A. L. NEEREAMER, Agent,
Room 306 Traction Terminal Building,
Indianapolis, Indiana

Reproduction of Front Cover of New Central Electric Traffic Association Tariff Sheet

terminals, agents will notify passengers that they must make their own arrangements for such transfer, unless the ticket bears a transfer coupon.

8. Apply from Ticket Office Points Only.—The rates shown herein apply only from points where regular ticket offices are maintained.

9. No Stop-overs.—No stop-overs will be allowed on through interline tickets.

10. Limit on Tickets.—The limit on one-way tickets must not exceed three (3) days, including date of sale, and the limit on round-trip tickets must not exceed thirty (30) days, including date of sale.

11. No Excess on Limited Trains.—Through interline tickets will be accepted for passage on all limited trains without excess fare.

Exception: That on the line of the Indianapolis, Columbus & Southern Traction Company (between Indianapolis, Ind., and Seymour, Ind.), the excess charges on limited trains will be 10 cents per passenger for any distance, to be collected by the conductor.

12. Definition of Limited Train.—A limited train is one that does not make country or crossroad stops, but only makes city or town stops.

13. Rates for Children.—Children five years of age or under, accompanied by an adult, free; over five years of age and under 12 years, half-fare, adding sufficient when necessary to make child's rate end in 0 or 5; 12 years old or over, full fare. The round-trip child's fare to be one-way adult fare, and not one-half of the adult's round-trip fare. Coupons and contract of half-fare tickets must be plainly marked or stamped "Half Fare," one ticket for each child. In no case will one whole ticket be issued for two children.

14. Transportation of Baggage.—Baggage may be checked over the lines issuing this tariff in accordance with the rules and regulations made in Joint & Local Baggage Tariff No. 1, I. C. C. No. 2, I. R. C. No. 2, O. R. C. No. 2, effective Aug. 2, 1909.

The names of the various carriers party to this tariff are as follows:

Chicago, Lake Shore & South Bend Railway.
Chicago, South Bend & Northern Indiana Railway.
Cleveland, Painesville & Eastern Railroad.
Columbus, Delaware & Marion Railway.
Columbus, Marion & Bucyrus Railroad.
Dayton & Troy Electric Railway.
Fort Wayne & Springfield Railway.
Fort Wayne & Wabash Valley Traction Company.
Indianapolis & Cincinnati Traction Company.
Indianapolis & Louisville Traction Company.
Indianapolis, Columbus & Southern Traction Company.
Indianapolis, Crawfordsville & Western Traction Company.
Indiana Union Traction Company.
Kokomo, Marion & Western Traction Company.
Lake Erie, Bowling Green & Napoleon Railway.
Lake Shore Electric Railway.
Louisville & Northern Railway & Lighting Company.
Marion, Bluffton & Eastern Traction Company.
Ohio Electric Railway.
Sandusky, Norwalk & Mansfield Electric Railway.
Southeastern Ohio Railway, Light & Power Company.
Springfield, Troy & Piqua Railway.
Terre Haute, Indianapolis & Eastern Traction Company.
Toledo & Chicago Interurban Railway.
Toledo & Indiana Railway.
Toledo, Fostoria & Findlay Railway.
Toledo, Port Clinton & Lakeside Railway.
Toledo Urban & Interurban Railway.
Western Ohio Railway.
Winona Interurban Railway.

A MONOGRAPH ON LONDON TRAFFIC CONDITIONS

The *Zeitschrift für Kleinbahnen* has reprinted in pamphlet form a study of London traffic by G. Kemmann, who is a retired German Government councillor. Mr. Kemmann has not only studied city traffic in European cities, but has also made personal investigations in the United States. The July 3, 1909, issue of the Electric Railway Journal contained an article by Mr. Kemmann, entitled "Action Necessary to Assure a Reasonable Return on the Investment." In the article on London the author bases many of his observations on the researches of the Royal Commission of London traffic and of the British Board of Trade.

He discusses, first, the political and territorial divisions of London, following this with a description of the different railway and omnibus lines, the districts served by each and the degree of their financial success or failure. The author concludes that the relief of the present difficulties in transportation and finance must be sought partly in the creation of a central traffic commission and in the closer working together of the different transportation purveyors of London.

SPECIAL EXCURSION CARS IN EASTERN PENNSYLVANIA

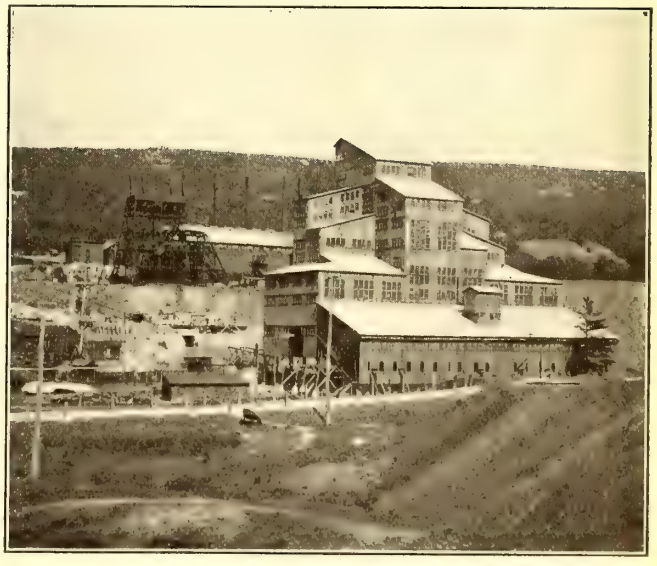
Last fall the Eastern Pennsylvania Railways Company of Pottsville, Pa., instituted a weekly excursion between Pottsville and Mauch Chunk, a distance of 31 miles, and on these trips used 15-bench cars with large observation platforms. Only the capacity of the car was sold, i.e., 75 people. These trips proved themselves to be so popular



Eastern Pennsylvania Railways—Entrance to Mauch Chunk

that the service was started early this summer and has been continued each week. The demand for tickets on each excursion has exceeded the supply each week, and this has necessitated running these trips twice a week.

This type of open "sight-seeing car" affords the passengers full opportunity to view the scenery and sights along



Eastern Pennsylvania Railways—Coal Breaker between Pottsville and Mauch Chunk

the trolley line; taking them through the Schuylkill Valley into Tamaqua, a progressive mining city of 12,000, from there to Mauch Chunk, passing through the Panther Valley and crossing the Nesquehoning Mountains at an elevation of about 1500 ft. above tide-water. The section of the country traveled by this "sight-seeing car" shows a striking

variance and contrast, every now and then passing the very entrance of a coal mine, showing complete working of the mining operations, then through a heavy forest, over mountains and past grove fields with trees laden with fruit into the picturesque Mauch Chunk region. Here the excursionists have six hours in which to see sights. This affords them time to make the round trip over the Switchback Railroad, the oldest railroad in America, to Summit Hill, where one can get a view for 50 miles.

The crew of the car is the same each trip, and are men who have been in the employ of the company for some time; on each trip the conductor is furnished with complete time-tables, guides, etc., for answering any questions that may arise. This man is also thoroughly conversant with the local history of the region through which the car travels and gives short lectures from time to time as the car passes the various points of interest along the route.

The entire distance traveled by this car on each trip is 62 miles. The car leaves the business center of Pottsville at 8:50 a. m., and, returning, arrives at 7:45 p. m.

PROTEST OF PENNSYLVANIA RAILROAD AGAINST CLASSIFICATION OF ADDITIONS AND BETTERMENTS

James McCrea, president of the Pennsylvania Railroad, has addressed the following letter to Martin A. Knapp, chairman Interstate Commerce Commission:

For and on behalf of the Pennsylvania Railroad Company and also of each of the several companies whereof I am president, which are controlled by, or affiliated in interest with, it, I beg hereby to make emphatic objection to the two orders of the commission of June 21, 1909, and declared effective July 1, 1909, relative, respectively, to "classification of expenditures for additions and betterments," and "form of general balance sheet statement"—as being not only beyond the powers of the commission, but otherwise legally invalid and ineffective; and to protest that the said companies ought not to be obliged to comply with the requirements thereof generally, and particularly as to those features which undertake to define and limit the expenditures which may be charged to operating expenses, and thereby prevent the directors and officers of the companies from exercising their proper discretion and discharging their functions and duties in connection with all the said companies' operations and administration of their affairs, so as to secure efficient and satisfactory practical results.

And I further beg to inform the commission, that, under and subject to the foregoing objection and protest, each of the said companies will for a time comply with the requirements of the said orders and keep their records and accounts in accordance therewith, but will do so solely because of the severe and excessive penalties which the several companies and their officers may be subjected to if the requirements of the said orders are not observed, and not because the directors and officers of the said companies believe that the said orders are either legally justified or that the pursuit of the methods of accounting therein prescribed will be productive of proper and just results.

It is therefore hereby expressly declared, and must be distinctly understood, that the compliance by each of the said companies with the requirements of the said orders, is wholly under and subject to the objection and protest hereby made, and must not be regarded as evidencing said companies' acquiescence or assent to the validity or justice of the said orders, nor as in anywise having the effect of limiting, restricting or estopping any or all of said companies from testing the validity of the said orders by any appropriate proceeding in law or equity as fully and effectually as if the same had not been complied with; and in connection with, and as part of, this protest, each of the said companies hereby declares and desires it to be understood that it reserves the right, at any time in the future, to take any steps or proceedings which it may deem advisable or necessary in order to secure relief against the system and methods of accounting contemplated and prescribed by said orders, which, if strictly pursued, will, in the judgment of its officers and directors, tend to produce incorrect statements as to cost of operation and therefore mislead the public as to the justice of transportation charges, and create in the minds of the companies' shareholders and the public erroneous ideas as to values.

CAR HOUSE CAR RECORD USED ON BOSTON ELEVATED RAILWAY

From the standpoints of operating and accounting it is important to keep periodical records of the car equipment on hand, received and sent away from car houses on large street railway systems. A simple yet complete record of this kind is illustrated in the accompanying form, used by the Boston Elevated Railway Company at all its surface car houses.

The form is filled out once a week by the car house foreman, and it shows the number of cars of each kind and the number of plows on hand, with the type of motor

Form 2156 5-09 60 Blks. BOSTON ELEVATED RAILWAY CO. DEPT. OF ROLLING STOCK AND SHOPS

WEEKLY REPORT OF ELECTRIC CARS AND PLOWS

RECEIVED AND SENT AWAY

Car House. Week Ending 190

WHITE—To be forwarded to Bureau of Audit
YELLOW—" " " Supt. R. S. and Shops

FOREMAN MUST REPORT ALL CARS AND PLOWS RECEIVED, SENT AWAY AND ON HAND (INCLUDING STORED CARS AND PLOWS)

Correct Foreman.

Day of Month	Car No.	Kind of Car	Cars Received From	Cars Sent To

CARS AND PLOWS ON HAND

EQUIPPED WITH MOTORS	W 50	W 50	2 GE 800	1 GE 58	2 GE 58	4 GE 58	2 GE 70	4 GE 70	2 GE 74	2 GE 79	4 GE 202	W 12	2 W 12	1 W 12A	2 W 12A	2 W 68	2 W 121	Dismantled	TOTAL CARS AND PLOWS
STEEL CAR No. 5000																			
SEMI-CONV No. 1																			
" " No. 2																			
" " No. 3																			
28 FT PASS.																			
28½ " "																			
26 " "																			
20 " "																			
24 " PARLOR																			
20 " "																			
16 " "																			
MAIL CARS																			
SAND CARS																			
WRECKING CARS																			
SERVICE CARS																			
PAY CARS																			
TOTAL CARS (BOX)																			
12 BENCH																			
10 "																			
9 "																			
8 "																			
7 "																			
TOTAL CARS (OPEN)																			
DOG HOUSE PLOWS																			
B. E. STEEL "																			
WASON " "																			
TAUNTON " "																			
TOTAL PLOWS																			
	W 50		GE 800	GE 58		GE 70	GE 74	GE 73	GE 202			W 12		W 12A		W 68	W 121		TOTAL
SPARE MOTORS																			

FOREMAN'S NOTE: OF THE ABOVE..... BOX CARS..... OPEN CARS..... PLOWS ARE STORED FOR..... CAR HOUSE

Boston Elevated Car House Record

equipment attached; the number of cars of each type and plows dismantled during the preceding week, and the date, car numbers and kinds of cars received from the shops or other car houses or sent to them. One copy of the record is filed at the car house, a duplicate is sent to the auditor, and a triplicate to the office of the superintendent of rolling stock and shops. A record is also kept of the number of spare motors of each kind on hand and the number of cars stored, as in the summer season, for other houses on the system.

TELEPHONE EQUIPMENT OF THE SYRACUSE, LAKE SHORE & NORTHERN

BY E. M. WHARFF, ELECTRICAL ENGINEER, SYRACUSE, LAKE SHORE & NORTHERN AND SYRACUSE & SOUTH BAY RAILROADS

The telephone dispatching systems of the Syracuse, Lake Shore & Northern and the Syracuse & South Bay electric railroads are operated from one office, located in Syracuse, N. Y. The telephone circuits on each road consist of two circuits of No. 10 bare copper wire along the private right-of-way connected to a 10-pair lead-covered suspended cable through the town limits of Baldwinsville, Phoenix and Fulton. One circuit, 30 miles long, connects the towns of Baldwinsville, Phoenix and Fulton with Syracuse; the other connects Syracuse and South Bay, and is 15 miles long. For connections in the city of Syracuse four pairs of wires are leased from the Bell Telephone Company, thus providing connection to the private branch switchboard located in the railroad company's ticket office at Syracuse. The only duties of the operator, who attends this switchboard at all times during the day and night, are to answer tele-



Fig. 1—Portable Telephone Set Connected to Jack Box

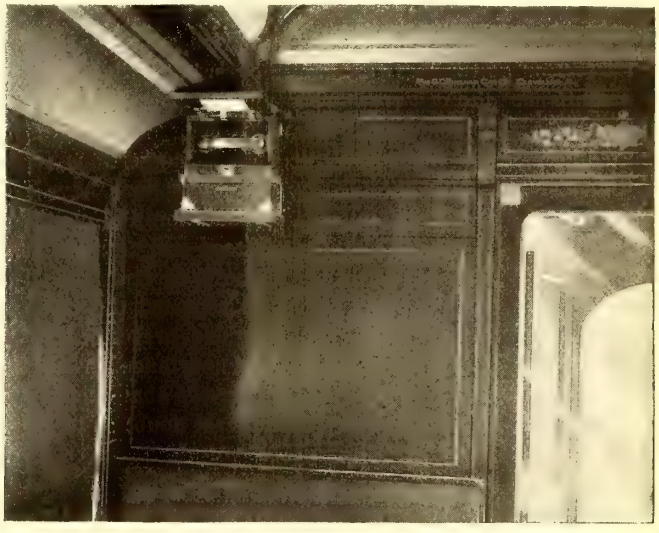


Fig. 2—Portable Telephone Set as Carried on Car

phone calls and give connections between the two outlying lines, the offices, and any intermediate points on either line. The telephones on the outlying lines are located at five substations, two car houses, five ticket offices and two important crossroads waiting stations. Western Electric magneto wall-sets or desk-sets are used in connection with a magneto generator and ringer. Each of these instruments is connected to the middle point of a double-throw switch. This switch is normally closed on one circuit, and in order to make the operations more positive, a ringer equipment, with loud-ringing gong, is permanently bridged across the other circuit, from which the telephone is normally closed.

In order to balance the circuits and facilitate the operation and service, the substations are connected on one circuit and the car houses and ticket offices on the other. With this arrangement all stations are equally accessible on both lines.

Along the right-of-way, where the road has pole line construction, there is installed at every twenty-fifth pole a permanent jack box on each telephone circuit, so that at every pole bearing a number which is a multiple of 25 will be found a box at which a portable telephone can be connected to either of the two telephone circuits. From these jack boxes communication can be established with the offices or car houses at any desired point. Every fifth pole along the line is numbered, and the poles are set about 90 ft. apart, so that an employee, or one of the train crew, knows exactly the location of the nearest telephone jack box, and has in no case to walk more than 1100 ft. to reach one.

On that portion of the Syracuse, Lake Shore & Northern where the catenary type of overhead construction is used the supporting bridges are located 300 ft. apart, except on the curves. A jack box on each telephone circuit is installed on each tower whose number ends in zero or is a multiple of 10.

The illustration in Fig. 1 shows a portable set connected to the jack box at one of these bridges. Allowing for the shorter spacing of the bridges on curves, the jack boxes are spaced approximately 2500 ft. apart, so that the maximum distance from any point to a jack box is not more than 1250 ft.

Each passenger, work and express car which is equipped with motors has as a part of its regular equipment a Western Electric portable car telephone set, securely strapped into its holder, which is fastened to the car in a position as shown in Fig. 2, in full view of passengers and trainmen. These portable telephone sets are light in weight, substantial in construction, of compact design, with the exterior surfaces flush, and all parts are readily accessible. The instrument weighs 16 lb., is 11½ in. high by 10½ in. wide by 4¾ in. deep. The case is of hard wood, finished to match the woodwork of the car, and conveniently arranged for accessibility to the enclosed parts. The front cover is divided, one-half being hinged along the upper edge so as to form a flap, with the lower half held in place by screws. The interior of the case is divided into two horizontal compartments. The lower half contains a five-bar generator, induction coil, two cells of dry battery and a 2500-ohm ringer. The upper half contains a hand telephone set, with cord, held in place by two spring clips, and also the generator crank handle and a cord and line plug for making connections at the pole jacks, which are connected to the telephone line wires. The hinges on the flap, or lid, are provided with springs which tend to keep the lid in the closed position, and the lower edge of the flap is beveled to exclude rain, snow, etc., when the instrument is in use in the open air.

When a connection with the stations is desired, the set is taken from the car and connected to the line by insert

ing the plug into a pole jack. The station is then called by means of the small magneto generator. The transmitter and receiver are mounted together on a yoke, so as to be operated conveniently when held in one hand. In the yoke of the hand set is a push button so located that it can be depressed with the thumb. This operation closes the battery circuit through the transmitter. When the button is released the battery circuit is opened, which prevents the introduction of extraneous noises through the transmitter and economizes the battery consumption.

These portable telephones are used only in emergencies, and are not used in any way for regular dispatching. For this reason it might be considered that they are something of a luxury, which could be omitted. They are extremely valuable, however, in emergencies. There have been no interruptions, confusion of schedules or blockades of traffic of any importance since the installation of this system. The portable telephones enable the car crews to report immediately trouble with their car or with the overhead line. This saves much time, because instructions can be obtained from the master mechanic or line foreman, as the case may be, and the repair crew can start at once for the scene of action with the least possible delay. There have been numerous instances where a broken wire might have tied up a section of the line for many hours, but with the present equipment the car crews reported the cause and the location in a few minutes, and saved a long inspection trip by a line gang in the wrong direction. Suggestions from the master mechanic received over the telephone have enabled a motorman to put his car in condition and continue his trip, whereas his car might have stood still until reached by some other car, or until one of the crew had walked a few miles to the nearest station and reported the trouble. While these telephones have no regular prescribed uses, they are considered to be of such importance that it is constantly impressed upon the train crews that they must use the telephones when there is the least doubt as to what to do and how to do it.

CONFERENCE ON RULES FOR OHIO INTERURBAN RAILWAYS

Several weeks ago the Ohio Railroad Commission sent out a circular letter to all electric interurban railroads in the State, requesting a conference to formulate a basic code of operating rules. A committee composed of Frank A. Davis, president and general manager, Scioto Valley Traction Company, Columbus; F. W. Coen, vice-president and general manager, Lake Shore Electric Railway, Sandusky; C. M. Paxton, general manager, Dayton & Troy Electric Railway, Dayton; Charles Currie, general manager, Northern Ohio Traction & Light Company, Akron; C. F. Franklin, president and general manager, Toledo & Western Railroad, and B. J. Jones, district manager, Ohio Electric Railway, Springfield, met with the railroad commissioners in Columbus, Ohio, on Oct. 13. The new standard code of interurban rules, adopted by the Transportation & Traffic Association at Denver, was discussed in an informal way, but as none of those present at the conference had had an opportunity of studying the new rules closely, no action was taken. Both the committtee and the commission were agreed as to the need of a standard basic code of rules, and both believed that, with possibly a few minor modifications, the new standard code of the Transportation & Traffic Association could be used in Ohio. The commission has called another conference for Oct. 27, at which time the rules will be gone over in detail and necessary changes made.

It was brought out at the conference that some roads operating in Ohio have no code of rules, and on other roads which have a code no steps are taken to ascertain if the employees are thoroughly familiar with the rules in force. In this connection the Ohio Electric Railway has recently adopted a plan for schools of instruction for its trainmen. Meetings of motormen and conductors are to be held on Sundays at division headquarters, and the men will be instructed in the rules of operation and the causes and prevention of accidents. A class for night crews will be conducted in the afternoon and the day crews will meet at night. The classes at Columbus are in charge of F. J. Moore, superintendent.

SUGGESTIONS INVITED REGARDING FORM OF NEW YORK ANNUAL REPORT

A letter asking for discussions of the forms of annual reports has been issued by W. J. Meyers, statistician of the New York Public Service Commission, Second District. Mr Meyers says:

At the present time it is one of the duties of the Public Service Commissions of this State to keep themselves informed concerning the affairs and conditions of the various public service corporations subject to the oversight of the Commissions. One of the means provided by the statute for such information is embodied in a system of annual reports required of the several corporations. Great latitude is allowed by the statute concerning the form which such annual reports shall take, the statutory provisions concerning them placing their form largely within the discretion of the Commissions.

In connection with the annual reports of the Commissions to the Legislature of the State, the statute requires the publication of "abstracts of the reports to such commission of common carriers, railroad corporations and street railroad corporations, and gas and electrical corporations," and requires such abstracts to be distributed to "railroad, street railroad, gas and electrical corporations, and other persons interested therein."

Owing to the large number of corporations placed within the supervision of the Public Service Commission for the Second District, the critical examination of the annual reports of the said corporations and the compilation therefrom of matters of sufficient general interest to warrant publication is a work of considerable magnitude and a correspondingly great expense. In order that such expense may not be an unwarranted burden upon the public funds, the information published should be such as satisfies some genuine public need, and this letter is sent to you in the hope that you may help to determine what are the public needs to be satisfied by such publication and what is the character of the matters to be compiled and published in order to meet such needs.

The various persons interested in the operations of public service corporations may conveniently be grouped into (*a*) consumers, (*b*) managers, (*c*) investors, and (*d*) employees. Each of these classes is doubtless interested from a separate standpoint in the matters under consideration, and we are desirous of affording in our statistical publications such information as is necessary to meet the real wants of these various classes so far as it is significant and can be provided without unwarranted expense.

In our endeavor to shape the requirements of our annual reports so as to yield truly significant information and to compile therefrom for publication matters of real public interest, it will be of material assistance to us if we may have from you in the course of the next thirty days a discussion of the general question of what information shall be gathered and published concerning the affairs, conditions, and operations of public service corporations, together with a statement of the standpoints from which you approach the question and the significance which in your opinion is to be attached to the various matters which you suggest as worthy of publication. *The more specific and concrete your suggestions the more valuable will they be.*

COMMUNICATION

PREPAYMENT CARS IN LOUISVILLE

Louisville Railroad Company
Louisville, Ky., Oct. 12, 1909.

To the Editors:

The adoption by a street railway company of any innovation either in its methods or its equipment is certain to bring forth from the public some unfavorable comments. The Louisville Railway Company has recently equipped five of its lines with pay-on-platform cars. Objections were raised in some quarters that the use of fare boxes and the collection of fares before the passengers entered the car would cause congestion on the rear platform, retard the running time of the cars and in other ways promote discomfort and dissatisfaction among the patrons of the railway company. One or two of the lines equipped carried the heaviest traffic of any of the lines in the city, and the objections raised have not materialized. Close observation of the operation of these cars after a period of some months shows that the passengers have adapted themselves to the prepayment method of fare collection so that there is practically no delay or any congestion on the platform. Passengers quickly learned to have their change ready before boarding the cars and now drop their nickels in the fare box without any delay. The conductor never leaves his position on the rear platform and is therefore able to protect passengers from injury and give assistance to those who need it. From our experience so far, we believe that an alert conductor will save the railway company at least 75 per cent of the boarding and alighting accidents which occur with the old type of cars. If this percentage can be saved, in the accident damage account, the fact that the company receives a nickel from every passenger is comparatively an insignificant advantage.

We have found that there are only two classes of persons who object to the plan of paying their fare before entering the cars. One of these is the man who rides on the cars only during rush hours, when the travel is so heavy that he can evade the conductor and ride free. With the fare box in use, this man's petty grafting is at an end. The other class is the intoxicated man who is always contrary and makes himself a nuisance to the traveling public. This man as a rule stands in the passage way and wants to argue with the conductor as to whether or not he shall pay his fare.

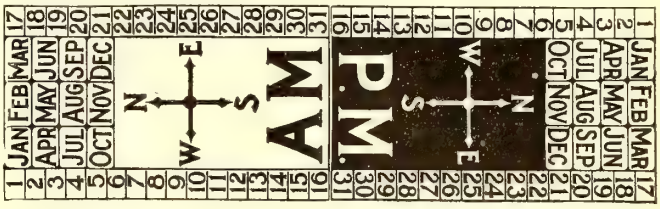
From our experience with the cars, we should say that 99 out of every 100 passengers are pleased with the system and are trying in every way to make it a success. The cars are started more promptly than ever before, because the conductor is always in a position to give the signal when the steps are clear.

J. T. Funk,
General Superintendent.

Two accidents that have happened recently, one in Great Britain and the other in India, point to a danger to which few have attached much importance. This is the possibility of sparks from the trolley wire and wheel igniting gas or other inflammable elements in the surrounding atmosphere. In England a spark from the overhead trolley ignited some gas which was escaping from a window in a neighboring house, and an explosion took place. In Calcutta a native store, where methylated spirits and other inflammables were kept in bottles and casks, was set on fire owing to the fact that an inflammable atmosphere was created by the fumes, and this was ignited by a spark from the trolley wheel of a passing car.

A NEW FORM OF HAT CHECK

The American Bank Note Company, New York, has designed and copyrighted the new form of hat check shown in the accompanying engraving. The check is printed to indicate A. M. on one half and P. M. on the other half, and on both halves are printed the days of the month, the names of the months and a cross indicating the four points of the compass. By making three punches in either half

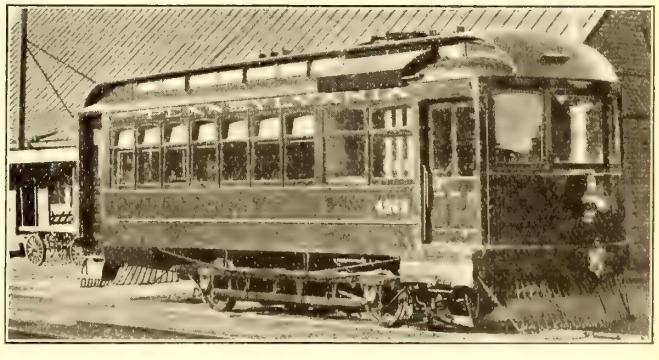


A New Hat Check

of the check the conductor can indicate the day, month, direction of travel and whether the ride was begun in morning or afternoon. These checks are printed on a good grade of white paper stock in seven distinctive colors so that a different color can be used for each day of the week. By occasionally changing the colors used for different days it is claimed that absolute protection against fraudulent use of the checks can be obtained.

GASOLINE MOTOR CAR FOR THE PENNSYLVANIA RAILROAD

The Pennsylvania Railroad recently purchased from Fairbanks, Morse & Company, Chicago, Ill., the gasoline motor car illustrated, for service on its Smyrna branch, between Clayton and Smyrna, Del. This car moved to its destination under its own power from the factory in Three Rivers, Mich., starting on Oct. 7 and reaching Wilmington, Del., on Oct. 10. The total distance was 780 miles, the actual running time 28 hours, and the average speed 27.5 m.p.h. The car is of the straight gasoline type, equipped with a four-cylinder, water-cooled engine rated at 60 hp at 600 r.p.m. The double ignition system is used, one set of spark plugs being connected with a magneto and the other with a storage battery. The engine is hung on



Gasoline Motor Car for Pennsylvania Railroad

the truck frame, entirely independent of the car body. As the latter rests on elliptical springs on the trucks, the vibration of the engine is not communicated to the body. The transmission is of the gear type, with three speeds in either direction. The control includes one small hand wheel to govern all the speed changes, and is so arranged that the clutch is automatically thrown out as the change is made from one speed to another. The drive is by roller chains

connected to the axle. The body of the car is divided into two compartments. The forward compartment contains the power equipment and is arranged also for handling light baggage and express; the rest of the car contains reversible seats for about 30 passengers. A special feature of the Pennsylvania car is the additional rear control, to permit the motorman to operate from either end. The air brakes installed apply brake shoes on all four wheels.

This car is the fifth of its kind built by Fairbanks, Morse & Company, and is known as No. 24. Another type, No. 19, is a 20-passenger car, built either open or enclosed. The following is the September, 1909, operating record of one of two No. 24 cars run by the St. Joseph Valley Traction Company, Elkhart, Ind.:

Miles run		2,867
Passengers carried		4,600
Cost of Operation:		
Wages of crew	$113.65	
Material	9.09	
Labor	21.80	
Gasoline, 558 gal.	58.60	
Oil and waste	25.84	
Supplies	8.33	
		$237.31
Cost of operation per car-mile		$0.083

The first car of this type was put in service on the St. Joseph Valley line in the latter part of May, 1909. During June, July, August and September it ran 8524 miles.

PACIFIC COAST TRAIN PARTY AT SEATTLE AND TACOMA

The party of delegates to the Denver convention of the American Street & Interurban Railway Association who, with President Shaw, are making a tour of the Far Western cities on the special train chartered by the Massachusetts Street Railway Association, left Butte, Mont., on Oct. 11. The train made its first stop of a few hours at Calgary, Alta. Here the party was met by Thomas H. McCauley, manager of the Calgary municipal street railway system, and although the time was short and the hour late, most of the tourists improved the opportunity of inspecting the handsome cars and the new track in Calgary. The entire system, according to Mr. McCauley, has been built during the past six months.

Oct. 13 and 14 were spent in crossing the Canadian Rockies, stops being made at Banff, Laggan and Glacier. Seattle was reached about noon on Oct. 15. A party of representatives of the Seattle and Tacoma electric railway companies who were in attendance at the convention returned to those cities on the special train, and this added greatly to the pleasure of the members of the party who came from the Eastern States.

On Friday afternoon most of the party visited the Alaska-Yukon-Pacific Exposition in Seattle. In the evening a banquet was tendered them at the Hotel Butler, Seattle, by the Stone & Webster Engineering Corporation. On Saturday morning special cars were placed at the disposal of the party for sightseeing trips around the city, the start being made at 10 o'clock in the morning. At 1 o'clock in the afternoon E. E. Potter, manager of the Seattle Electric Company, was the host at a luncheon given for the men of the party at the Rainier Club, Seattle, and later in the afternoon another trolley trip was provided. Saturday night a beefsteak dinner was arranged at the Hotel Butler, after which the party was carried in special cars to the exposition grounds to witness the ceremony of closing the fair.

Sunday morning about 20 members of the party were taken in automobiles to the Snoqualmie Falls power plant, which was inspected with much interest. Other members of the party spent the day quietly or took trips about the city in automobiles and street cars.

Monday morning, Oct. 18, the entire party was carried by special cars over the lines of the Puget Sound Electric Company to Tacoma, and thence on an inspection trip to the large power plant recently erected by the Stone & Webster Engineering Corporation at Electron. Dinner was served at the Tacoma Hotel. The special train left Tacoma at 8 o'clock Monday evening for Portland, which was reached early Tuesday morning. R. T. Laffin, of the Stone & Webster Management Association, made a brief farewell speech before the train left, and extended the best wishes of the Seattle and Tacoma railway organizations for the success of the trip. Charles C. Peirce, in reply, voiced the appreciation of the entire party for the many hospitalities extended during its visit.

While in Seattle and Tacoma the party was the recipient of many courtesies and attentions from the representatives of Stone & Webster and the companies managed by that organization. Each guest was provided with a triskilion badge, which is the trade-mark of the Stone & Webster companies, and was also furnished with tickets good for transportation over all of the electric lines in Seattle and Tacoma controlled by Stone & Webster. Pamphlets, giving technical and other information about the various properties in these cities, were furnished to the tourists, and sightseeing cars were provided for the different trolley trips.

When the train reached Portland, Tuesday morning, it was met at the station by representatives of the Portland Railway, Light & Power Company, who extended a warm greeting to the tourists. A trolley ride around the city was provided in the morning and a luncheon was given to the party at the Commercial Club at 1 o'clock. Speeches were made by the Mayor of Portland and others. In the afternoon automobiles were provided for sightseeing in and around the city. The party left for San Francisco at 6 o'clock in the evening. From San Francisco the itinerary will include Santa Barbara, Los Angeles, El Paso, San Antonio, Houston and New Orleans, thence returning by direct route to Boston.

ELECTRIC RAILWAY ACROSS THE PYRENEES

There has just been completed between Villefranche and Bourg-Madame, in Southern France, an electric railway 34 miles long. The new line starts from Villefranche at an altitude of 1407 ft. above sea level, and is 5220 ft. high at the crest of the line and 3750 ft. at Bourg-Madame. The ruling grade is 6 per cent. Three trains a day are operated in each direction at a schedule speed of 12.4 m.p.h. The trains consist of motor cars and trailers with baggage compartments, accommodating a total of about 300 passengers and 80 tons of freight. The trains are operated on the Sprague multiple-unit system, and each motor car is equipped with four 50-hp motors. The current is taken from a third-rail at 800 to 850 volts.

In 1908 the electric railways purchased 6,425,368 crossties, or 5.7 per cent of the total number purchased in that year. The average price paid by electric railways for sawed ties was 54 cents. The electric railways used 61,492 treated ties, or 9.6 of the total purchased by them, while the treated ties used by the steam railroads formed 21.8 of the total.

ELECTRIC RAILWAY LEGAL DECISIONS

LIABILITY FOR NEGLIGENCE

Colorado.—Street Railroads—Injury at Crossing—Contributory Negligence—Duty of Pedestrian—Looking Along Tracks for Approaching Car—"Last Chance Doctrine."

The law gives no right of recovery for an injury sustained by a pedestrian in a collision with a car at a street crossing, where both parties are negligent, each disregarding his own duty and seemingly relying upon a performance of the duty of the other, and where the injury resulting from their concurring negligence would have been avoided if the duty of either had been performed. The law requires a pedestrian, about to cross over a street railroad, to look along the tracks to ascertain whether a car is approaching near by, and to do so at a place and time when it will be reasonably calculated to be effectual for his protection. The exception to the general rule making contributory negligence a defense, known as the "last chance doctrine," does not apply where there is no negligence of the defendant supervening subsequently to that of the plaintiff, as where his negligence is continuous and operative down to the moment of the injury, or where his negligence or position of danger is not discovered by the defendant in time to avoid the injury. (Denver City Tramway Co. v. Cobb, 164 Federal Rep., 41.)

Georgia.—Carriers—Street Railway Passenger—Negligence.

In an action for damages for personal injuries, a petition was not open to general demurrer which alleged in substance that the plaintiff, an adult, was a passenger at night on a greatly overcrowded street car of the defendant company; that after the conductor had called a given street, at which plaintiff desired to alight, plaintiff signaled the conductor, who in turn signaled the motorman to stop the car at that street; that plaintiff, thinking that such street had practically been reached, proceeded at once, for the purpose of promptly alighting and in full view of the conductor, to work his way from the center of the car along the crowded aisle to the rear platform and onto the steps, both the platform and the steps being also crowded with passengers; that by reason of his shortness of stature and the crowded condition of the aisle, platform and steps the plaintiff was unable to see or locate just where the car was; that, thinking that the car had stopped, relying on the call of the conductor, and being unable, on account of the crowd on the steps, to see the ground, plaintiff stepped from the platform onto the steps, when he discovered the car was in motion, but too late to recover himself on account of the passengers on the steps; and that, being unable on account of the number of such passengers to catch hold of the bars at the sides of the steps provided for the use of passengers in boarding and alighting from the car, plaintiff was violently thrown to the pavement, and injured and damaged as set forth. (Worthington v. Georgia Ry. & Electric Co., 62 S. E. Rep., 525.)

Kentucky.—Street Railroads—Operation—Action for Injuries—Instructions—Applicability to Evidence—Negligence—Contributory Negligence—Child on Track—Injury—Instructions—Injuries to Persons on Track—Children—Trial—Reception of Evidence—Examination in Chief.

In an action for injuries by being struck by defendant's street car, an instruction that unless defendant's agents, or one of them in charge of the car, failed to have it under reasonable control or keep a reasonable lookout or exercise reasonable care, the jury should find for defendant, was erroneous, where defendant had two agents on the car, the conductor and the motorman, and it was not the conductor's duty to keep a lookout, since the jury might have found for plaintiff because the conductor failed to keep a lookout.

An instruction that if defendant's street car was running at a reasonable speed and under reasonable control, and plaintiff went upon the track so close to the car that the motorman could not by ordinary care prevent a collision, the jury shall find for defendant, was erroneous, since it would permit a recovery, even if a collision could not have been avoided had the car been running at a reasonable rate of speed and under control.

Though a street car was running too fast and was not under reasonable control, the company would not be liable for injuries to plaintiff if he came upon the track in front of the car so close to it that a collision could not have been avoided, even if the car had been running at a reasonable rate of speed and had been under control.

In an action for injury to a child on defendant's street railway track, instructions to be given on new trial determined.

In an action against a street railroad for injury to a four and a half year old child, plaintiff was too young to be charged with contributory negligence, and no instruction upon that subject should be given.

In an action for injuries by being struck by a street car, plaintiff should introduce as evidence in chief testimony as to the distance in which the car could have been stopped before striking him. (Louisville Ry. Co. vs. Gaar, 112 S. W. Rep., 1130.)

Maine.—Negligence—Acts or Omissions Constituting Negligence — Carriers — Carriage of Passengers — Street Railroads — Contributory Negligence—Questions for Jury.

When the facts disclose a situation, dangerous to life or limb, into which, from its very nature, it is practically certain, even prudent men may be induced to enter, and it is practicable to remove such danger, without injuriously interfering with other rights or privileges, then the court should establish, as the law, the rule which prevents injury or loss of life, rather than that which invites or even permits it.

A street railroad is a public corporation. It receives all its privileges from the public. It depends upon the public for its income. It invites and induces the public to ride upon its cars. Great experience makes it familiar with the habits of people so riding and with their natural tendency, with or without reason, to move from seat to seat. With its special means of knowledge, it should be held to anticipate, what is even a matter of common knowledge, that a passenger riding upon one of its cars may at any place along the line and while the car is in motion undertake to change his seat.

It is too narrow a construction, and against good public policy, to hold that it is negligence per se on the part of a passenger riding on a trolley car not to anticipate that a pole may be permitted to stand so near the railroad track that he cannot, in an erect position and careful manner, pass from one seat in the car to another over the running board without danger of injury from collision with such pole.

It establishes a safer rule of law to require street railroads to exercise a degree of care sufficient for the protection of their passengers with respect to poles and other obstacles along their rights of way when such protection involves only a question of pecuniary outlay, than to hold that such railroad may be permitted, for the mere purpose of saving expenditure, to continue the maintenance of a structure which may be calculated sooner or later to result in the injury or death of a passenger.

A street railroad owes to its passengers a duty with respect to the proximity to the track of poles and other permanent structures, and that whether, in case of an injury to one of its passengers by coming in contact with a pole or other structures, the defendant was negligent in the location and maintenance thereof, is a question of fact for the jury.

In the case at bar, the chartered rights of the defendant, the location of its tracks and poles by the city, and approval of the same by the railroad commissioners, were all proceedings, assuming them to be in all respects legal, intended to bestow upon the defendant the right to exist, not to destroy. They were calculated to confer upon it the right to exercise all the privileges of its franchise, but not immunity from its negligence.

Although in the case at bar on the back of each seat in the car on which the plaintiff's intestate was riding at the time of his injury, in legible letters, plainly to be seen, were the words, "Avoid accidents; wait until the car stops," yet this notice must be construed to have been intended by the defendant as a caution to passengers against alighting from a car in motion, and not as an exemption from its own negligence. If not so intended, it was calculated to so impress the mind of the ordinary passenger.—(Cameron vs. Lewiston, B. & B. St. Ry., 70 Atl. Rep., 534.)

Massachusetts.—Negligence—Imputed Negligence—Guest of Automobile Driver—Street Railroads—Injuries to Travelers—Question for Jury—Operation of Street Cars—Rules—Violation.

Where plaintiff, who was inexperienced in the operation of an automobile, was injured, while riding as the guest of an experienced driver, in a collison between the automobile and a street car, there being no mutuality in a common enterprise between them, the driver's negligence, if any, was not imputable to plaintiff.

Where the driver of an automobile, with whom plaintiff was riding when she was injured in a collision with a street car, turned from behind a car he was following on a narrow bridge, where the collision occurred, not only in the direction required by Rev. Laws, c. 54, § 2, but in the only direction in which there was room for him to pass, plaintiff was not negligent as a matter of law in failing to warn the

driver against turning from behind the car onto the opposite track.

In an action for injuries to plaintiff in a collision between an automobile, in which she was riding, and a street car, plaintiff's negligence, if any, held for the jury.

Where a much-traveled bridge supporting double street car tracks was so narrow that it was impossible to pass with a vehicle between a car and the guard rail, and there was considerable travel over the bridge, due care required the motorman of a car, passing another car on the bridge, to keep his car under sufficient control to avoid collision with a vehicle that might be approaching behing the passing car, and which might turn out on the track in front of him.

Where a bridge supporting double street car tracks was so narrow that a vehicle could not pass between a car and the guard rail, a violation of the rule prohibiting the operation of tow cars on the bridge at the same time, which caused a collision between an approaching car and an automobile, in which plaintiff was riding, as the chauffeur attempted to pass a car he had been following over the bridge, was some evidence of negligence in the operation of the colliding car; it appearing that, after the car and automobile became visible each to the other, the automobile came to a full stop, but the motorman, in spite of proper effort, could not stop the street car.—(Chadbourn v. Springfield St. Ry. Co., 85 N. E. Rep., 737.)

Michigan.—Carriers—Passengers—Injuries—Negligence.

In an action for injuries to a passenger alighting from a street car, evidence held not to establish negligence on the part of the street car company.—(Snyder v. Michigan Traction Co., 117 N. W. Rep., 889.)

Michigan.—Street Railroads—Operation—Collision with Vehicles—Negligence of Motorman—Last Clear Chance—Actions—Sufficiency of Evidence—Operation of Car on Approaching Vehicles—Qualification of Experts.

If plaintiff's passage across a street car track was prevented by other traffic, and a wall prevented her moving her rig to a safe distance from the track in the other direction, and the motorman saw plaintiff's dangerous position in time to stop the car and avoid striking her, but thereafter negligently ran into her rig, the company was liable for resulting injuries, even though plaintiff was negligent in driving into the dangerous position.

In an action against a street railroad for injuries sustained by colliding with plaintiff's rig, evidence held to show that the motorman recklessly ran into the rig with knowledge of plaintiff's dangerous position.

In an action for injuries caused by defendant's street car colliding with a rig on a bridge approach, a motorman, who had 17 years' experience as a motorman and conductor, was familiar with the situation at the approach, and with the car in question, upon being told of the condition of the weather at the time of the accident, could testify within what time that car could be stopped at the bridge approach when running at various rates of speed.—(Bladecka v. Bay City Traction & Electric Co., 118 N. W. Rep., 963.)

Missouri.—Street Railroads—Collision with Vehicles—Negligence—Contributory Negligence—Instructions—Humanitarian Duty—"Humanitarian Doctrine."

In an action against a street railway company for injuries sustained by the driver of a team in a collision with a street car, the evidence of plaintiff, to which defendant demurred, showed that plaintiff, while driving along the street car tracks, on observing the approach of a car, attempted to leave the track, but became hemmed in by other vehicles and was unable to do so, and that the motorman saw, or by reasonable care should have seen, the situation of plaintiff, but failed to stop the car or make any effort to avoid the collision until too late. Held, that the demurrer to the evidence was rightfully overruled, since the facts shown by plaintiff established defendant's negligence, without contributory negligence of plaintiff, as matter of law.

In an action for injuries to a driver of a team, sustained in a collision with a street car, an instruction that, although plaintiff was himself guilty of negligence in driving along or across the track of defendant at the time and place of the collision, that alone will not discharge the company or its employees from the observance of reasonable care in the management of its cars, is erroneous, as ignoring the defense of contributory negligence, and in not restricting the application of the principle stated therein to the doctrine of humanitarian duty.

It is the fact that a person is in danger and has perhaps been negligent that calls the humanitarian doctrine into play.

The foundation of the humanitarian doctrine is the principle that no person has the right knowingly or negligently to injure another, when he knows, or should know, if he is reasonably careful, that his fellow is in danger of injury at his hands, and he possesses the means of removing that danger. (Ross vs. Metropolitan St. Ry. Co., 112 S. W. Rep., 9.)

New York.—Negligence—Contributory Negligence—Acts in Emergencies—Street Railroads—Actions—Question for Jury.

The law does not require one placed in a dangerous position by another's negligence to exercise the best possible judgment on the moment to extricate himself therefrom.

In an action against a street car company for injuries caused by the car striking plaintiff's wagon, whether defendant was negligent held for the jury. (Leonard vs. Joline et al., 113 N. Y. Sup., 682.)

New York.—Street Railroads—Persons On or Near Track—Injuries—Negligence—Instructions.

Plaintiff, as foreman for certain contractors, was extending the platform on the northerly side of the New York terminal of the Brooklyn bridge, on which defendant operated two lines of surface street cars. During the elevation of a girder through an opening in the floor of the bridge, plaintiff went on the platform to superintend the raising, and, seeing a train approaching, signaled the flagman, and pushed the girder so that the train could pass it in safety. The girder was hoisted until it was 6 ft. above the surface of the platform, and had swung 2 ft. over the track, when a second train approached at full speed. Plaintiff motioned to the flagman, but discovered that he was not there. Plaintiff held back the girder so that the first coach passed without hitting it, but was unable to hold it longer, and it swung over the track, hitting the second car, and, in some way, caught plaintiff's leg and injured it. Held insufficient to show negligence on defendant's part; no request having been made to suspend the operation of the trains.

Plaintiff, a contractor's foreman, was injured while raising a girder to a platform by the girder being struck by a passing street railroad train. Held, that the court erred in refusing to charge that if, when approaching the girder, the motorman saw that his car could pass in safety, and plaintiff gave no signal to stop, a verdict must be for defendant, the iron having come in contact with the body of the car after the front had passed, and in charging that, if the circumstances were such that an ordinarily prudent person in charge of the car would have been justified in concluding that he could have passed in safety, then defendant would not have been negligent. (Fay vs. Brooklyn Heights R. Co., 113 N. Y. Sup., 689.)

Pennsylvania.—Carriers—Street Railroads—Duties of Conductor—Duty of Passenger—Dangerous Position—Negligence of Passenger.

The conductor of a street car must control the operation of the car, and enforce the rules of the company as far as they affect the transportation of passengers.

A passenger on a street car should take the place on the car assigned to him by the conductor, unless the danger in so doing is so apparent that a reasonably prudent person would not assume it.

A passenger with numerous bundles attempted to enter an open summer car, and the conductor, after accepting his fare, directed him to occupy the platform. Held, that the passenger, in following the directions of the conductor, was not guilty of negligence as a matter of law. (Mittleman vs. Philadelphia Rapid Transit Co., 70 Atl. Rep., 828.)

Washington.—Street Railroads—Injury to Traveler—Complaint — Sufficiency — Pleading — Variance — Motions—Making More Definite.

A complaint alleging that plaintiff's team "was struck and knocked down and run over by defendant's cars" sufficiently alleges collisions with any or all of defendant's cars involved in the accident.

Even if a collision with only one car was alleged, a second collision occurring from five to ten minutes after the first, and before the horses could be removed from the track, was part of the same transaction, and evidence thereof was not at variance with the allegations.

If defendant was in doubt as to what particular car was referred to in the complaint, its language being broad enough to embrace more than one, it should have moved to make the complaint more definite and certain, and an objection to evidence of a second collision because so at variance with the complaint that it was not notified by the pleadings that damages were claimed for a collision with any other than the first car was insufficient. (South Tacoma Fuel & Transfer Co. vs. Tacoma Ry. & Power Co., 97 Pac., Rep., 970.)

News of Electric Railways

Boston, Lowell & Lawrence Electric Railroad Hearings Resumed

During the past three weeks the Massachusetts Railroad Commission has resumed public hearings upon the petition of the Boston, Lowell & Lawrence Electric Railroad for a certificate of exigency, and many witnesses in favor of the project have testified before the board. The initial hearing upon the project was held on June 14, 1909, and the plans of the company as developed by Westinghouse, Church, Kerr & Company were described by Lester W. Tucker, engineer of that organization, and briefly reviewed in the ELECTRIC RAILWAY JOURNAL. The company desires to build a double-track, high-speed interurban electric railway on a private right-of-way between the terminus of the Boston Elevated Railway at Sullivan Square, Charlestown, and Lowell and Lawrence. The intention is to provide a low-cost, rapid and frequent train service, and the general trend of the company's testimony has thus far been to endeavor to point out that the road will serve a traffic which neither the existing steam nor street railroads can handle. The petitioners were represented by J. W. Farley, Adalbert Ames, Jr., and James F. Jackson, formerly chairman of the Railroad Commission. For the opposition the Boston & Northern Street Railway was represented by Warren, Garfield, Whiteside & Lamson, and the Boston & Maine Railroad by Coolidge & Hight, all of Boston. R. E. Joslin appeared for the town of Winchester and Edward E. Elder for Medford.

Interest has centered during the recent hearings upon the testimony of James C. Boyd, consulting engineer with Westinghouse, Church, Kerr & Company, New York. Mr. Boyd was first called to the stand on Sept. 24. He testified that the plans for the Boston, Lowell & Lawrence Railroad had received thorough treatment. Westinghouse, Church, Kerr & Company maintain a staff of from eight to 15 men in their statistical department alone, and within the last seven years about 300 reports upon railway problems have been prepared. The financial practicability of projects is usually considered in these reports. Mr. Boyd testified as to his familiarity with the territory in question and emphasized the desirability of Boston as the primary terminal of an interurban line. Lowell and Lawrence are representative manufacturing cities in which the population spends liberally for transportation facilities, on account of a fairly high average income per family, in spite of the low average wage per individual. The engineering organization considered the project feasible and advisable. Two routes have been studied, one through Arlington Heights, and the other through Winchester, Woburn and Wilmington to Tewksbury, Lowell and Lawrence. The Winchester-Woburn route is the preferable one. It requires 66.8 miles of single track. Below is given the estimated cost of constructing this route:

ESTIMATED COST OF WINCHESTER-WOBURN ROUTE.

Right of way	$954,600
Roadbed and track	3,987,400
Electrical equipment	1,332,200
Rolling stock	727,400
Stations, etc.	64,100
Total	$7,065,700

The total estimated cost by the Arlington Heights route is $6,445,600.

Mr. Boyd testified that the proposed schedule of fares provides for the sale of single-trip, 10-ride and 50-ride tickets. The fare from Sullivan Square to Lowell is to be 35 cents, and from Sullivan Square to Lawrence, 40 cents. The average rate is to be about 1.2 cents per mile. The fares were made up on a starting basis of about 1.5 cents per mile with a minimum of 1 cent. The basic rate for single-trip tickets is 1.42 cents, for 10-trip, 1.22 cents and for 50-trip, 1 cent. This was distributed on a mileage basis, except that the fare was brought to the nearest 5 cents in each case, with no fare less than 5 cents. Mr. Boyd cited the Lackawanna & Wyoming Valley Railroad as a successful road with substantially the same fares per mile as that proposed for the Boston, Lowell & Lawrence Railroad. It is expected that the 10-ride tickets will represent the average conditions. The absence of grade crossings and the infrequency of stops bring the road closer to steam railroad conditions. The absence of grade crossings will enable faster time to be made, with the result that the platform labor is reduced in proportion to the mileage covered. The proposed running time between Sullivan Square and Lowell is 35 minutes and 45 minutes for local trains. The population of Boston proper was not considered in the estimates of the inhabitants of the road's territory. The hearing adjourned at this point to Sept. 29.

Mr. Boyd was again called to the stand on Sept. 29. He stated that the running times of the proposed road were taken to Sullivan Square instead of to the North Station in Boston for the reason that there it takes from about 3 to 5 minutes for a passenger to reach the North elevated station from a railroad train in the North Station of the Boston & Maine Railroad, depending upon the number of the track on which the train arrives, while from 6 to 7 minutes are consumed by a Boston Elevated train between Sullivan Square and the North Station. In addition, a passenger can get off an elevated train more quickly than a steam train, an average time of emptying a steam train being 50 seconds against 20 seconds for the elevated. This would mean that the estimate of the time to Sullivan Square would make a net difference of only 2 or 3 minutes, compared with the North Station. It would be necessary for a passenger to walk only from 50 to 100 ft. to reach an elevated train at Sullivan Square.

The desirability of terminating the proposed line at Sullivan Square was next emphasized. The promoters and engineers feel that where a large city has a rapid transit system in operation, a road entering the community from outlying points should deliver traffic to the city system. In this way the facilities are confined to a single control and the service is rendered in the least expensive manner. In New York the lines which extend beyond the city limits deliver their passengers well out upon the city lines. Regarding the capacity of the Sullivan Square terminal to handle traffic over the Boston, Lowell & Lawrence Railroad, the witness stated that the former congestion at Sullivan Square was due to the operation of elevated trains in the Tremont Street Subway, which limited the speed and the length of the train units, and to the limited capacity of the station on the elevated system. The transfer of elevated trains to the Washington Street Tunnel has resulted in greatly improved handling of traffic and the extension of platforms to accommodate 8-car trains has also been an important change for the better. Mr. Boyd stated that at a conservative estimate the capacity of the Boston Elevated rapid transit overhead and tunnel system will be doubled by these changes, and the extension proposed to Medford will also tend to cut down any congestion at Sullivan Square. It is estimated that the Boston, Lowell & Lawrence Railroad would be self-supporting in three years. The estimated traffic was based upon a study of the present travel between the different cities, the population of the territory and a comparison with the Lackawanna & Wyoming Valley Railroad.

A study was made of travel between Lowell and Boston, based largely upon figures filed by the Boston & Maine Railroad and the Boston & Northern Electric Railway in the first case before the board relating to the proposed road, about three years ago. The estimated earnings from travel on the Boston & Maine Railroad were $275,000 per year and on the Boston & Northern Street Railway, between Lowell and Boston, $188,000. It was estimated that by 1916, after three years of operation, the earnings of the new road between Boston and Lowell would be $4.10 per capita, or a total of $450,000 per year and between Boston and Lawrence, $400,000 per year, or $3.66 per capita. It was estimated that the travel between Lawrence and Lowell would give a revenue of $150,000 per year, and that the present running time would be cut in half by the new road. For intermediate service the earnings would be about $64,000, making total earnings of about $1,000,000 per year for the system. The schedule would call for 2,800,000 car miles per year, or gross receipts of nearly 40 cents per car mile. The tributary population is about 233,473, and the earnings should reach $1,000,000 on an average per capita expenditure of $4.30. The comparison with the Lackawanna & Wyoming Valley Railroad showed that in the latter case the riding between Scranton and Wilkes-Barre, the terminals, brought in about 50 per cent of the gross passenger receipts. Scranton has a population of about 124,000 and Wilkes-Barre, 22 miles distant, has 63,000 inhabitants. Treating Scranton as the primary terminal gave gross earnings of $3.86 per capita from Wilkes-Barre. About 16 per cent of the riding was between Scranton and Pittston, the latter having 14,356 inhabitants. Pittston's per capita expenditures were $5.42. The per capita earnings between Scranton, Wilkes-Barre and Pittston, excluding the Scranton population were $4.15. The riding between the two secondary terminals of Pittston and Wilkes-Barre was about 13 per cent of the total, and for that section of the road, treating Wilkes-Barre as the primary terminal, the result is $5.34 per capita. The local

traffic of the road is 20.7 per cent of the total. Taking the total tributary population of the road and excluding Wilkes-Barre the earnings show an expenditure of $5.25 per capita. A comparison of the riding estimated by reference to the Boston, Revere Beach & Lynn line, excluding the beach service gave $4.15 gross receipts per capita for the Boston, Lowell & Lawrence Railroad. It is estimated that the company can operate for 50 per cent of the gross earnings.

Under cross-examination by Bentley W. Warren, for the Boston & Northern Street Railway, Mr. Boyd stated that there should be little difference between the Arlington Heights and the Winchester routes in point of attracting through travel. Land damages were figured by counsel, the assessed values having approximately 50 per cent added to cover the injuries to property. The selection of a terminal at Lawrence is held back on account of the present railroad grade crossing situation. The class of travel which would be created by the road would differ materially from the travel on the Boston & Maine.

Cross-examination of Mr. Boyd was continued on Sept. 30. He stated that the estimate of land damages on the Winchester-Woburn route is $954,600, and on the alternate route $873,700. The maximum speed of the trains is to be about 55 m.p.h. Thirty-eight cars are estimated as the necessary rolling stock at the commencement of operation. These are to be built with steel underframes and are to be equipped with two 200-hp motors. Passengers are to enter and leave at the platform level. Cross seats and multiple unit control are provided. The transmission line is to be operated at 20,000 volts between the power house and the substations. Four substations will be required. The cost of each car will be about $14,000. The estimated cost of stations is $64,000, including a $25,000 terminal at Sullivan Square and a $12,000 station at Lowell. The intermediate stations are to consist of a simple waiting room, with a ticket office over each and an umbrella shed over the platform. An elevated structure 650 ft. long is to be built at Sullivan Square in connection with the present station, the plan providing for a single short connection between the interurban and the elevated stations. A stub-end terminal would be used, with four tracks. At the Lowell station the platform would be about 7 ft. below the level of the street. In response to a question by Mr. Warren, Mr. Boyd stated that the electrification of the Erie Railroad's Rochester division has shown better passenger earnings than were estimated. The electrification was undertaken as an experiment by the Erie road, and the results show that electrification was justified. About 50 miles of road were electrified and the passenger business more than doubled in the first year of operation. The Long Island electrification has saved the difference in operation on the first 100 miles of track changed over that the company hoped to effect below the cost of steam service, and the business has also been increased. Mr. Boyd admitted that in general it would cost less to electrify an existing steam road than to build a parallel high-speed electric road, and that it would cost less to electrify the Boston & Maine between Boston and Lowell than to build the proposed line of the Boston, Lowell & Lawrence. The hearing then adjourned until Oct. 12.

Cleveland Traction Situation

Judge Tayler has taken up the questions referred to him under the conditions imposed in a letter addressed to the city and the Cleveland Railway recently, which include the task of valuing the property and franchises of the company and fixing the maximum fare, and has also accepted the commission of arbitrating the difference between the city and the company on the Euclid Avenue-East Cleveland matter and the contract that is to be entered into with the interurban railways. The committee of which the judge is a member has completed the so-called safety clause of the franchise and it has been accepted by both sides, as well as the clause giving the company preference in the bids at the end of eight years, when the city is to have the right to nominate a bidder for the property.

On the evening of Oct. 12 Horace E. Andrews, president of the Cleveland Railway, reported to the Council committee of the whole that the Council of East Cleveland had refused to modify the contract of the company with that village, and suggested that this, with other disputed points, be referred to Judge Tayler for final determination. The committee replied that as Judge Tayler is to determine the value of the property, including the franchises, this question might also be referred to him, since he would necessarily be the arbitrator of unprofitable as well as profitable contracts held by the company. The company opposed the proposal that the judge should be asked to state the amount to be deducted for the loss claimed from operation through East Cleveland on the ground that the Council, in giving instructions to make a deduction on account of this contract, would be taking part in the arbitration.

At this meeting a report was made on progress with the new contract with the interurban railways, but this was not acted upon by the committee. Among the changes from the Baker ordinance asked for by the interurban railways at that time were that passengers paying a cash fare of 5 cents should be entitled to a transfer to and from interurban cars; that the weight of interurban cars, without load, should not exceed 80,000 lb., without the consent of the city, and that the cars should not be required to stop for passengers on inbound trips nor to allow them to alight on outbound trips.

On Oct. 13 the interurban question was discussed. The city replied to the proposition embodied in the report. Regarding the fare, it took the position that passengers should be carried to the city limits, rather than to the junction of the interurban and city lines. Interurban companies should be required to give and receive transfers, but they should not be free unless free transfers are given on the city lines. The weight of cars, without load, should be limited to 80,000 lb. for those now in use and to 70,000 lb. for those which are purchased in the future. Stipulations regarding stopping to receive and discharge passengers are agreed to as is the minimum charge of 18 cents per car-mile. The Council insists that city cars be operated to Garfield Park and that service be given to Lindale over the Lorain Street line, as passengers have been paying two fares for this service under the present arrangement. In its conclusion the city agrees to leave the existing differences on all these points to Judge Tayler for decision. Officers of the company also asked that any differences which may arise in the negotiations before the franchise is granted be referred to Judge Tayler.

On the afternoon of Oct. 14 the Council committee of the whole adopted a resolution accepting the clause prepared for the purpose of safeguarding the city and giving the Cleveland Railway the preference when bids are asked for the property at the end of eight years. The clause referring to the sale states that the city shall have the right to name a purchaser after Jan. 1, 1918, who will agree to accept one-fourth of 1 per cent less return on the investment under this grant than the original holder. Under the clause, the city may, upon 30 days' notice, fix a time for receiving bids. Proposals other than those from the Cleveland Railway must be accompanied by a cash deposit of $50,000 to recompense the Cleveland Railway for any expense it may have incurred in bidding and any balance is to go to the city treasury. If the company's bid is as low as that of its competitor, it shall be accepted. The rate of interest in the proposal then made shall be in force from that time on, unless no other proposal is filed or the bidder fails to complete the transaction, when it shall be the same as it had been for the eight years. A period of six months must elapse between bids.

Respecting the so-called safeguard feature, the clause prepared by the committee stipulates that if the section of the ordinance dealing with rates of fare shall fail, including the provision for submitting it to arbitration, the City Council shall have power to fix the rate of fare from time to time, not exceeding the maximum that is yet to be determined, and not to decrease the rate of fare unless the amount in the interest fund shall exceed $500,000. The rate so fixed shall not be such as to impair the ability of the company to pay all expenses and yield 6 per cent on the investment. In case the company refuses to turn over its property to a purchaser after the city has decided that a licensee shall purchase it, the City Council is to have the power to revoke the grant. The books of the company must always be open to the city and a commissioner will be appointed especially to care for the city's interests.

On Oct. 15, Judge Tayler asked that arrangements be made for the representatives of the city and the company to meet him as soon as possible to fix upon details of the work that he is to perform. He suggested that the questions submitted to him be taken up in the following order: East Cleveland, interurban, valuation and maximum fare. As a result Mayor Johnson called a meeting for Oct. 16 to discuss this matter.

The Cleveland Railway has declared its intention of accepting the clauses prepared by the special committee relating to safeguards and naming of a bidder for the property at the end of eight years. Regarding the questions to be submitted to Judge Tayler, Mr. Andrews sent the following letter to the City Council:

"As to the so-called East Cleveland question, your statement that we have already agreed to submit to Judge Tayler the determination of the true and just value of the property of the company, including franchises, is correct. This submission includes, of course, the East Cleveland franchises.

"With reference to the interurban question, to the extent to which we are unable to secure changes in contracts to meet your views, we are willing that the question be submitted to Judge Tayler; and they are now in such shape that they can be referred to him immediately.

"In view of our agreement to leave to Judge Tayler, the city solicitor, Judge Lawrence and Mr. Tolles, the drafting of sections 33 and 47, it is unnecessary to say more in regard to the provisions of those sections than that we have accepted the report made by that committee."

On Oct. 16 the City Council, acting as a committee of the whole, named Mayor Johnson as its representative in the hearing before Judge Tayler as arbitrator. Following the suggestion of the Cleveland Railway the Council also agreed to leave the question of interurban contracts as a whole with Judge Tayler. Still insisting that something should be deducted from the franchise value because of the so-called unprofitable contract, the Council sent a letter to the company commenting upon the East Cleveland question. The Cleveland Railway replied that the officers felt that franchises such as those in East Cleveland are valuable and that something should be added to the value of the other property, instead of deducted. The company, however, agreed to the plan of the Council, suggesting that attorneys representing both sides agree upon the phraseology of the ordinance.

On Oct. 17, City Solicitor Baker sent the officers of the Cleveland Railway the draft for the proposed new grant which he had prepared under instruction from the City Council. This draft, however, covers only the points that have been agreed upon, leaving blank those clauses covering subjects before Judge Tayler. The invalidity clause, prepared by Judge Tayler, Judge Lawrence, Mr. Tolles and the city solicitor, Mr. Baker, is included. This clause provides that if any of the material provisions relative to fixing the fare be declared invalid, the City Council may regulate the rate of fare under the restrictions named in another portion of this article. If that part of the ordinance relating to settling questions by arbitration be found invalid, the City Council shall be declared the board of arbitration and settle disputed points. The city auditor is to assume the duties of street railway commissioner in case the portion relating to that position is found to be invalid. Under this draft of the ordinance the Cleveland Railway must put into use not less than 450 pay-as-you-enter cars and within 18 months all cars except 100 trailers must be of this type. The city reserves the right to control the schedules and routes of both the local and interurban cars, but is not to fix a service that will reduce the dividends below 6 per cent. In case of disagreement between the street railway commissioner and the company regarding the keeping of accounts, the matter shall be referred to the committee on standard classification of accounts of the American Street & Interurban Railway Accountants' Association. All rates of fare are provided except the maximum which will be inserted after Judge Tayler arrives at a conclusion. Attorneys for the company have also prepared an ordinance which will be submitted to the city for comparison with the Baker draft and some minor changes in the Baker grant will probably be made.

Representatives of the city and the Cleveland Railway met Judge Tayler on Oct. 18 to discuss arrangements for the work of making the valuations. It developed that the proposed new ordinance for the Cleveland Railway will not be effective unless it is accepted by the Municipal Traction Company, the Forest City Railway, the Low Fare Railway and the Neutral Traction Company, all organized for different purposes during the movement for 3-cent fares. Judge Tayler expressed surprise when he discovered that the city had put this provision into its ordinance, after it was understood that all questions with the exception of those referred to him had been settled. It was supposed that the Cleveland Railway is the only one concerned in the acceptance of the grant. The company and the city have agreed that the Euclid Avenue line is to be included in the franchise ordinance and that Judge Tayler shall consider the effect of the East Cleveland haul in connection with the valuation he places upon the franchises.

Transit Affairs in New York

The power of the Public Service Commission to order the completion of an electric railway for which a franchise has been obtained or to order the operation of disconnected portions of a line already constructed was questioned on Oct. 11 by counsel for the New York City Interborough Railway at a hearing before the full commission. Commissioner Eustis, to whom the proceeding had been assigned at the last hearing, stated that he would recommend an order requiring the company to complete and operate its line from 145th Street and Lenox Avenue over the Harlem River to 149th Street, thence east through 149th Street to St. Ann's Avenue and north to 156th Street. The line as contemplated is to extend easterly to the Bronx River, but at 156th Street it has been held up by the Supreme Court, which has issued a temporary injunction. Counsel for the railroad assured the commission that it was the intention of the company to proceed with the work as rapidly as possible, but some delay was unavoidable, and he asked the commission not to issue an order, which he also claimed would be illegal.

Commissioner Eustis was not inclined to allow any further delay. He said: "The tracks in 149th Street have been laid three or four years, and they ought either to be used or to be removed. I have given the company already an abundance of time to see what it would do, but instead of completing the road it has gone to the Board of Estimate and got the time for construction under the franchise extended to 1912." The hearing was continued on Oct. 18, and counsel were directed to submit briefs.

Kraukoff, Harmon & Mathewson, attorneys representing the New York Parcel Dispatch Company, addressed a letter to the Public Service Commission of the First District of New York on Oct. 15 relative to the construction of a tube subway system in various parts of the city to be operated for the carriage of parcels and packages either by compressed air or electricity. No details were suggested in the letter of the lawyers, and the statement was made that L. B. Stillwell, the engineer for the company, would confer with the commission as to the plans for construction.

Reference to Chicago Electrification in Illinois Central Railroad Report

The report of the Illinois Central Railroad for the year ended June 30, 1909, contains the following reference to the electrification of the company's lines out of Chicago under the heading "Electrification of Chicago Terminals":

"The subject of electrification of the Chicago terminals of this company has had and is having most earnest and thorough consideration. The problems presented are unique and complex. There are no great freight terminals operated by electricity, and it is questionable, even aside from the great expense involved, if it is practicable. There are over 310 miles of track in the terminals, and there is a very heavy exchange of cars between this road and other roads in Chicago; to effect this exchange it is necessary that the trains of this company shall go upon the tracks of other companies, and that their trains shall come upon our tracks; with this road alone electrified, this exchange of cars would not be practicable.

"Without precedents to guide, the estimates of cost are at best unreliable; from the best obtainable information it would appear that the cost of electrifying the terminals of this company would be more than $18,000,000, a great sum to expend upon what would be of doubtful success in operation. Earnest and painstaking investigation and consideration are being given to the subject, and pending a solution of the problem that will be satisfactory to all the interests concerned this company is devoting great attention to reducing to a minimum the noise and smoke of its locomotives. The board has authorized the purchase of, and the officers are negotiating for, cars propelled by gasoline motors and adapted for handling suburban passengers. Experiments in the use of coke as fuel for locomotives are being pursued."

Bernard W. Snow, chairman of the finance committee of the Chicago City Council, has introduced a mandatory ordinance in the City Council of Chicago to compel every railroad operating into the city to substitute electricity for steam as motive power within an 8-mile radius of the City Hall, Chicago, by Jan. 1, 1912. The ordinance has been referred without discussion to the committee on local transportation.

Convention of Association of Railway Electrical Engineers

The Association of Car-Lighting Engineers held its second annual convention in Chicago from Oct. 4 to 7. A. J. Farrelly, in his presidential address, outlined the history of the association since its inception in May, 1908. In accordance with the plan to increase the scope of the association so as to include the applications of electricity to general railroad work it was decided to change the name of the body to the Association of Railway Electrical Engineers. J. H. Klink addressed the convention on the application of electricity to railway shops, and many arguments were advanced to show the superiority of electric drive for this

class of work, although the first cost is considerable. The report of a special committee on axle generators was read by J. R. Sloan. This dealt with the design and construction of the axle generator proper and its auxiliary apparatus.

George W. Cravens, designing and consulting engineer, Chicago, Ill., read a paper entitled "Electrification of Steam Railroads," in which he said that it is generally recognized among railroad men that the change in motor power from steam to electricity will come eventually. He said that in Illinois, Indiana and Ohio, where there are about 5000 miles of electric railway as compared with about 30,000 miles of steam railroad, the cost of operation by electricity averages 15.8 cents per car mile, divided as follows: 3.7 cents for energy; 5.4 for operation; 1.3 for maintenance of cars and equipment; 1.7 for maintenance of a permanent way, and 3.7 for operation. The cost of operating steam railroads averaged from 40 cents to 60 cents per car mile. In discussing Mr. Cravens' paper, Mr. Pomeroy remarked that in estimating the cost of operation by steam and electricity it is difficult to compare one road with another on account of the wide variation in conditions. He said that the comparative cost per car mile is not the only criterion, because in some cases it is possible with electricity to handle on two tracks traffic that with steam requires four tracks.

The following officers were elected for the ensuing year: President, E. M. Cutting, engineer of train lighting, heating and ventilation, Southern Pacific Railway, Oakland, Cal.; first vice-president, J. R. Sloan, electrical engineer, Pennsylvania Railroad, Altoona, Pa.; second vice-president, F. R. Frost, electrical engineer, Atchison, Topeka & Santa Fé Railroad, Topeka, Kan.; secretary and treasurer, George B. Colegrove, chief electrician mechanical department Illinois Central Railroad, Chicago. The next annual convention will be held in Chicago on Oct. 4, 5, 6 and 7, 1910, and a semi-annual meeting will be held in Buffalo on June 7 and 8, 1910.

Philadelphia Transit Talks

Transit Talk No. 22 of the Philadelphia (Pa.) Rapid Transit Company was dated Sept. 30, 1909. It was entitled "Notify Emergency." The talk follows:

One of the few exciting things about the operation of the traction company is the emergency department.

"Notify Emergency" is rule No. 1 in case of trouble, and the emergency dispatcher's desk, in the lines and cables department, is never vacant for an instant, night or day.

For the emergency dispatcher to get the report of a blocked line, 'phone the station nearest to the trouble and have an emergency crew on its way all within three minutes—that is not considered anything out of the ordinary.

There are eight emergency stations, equipped with wagons, tower and wrecking cars. An automobile tower wagon that can make even quicker time than horses is now being built for us. The average year's work for the emergency department, not including ordinary repairs, is 17,000 jobs; this includes 900 wagons blocking the line, 600 wire repairs and 350 fires.

Frequent surprise tests are made to find out how quickly the emergency crews get to work, and regular examinations are held to test the men's knowledge regarding the power system. It takes at least five years to train an emergency-wagon foreman, for, among other things, he must know from what source every block of trolley wire derives its power and how the supply, if cut off, can be most quickly replaced.

The whole lines and cables department is kept keyed up to the highest pitch of efficiency; it must be to maintain 618 miles of overhead wire and 1000 miles of underground cable. And the department does its work so well that it has become a model for other systems.

Transit Talk No. 23 was dated Oct. 5, 1909. It was entitled "Cleanliness Is Next." The talk follows:

Suppose your house had 2000 rooms, with 40,000 windows, and that you housed 1,250,000 guests a day in addition to a household staff of 6000.

Such a supposition will enable you to understand our house-cleaning problem. We have 2000 cars that must be cleaned every day. And we do this cleaning notwithstanding the fact that most of the cars are in use the greater part of the 24 hours.

Every car is thoroughly cleansed and every window is washed at least once a day. If you happen to notice a car that is not in good condition, you may be sure that it has become dirty since it started on the day's run.

In addition to rendering the cars sanitary we try to eliminate sources of uncleanliness. There is a sign in every car calling attention to the State law prohibiting spitting in public places and fixing penalties for violation of the act.

We wish that this law and the health bureau regulations could be more strictly enforced. Observance of such laws is imposed by public opinion. Public disapproval of spitters will do more than anything else to stop the practice, to lighten our house-cleaning and to make you more comfortable.

Transit Talk No. 24 was dated Oct. 8, 1909. It was entitled "How to Reach the Auto Race Course," and was prepared especially for the benefit of those who desired to witness the Fairmount Park automobile race on Oct. 9. A map of the course was published with a key to the lines running to different points along the route of the race.

New Road Opened in Montana.—The Gallatin Valley Electric Railway, Bozeman, Mont., has been placed in operation. The road extends from Bozeman to Salesville, and is 20 miles long. It is the first long rural electric railway to be built in Montana.

Kansas City Franchise Amendments Passed.—On page 885 of the Electric Railway Journal of Oct. 16, 1909, mention was made of the introduction into the Council of Kansas City, Mo., of the ordinance extending the franchise of the Metropolitan Street Railway. Of the amendments noted in that issue as having been introduced two have been adopted by the committee on streets, alleys and grades of the upper house. One changes the fare from 5 cents to six tickets for 25 cents, or 25 tickets for $1, after Jan. 1, 1913. The second provides that the city relinquish the right which it seeks to share the earnings of the company.

Another Subway Proposal in Chicago.—M. H. McGovern has presented to the City Council of Chicago a general proposal for the construction of a subway system throughout the territory bounded by Chicago Avenue, Twenty-second Street, Halsted Street and the Lake. Mr. McGovern's communication follows: "We hereby propose to enter into a contract to build a subway system for Chicago in accordance with the plans and specifications of the expert engineers employed by the city and ourselves, and are prepared to give any necessary assurance of our financial ability to the extent of $100,000,000 or more. We will accept an ordinance that will give municipal ownership as practically as present financial and legal conditions will permit and without delay."

Electrical Show in New York.—The third annual electrical show in New York was held at Madison Square Garden from Oct. 11 to Oct. 21. As has been the custom for the last few years, the exhibits were confined largely to apparatus and devices having to do with the household, such as irons, washing machines, vacuum cleaners, etc. The New York Edison Company, the United Electric Light, Heat & Power Company, the Edison Electric Illuminating Company of Brooklyn and the Public Service Corporation of New Jersey were all represented. Dossert & Company, the General Electric Company, the Westinghouse Electric & Manufacturing Company, Studebaker Bros. and the Electric Storage Battery Company also exhibited. The show was in every way a success, the record of attendance both in the afternoon and evening being very large.

Examination for Examiners and Clerks for the Interstate Commerce Commission.—The United States Civil Service Commission announces an examination on Nov. 23 and 24, 1909, to secure eligible applicants from whom to make certifications for the appointment of examiners and clerks in the bureau of statistics and accounts of the Interstate Commerce Commission. The examination will be a very important one and is designed to secure for the commission persons with expert qualifications in the various fields of railway or other common-carrier accounting. Eligible applicants obtained from the examination will be classified in three groups, as follows: Group A, examiners, salary $2,220 to $3,000; group B, examiners, salary $1,860 to $2,100; group C, clerks, salary $1,200 to $1,620. It is expected that five appointments will be made from group A, 50 from group B and 50 from group C. The age limit is 21 to 48 years on date of examination. The general qualifications for the different positions were given on page 641 of the issue of the Electric Railway Journal for Sept. 12, 1908. Those who desire to qualify for appointment should apply at once to the United States Civil Service Commission, Washington, D. C., for application form 304.

Public Service Commission Appeals Decision Reversing Its Finding.—The Public Service Commission of the Second District of New York has instructed its counsel to appeal from the order of the Appellate Division of the Supreme Court reversing and annuling the decision of the commission which denied the application of the Delaware & Hudson Company for authority to issue certain bonds, and remitting the application to the further consideration of the commission. In June, 1908, the Delaware & Hudson Company applied to the commission for authority to mortgage its railroad properties, rights and franchises to secure an issue of $50,000,000 first and refunding 4 per cent bonds, due in 1943, and to issue immediately $20,000,000 of the bonds for the funding of floating debt and for the provision of funds for improvements. In July the commission announced its decision, granting the company authority to issue $26,500,000 for the purpose of retiring outstanding bonds, and $13,276,000 for the purpose of taking care of certain existing note obligations aggregating $12,664,080. The company wishes also to issue bonds to refund issues put out at the time of the acquisition of 75,000 shares of stock of the United Traction Company to the amount of $4,665,295, to refund some $230,000 stock and bonds of the Troy & New England Railway and to cover advances to $2,500,000 made to the Hudson Coal Company. These last three issues were disallowed on the grounds that no proof had been presented by the Delaware & Hudson Company showing them to be proper subjects for capitalization under a mortgage on the railroad properties.

Financial and Corporate

New York Stock and Money Market

October 19, 1909.

The losses which occurred in the stock market during the temporary reaction two weeks ago, caused by the sudden advance in the rates for money, have practically been regained, and the movement recently has been upward and the tone strong. The buying of stocks for investment or for long trades is still in evidence, bearing witness of the faith of the public in future higher levels. Traction stocks have shared in the activity and strength of the market, although the fluctuations have not been as pronounced as in the case of more popular issues. Interborough-Metropolitan—both common and preferred—has appeared to a considerable extent in the trading although price changes have been unimportant.

The price of money shows no further tendency to advance and the banks appear to be amply supplied for all reasonable trading. Rates to-day were: Call, 4 to 4½ per cent; 90 days, 4¾ per cent.

Other Markets

Subway stock holds the interest among the tractions in Chicago. During the week it has advanced several points and to-day sold as high as 95⅝. Metropolitan Elevated has also developed some activity, but is a trifle lower.

In the Philadelphia market there has been some selling of Rapid Transit, causing fractional price recessions, but the movement is not sufficiently definite to be worthy of especial note. Other traction issues are neglected.

There is not much doing in traction stocks in the Boston market. Odd lots of Massachusetts Electric and of West End have appeared in the market, but prices are virtually at the old figures.

As usual, the traction interest in Baltimore is confined to the bonds of the United Railways Company. These are traded in daily to some extent at the former ranges of prices.

Quotations of various traction securities as compared with last week follow:

	Oct. 11.	Oct. 19.
American Railways Company	a46	a46
Aurora, Elgin & Chicago Railroad (common)	*48	a45
Aurora, Elgin & Chicago Railroad (preferred)	*92	a95
Boston Elevated Railway	130	130½
Boston & Suburban Electric Companies	a17½	15
Boston & Suburban Electric Companies (preferred)	a73	73¼
Boston & Worcester Electric Companies (common)	10½	a11½
Boston & Worcester Electric Companies (preferred)	a55	a54
Brooklyn Rapid Transit Company	77¾	78⅜
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	87	86⅝
Capital Traction Company, Washington	a140	a140
Chicago City Railway	180	a190
Chicago & Oak Park Elevated Railroad (common)	*1¾	*2
Chicago & Oak Park Elevated Railroad (preferred)	*7	*10
Chicago Railways, ptcptg, ctf. 1	109¾	a110
Chicago Railways, ptcptg, ctf. 2	36½	a37
Chicago Railways, ptcptg, ctf. 3	24½	a25
Chicago Railways, ptcptg, ctf. 4s	9	a10
Cleveland Railways	*78	a84
Consolidated Traction of New Jersey	a78	a77
Consolidated Traction of N. J., 5 per cent bonds	a107	a106½
Detroit United Railway	69	a68
General Electric Company	163	164
Georgia Railway & Electric Company (common)	a98	a99½
Georgia Railway & Electric Company (preferred)	*88½	*88½
Interborough-Metropolitan Company (common)	15¼	17½
Interborough-Metropolitan Company (preferred)	47¼	49⅞
Interborough-Metropolitan Company (4½s)	82⅞	83⅝
Kansas City Railway & Light Company (common)	41	a40
Kansas City Railway and Light Company (preferred)	82	80¾
Manhattan Railway	a144	a142
Massachusetts Electric Companies (common)	a18	17¾
Massachusetts Electric Companies (preferred)	80	81
Metropolitan West Side, Chicago, (common)	17¾	a18
Metropolitan West Side, Chicago, (preferred)	52	a53
Metropolitan Street Railway	a24	a24
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	78	a80
Northwestern Elevated Railroad (common)	20	a20
Northwestern Elevated Railroad (preferred)	70	a69
Philadelphia Company, Pittsburg (common)	48	a48½
Philadelphia Company, Pittsburg (preferred)	41	a44½
Philadelphia Rapid Transit Company	28	a28
Philadelphia Traction Company	90	a90
Public Service Corporation, 5 per cent col. notes	a101	a100⅛
Public Service Corporation, ctfs.	a95½	a95
Seattle Electric Company (common)	a114	a114¾
Seattle Electric Company (preferred)	105	a104
South Side Elevated Railroad (Chicago)	51	a52
Toledo Railways & Light Company	9¼	a10
Third Avenue Railroad, New York	19⅛	21
Twin City Rapid Transit, Minneapolis (common)	a109½	109
Union Traction Company, Philadelphia	52½	a53¼
United Rys. & Electric Company, Baltimore	14¼	a14
United Rys. Inv. Co. (common)	41	43
United Rys. Inv. Co. (preferred)	70¾	72½
Washington Ry. & Electric Company (common)	a47¼	a47
Washington Ry. & Elec. Company (preferred)	a94	a93⅜
West End Street Railway, Boston (common)	95	94
West End Street Railway, Boston (preferred)	104	103
Westinghouse Electric & Manufacturing Company	85⅜	86
Westinghouse Elec. & Mfg. Company (1st pref.)	a140	140

aAsked. *Last Sale.

Anderson (S. C.) Traction Company.—The property of the Anderson Traction Company has been sold under foreclosure by order of the Federal Court to E. W. Roberts, one of the receivers, for $154,750.

Boston (Mass.) Suburban Electric Companies.—A. E. Viles, treasurer of the Boston Suburban Electric Companies, will receive tenders of the stock of this voluntary association for cancellation until Oct. 27 at 3 p. m., at the office of the Boston Safe Deposit & Trust Company. The tenders will be opened by the trustees of the Boston Suburban Electric Companies at a meeting with a stockholders' committee on Oct. 28, and acted upon not later than Nov. 5 at 2 p. m. Stock representing tenders accepted must be presented for cancellation 10 days after notice of acceptance, which will be not later than Nov. 8. In a circular to the stockholders Mr. Viles says: "The trustees are ready to expend cash to an amount not exceeding $600,000, and to issue notes of the trust to an aggregate amount not exceeding $2,000,000 for the acquisition of preferred and common shares upon terms deemed advantageous to the trust, the number of common shares acquired not to exceed the number of preferred shares. They accordingly invite tenders of preferred and common shares for cash and for notes. The notes issued in exchange for shares will be 4 per cent 10-year coupon notes of the Boston Suburban Electric Companies, dated Dec. 1, 1909, with interest payable semi-annually, in denominations of $1,000, $500 and $100, with a provision for their retirement on any interest day on 60 days' previous notice at 105 per cent, if called at any time before Dec. 1, 1914, or at 102½ per cent, if called at any time after Dec. 1, 1914. These notes will not be specially secured, but will be simple obligations of the trust."

Camden & Trenton Railway, Camden, N. J.—The date for the sale of the Camden & Trenton Railway under foreclosure has been fixed for Nov. 12, at Trenton.

Chicago (Ill.) Consolidated Traction Company.—A general reorganization committee for the Chicago Consolidated Traction Company was organized at Chicago on Oct. 9, with Charles G. Dawes, president of the Central Trust Company of Illinois, as chairman, and adopted a plan of reorganization. Subsequently Mr. Dawes made a statement in which he said: "Our plan provides that the committee, in the name of a new company, shall apply for a franchise, negotiating concurrently and under the supervision of the proper representatives of the city an operating agreement with the Chicago Railways. The underlying bonds were issued originally by subsidiary companies, and are all in default. The second, or consolidated, bonds amounting to $6,750,000 are also in default. Under the plan the first mortgage bondholders release their first lien, so that new money can be obtained by a rehabilitating mortgage to put the road in shape for good service. The present first mortgage bondholders take a second mortgage. The consolidated bondholders cancel their bonds and receive participation receipts, issued against the stock of the new company, which latter will be issued for only a nominal amount. None of the members of the general reorganization committee owns any of the securities of either the Consolidated Traction Company or of the Chicago Railways." The general reorganization committee consists of James N. Wallace, president of the Central Trust Company of New York; Emile K. Boisot, vice-president of the First Trust & Savings Bank, Chicago; C. P. Hoover, vice-president of the Harris Trust & Savings Bank; Hans Winterfeldt, of the firm of Speyer & Company, New York; Andrew Cooke of the Harris Trust & Savings Bank; Allen Forbes of N. W. Harris & Company, New York, and Charles G. Dawes, president of Central Trust Company of Illinois. B. F. Blye is secretary.

Detroit (Mich.) United Railways.—The Detroit United Railways has applied to the Railroad Commission of Michigan for authority to issue in January, 1910, $2,000,000 of bonds for the purpose of taking up indebtedness. The company has $2,000,000 of 5 per cent collateral trust notes maturing on Feb. 15, 1910.

Everett Railway, Light & Water Company, Everett, Wash.—The Everett Railway, Light & Water Company has made a mortgage dated Feb. 1, 1909, to the American Trust Company, Boston, Mass., as trustee, to secure an issue of $4,000,000 of bonds, of which $2,000,000 are to be used in taking up underlying bonds and $2,000,000 for improvements.

Fayetteville Consolidated Power & Street Railway Company, Fayetteville, N. C.—The difficulties of the Fayetteville Consolidated Power & Street Railway Company have practically been adjusted. It is understood that bonds to the amount of $75,000 will be issued, and that an application will be made at once to the court to dissolve the receivership. The funds to be raised by this bond issue, it is stated, will be sufficient to carry out the plans for improvements and extensions.

Metropolitan Street Railway, New York, N. Y.—Counsel for the Guaranty Trust Company, New York, N. Y., trustee of the first mortgage of the Metropolitan Street Railway, filed a motion, on Oct 12, in the Supreme Court for the advancement and early hearing of the Guaranty Trust Company's appeal from the judgment of the Federal Circuit Court of New York, ordering foreclosure; but permitting the receivers of the road to issue certificates having priority over the mortgage.

Middlesex & Boston Street Railway, Framingham, Mass.—The Railroad Commission has approved the consolidation of the Middlesex & Boston Street Railway and the Newton & Boston Street Railway, authorizing the Middlesex & Boston Street Railway to issue new capital stock to the amount of $200,000 par value for the purpose.

Northampton (Mass.) Street Railway.—Frederick Harris, Springfield; Joseph H. Skinner, Holyoke; W. S. Loomis, Holyoke, and L. D. Pelissier, Holyoke, have been elected directors of the Northampton Street Railway to succeed J. C. Hammond and J. A. Sullivan, Northampton, and George W. Cook and F. H. Goldthwaite, Springfield. The directors have elected H. M. Tylee, Northampton, president, to succeed J. C. Hammond, and L. D. Pelissier, treasurer, general manager and clerk. Mr. Pelissier, who is treasurer and general manager of the Holyoke Street Railway succeeds H. P. Field, Northampton, as clerk and N. D. Winted as treasurer; E. C. Clark, superintendent, and Richard Skeehan, cashier, are retained in their present offices.

Railways Company General, Philadelphia, Pa.—The Railways Company General, which paid a first cash dividend of 10 per cent on Sept. 15, 1909, for the fiscal year ended June 3, 1909, has declared a quarterly dividend of 1 per cent, payable Nov. 1, 1909, to stockholders of record Oct. 20.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa.—The stockholders of the Pittsburgh, McKeesport & Westmoreland Railway will meet on Oct. 27 to ratify the sale to foreign interests of $500,000 of the $1,000,000 treasury bonds of the company, being the unissued portion of the $2,000,000 of bonds dated 1906.

Seattle, Renton & Southern Railway, Seattle, Wash.—E. B. Jones & Company, Philadelphia, Pa., are offering for subscription at prices to net about 5½ per cent $243,000 first mortgage 5 per cent bonds of the Seattle, Renton & Southern Railway, dated 1908. The total authorized issue is $1,000,000, of which $400,000 are reserved for future betterments at not to exceed 70 per cent of the actual cost thereof. Of the total issue $600,000 is outstanding.

Second Avenue Railroad, New York, N. Y.—Charles D. Marvin, president of the Second Avenue Railroad, announces that in view of the proceedings for the foreclosure of the first consolidated mortgage dated 1898 ($7,000,000 authorized), it is deemed best to reserve the refunding of the $1,280,000 general (now first) mortgage 5 per cent bonds of 1885 for a comprehensive plan of reorganization, and in the meantime to extend the date of maturity of said bonds to Nov. 1, 1910. Upon presentation of any of said bonds at the Guaranty Trust Company, New York, on or prior to Nov. 15, 1909, they will be stamped to indicate such extension, and there will be affixed interest warrants representing the interest to accrue thereon May 1, 1910, and Nov. 1, 1910, respectively, at the rate of 5 per cent per annum. Any holder who does not desire to extend the date of maturity will receive his principal on or after Nov. 1, 1909, upon surrendering of his bond at the Guaranty Trust Company for purchase in aid of said plan of extension. The interest warrants on said bonds maturing Nov. 1, 1909, will also be paid by the Guaranty Trust Company.

Southwestern Traction Company, London, Ont.—The Royal Securities Company, Montreal, in connection with the Electrical Securities Trust, Edinburgh, Scotland, is preparing to purchase the property of the Southwestern Traction Company in the interest of the bondholders. All bondholders were invited to deposit their bonds with the Royal Securities Company or the Bank of Montreal, London, Eng., before Oct. 20.

United Railways, Portland, Ore.—On page 886 of the Electric Railway Journal of Oct. 16, 1909, mention was made of the report that control of the United Railways of Portland had passed to new interests. The fact is that J. H. Hulbert, Fontanella, Ia., and C. I. Dunbar, Vancouver, B. C., who were reported to have purchased the property, have taken an option on the securities of the company held by W. D. Hofius, Portland; S. L. Greenough, Missoula, Mont., and Moritz Thompson, president of the company, who control the company through the ownership of a majority of the stock. Mr. Hulbert and Mr. Dunbar are understood to represent interests other than themselves, but no statement has been made as to who the real parties are that are seeking to secure the property or what the proposed plans are.

Traffic and Transportation

Crowding Must Be Defined

Alexander R. Mallowny, judge of the Police Court in Washington, D. C., has decided that the general provisions of the Act of Congress approved on May 23, 1908, giving the Interstate Commerce Commission jurisdiction over the street railways in the District of Columbia, are not sufficient as a basis for the prosecution of the local railways in Washington for overcrowding. The judge has sustained a motion to quash an information based on evidence as to overcrowding, but has declined to rule that the act is unconstitutional. The ground was taken by the judge that Congress laid down general principles as to overcrowding of cars, depending upon the Interstate Commerce Commission to adopt rules and regulations which would specify what constitutes overcrowding. Without such regulation, he declared, it was not possible within the meaning of the law to determine what constitutes overcrowding. After quoting Section 16 of the Act of May 23, 1908, in which general requirements for the operation of cars in Washington are stated and power delegated to the Interstate Commerce Commission to require and compel obedience with the provisions of the section and fixing a fine of $1,000 a day for violation of the provisions of the act, each day to constitute a separate offense, the judge said in his decision:

"Four of the informations charge a violation of the provision, 'in that the defendants did operate and run certain cars over and upon certain streets in said district and in so operating said cars did unlawfully permit a car to be crowded by persons desirous of the use of the same.' The fifth information charges a violation of order of regulation 9 of the Interstate Commerce Commission, 'in that the defendants operated a car equipped with wheels causing unnecessary noises commonly known as flat wheels.' The motion is based chiefly upon two grounds:

"1. Because the act is unconstitutional in that the penalties for disobedience of the section are by fines so enormous as not only to be confiscatory of the property of the defendants, but to intimidate the defendants and its officers from resorting to the courts to test the validity of any of the requirements of said section or of any regulation which may be made by the Interstate Commerce Commission under the provisions thereof.

"2. Because the general language of said section was intended only to announce certain principles to be formulated into specific orders, rules and regulations by said commission, which orders, rules and regulations, when properly made and prescribed, would constitute the provisions of law for the failure to obey which prosecution could be had at the instance of said commission and that the language of the act is so general and indefinite that it cannot itself constitute a rule of conduct or of law.

"The provision under which four of the informations are brought requires the car companies (1) to supply a sufficient number of cars, and (2) to so operate this supply of cars as to give expeditious passage to all persons desirous of the use of said cars without crowding. So even if the defendant did operate its cars without crowding it would still fail to obey the provision if it did not supply and operate a sufficient number of its cars for all persons desirous of the use of the same. Can it be claimed that it was the intention of Congress in using such indefinite terms to announce a rule of law that would subject the defendant or any of its employees to a penalty which might be $1,000, and make each day's failure to obey the provision a separate offense under a like penalty? How can these car companies, or anyone else, determine the number of persons desirous of using the cars or how many cars to supply and operate for all such persons on times and occasions which must necessarily be in the future and controlled by circumstances impossible of anticipation?

"Take the other provisions of the section: The sufficient number of cars must be 'in good repair'; they must have 'proper and safe power; proper and safe equipment and appliances'; the service must be 'comfortable and convenient.' Is not each of these provisions so general and indefinite as to be incapable of enforcement until some rule or order is made determining the standard of 'good repair,' the standard of 'safe power and equipment' and appliances and some standard of service comfortable and convenient formulated into definite rules of conduct or of law? Consider the only provision in the section that might be said to be definite and enacted with any legal certainty, in that 'the cars are not to exceed 15 m.p.h. within the city limits or 20 m.p.h. in the suburbs. Surely it was not the intention to allow these cars to go through the streets of the city at the rate of 15 m.p.h. without

any regard for the general traffic; but rather that this provision is intended to be simply a declaration on the part of Congress to be regulated and enforced by rules and orders of the Interstate Commerce Commission. This seems to be the view taken by the commission, for otherwise they have done a useless thing in reiterating in their regulation number 4 that 'no street cars shall move at a greater rate of speed than 15 m.p.h. in the city, nor at a greater rate of speed than 20 m.p.h. in the suburbs.' Street cars shall not exceed a rate of speed greater than 6 m.p.h. at street crossings, and in their report to Congress in Public Document H. R. 1336, Sixtieth Congress, Second Session, the commission uses this language:

"'The act itself seems to bear intrinsic evidence that it was not the purpose of the Congress to vest such authority in the commission, our power being limited to the making of rules and regulations which shall insure a sufficient number of comfortable and convenient cars and their operation at such speed as to give expeditious passage.'"

Here the judge refers to the inquiry which the commission conducted into the question of overcrowding, the report on which to Congress was concluded by the commission with these words: "The result of this investigation discloses the fact that in almost every city in this country and abroad, except in France, the question of overcrowding cars is one which the authorities have been endeavoring to solve and remedy, but that, as a matter of fact, despite all laws and regulations, the conditions which cause widespread complaint have not yielded to any solution which has been possible to bring to bear upon the situation."

Continuing, the judge says: "If Congress intended that these provisions were to be treated as separate offenses, why, then, was it necessary for the act to confer power on the commission not only to make rules and orders, but power 'to require and compel obedience' to these very provisions? Does it not seem inconsistent for Congress to make a law to be enforced by a penalty and then say in terms: No, this law need not be obeyed, but we will confer power on a commission to require and compel obedience to it through rules and regulations and annex a penalty which is not to exceed $1,000 for a violation of any of these rules?

"I hold, therefore, that in the provisions of this section Congress simply intended to lay down certain general principles which were to be enforced by reasonable rules and regulations of the Interstate Commerce Commission.

"The other ground of the motion brings in question the validity of the statute on account of the penalties. Article 1, section 2, of the Constitution of the United States, provides: 'That all fines shall be moderate and no cruel or unusual punishment shall be inflicted.' Referring to the section—the penalty is a fine of not more than $1,000. Now, while it may be contended here that an excessive fine might be imposed for a technical violation, it would not be the statute that imposed it, but the court exercising a discretion with power to impose a fine as low as one cent, and if the amount imposed is immoderate and unusual it is the judgment that is void and not the statute.

"The general principle of law fixing the minimum punishment as the basis for testing the constitutionality of the act is clearly stated in Volume 13, *American and English Encyclopedia of Law*, Second Edition, page 60:

"'Fines are to be fixed with reference to the objects which they are designed to accomplish and their imposition and regulation belong to the Legislature. The courts cannot with reason or propriety question the action of the Legislature or control or restrain its discretion in the matter of fixing the amount of a fine except where the minimum penalty is so plainly disproportioned to the offense or act which it is imposed as to shock the sense of mankind.'

"In ex parte Young, 209 U. S. Reports, page 123, the question of the validity of a statute on account of the penalties was passed upon. The State of Minnesota passed an act fixing certain freight charges and made it an offense for any agent or employee of a railroad to charge in excess of these rates under a penalty of imprisonment not exceeding 90 days in jail and by another section of the act fixed a passenger rate at two cents a mile and declared that any railroad company or its employees selling a ticket in excess of this rate was subject to a fine not exceeding $5,000, or imprisonment not exceeding five years. Justice Peckham in his opinion holding the act invalid said:

"'It is urged that there is no principle upon which to base the claim that a person is entitled to disobey a statute at least once, for the purpose of testing its validity, without subjecting himself to the penalties for disobedience provided by the statute in case it is valid. This is not an accurate statement of the case. Ordinarily a law creating offenses in the nature of misdemeanors or felonies relates to a subject over which the jurisdiction of the Legislature is complete in any event. In the case, however, of the establishment of certain rates without any hearing, the validity of such rates necessarily depends upon whether they are high enough to permit at least some return upon the investment (how much it is not now necessary to state), and an inquiry as to that fact is a proper subject of judicial investigation. If it turns out that the rates are too low for that purpose, then they are illegal. Now, to impose upon a party interested the burden of obtaining a judicial decision of such a question (no prior hearing having ever been given), only upon the condition that if unsuccessful he must suffer imprisonment and pay fines as provided in these acts, is, in effect, to close up all the approaches to the courts, and thus prevent any hearing upon the question whether the rates as provided by the acts are not too low, and therefore invalid. The distinction is obvious between a case where the validity of the act depends upon the existence of a fact which can be determined only after investigation of a very complicated and technical character and the ordinary case of statute upon a subject requiring no such investigation and over which the jurisdiction of the Legislature is complete in any event.'

"Now, considering the statute in question in the light of this rule, we have these provisions enforced by certain rules and orders of the Interstate Commerce Commission. The rules and regulations to be valid must be reasonable upon their face and would not depend upon any fact that could only be determined after a judicial investigation of a technical character, but would be the ordinary case of a statute upon a subject which would constitute a rule of conduct plain and clear that these defendants, in the performance of their duty to the general public as common carriers, in obeying need not do acts which must necessarily result in their violation.

"The motion, therefore, to quash the information No. 164,272, charging a violation of a regulation of the commission, on the ground that the act is unconstitutional, is overruled.

"The motion to quash informations Nos. 163,043, 163,945, 163,946 and 163,950, charging a violation of the provision relating to the crowding of cars, is granted."

The Government, through United States District Attorney D. W. Baker, is preparing a bill of exceptions upon which the case will be taken to the Court of Appeals of the District of Columbia, from which an appeal may be taken to the Supreme Court of the United States, as there is a constitutional question involved.

Elevated Smoking Cars to be Discontinued in Chicago.—The Chicago & Oak Park Elevated Railroad has announced that it proposes to discontinue the operation of smoking cars on Nov. 1.

Pay-As-You-Enter Service Soon in Detroit.—The Detroit (Mich.) United Railways expects soon to place 10 pay-as-you-enter cars in service on its Woodward Avenue line and is instructing motormen and conductors in the operation of the cars.

Public Attention Called to Transfer Rules in Atlanta.—The Georgia Railway & Electric Company, Atlanta, Ga., on Oct. 15, 1909, carried a half-page advertisement in the Atlanta Constitution in which it called the attention of the public to the company's transfer rules.

Trenton Street Railway Restores Tickets.—The Trenton (N. J.) Street Railway has restored the six-for-a-quarter tickets, reduced the fare from Trenton to the Interstate Fair Grounds from 10 cents to 5 cents and increased its rush hour service. Strip tickets are again sold on the cars by conductors.

Ohio Road Will Handle Through Night Freight Cars.—Arrangements have been completed by the Ohio Electric Railway, Cincinnati, Ohio, to operate through night cars between Toledo and Columbus in order to take care of the increasing freight business. Heretofore all freight has been handled during the day.

Limited Service on the Cleveland, Southwestern & Columbus Railway.—Arrangements have been made by the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, to operate three limited cars a day each way between Cleveland and Bucyrus. At Bucyrus connection will be made with the Columbus, Marion & Bucyrus Railway for Marion, Delaware and Columbus.

Proposed Limited Service Over Flint & Saginaw Railway.—Through limited service over the Flint & Saginaw Railway and the Flint division of the Detroit United Railway will be inaugurated shortly. The details of the schedules remain to be completed, and the schedules probably will not be finally adopted for several weeks. Either three or four limiteds will be run daily each way.

Suit Against Indiana Companies for Violating Labor Law.—On account of complaints filed with the Indiana Railroad Commission charging certain electric railways in Indiana with having repeatedly violated the statute prohibiting, under penalty, trainmen working more than 16 consecutive hours, the commission has directed the Attorney-General to prosecute the companies alleged to have violated the law.

Device to Compel Reduction in Speed.—The New York & Queens County Railway Company has been trying for the last three months a device for making motormen slow down in front of car houses, at railway crossings and at other points where the local rules require the cars to slow down. It consists of a conical iron block, 9 in. long, 1 in. in diameter and weighing 2½ lb. It is designed to be bolted on the trolley wire and is sufficient as an obstruction to the passage of the trolley wheel to throw it off the wire if the car is moving fast. At the same time the trolley wheel will pass over the block when the car runs slowly.

A Reduction in Fare on Westchester Electric Railroad.—It was announced at a hearing before Commissioner Eustis of the Public Service Commission of the First District of New York on Oct. 15 that the Westchester Electric Railroad would cease charging two fares within the city limits. The company runs cars from the 177th Street station of the Lenox Avenue branch of the New York subway through White Plains Avenue to Larchmont. A second fare was charged at 233d Street, New York, going either way, on the Larchmont cars. The company insisted it did not come within the statutory provision forbidding the charging of more than 5 cents within the limits of a city, because the cars of this line run over the tracks of the Union Railway for a part of the route. It also was urged that cars bound for Mount Vernon did carry passengers to the city for 5 cents.

Folder of Ohio Valley Scenic Route.—A folder entitled "Ohio Valley Scenic Route" has just been issued by the Ohio River Passenger Railroad, East Liverpool Traction & Light Company and the Steubenville & East Liverpool Railway & Light Company, East Liverpool, Ohio. It gives the location of towns served, a schedule of the service over the lines, the electric railway and steam railroad connections, and contains a large map of the lines of the East Liverpool Traction & Light Company and the connecting electric railways between Pittsburgh and Wheeling and in the Upper Ohio Valley and the Lake Erie regions. The territory through which the companies operate is described, and some excellent half-tone illustrations accompany the text. Two of these are quite notable. One is of the skyline of Pittsburgh, with the office buildings in the business center of the city, and the Monongahela River; the other is a bird's-eye view of Steubenville.

Coney Island & Brooklyn Railroad Celebration Traffic.—A record of the passengers carried by the Coney Island & Brooklyn Railroad by days during the Hudson-Fulton celebration follows: Sept. 25, 108,178; Sept. 26, 79,712; Sept. 27, 94,044; Sept. 28, 93,792; Sept. 29, 98,089; Sept. 30, 101,146; Oct. 1, 125,456; Oct. 2, 104,600. Thus the total of passengers carried for this period by the Coney Island & Brooklyn Railroad was 805,017. In the Electric Railway Journal of Oct. 16, 1909, page 887, the record of passengers carried by days for the period from Sept. 25 to Oct. 2, inclusive, on the lines of the Interborough Rapid Transit Company, Metropolitan Street Railway and the Third Avenue Railroad was published. The total of passengers carried by the Brooklyn Rapid Transit Company was also published. Including the total of passengers carried by the Coney Island & Brooklyn Railroad for the period mentioned with the totals of the other companies gives the grand total of 44,321,821 passengers carried on the street railways in the boroughs of Manhattan, the Bronx and Brooklyn during the celebration.

Petition for Reduction of Fare Refused in Massachusetts.—The Massachusetts Railroad Commission has issued an order in favor of the Boston & Northern Street Railway in the petition of the Selectmen of Peabody, Mass., for a reduction in fare between Peabody Square and Salem Willows. The board says, in part: "The petitioners allege that the established fare of 10 cents for a single ride in either direction between Peabody Square and Salem Willows is excessive and unreasonable, and pray that it be reduced to 5 cents. The fare between Peabody Square and other parts of Peabody to and from Town House Square, Salem, is 5 cents, and the fare to the end of the Salem Willows line, which serves as a line for the summer travel to and from the pleasure resort known as Salem Willows, is an additional 5 cents. The riding on this line during the summer months is considerable, but during the rest of the year the travel is extremely light. * * * Investigation of the situation convinces us that the fare complained of, taken in connection with the fares between other points upon the system of this company, is neither unreasonable nor excessive. The reduction petitioned for, if granted, would result in the lines between Peabody and Town House Square, Salem, maintaining the burden of carrying for a free transfer the passengers from Town House Square to Salem Willows. The line from the Willows to Town House Square, Salem, ought also to return its due proportion of the receipts for passengers carried over it, and should not be called upon to render a free service for Peabody passengers. For the foregoing reasons the petition must be dismissed."

Greeting to St. Louis Employees.—Robert McCulloch, president and general manager of the United Railways, St. Louis, Mo., addressed the following communication to the employees of the company just prior to the beginning of the Centennial festivities in St. Louis which continued during the week commencing Oct. 3: "During the week beginning Sunday, Oct. 3, 1909, our good city of St. Louis will be on dress parade before the world. We have invited everybody to come and see what a great city we have. To our visitors the city will stand before them in its people and its business institutions, and of all the integral parts that go to make the city ours is the largest and most important and most potent in each day's doings. When our wheels start the work of the day for the city begins, and unless our wheels start promptly and move without friction the designs on the day's trestle-board are all marred and there is confusion in every craft. The visitor will look for us first of all others when he arrives, he will depend on us to carry him safely and pleasantly from place to place during his entire stay, and when he bids the city farewell our portals will be the last through which he passes. This gives some inkling of our importance during this gala week, and it is incumbent on us to acquit ourselves not only creditably but most creditably. No man must sleep on his post or think of himself in that week. Our pride in the city must stimulate us to endure the never-ceasing work that confronts us every hour of all the time. To the visitor the railroad consists only of the car and the two men who operate it. If the car is clean and comfortable and carries him safely and promptly, and if the conductor and motorman are attentive, careful, polite, patient and civil, this visitor goes away with favorable impressions of the city's most important institution. In creating this impression we are only doing our duty. We are public servants and can make no claim to virtue for duty well performed, but dereliction should damn us."

Increase in Fare Unit on Hartford & Springfield Street Railway.—The Hartford & Springfield Street Railway, Warehouse Point, Conn., has announced to the traveling public an increase in the fare unit over its lines from 5 cents to 6 cents, to take effect on Nov. 1, 1909. A statement issued to the public under date of Oct. 18, 1909, and signed by Francis R. Cooley, Thomas C. Perkins and Chauncy Eldridge, executive committee, gives the reasons for the change. The Hartford & Springfield Street Railway consists of 45 miles of interurban railway, connecting the Hartford (Conn.) Street Railway and the Springfield (Mass.) Street Railway on both the east and west side of the Connecticut River, with branches from Warehouse Point to Rockville, Thompsonville and Somers. The total receipts of the company, as well as the cost of operation, in comparison with other street railways in Connecticut, are shown for the year ending June 30, 1908, and a list of 15 street railways which have recently found it necessary to increase their fares is published. The statement is made that there are three roads in Connecticut which have less income per mile of track operated than the Hartford & Springfield Street Railway. They are the Norwich & Westerly Street Railway, now in the hands of a receiver; the Providence & Danielson Street Railway, which has never earned the interest on its bonds, and the New London & East Lime Street Railway, which is barely coming out even. On the other hand, whereas the Hartford & Springfield Street Railway has total receipts of a trifle more than $4,000 per mile of track operated, the Connecticut Company shows earnings of more than $8,000 per mile, the Danbury & Bethel Street Railway more than $8,000 per mile, and the Bristol & Plainville Tramway more than $6,000. It is cited that for the year ended June 30, 1908, according to the sworn report furnished the Railroad Commission, the Hartford & Springfield Street Railway, after paying its operating expenses, taxes and interest on bonds, had left a little more than $1,800 applicable to dividends and surplus. The statement is concluded to the effect that the company believes that the public would prefer to have good service, good cars, well kept up, and a 6-cent fare rather than pay 5 cents for an unsatisfactory service.

Personal Mention

Mr. H. E. Tilley has been elected president of the Northampton (Mass.) Street Railway to succeed Mr. J. C. Hammond, resigned.

Mr. J. C. Hammond has resigned as president of the Northampton (Mass.) Street Railway and is succeeded by Mr. H. E. Tilley.

Mr. A. L. White, second vice-president of the Spokane & Inland Empire Railroad, Spokane, Wash., has been elected first vice-president of the company.

Mr. C. B. Fairchild, Jr., formerly editor of *Electric Traction Weekly*, Chicago, Ill., has become associated with the Chicago (Ill.) City Railway.

Mr. R. W. Edwards has resigned as trainmaster of the Oregon Water Power division of the Portland Railway, Light & Power Company, Portland, Ore., to become a trainmaster with the Missouri Pacific Railroad at Kansas City, Mo.

Mr. J. F. Roach, chief dispatcher of the Oregon Water Power division of the Portland Railway, Light & Power Company, Portland, Ore., has been appointed trainmaster of the company to succeed Mr. R. W. Edwards, resigned, and will hereafter act as chief dispatcher and trainmaster of this division of the company.

Mr. Bion J. Arnold has been selected as a member of the committee of engineers to be retained by the Pittsburgh Civic Commission to assist that body in preparing plans for Greater Pittsburgh. Mr. Arnold will report on the railroad terminal facilities with a view to meeting the increasing tonnage, and will also report on the city transit facilities with special reference to the possibilities for the construction of subways. Mr. Arnold's associates on the board will be Mr. John R. Freeman, Providence, R. I., hydraulic engineer and authority on water supply, sewage disposal and harbor construction, and Mr. Frederick Law Olmstead, Boston, Mass., a noted park and street designer and an expert on housing conditions.

Mr. Waldo G. Paine, traffic manager of the Spokane & Inland Empire Railroad, Spokane, Wash., has been elected second vice-president of the company, and will continue to act as traffic manager. Mr. Paine was one of the original incorporators of the Coeur d'Alene & Spokane Railway, which was merged into the Inland Empire System in 1906, and was traffic manager of the Coeur d'Alene & Spokane Railway. He became general passenger agent of the Spokane & Inland Empire Railroad in 1905. Following the resignation of Mr. J. H. Lathrop as general freight agent of the company on Nov. 1, 1908, the freight and passenger departments of the company were merged and Mr. Paine was appointed traffic manager.

Mr. A. G. H. Jenssen has been appointed district passenger and freight agent of the Ohio Electric Railway at Toledo, Ohio, in charge of this department on the Lima-Toledo division, Ottawa and north, vice Mr. G. F. Hosbury, resigned. Mr. Jenssen was born in Toledo, Ohio, on July 5, 1872. He entered business on July 7, 1887, as a messenger in the division freight office of the Wabash Railroad at Toledo, and held successively the positions of clerk, assistant rate clerk and rate and tariff clerk, and in September, 1898, was appointed city contracting and traveling freight agent. Mr. Jenssen resigned from the Wabash Railroad in April, 1907, to become traffic manager for the F. Bissel Company, Toledo, Ohio. In March, 1908, he resigned from the F. Bissel Company and accepted an appointment as salesman of the Monarch Manufacturing Company, Toledo, Ohio, for Ohio.

Mr. John J. Lane, secretary of the New England Street Railway Club, and Mrs. Lane celebrated their silver wedding anniversary at Everett, Mass., on Oct. 16. The Rev. Lewis Malvern, Lynn, Mass., who officiated at the marriage of Mr. and Mrs. Lane in Laconia, N. H., 25 years ago, presented Mr. and Mrs. Lane with a twenty-fifth anniversary certificate. The ushers at the anniversary were Mr. William D. Wright, president of the New England Street Railway Club; Mr. Edwin C. Beers, Everett; Mr. George E. Hunt, chairman of the Everett School Board, and Mr. Frank J. Stone, Boston. After being received by Mr. and Mrs. Lane, the guests were entertained by a committee, comprising Mr. and Mrs. John R. Dexter, Mrs. E. C. Beers, Mr. and Mrs. George E. Hunt, Mr. and Mrs. John G. Cox, Mrs. Frank H. Gardner, Mr. and Mrs. Waldo S. Hadley, Everett; Mr. and Mrs. Charles H. Hile, Boston; Mr. and Mrs. W. D. Wright, Providence; Mr. and Mrs. Franklin Woodman, Haverhill; Mr. J. H. Neal, Boston; Mr. and Mrs. C. E. Learned, Wakefield, and Mrs. Fronia E. Clement, Tilton, N. H.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

San Diego, El Cajon & Escondido Railway, San Diego, Cal.—Incorporated to build an electric railway to connect San Diego, La Mesa, El Cajon, Bostonia, Lakeside, Morton, San Pasquel, Bernardo and Escondido, 65 miles distant. Surveys have been completed. Headquarters, San Diego. Capital stock, $2,500,000. Incorporators: G. W. Pursell, H. G. Crowe and A. C. Riordon, San Diego; W. L. Ramey and C. O'Kelly, Escondido, and William Stell and C. O. Nichols, El Cajon. [E. R. J., Sept. 25, '09.]

***Pueblo & San Luis Valley Railroad & Power Company, Pueblo, Col.**—Incorporated to build an electric railway from Pueblo across the Sangre de Christo Mountains, into Costilla County, where an interurban system will be established to connect Alamosa, Del Norte, South Forke, Center, Saguache, Moffat, Hooper, Mosca, Blanca, La Jara, Sanford, Manassa, Antonito and Capulin, all in the San Luis Valley. Capital stock, $8,000,000. Incorporators: J. L. Hurt, Center; C. L. Smith, La Jara; John I. Palmer, Saguache; D. H. Sullivan, Alamosa; John Ewing, Jr., Del Norte, and Jas. A. Kelly, Monte Vista.

***Elizabethtown (N. Y.) Railway.**—Incorporated to build an electric railway in Essex County from Elizabethtown to Westport, 8 miles distant. Capital stock, $80,000. Incorporators: Richard L. Hand, Francis A. Smith and Geo. W. Jenkins, all of Elizabethtown.

***Waynesburg & Blacksville Street Railway, Waynesburg, Pa.**—Incorporated to build an electric railway from the Pennsylvania and West Virginia State line at Robert's Run along the Roberts and Smith Creeks, 14 miles to Waynesburg. Capital stock, $84,000. Incorporators: Samuel Eakin, Wadestown, W. Va., president; L. L. Thomas, R. E. Lent, M. B. Patterson and Chas. H. King.

Chicago & Wisconsin Valley Railway, Madison, Wis.—Incorporated to construct an electric railway from Janesville to Merrill connecting Stoughton, Madison, Portage, Friendship, Grand Rapids, Stevens Point, Wausau and Lodi. The company will conduct a passenger and freight business. Capital stock, $40,000, preliminary. Incorporators: E. G. Frost, president; J. W. Powers, first vice-president; J. P. Barnes, A. J. Bermeyer, J. E. Jones, F. G. Tynoll, A. J. Baskerville, and A. P. Russell. [E. R. J., Oct. 16, '09.]

FRANCHISES

Nelson, B. C.—The City Council has passed the by-law guaranteeing the bonds of the Nelson Electric Tramway Company. It is expected that the system will be in operation by January, and that an extension will be built next year.

Fresno, Cal.—The Fresno Traction Company has asked the Board of Supervisors to grant a franchise permitting the construction of an electric railway on First Street, from Tulare Avenue to Kern Avenue. Bids for the franchise will be opened on Nov. 11.

Oakland, Cal.—The Peninsular Railway, San José, has applied to the City Council for a franchise to extend its electric railway northerly on Franklin Street to Twenty-second Street, Oakland. J. T. Burke is interested.

Vallejo, Cal.—The City Trustees have authorized that an ordinance be prepared annulling the franchises and rights of way held by the Vallejo & Northern Electric Railway in Vallejo. T. T. C. Gregory, president. [E. R. J., Aug. 21, '09.]

Indianapolis, Ind.—The Shore Line Traction Company has applied to the Commissioners of Marion County for a franchise to construct an electric railway from Beach Grove northwest to Indianapolis, 8 miles distant, along the Churchman's Pike. Jos. F. Weber, F. T. Edenharter and Geo. F. Mull, Indianapolis, are said to be interested. [E. R. J., May 8, '09.]

Camden, N. J.—The City Council has granted a franchise to the Delaware Tunnel Railroad to enter its rapid transit railway into Camden. The proposed railway will extend from Philadelphia, Pa., to Camden under the Delaware River. William A. Stern, 605 Land Title Building, Philadelphia, president. [E. R. J., March 27, '09.]

Lancaster, Ohio.—The Lancaster Traction & Power Company has applied to the City Council for a franchise giving the right to construct a street railway upon certain streets of Lancaster. Bids will be received up to Nov. 8 and the franchise sold to the highest bidder.

Hamilton, Ont.—The Hamilton, Waterloo & Guelph Railway has applied to the City Council for a year extension of its franchise in which to complete its railway. John Patterson, general manager.

Beaver Falls, Pa.—The New Castle & Beaver Valley Street Railways has applied to the City Council for a franchise to build an electric railway in Beaver Falls. The company also intends to erect a power plant. The railway is to extend from New Castle to Beaver Falls. Robert W. Cunningham and Stewart S. Neff are interested. [E. R. J., Oct. 16, '09.]

Pasco, Wash.—The Walla Walla Valley Traction Company has applied to the Board of Commissioners for a franchise to construct its railway in the Riverside Addition and on Ainsworth Avenue, besides outside the city limits. The company intends to build an extension from Walla Walla to Pasco, for which it is making surveys. The hearing of this application will be held Nov. 10.

Charleston, W. Va.—The City Council has granted a franchise to the Kanawha Valley Traction Company to extend its street railway on Russell Street, so as to connect its present lines on the West Side with the bridge of the Kanawha Bridge & Terminal Company at Seventh Street. J. C. Rockwell, Charleston, superintendent.

Wheeling, W. Va.—The acceptance of the City & Elm Grove Railroad has been adopted by the County Commissioners, granting the company the right to construct the proposed Park View extension.

***La Crosse, Wis.**—W. J. Ferris, president of the La Crosse Water Power Company, will apply to the City Council for franchises to enter La Crosse with an interurban electric railway to run from Winona, Minn., to Sparta, Wis., via La Crosse. The railway will cost about $3,000,000.

Milwaukee, Wis.—The Milwaukee Electric Railway & Light Company has applied to the City Council for franchises to extend its system over certain streets and avenues of Milwaukee. John I. Beggs, president.

TRACK AND ROADWAY

California Midland Railroad, San Francisco, Cal.—It is announced that construction on this electric railway will be resumed within 60 days. The company recently gave Yuba County about $15,000 to be used in strengthening the Yuba River levee, on which its tracks will be laid. This track will be built first, starting from Marysville. The railway is surveyed, and rights of way purchased for the entire distance between Marysville and Spenceville, and from there in two branches, one to Grass Valley and the other to Auburn. In Grass Valley it will connect with the Nevada County Traction Company to Nevada City. John Martin, 708 Alaska Commercial Building, San Francisco, president.

Vallejo & Northern Electric Railway, Vallejo, Cal.—It is announced that this company, which proposes to build an electric railway from Vallejo to Sacramento, connecting Cordelia, Suisun, Vacaville and Woodland, has commenced grading on the Willotta ranch in Suisun Valley. The estimate cost of construction is $6,500,000. T. T. C. Gregory, Suisun, Cal., president. [E. R. J., Aug. 21, '09.]

Meriden, Middletown & Guilford Railway, Hartford, Conn.—It is reported that this company has commenced construction at Middlefield, on its proposed electric railway from Meriden to Guilford via Middletown, a distance of 20 miles. Francis Atwater, Meriden, president. [E. R. J., Aug. 14, '09]

Westchester & Wilmington Electric Railway, Wilmington, Del.—This company announces that it will start construction on the railway between the two cities by Nov. 1. The railway will be 14 miles long, and eight cars operated. Officers: Thos. E. O'Connell, president; C. E. Faucett, secretary and treasurer, and St. George H. Cooke, general manager, purchasing agent and electrical engineer. [E. R. J., Sept. 18, '09.]

Central Florida Traction Company, Orlando, Fla.—L. L. Payer, secretary, announces that the present organization of the Central Florida Traction Company is temporary only. Officers: M. O. Oberstreet, president; J. H. Smith, vice-president, and W. A. Smith, treasurer. The railway will extend 45 miles from Kissimmee to Sanford via Orlando. [E. R. J., Aug. 7, '09.]

Chicago, Blue Island & Joliet Traction Company, Chicago, Ill.—It is stated that construction has been started between Blue Island and Mokena on this 6-mile electric railway from Chicago to Oak Park. This railway is intended to connect the Chicago & Southern Traction Company at Blue Island with the Joliet & Southern Traction Company at Mokena. W. H. Conrad, 1145 First National Bank Building, Chicago.

***Mount Vernon, Ill.**—It is reported that Albert J. Davis, St. Louis, Mo., and associates will build an electric railway from Mount Vernon, Ill., to a point on the Mississippi River above Chester by way of Winkle, a distance of 83 miles.

Murphysboro & Southern Railway, Murphysboro, Ill.—This company writes that it is constructing an electric railway from Murphysboro to Carbondale, of which 1½ miles are in operation. The company is at present operating four cars. The power station and shops are located at Murphysboro. According to the company's franchise, power for lighting, heating, etc., may be furnished. Capital stock, $250,000. Officers: A. B. Minton, president; C. H. Clay, vice-president; W. C. Alexander, secretary, and J. C. Hardy, treasurer. [E. R. J., Oct. 9, '09.]

***Plano, Ill.**—John B. Newhall, Cincinnati, Ohio, representing financiers of that city, is said to be promoting a plan to build an electric railway from Sandwich to Plano, Bristol, Yorkville, Oswego and Aurora. O. G. Lawbaugh, C. A. Darnell and Seth Parsons, Plano, have been engaged to procure franchises in Sandwich and Plano, and the right of way for the proposed line. Ivan L. Smith, Kendall County, has been employed to make the preliminary surveys.

Waukegan, Rockford & Elgin Traction Company, Waukegan, Ill.—Robert D. Wynn, vice-president and general manager of this company, is said to have announced that the Central Engineering & Construction Company, Chicago, has decided to undertake the construction of this electric railway from Waukegan to Woodstock, Marengo, Rockford, Belvidere, Elgin, Antioch and Millarn, next year, and would place the bonds at once. Plans and details will be completed during the winter. John D. Pope, Waukegan, is also said to be interested. [E. R. J., Jan. 30, '09.]

Capital Circuit Traction Company, Indianapolis, Ind.—The-right-of-way for this electric railway connecting Greensfield, Fortville, Noolesville, Sheridan, Lebanon, Advance, Jamestown, North Salem, Danville, Clayton, Hall, Martinville, Trafalgar, Franklin, Marietta, Shelbyville and Fountaintown, has been practically secured, and the survey has been completed. The company expects to place contracts as soon as necessary money is secured. J. N. Crabb, 1019 Law Building, Indianapolis, president. [E. R. J., Feb. 20, '09.]

Indiana North-Western Traction Company, Monticello, Ind.—This company is said to be making locations on its proposed railway from Lafayette to Hammond via Logansport and Monticello. W. F. Brucker, Monticello, secretary. [E. R. J., Sept. 18, '09.]

Louisville, Blue River & French Lick Traction Company, New Albany, Ind.—It is stated that this company has started the survey of this proposed electric railway between New Albany and French Lick Springs. J. H. Faucett is said to be interested. [E. R. J., Oct. 16, '09.]

South Bend & Logansport Traction Company, South Bend, Ind.—This company recently incorporated to build an interurban railway from South Bend to Logansport, Ind., has closed a contract with the Indiana & Michigan Electric Company, South Bend, for $10,000 worth of wiring work and supplies. Other contracts will be closed in a few days. The company has opened up a branch office in the American Trust Building. The present general offices in the Exchange Block will be continued. P. J. Haulihan is interested. [E. R. J., Sept. 25, '09.]

Wabash & Northern Indiana Traction Company, Warsaw, Ind.—It is announced that work will be begun immediately on this electric railway from Wabash to Warsaw as a result of the voting of subsidies in the townships of Wabash and Koscuisko, which amounted to $57,500. The route from North Manchester to Liberty Mills, Sydney and Packerton will be chosen instead of the route through Clay Township, which refused to vote a subsidy. The Bethlehem Steel Works will furnish rails, which will be 70-lb., and The J. G. Brill Company, Philadelphia, will furnish the rolling stock. The franchise in Warsaw calls for the construction of 5 miles of railway this year and for the completion of the railway by July 15, 1910. J. A. Barry is said to be interested. [E. R. J., July 17, '09.]

Davenport & Manchester Interurban Railway, Davenport, Ia.—At a meeting of the stockholders of this company in Davenport on Oct. 5, a resolution was made to accept the proposition of F. J. Cross, Monticello, to construct the railway from Monticello to Manchester, a distance of 26 miles. The proposition provided that the railway will not be capitalized at more than $24,000 per mile on that section, and of this Mr. Cross should receive $14,000 in stock and $16,000 in bonds. Under these conditions he agreed to build the line using 70-lb. rails, and equipping the railway with two gasoline motor cars, one of 40 hp for passenger service, and one of 200 hp for freight service. This proposition will be subjected to the approval of the Executive

Council, before it is possible to proceed with construction. It was suggested that the proposition be made to cover the entire route from Manchester to Davenport, and Mr. Cross agreed to make this change. F. W. Rank, Moline, Ill., secretary. [E. R. J., Sept. 11, '09.]

Des Moines & Sioux City Railroad, Des Moines, Ia.—This company is said to have awarded the contract for constructing the proposed electric railway from Des Moines to Sioux City, via Adel and Perry, a distance of 196 miles, to the American National Corporation, Indianapolis, Ind. The contract calls for completion by Dec. 30, 1910. The company has secured its terminal site and trackage area in Des Moines. Office, 200 Youngerman Block, Des Moines. Officers: John P. O'Malley, Perry, president; W. H. Miller, Fort Dodge, vice-president and general manager; J. W. Doran, Beaver, second vice-president; E. D. Carter, Berkeley, secretary, and J. W. Russell, Adell, treasurer. [E. R. J., Sept. 25, '09.]

Red Oak & Northeastern Railway, Red Oak, Ia.—The final survey of this electric railway from Red Oak through Greenfield to Des Moines, a distance of 110 miles, has been started at Grant Township. H. H. Von Hipple, engineer. [E. R. J., Sept. 18, '09.]

Interstate Railway, Kansas City, Mo.—The construction of this electric railway from Kansas City to St. Joseph has been started about 2½ miles south of St. Joseph. The Electric Traction Company, Commerce Building, Kansas City, is in charge of construction, and N. C. Van Natta, Corley Building, St. Joseph, engineer. [E. R. J., Oct. 2, '09.]

Jersey Central Traction Company, Keyport, N. J.—This company has awarded the contract for constructing its proposed extension through South Amboy to Perth Amboy, 2½ miles, to the General Contracting & Engineering Company, 50 Church Street, New York, N. Y. Surveys and right- of- way have been completed. H. C. Todd, Keyport, chief engineer.

***Dundee (N. Y.) Electric Lighting Plant.**—This company will construct, next year, a 4-mile narrow-gage electric railway from Dundee to Starkey Station on the Pennsylvania system of the Northern Central Railroad and also to Starkey Point on Seneca Lake, to connect with the steamers for Geneva, Watkins Glen, etc. The company will use the 50-lb. rails for construction. A. J. Pierce, Dundee, chief engineer.

***Hendersonville Light & Power Company, Hendersonville, N. C.**—This company advises that it will construct 4½ miles of electric railway from Hendersonville to Parceola Lake. The company has issued $100,000 in bonds for the construction. C. H. Broward, superintendent.

Piedmont Street Railway, Salisbury, N. C.—This company has awarded the contract for the grading of this electric railway in Concord to W. A. Foil, Concord. The railway will extend from Salisbury to Concord via China Grove and Landis. T. H. Vanderford is said to be interested. [E. R. J., July 10, '09.]

Fostoria & Fremont Railway, Fostoria, Ohio.—The directors of this company have chosen the following officers: F. D. Carpenter, Lima, president; J. H. Goeke, vice-president, and J. D. McDonel, secretary and treasurer. Capital stock, common, $150,000; preferred, $150,000; bonds issued amounting to $250,000. The railway will be built from Fostoria to Fremont and will connect the Lake Shore Electric Railway and the Western Ohio Railway. [E. R. J., Oct. 9, '09.]

Juniata Valley Electric Street Railway, Huntingdon, Pa.—This company expects to build 51 miles of railway connecting Huntingdon with Lewistown and Mt. Union with Huntingdon. The company will have at least two large parks. The Juniata Valley Electric Street Railway, the Juniata Valley Street Railway and the Big Valley Railway have all merged under the name of the Huntingdon, Lewistown & Juniata Valley Traction Company.

Rhode Island Company, Providence, R. I.—This company has commenced an extension of 5500 ft. to its Greystone division, which will make Enfield, R. I., the terminus.

Gallitin, Tenn.—C. H. Fidler, Gallitin, is said to be promoting a 12-mile electric railway from Gallitin to Beckwith. Preliminary surveys have been made.

Corpus Christi, Tex.—Survey for the proposed electric railway in Corpus Christi has been started and construction will begin at once. Daniel Hewitt, Salina, Kan., is said to be interested. [E. R. J., Oct. 2, '09.]

Glen Rose & Walnut Springs Railway, Glen Rose, Tex.—J. H. Farr, vice-president and general manager, writes that this company desires to purchase 14 miles of new or second-hand relaying 56-lb. to 60-lb. rails for constructing its railway from Glen Rose to Walnut Springs. The company began grading on Oct. 7, and expects to operate gasoline motor cars. Capital stock, $100,000. Officers: John C. Leese, president; F. E. Johnson, secretary; John Shields, treasurer, and F. M. Simpson, Oak Cliff, chief engineer. [E. R. J., Oct. 16, '09.]

Fort Worth, Mineral Wells & Western Railroad, Fort Worth, Tex.—At a mass meeting in Mineral Wells the proposition of this company to build its electric railway into Mineral Wells for a bonus of $60,000, terminal site and right of way, was accepted. The company will make a proposition before the Fort Worth Board of Trade, asking for a bonus of $125,000, terminal site and right of way. L. C. Cole, Fort Worth, is said to be interested. [E. R. J., Oct. 2, '09.]

Grafton (W. Va.) Traction Company.—This company expects to build a 3-mile extension next year, and also a bridge across Tygart Valley River, so as to extend the railway to the west side of Grafton, and from there to Grafton Park, a distance of 2 miles. G. L. Hartley, superintendent.

Chicago & Wisconsin Valley Railway, Madison, Wis.—It is reported that this company recently incorporated to build an electric railway from Janesville to Merrill will let the contract for construction to the Western Indiana Construction Company, Madison and Portage, Wis. Surveys will be started at once, at Portage. Allen P. Russell, Baltimore, Md., chief engineer. [E. R. J., Oct. 16, '09.]

SHOPS AND BUILDINGS

British Columbia Electric Railway, New Westminster, B. C.—This company is said to plan the construction of a new station in New Westminster. The building, which will be the terminus for the Fraser Valley division, will have the ground floor finished with marble. The upper stories, the structure consisting of three stories, at first, and five stories, later, are to be used for offices.

Northern Electric Railway, Chico, Cal.—This company plans to lay out a freight yard at the rear of Armory Hall, Marysville, between Second, Third, Willow and Orange Streets. A freight house and office will be erected and sidetracks and spurs will be laid. The company has applied for permission to the Marysville Council.

Atlantic & Suburban Railway, Pleasantville, N. J.—This company is building a two-story brick office building and terminal station at Pleasantville. The building, which is about completed, will cost $3,000.

Scioto Valley Traction Company, Columbus, Ohio.—This company expects to build a new storehouse in Columbus. R. Fullerton, purchasing agent.

Portland General Electric Company, Salem, Ore.—This company is planning to build a car house at Front Street and Shemeketa Street, Portland. The building is estimated to cost $20,000.

Dominion Power & Transmission Company, Hamilton, Ont.—This company has prepared plans for a one-story concrete inspection and storage shed, 96 ft. x 150 ft., to be erected at Sanford Avenue and King Street. The building will cost approximately $25,000.

Toronto (Ont.) Railway.—This company has a permit to erect car houses on Landsdowne Avenue near Lappin Avenue. The buildings will cost approximately $60,000. James Gunn, superintendent.

POWER HOUSES AND SUBSTATIONS

Southern Pacific Railroad, Los Angeles, Cal.—This company has awarded the contract for completing its power station, that is being erected on the tidal canal between Park Street and Fruitvale Avenue, Alameda, to F. P. Fisher, Alameda. His bid to finish the plant was $127,000. The contract calls for the construction of the walls, the roof and the finishing of the interior of the structure. The steel frame of the building is already in place and considerable of the machinery to go into the plant has been installed.

Georgia Railway & Light Company, Atlanta, Ga.—It is stated that this company is building a substation in the basement of its office building at Walton and Fairlie Streets, which will have a capacity of 1500 hp. This will cost approximately $25,000. The company will also spend $25,000 for a new motor-generator set being installed in its Davis Street station, which will furnish power for the Hapville extension.

Hendersonville Light & Power Company, Hendersonville, N. C.—This company plans to add a 1300-kw Terry turbine and 300-hp boilers to its equipment. The addition is to be used for generating power for the proposed electric railway to Parceola Lake. C. H. Broward, superintendent.

Scioto Valley Traction Company, Columbus, Ohio.—This company has purchased two 250-hp boilers and two automatic stokers.

Manufactures & Supplies

ROLLING STOCK

Grafton (W. Va.) Traction Company expects to buy two cars for summer traffic.

Port Arthur (Ont.) Electric Street Railway will soon purchase several more cars.

C. G. Nichols, Greenwood, Miss., it is reported, is in the market for gasoline motor cars.

Helena (Ark.) Gas Company is making inquiries for gasoline motor cars for street railway and interurban service.

Union Electric Company, Dubuque, Ia., has ordered five 21-ft. pay-as-you-enter cars from the Danville Car Company.

Glen Rose & Walnut Springs Railway, Glen Rose, Tex., a proposed electric railway, desires to purchase gasoline motor cars. J. H. Farr, general manager.

Muskogee (Okla.) Electric Traction Company is having six cars, 21 ft. long, built by the Danville Car Company. They will be of the pay-as-you-enter type.

Mount McKay & Kakabeka Falls Railway, Fort William, Ont., will, as reported in the Electric Railway Journal of March 20, 1909, purchase several new cars.

Wabash & Northern Indiana Traction Company, Warsaw, Ind., an electric railway under construction, will have its rolling stock furnished by The J. G. Brill Company.

Peoria (Ill.) Railway Terminal Company expects to purchase five interurban cars and one snow plow and sprinkler, as mentioned previously in the Electric Railway Journal, within the next three months.

Penn Yan, Keuka Park & Branchport Railway, Penn Yan, N. Y., has purchased one set of double freight trucks from the Taylor Electric Truck Company and one Westinghouse A. M. S. airbrake equipment.

Atlantic & Suburban Railway, Pleasantville, N. J., has just placed in service one 40,000-lb. capacity construction car built by The J. G. Brill Company. Four Westinghouse 101-B2 motors and K-28B controllers are used.

Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind., has purchased a number of cars from the Jewett Car Company, motors from the General Electric Company and trucks from the Baldwin Locomotive Works.

Bloomington & Normal Railway & Light Company, Bloomington, Ill., has purchased three 30-ft. pay-as-you-enter cars from the Danville Car Company. Brill 21-E trucks, four G.E.-80 motors and K-28 controllers were specified.

Oklahoma Railway, Oklahoma City, Okla., mentioned in the Electric Railway Journal of Sept. 11, 1909, as contemplating the purchase of eight combination cars, has ordered three 54-ft. interurban cars from the Niles Car & Manufacturing Company, Niles, Ohio, and is also building two steel combination locomotive work cars.

Chicago (Ill.) City Railway has drawn up the following details on the 50 pay-as-you-enter cars reported in the Electric Railway Journal of Oct. 2, 1909, as being built by The J. G. Brill Company:

Seating capacity.....40	Motors.....Four GE-80
Length of body.....32 ft.	Paint .....Sherwin-Williams
Length over bumpers...46 ft.	Push button signal,
Width over all at guard rails ..... 8 ft. 6 in.	Consolidated
	Registers .....International
Sill to trolley base..11 ft. 9 in.	Sanders .....Nichols-Lintern
Height, rail to sill..11 ft. 9 in.	Seats.....Hale & Kilburn
Body .....Composite	Seating material.....rattan
Interior trim.....cherry	Side bearings.Wood's gravity
Underframe .....metal	Step treads....Mason Safety
Air brakes....Allis-Chalmers	Trolley retrievers.....Earll
Bolsters, body..Carbon steel	Trolley base.....U. S. 14
Bumpers .....Channel	Trucks.....Brill No. 27-F
Center bearings...Symington	Varnish..Chicago and Beck-with-Chandler
Control system.....K-35-C	Ventilators.Acme Automatic
Curtain fix....Curtain S. Co.	Wheels.....rolled steel 34 in.
Curtain material..Pantasote	Wheelguards .....H-B
Destination signs.....Hunter	Agosote headlining
Hand brakes.....Peacock	Door hangers,
Headlights, Adams and Westlake	Burdette-Rowntree

TRADE NOTES

American Ship Windlass Company, Providence, R. I., has received an order from the Portland (Me.) Railroad for a six-retort Taylor underfeed stoker to be applied to a new 500-hp Babcock & Wilcox boiler now being installed in the railway company's power house in Portland.

Warren Steam Pump Company, Warren, Mass., announces that L. G. Kibbe has resigned his position as treasurer of the Wheeler Condenser & Engineering Company, Carteret, N. J., to take an active part in the management of the first mentioned concern. His office will be at Warren, Mass.

Whipple Supply Company, New York, N. Y., has been formed by A. L. Whipple, formerly sales manager of Forsyth Brothers Company. The new company will have offices in the Hudson Terminal Building, 50 Church Street, and will handle several specialties for steam and electric railroads.

Allis-Chalmers Company, Milwaukee, Wis., shipped during September 21 steam turbines to 18 different customers. The smallest unit built during the month was of 300-kw capacity. Several of the machines were of the low-pressure type for use in connection with high-pressure reciprocating engines.

Western Electric Company, New York, N. Y., has just completed two installations of telephone train dispatching apparatus on the Norfolk & Western Railroad for handling its trains between Roanoke, Va., and Bluefield, W. Va., 102 miles and between Bluefield and Williamson, W. Va., 107 miles. There are 16 stations on the former circuit and 22 stations on the latter. Gill selectors are used on both circuits. These lines extend through some very mountainous country and afford a good test of telephone train dispatching under very severe conditions. The equipment has been in service since Sept. 25, and W. C. Walstrum, superintendent of telegraph, reports that both circuits have been giving excellent service since that time. One of these circuits was pressed into service before being fully completed owing to the telegraph circuits having gone out of commission due to the recent widespread electrical disturbance attributed to the Aurora Borealis.

ADVERTISING LITERATURE

Northwestern Expanded Metal Company, Chicago, Ill., has sent out an illustrated bulletin showing how its "Knoburn" expanded metal lath can be used in giving a wooden house a fireproof cement outer coat.

Frank Ridlon Company, Boston, Mass., has issued its list of second-hand electrical machinery for October, 1909. The list contains an announcement about a special offer of new National d. c. 220-volt four-pole motors.

Pay-as-You-Enter Car Corporation, New York, N. Y., is distributing in the shape of a pamphlet entitled "A Word to the Wise" a reprint of an article about graft on street cars which was originally published in the *New York Sun* of July 4, 1909. In the story an ex-conductor tells in a racy style how nickels are stolen, and cites his experience in many cities. From the knowledge of street railway conditions in different cities throughout the United States which the confessor displays it is evident that the disclosures are anything but fiction.

NEW PUBLICATIONS

Theoretical Elements of Electrical Engineering. By C. P. Steinmetz. New York, 1909: McGraw-Hill Book Company. Cloth, 455 pages, including index. Price, $4.00 net.

This well-known treatise on alternating current phenomena has now reached its third imprint, representing a thorough revision to include the latest developments in this field. The author treats both transmission circuits and machinery.

Radiation, Light and Illumination. By C. P. Steinmetz. New York, 1909: McGraw-Hill Book Company. Cloth, 304 pages, including index. Price, $3.00 net.

This book is based on a series of engineering lectures delivered at Union College, Schenectady. With the exception of two chapters, entitled "Light Flux and Distribution" and "Light Intensity and Illumination," the treatment is non-mathematical. The twelfth and thirteenth lectures treat of the problems of the illuminating engineer and are especially interesting because of the greater attention now given to scientific lighting.

Alternating-Current Motors. By A. S. McAllister, Ph.D. New York: McGraw-Hill Book Company, 1909; 322 pages (illustrated) including index. Cloth, $3.00 net, postpaid.

The fact that Professor McAllister's work has reached a third edition in three years proves that it has filled a niche in alternating-current literature with satisfaction. The new issue will appeal to railway men in particular on account of the clear, extended treatment of repulsion motors and on the prevention of sparking in single-phase motors. The excellent plan of summarizing the salient features of each type of apparatus before presenting any analytical treatment has been retained in this last edition.

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The Constituents of Value

In its decision denying the application of the bondholders' committee of the Third Avenue Railroad for approval of a proposed plan of reorganization, the New York Public Service Commission, First District, touches on the subject of value. While the opinion of the commission in this case affects directly only one company, except so far as its position may or may not establish a precedent upon which a future course may be based, any definite expression of views from this source in relation to values would necessarily be of importance. The attitude of the commission on this subject receives, of course, only incidental attention, but it seems unfortunate that the question of what constitutes value in this, or any other case, was not given the thorough discussion, or, at least, the mention, which its serious character warrants. Perhaps the commission did not lose sight, in its allusions to this feature of the decision, of the undoubted truth that a property of this nature comprises assets of extreme value which are not visible to the naked eye, but if so, it did not make that point clear. No matter in what language assets of this character may be described, their existence is too plain to admit of argument. The commission appears to be dealing rather loosely with fundamental problems when it states in a document issued for general distribution that "it must be just to all, remembering that when an issue of bonds is approved the public believes that they represent actual propery, physical in most part or in whole." Whether or not the commission would have bonds represent "actual property, physical in most part or in whole," and stock represent the other large amounts of money which are reasonably invested in a property is not so material a matter as the point that there are honest values in the creation of public utility properties which, although not physical, may justly be capitalized. Excessive over-capitalization is bound to result in trouble sooner or later, but capitalization and net physical value in public utility plants in large cities can rarely, if ever, be identical.

A New England Increase of Fare

Another New England company, the Hartford & Springfield Street Railway, has decided to increase its unit of fare from 5 to 6 cents as a result of serious concern regarding the higher costs of operation. The long list of companies which have been forced to take this step increases as time goes on, and no evidence is at hand to indicate that the course of fares on many systems will be other than upward.

The economic reasons which justify advances in rates of fare in various cases are understood so plainly that it is repetition to introduce them again into these columns, but the fact is that the causes which make present revenues unsatisfactory are ignored frequently. The effects of these causes, as pointed out clearly in the circular of the Hartford & Springfield Street Railway, are evident in the higher costs of supplies and larger wages paid to trainmen. In addition, an important cause for well-founded anxiety lies in the fact that expenditures to meet the ravages of time grow larger and larger as each year of operation of the street railway passes. The circular of the Hartford &

Springfield Street Railway declares that the "experience of this company with these conditions has been similar to all the rest."

Observers of the electric railway situation are familiar with the extent of the movement for higher fares, and the Hartford & Springfield company, in its circular letter of announcement to the traveling public regarding the change which it is to make effective on Nov. 1, shows the names of other companies in Massachusetts which have made similar advances to 6 cents in the unit of fare. For the year ended June 30, 1908, after paying interest, taxes and expenses, this company had a surplus of little more than $1,800 applicable to dividends or surplus, and in the ensuing year, after providing for the same expenditures, a deficit of $257; and the company, recognizing that its patrons may be surprised to learn of this situation, proceeds to give a list of the Massachusetts properties which have taken the same action respecting fares. It was advisable to attract the attention of patrons in this manner to properties with which they might have some degree of familiarity. Because of the short distances at which the Massachusetts properties are located from the territory served by the Hartford & Springfield road, its patrons, at least in part, may reasonably be expected to have knowledge of the widespread advances in fares which have attracted so much attention on the Massachusetts lines. If the management of the Hartford & Springfield road had been so inclined, it might have extended the list by reference to properties in other parts of the country which, beset by a similar state of affairs, have been led to take action designed to increase the gross revenue per passenger.

Various urban as well as interurban lines are suffering from increased cost of operation and from the failure to take into account in the past the inevitable result which time surely exerts upon the efficiency of equipment. The wisest course which any company can follow if it finds itself confronted with a condition where the utmost effort fails to protect the money reasonably invested in the property, and to earn a fair rate of return thereon, is to take immediately such steps as lie within its power to improve its unit earnings.

Current Clocks and Coasting Registers

It seems anomalous for a railway company to spend many thousands of dollars in station equipment to secure a slight saving in the cost of generating power or to reduce the weight of its cars to a minimum by making costly changes, only to have many times the estimated saving wasted on the road through the carelessness or incompetency of its motormen. The loss of power is not the only evil connected with inefficient operation of cars. Every watt-hour consumed to make a given run over that actually required must be dissipated as friction, resulting in useless wear on the brake shoes and wheels. Much has been written on this subject, but little has been accomplished in practice. Recording wattmeters have been tried, and in most instances abandoned because of their delicacy and lack of reliability when subjected to the rough handling received on the cars. The Metropolitan West Side Elevated, of Chicago, and the Philadelphia elevated railroad, among others, have tried to educate their motormen as to where to use current and where to coast, and have installed signposts along the structure to serve as guides or reminders of the instructions issued. This expedient has had a beneficial effect, but it lacks the one essential feature of preserving a comparative record of obedience to the instructions issued. Without such a record it is almost impossible to pick out the careless or deliberately disobedient motorman for discipline and the loss of current may go on unchecked for a long time.

Two other methods have been tried, the current clock and the coasting register, one abroad and the other quite recently in this country. The former has been employed extensively throughout Germany, and while it records the number of hours or minutes during which current is used instead of watt-hours, it has had a remarkable influence in reducing the energy consumption of cars. The figures from Berlin, published recently in this paper and confirmed by personal observation of car operation in that city, show that in the less congested districts of the German capital the motormen have attained astonishing ability in floating their cars to the stopping points with only light application of the brakes. Here, as elsewhere, the principle of coasting had been taught to the motormen, but only the presence of a reliable automatic watchman on the cars made the men apply their knowledge in practice. The use of these current clocks has also had a noticeable effect in reducing brake-shoe wear and minimizing accidents due to ineffective braking in short distances. It might be expected that the encouragement of coasting would lengthen the running time between terminals, but the men made so much better time after the clocks were installed that the average schedule speed has been increased 10 per cent.

The coasting register designed for use on the Manhattan Elevated Railroad in New York, which is described elsewhere in this issue, operates on a diametrically opposite principle to that of the current clock. It is arranged to record the time during which the car or train coasts without power and with the brakes off rather than the time during which current is used, on the theory that the chief desideratum is to operate the trains without power for the maximum time before retardation begins. The chief advantage of the coasting register over the current clock is that it affords a check both on the efficiency of controller manipulation and braking. The maximum permissible coasting time during a run with predetermined limits of acceleration and deceleration can be determined easily. If the maximum is exceeded in an effort to make a good showing it is *prima facie* evidence of severe braking and short stops. If the maximum coasting time is not reached, then the motorman has either fed the motors too slowly or "fanned" the air brakes. With automatic accelerating relays such as are used in modern multiple-unit control equipments, the first stage of the cycle of acceleration, coasting and braking are to a large extent taken out of the hands of the motorman. His skill, therefore, can be shown by his coasting distance and his handling of the brakes.

In the application of either current clocks or coasting registers to single cars having the ordinary drum controllers and straight air or hand brakes, proper manipulation of the controller and of the brakes of course must be assumed; otherwise the records made by different motormen would not be comparable.

Illinois Central Terminals and Electric Operation

The popular point of view regarding electric operation of railroad terminals is illustrated by the widespread protest which has arisen in Chicago over the conclusion of the stockholders of the Illinois Central Railroad to defer electrification until further studies can be made.

The first action of the stockholders of the Illinois Central Railroad on the subject of electrification was taken at their annual meeting in October, 1908, when a resolution was adopted committing the management to the conversion of the company's Chicago terminals from steam to electric operation "with all reasonable dispatch." At the stockholders' meeting held in Chicago last week a strongly adverse report on electrification was read by the president of the railroad, J. T. Harahan. Following the presentation of this report a resolution was adopted declaring that "electrification at this time is impracticable," and that there was a necessity for "deferring a determination as to electrification until such time as a continued study of the subject can intelligently determine the proper line of procedure."

Mr. Harahan's report to the directors of the company, which is reprinted elsewhere in this issue, concludes with four reasons why electrification should not be undertaken at the present time. First, that in the present state of the art electric operation of large freight terminals such as those of the Chicago railroads is impracticable. Second, that electric operation would not result in economies sufficient to pay an adequate return on the additional investment required. Third, that electric operation is demanded on the ground of smoke prevention, and that by the use of coke as fuel for locomotives and the adoption of self-propelled gasoline motor cars for suburban service, smoke can practically be eliminated. Fourth, that the adoption of any of the existing systems by one railroad in Chicago at the present time might seriously interfere with the interchange of cars and equipment with other roads in the city, which might in the future adopt a different system.

Naturally, there will be dissenting opinions from these reasons, not only from those who urge electrification at any expense, but from others who, recognizing the difficulties, still predict that electric operation is the solution, although the public, of course, will have to pay the cost.

The first conclusion advanced by Mr. Harahan is that the electric operation of large freight terminals is as yet without a precedent. With this statement no one can disagree. The yards at the entrances to the Sarnia tunnel are jointly operated with steam and electricity, but this cannot be considered as a typical terminal problem. The New Haven is soon to begin its first experiments with electric locomotives designed to haul freight trains, and it will probably carry on exhaustive tests before taking definite steps to abolish altogether steam locomotives for hauling and switching freight on its main line sections or in its terminal yards in the Bronx. Similar experiments were made by all the railroads long before the real work of converting the passenger terminals in New York to electric operation was begun.

The statement of expenditures and returns from electric operation of suburban trains alone, on which the second conclusion is based, shows an estimated annual deficit of $624,947, as compared with an assumed annual net revenue under steam operation of $109,712. The cost of converting the suburban tracks only for electric operation is estimated at $8,000,000, which would carry with it annual fixed charges, including interest and depreciation, of 10 per cent, or $800,000. On the basis of an assumed operating ratio of 82.9 per cent for steam and 66 per cent for electricity, the annual saving in operating expenses due to electrification is stated to be $175,053. It does not appear, however, to be assumed that there would be any extraordinary growth in the traffic and gross revenue following the change. It is plain that, considering the figures as presented, a very large increase in traffic would be necessary to pay the fixed charge on the new investment required.

No mention is made in the report of comparative costs of overhead and third-rail conductors, nor is any clue given as to which system the engineers had in mind in arriving at their total estimated cost of converting the suburban tracks to electricity. On a basis of 52 miles of suburban trackage, the cost per mile figures out approximately $150,000, which would indicate that there had been included in the estimate the cost of a very large power station, the most expensive type of distribution system, and ample rolling stock equipment. The unit cost for complete electrification of the 325 miles of track within the terminal district, based on the engineers' total estimate of $20,000,000, is $60,000 per mile. Enormous contributory expenses for station alterations, grade crossing elimination and the like, would explain in part the great increase over the estimate published last year at the time the first public announcement was made that the railroad company was studying the problem. These early estimates varied from $4,000,000 to $6,000,000, and it was in contemplation of spending this sum that the stockholders consented to electrification.

The use of coke as locomotive fuel and of gasoline motor cars for suburban service are both in the nature of experiments. These improvements cost much less to install, and their experimental introduction involves little or no risk of interruption to the present service.

Mr. Harahan's last conclusion, that it would be inadvisable for any one railroad in Chicago to begin electric operation at this time independently of the other railroads, because it might retard rather than promote future development seems to be less a financial argument than one based on the contemplation of future difficulties of operation which, after all, might not prove to be insurmountable. It would be unfortunate if all the advantages of electric operation should be denied indefinitely to one road pending a decision to electrify or the ability to raise the necessary money to electrify by one or more of the connecting railroads.

Since Mr. Harahan's report does not contain any detailed estimates of first cost or cost of operation with electric traction, it cannot be compared with the known results of operation in existing installations, where, under conditions that are admittedly different, commercial practicability has been demonstrated. It is evident that there is no express disposition on the part of the Illinois Central to abandon altogether the long-discussed electrification of its Chicago terminals. The time that will probably intervene before definite action is taken will permit further study of the important installations already made or projected in the great passenger terminals of New York City.

RECONSTRUCTION AND IMPROVEMENTS OF THE LOS ANGELES PACIFIC COMPANY

BY P. H. ALBRIGHT, ENGINEER

The Los Angeles Pacific Company is one of the large interurban electric properties on the Pacific Coast owned by the Harriman interests. It operates between Los Angeles, Hollywood, Colegrove, Sherman, Sawtelle, Soldiers' Home, Port Los Angeles, Santa Monica, Ocean Park,



Los Angeles Pacific Company—Map of Interurban Lines

Venice, Palms, Playa Del Ray, Hermosa Beach, Redondo Beach and intermediate stations in California. This road does a general passenger and freight business, and also operates an express and mail service. The passenger business consists principally of an interurban traffic between Los Angeles and the above-mentioned towns and cities. Local passenger traffic in Los Angeles and the other cities served is an important item, but does not compare in volume with the interurban traffic.

The interurban business is handled by electric trains of from one to six cars. The cars are of the half-open type, 51 ft. in length and weigh 75,000 lb. They are equipped with the type-M General Electric multiple-unit control system, four 75-hp motors and Westinghouse schedule AMM air brakes with graduated release. The speed of the trains sometimes exceeds 60 m.p.h. between stations on straight track.

ROUTES AND SERVICE

The six routes between Los Angeles and the beaches over which this company operates through interurban trains are shown on the map. The regular schedule for through trains to the beaches is as follows: One train on the Palms division every 20 minutes; one train on the Sawtelle division every 30 minutes; one train on the Hollywood division every 30 minutes; one train on the Redondo division every 30 minutes; one train on the Westgate division every hour. On the old Santa Monica branch of the Southern Pacific Railway cars run from Santa Monica to Port Los Angeles every 30 minutes, but from Ivy to Santa Monica the service is principally made up of special trains, as the regular schedule calls for but two trains each way per day. The frequency of trains, however, is increased on all the above routes as the traffic requires.

The traffic between Los Angeles and the beach resorts is exceptionally heavy on Sundays and holidays. Frequently, the service on the Palms division, which carries the greater portion of the holiday traffic, is increased to one train of four to six cars every 7½ minutes regularly. An accompanying engraving shows the type of trains operated in this service.

Other interurban schedules include 30-minute service between Los Angeles and Colegrove; 10-minute service between Los Angeles and Laurel Canyon by way of Hollywood; 15-minute service between Sawtelle and Playa Del Rey by way of Santa Monica, Ocean Park and Venice, and two trains per day between Santa Monica and Inglewood. All of this traffic is handled by single cars, with the exception of the Laurel Canyon trains marked "Flyer." The "Flyer" service is run during the morning and evening rush hours between Hollywood and Los Angeles with trains made up of two and three cars.

The local passenger traffic is confined to within the city limits of Los Angeles, Hollywood, Sawtelle, Santa Monica and Ocean Park. Cars used in this service are the half-open type, 40 ft. long and weighing 44,000 lb. They are equipped with two 57-hp motors, Westinghouse K-28 controllers and Westinghouse straight air brakes.

FREIGHT SERVICE

The freight business is exceptionally heavy on this road, as it serves exclusively all that country to the west and southwest of Los Angeles. Freight is handled in carloads as well as in smaller lots. The greater portion of the freight is hauled between midnight and morning. This is done for two reasons. First, to keep the freight out of the way of the passenger trains, thereby avoiding delay. Second, to economize on power. The economy in power is



Los Angeles Pacific Company—Scenic Route from Santa Monica to Port Los Angeles

made by using a supply of purchased electrical power capacity that would be a loss unless used for the transportation of freight, as the passenger traffic is light during these hours.

Crushed rock from rock quarries located on the line, oil from the Sherman oil district, which is served by this company; cargoes of lumber from the Long Wharf at Port

Los Angeles and other carloads of freight are handled in trains of from 4 to 15 cars.

Outside the regular freight and passenger traffic, the "Balloon Route" excursions are conducted by this company. During the summer and winter tourist seasons an average of 10,000 people per month are carried over the "Balloon Route." For this service the company operates

ROLLING STOCK

The rolling stock owned and operated includes 405 cars, consisting of 144 passenger cars, 6 parlor cars, 17 electric locomotives, 221 freight cars, 5 mail and express cars and 12 service cars.

REHABILITATION

Perhaps no other road in the West has undergone such



Los Angeles Pacific Company—Five-Car Train at Venice, One of the Beach Resorts

attractive parlor cars. Two new parlor cars specially designed for this excursion traffic are being constructed at the present time in the company's shops at Sherman.

The Los Angeles Pacific Company files all freight and passenger tariffs with the Interstate Commerce Commission and the State Railroad Commission. Joint freight tariffs

a general reconstruction and thorough improvement as the railway of the Los Angeles Pacific Company. Improvement work was started in the summer of 1906 and has been carried on continuously since that time. This has involved a general reconstruction of all operated tracks; the leasing of the old Santa Monica branch of the Southern Pa-

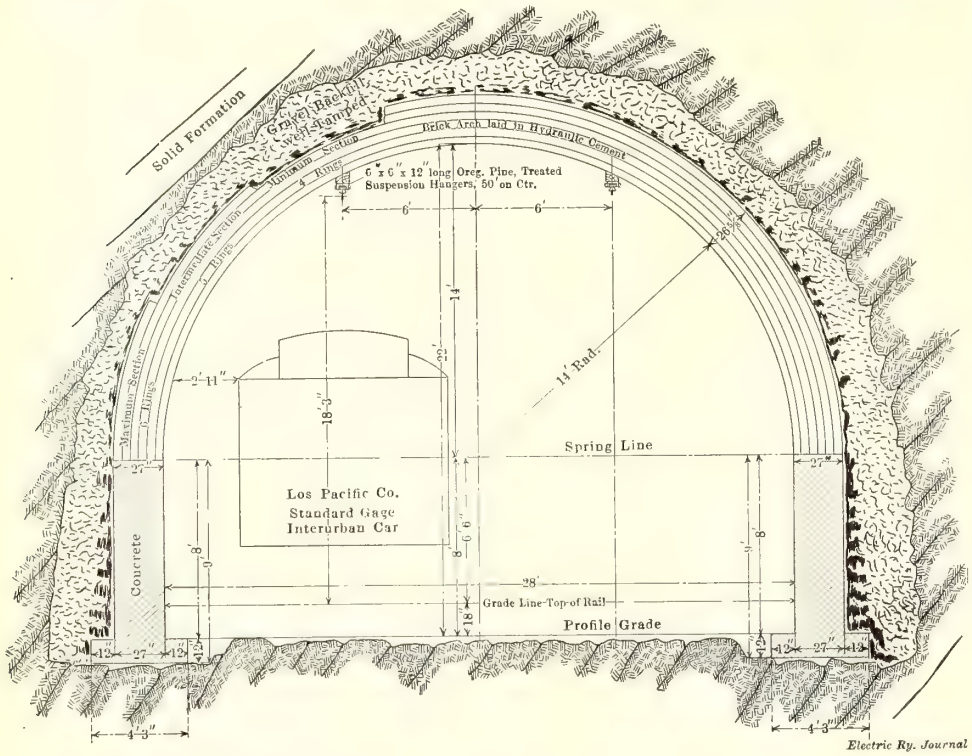


Los Angeles Pacific Company—Buena Vista Freight Depot

are now published in connection with the different steam lines entering Los Angeles. The express business is handled by the Wells-Fargo Express Company. Specially designed electric cars are used in the express and mail service.

cific Company; constructing new track; making extensive improvements and additions to the company shops; constructing the new Hill Street cutoff, and increasing the electrical equipment both in the generating and distributing plants.

The total mileage of tracks in the spring of 1906 was 170.03 miles, of which 12.91 miles were standard gage, while the gage of the remaining 157.22 miles was 3 ft. 6 in. Practically the entire road was unballasted. The rails in use weighed from 40 to 70 lb. per yard, the major portion, however, weighing less than 60 lb. The ties were 6 in. x 8 in. x 6 ft. in size.



Los Angeles Pacific Company—Cross Section of Hill Street Cut-Off Tunnel

At the present time the mileage of tracks is 213.5, and 1000 gross tons of new 60-lb. A. S. C. E. rail, 200 gross tons of 61.5-lb. Southern Pacific rail, 1000 tons of 70-lb. A. S. C. E. rail, 1030 tons of 72-lb. Lorain No. 331 rail and 2500 tons of 75-lb. A. S. C. E. rail have been laid since the spring of 1906. The entire roadway has been standardized, this work including ballasting, putting in new ties and changing over to 4-ft. 8½-in. gage.



Los Angeles Pacific Company—South Portal, Tunnel No. 2

The ballasting and laying of new ties were done during the years 1906 and 1907, except on the Hollywood and Colegrove divisions, which were ballasted and converted to standard gage this year. Ballasting was done with canyon gravel and crushed rock. The new ties are 6 in. x 8 in. x 8 ft., of redwood, Japanese oak and a small proportion of Oregon pine.

The changing of all tracks except on the Hollywood and Colegrove divisions to standard gage was done during the spring of 1908. On account of the interlacing of the tracks and the numerous crossings with other companies in the city of Los Angeles and the heavy traffic, which would not permit the discontinuance of car service, the change to standard gage offered a great many novel problems both to the engineering and operating departments. However, the work was accomplished by laying a third rail in some places, and in others by laying two "outside" rails, while in still other places, where the car service was less frequent, the cars were dispatched over one track while track forces were spreading the rails on the other. Temporary special work layouts were placed where necessary prior to or at the time of making the change, but were replaced as rapidly as possible after the narrow-gage cars were removed from the service. The permanent special work is the hard center type built up of 100-lb rail.

The Santa Monica branch of the Southern Pacific Company was leased on July 1, 1908. This line consists of 25.17 miles of track, including the Soldiers' Home line, the Long Wharf at Port Los Angeles, freight and passenger station buildings, yards, pumping plants, a roundhouse and all other accessories. The work of electrifying was done prior to the date of the lease, making it possible to operate this property from the date of the lease. No material changes were made outside of the electrical equipment of the steam track.

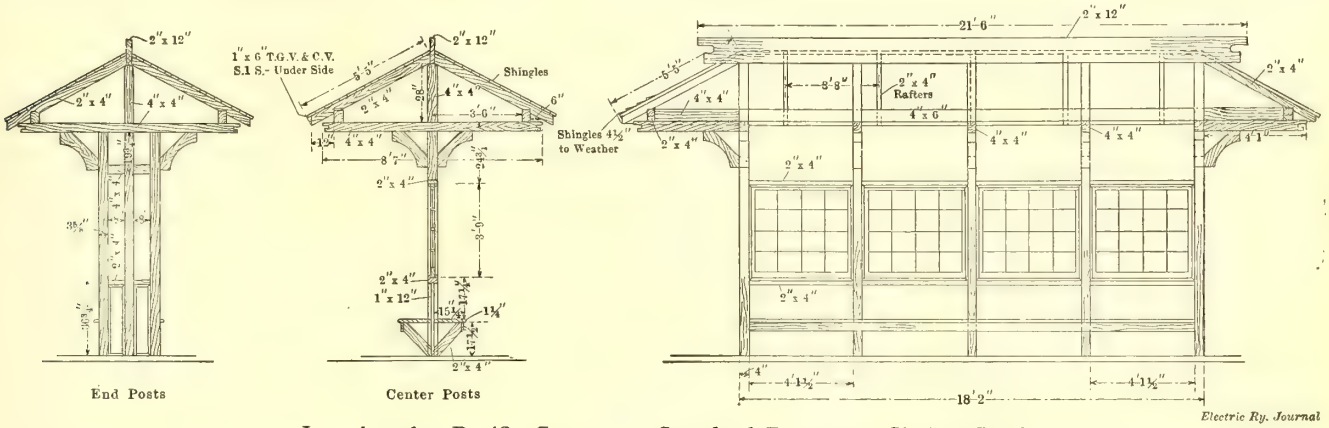
The Long Wharf, 4300 ft. in length, is probably the largest ocean wharf in the world operated exclusively by an electric railway company. It supports a two-story station building with 15,750 sq. ft. of floor space and the large coal bunkers built by the Southern Pacific Company at the time when this was the only coaling station on the coast off Los Angeles. There are 2.75 miles of track in the yards on the wharf. Vessels exchange passengers and



Los Angeles Pacific Company—Depot at Beverly

freight here with the Los Angeles Pacific Company for the towns tributary to its lines.

During the past three years the attention of this company has been directed toward the reconstruction and standardization of operated lines more than toward extensions, therefore the 31.11 miles of new track constructed is not a fair index of the improvement made in the roadway. The new mileage includes passenger and freight lines, yard and terminal tracks, commercial sidings and oil spurs. The new passenger and freight lines were for the most part built as extensions, branches or spurs from the main operated lines and in territories previously developed.



Los Angeles Pacific Company—Standard Passenger Shelter Shed

BUILDINGS AND TERMINALS

The improvement of yard and terminal facilities was made chiefly at the Buena Vista freight depot, the Hill Street terminal and at Sherman yards in connection with the Sherman shops. A large amount of local freight is carried out of Los Angeles from the Buena Vista freight depot. On account of the rapidly increasing number of cars used in hauling this freight, it became necessary to design and install a track layout that would utilize to the best advantage the property available for this purpose. In the new yard the minimum radius used on curves traversed by freight cars is 100 ft.

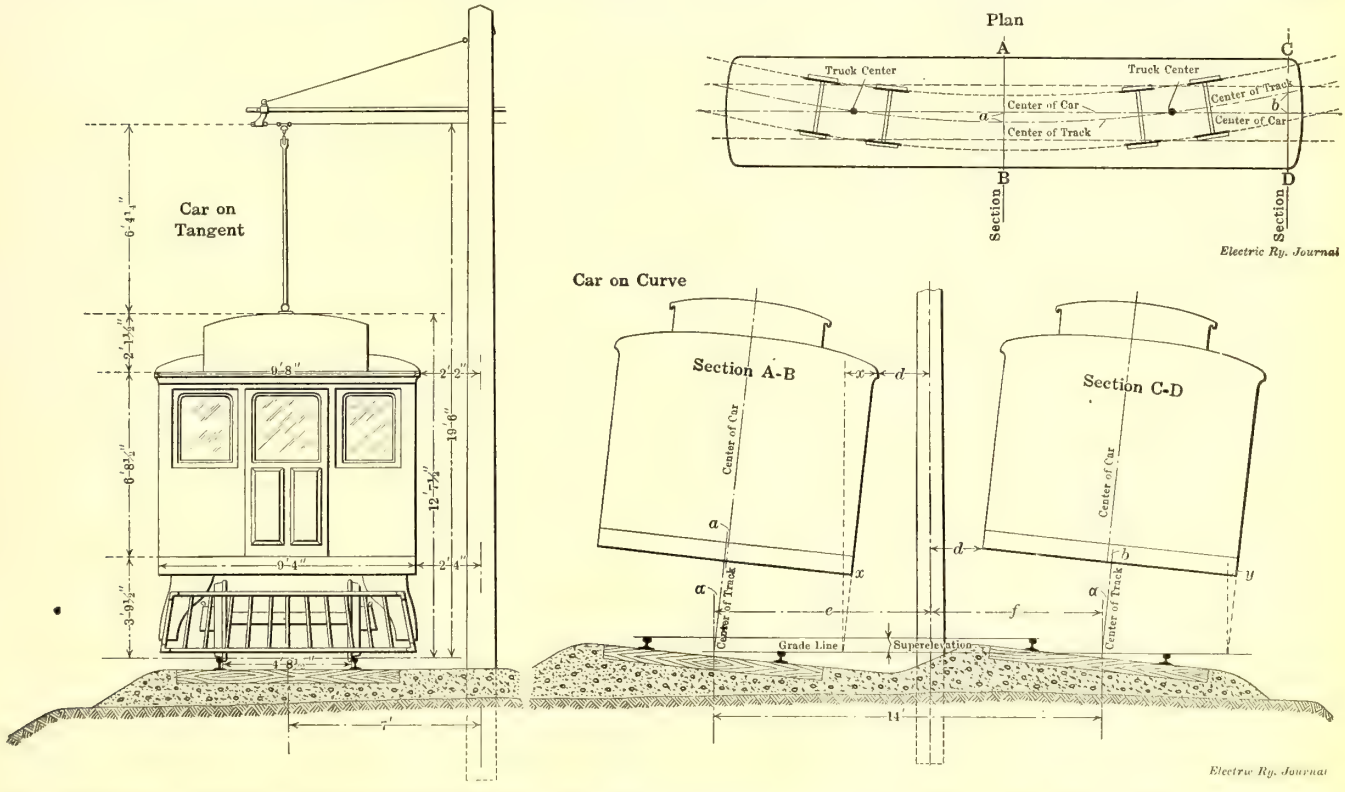


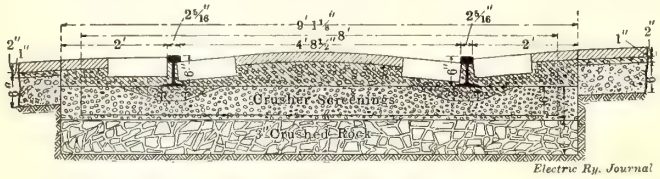
TABLE OF DISTANCES

D.	S. Elev.	α	a	b	x	y	Overhang AB	Overhang CD	d	e	f
1°–00′	0′–1½″	1°–31′–20″	0′–0¼″	0′–0 1/16″	0′–3 1/4″	0′–1 1/16″	0′ 3 11/32″	0′–0 3/32″	2′–1 11/16″	7′–3 5/32″	6′–8 27/32″
2°–00′	0′–3″	3°– 2′–40″	0′–0 1/32″	0′–0 3/32″	0′–6 1/8″	0′–2 1/32″	0′–7 5/32″	0′–1 3/32″	2′–0 1/4″	7′–5 5/32″	6′–0 3/32″
3°–00′	0′–4½″	4°–34′–10″	0′–0 3/32″	0′–1 7/16″	0′–10 1/16″	0′–3 1/8″	1′–0 5/32″	0′–2 3/16″	1′–10″	7′–0 5/32″	6′–5 3/32″
4°–00′	0′–6″	6°– 5′–10″	0′ 0 31/32″	0′–1 3/32″	1′–1 7/16″	0′–4 3/32″	1′ 2 13/32″	0′–2 1/16″	1′–8 1/4″	7′–9 5/32″	6′–2 27/32″

NOTE.—Maximum high speed curve, 4°–00′; maximum super-elevation, 0′–6″; maximum curve with center poles, 5°–00′.

Los Angeles Pacific Company—Standard Clearances on Straight and Curved Track

Formerly the passenger station in Los Angeles was on Fourth Street between Hill Street and Broadway. All cars were switched and loaded in the street. This was extremely unsatisfactory to the railway company and to its patrons, as considerable delay was caused by blockades and insufficient switching facilities. In April, 1908, a new terminal was completed on Hill Street between Fourth and Fifth Streets, on the site of the proposed Fourth Street subway terminal. As it will have to be removed from this



Los Angeles Pacific Company—Standard Track Construction in Paved Streets

location when work on the subway is commenced, the Hill Street station is called a "temporary" terminal. The yard comprises 0.40 mile of track, laid with 75-lb. A. S. C. E. rail, and hard-center special work of 100-lb. A. S. C. E. rail. The depot is a 30-ft. x 150-ft. brick structure, with stucco finish.

In addition to the brick station buildings at the Hill Street terminal and at the Buena Vista freight yards, there are brick depots at Santa Monica, Ocean Park, Beverly, Playa Del Rey, Hermosa Beach, Hollywood, Sawtelle and Sherman. Frame depots have been built at Port Los Angeles, Santa Monica, Palms, Soldiers' Home, Ocean Park, Venice and Redondo. Passenger shelters are placed at the intermediate stations.

Additional facilities at the Sherman shops have been built as shown on the accompanying plan, with the exception of the paint shop and transfer table, which have not yet been built. The brass and iron foundries formerly stood on the present site of the carpenter shop, but were removed and rebuilt in the location shown on the plat. A temporary track layout was installed at the time of the con-



Los Angeles Pacific Company—Substation at Plaza del Rey

struction of the completed buildings, and has not yet been replaced with the permanent layout. This will probably be done in the near future.

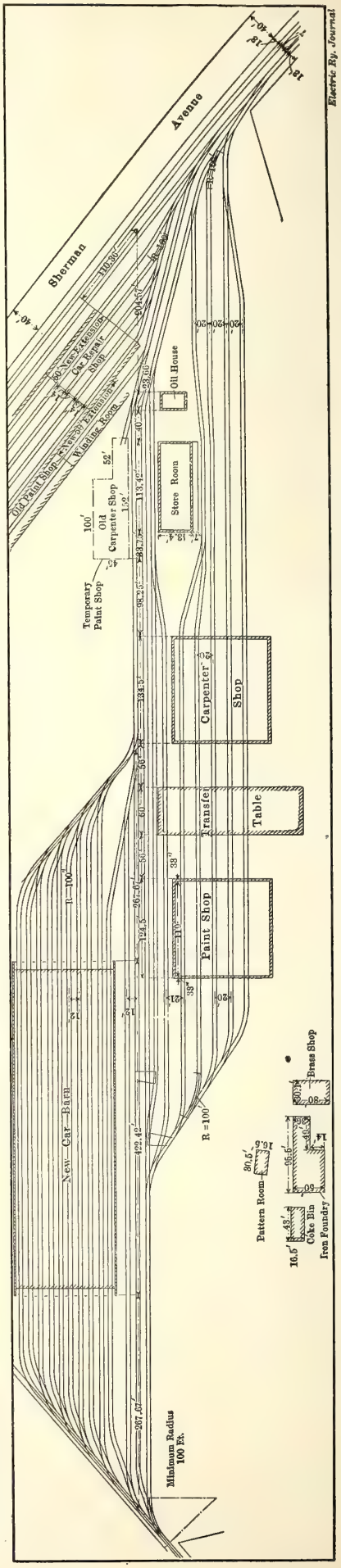
TUNNEL CUT-OFF

One of the best examples of this company's progressive policy is the recently completed Hill Street cut-off. The Hollywood and Colegrove cars were formerly brought from Buena Vista Street to the Los Angeles terminal over the tracks of the Los Angeles Railway Company. Owing to the congested condition of the streets along this route, much delay and inconvenience were encountered in getting the cars in and out of the downtown district. In order to avoid congested streets and operate over a shorter, quicker and more economical route, a cut-off line was built along Hill Street and a private right-of-way. This cut-off involved the building of 0.81 mile of double track and tunnels No. 1 and No. 2, respectively 546 ft. and 976 ft. in length.

The track construction in the street is in accordance with the company's standards, and consists of 72-lb. 6-in. rail (Lorain section No. 331), 6-in. x 8-in. x 8-ft. redwood ties spaced 24 in. on centers and an 8-in. base of crushed rock. The base was prepared by rolling first the dirt, then a 7-in. layer of 3-in. crushed rock, with a 12-ton steam roller. Next, the track was laid, and later brought to grade by tamping up with a 1-in. layer of crusher screenings. The rail joints were welded with thermit.

The track construction in the tunnels consists of 75-lb. A. S. C. E. rail with Atlas joints, 6-in. x 8-in. x 8-ft. Japanese oak ties spaced 24 in. on centers, and a 6-in. base of 3-in. crushed rock.

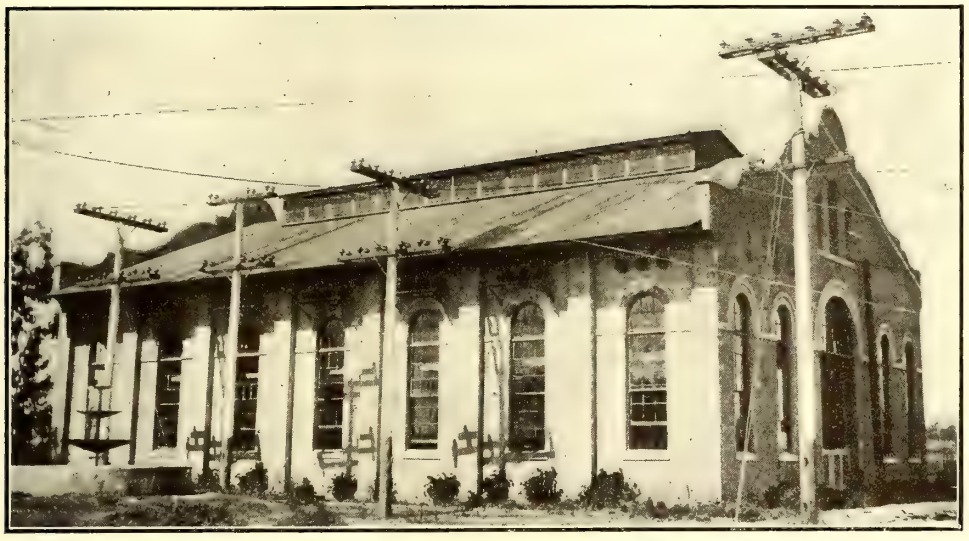
Tunnels No. 1 and No. 2 were both driven by the method of tunneling recently designed and used by the Southern Pacific Company in driving five tunnels on the Bay Shore cut-off into San Francisco. Work on tunnel No. 2 was commenced dur-



Los Angeles Pacific Company—Plan of New Shops at Sherman, Cal.

ing June, 1908, and completed in December, 1908. Work was commenced on tunnel No. 1 in December, 1908, and completed Aug. 31, 1909. Cars were operated over this cut-off beginning Sept. 15, 1909.

The tunnel cross-section was designed for a double-track electric railway with overhead trolley wires. The track centers are 12 ft. The cross-section shows 8-ft. concrete bench walls and a brick arch having a radius of 14 ft. Thus the height of the tunnel at the center of the arch is 22 ft., and the width between bench walls is 28 ft. The portals and retaining walls are all of concrete. Special reinforced concrete construction was placed under California Street, adequate to support the wagon and street railway traffic on that thoroughfare.



Los Angeles Pacific Company—Substation at Ivy

A novel engineering method was employed in constructing the south portal and retaining wall of tunnel No. 1. On account of the heavy character of the dirt and its tendency to slip, the portal and retaining wall were constructed before the dirt was excavated from the south approach. This was done by sinking a 6-ft. x 8-ft. shaft, through which the dirt was raised and construction materials lowered by an electric hoist. Thus, when the dirt on top of the portal and the wall was terraced off and the approach excavated, the completed tunnel was revealed.

Both tunnels No. 1 and No. 2 are drained by a 6-in. vitrified tile drain laid along the center lines of the tunnels 3 ft. below the track grade. Concrete sumps are placed along this line at 100-ft. intervals, with intermediate sumps in the wet portions of the tunnels. Open tile drains of 3-in. pipe are placed along each side of the tunnels, with concrete sumps opposite the sumps in the center. Four-inch and 6-in. lateral vitrified tile drains carry the water from the side to the center sumps.

Plans and specifications are completed and assessments are being made by the city of Los Angeles to construct a tunnel adjacent to tunnel No. 1. The east bench wall of tunnel No. 1 was constructed to the spring line of the city's tunnel so as to be used jointly by the city and the railway company. The contract for constructing the city tunnel will be let within a short time.

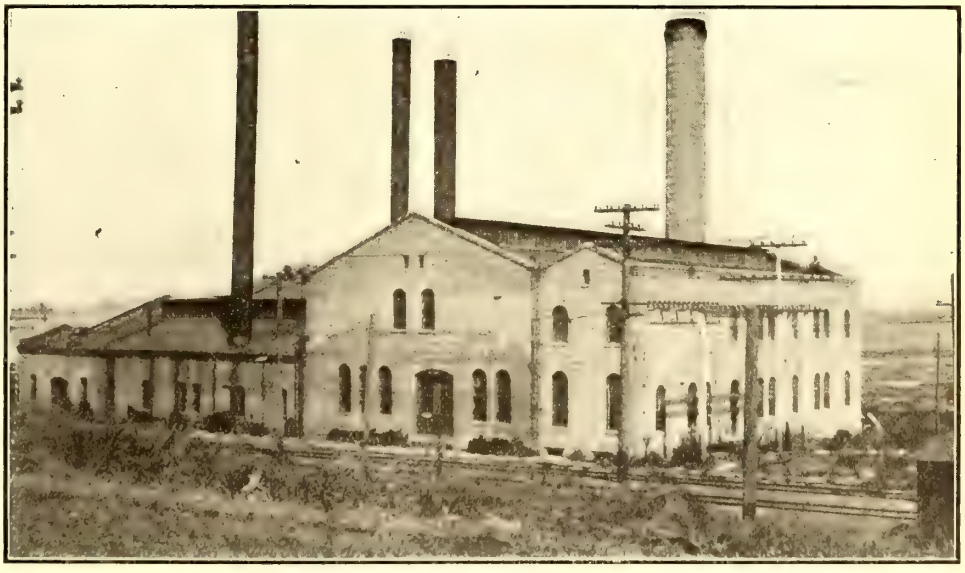
POWER IMPROVEMENTS

The improvement in the electrical department has been in keeping with the improvements made in the other departments. All power stations have been enlarged both in electrical capacity and, with two exceptions, in the size of the buildings, since the spring of 1906. The electrical department has carefully planned all stations for future additions to the electrical capacity as well as for an adequate supply for present needs.

The electrical equipment comprises one central power station at Vineyard, substations at Bush Street, West Olive, Ivy Park, Playa Del Rey, Hermosa Beach, Ocean Park, Sherman and one portable substation.

The Vineyard power station has been reconstructed and enlarged to allow the installation of additional boilers, a large transformer room and a high-tension switch gallery. To the units previously installed, consisting of one 600-kw, one 800-kw, and one 1200-kw direct-connected, 2200-volt, 50-cycle a.c. generators, a 2750-kw Westinghouse-Parsons steam turbine has been added. An electric crane for handling and installing machinery and for repair work also has been put in.

The Bush Street substation, situated on West Sixteenth Street in Los Angeles, contained one 250-kw induction motor-generator set and one 200-kw synchronous motor-generator set. These have been removed and replaced by one 400-kw and two 600-kw induction motor-generator sets. A transformer annex has been added to the building, and a part formerly occupied by the storage battery has been reconstructed, the storage battery removed and its enclosure added to the main transformer room.



Los Angeles Pacific Company—Vineyard Power Station

The West Olive Street substation, situated on the Holly-

wood division in the city of Los Angeles, contained one 300-kw and one 400-kw synchronous motor-generator set. The smaller set has been replaced by a 1000-kw synchronous motor-generator set. In the reconstruction work the main station building was turned into a transformer and high-tension switch room, and another building was erected adjoining the former. The latter structure now is the main station. Room has been left in it for the future installation of another 1000-kw motor-generator set.



Los Angeles Pacific Company—Passenger and Freight Depot at Sawtelle

Ivy substation, located at the junction of the Palms and Redondo divisions at Ivy Park, contained one 300-kw synchronous motor-generator set, to which has been added a 1000-kw induction motor-generator set. The entire station equipment was moved into a new and larger building, allowing ample room for transformers and high-tension switches and buses, and also allowing room for the addition of two more generator sets.

Del Rey substation, located at Playa Del Rey, near the junction of the Lagoon and Redondo divisions, had one 300-kw synchronous motor-generator set, to which a 250-kw induction motor-generator set has been added.

The Hermosa substation, located on the Redondo division at Hermosa Beach, contained one 200-kw synchronous motor-generator set, to which another set of the same capacity has been added.

Ocean Park substation contained one 250-kw induction motor-generator set and one 250-kw synchronous motor-generator set, to which one 1000-kw synchronous motor-generator set and a 1000-kw induction motor-generator set have been added. The building has been reconstructed and enlarged, and a transformer and high-tension switch room have been added.

The Sherman station, which was a steam plant, contained a 225-kw and a 300-kw belted railway generators; also one 400-kw, direct-connected 600-volt generator. The two belted units have been removed and replaced by one 1000-kw synchronous motor-generator set. The building has been enlarged and reconstructed.

The portable substation which has been built consists of a 400-kw induction motor-generator set, mounted on a standard flat car and boxed in on the sectional plan, so that any of the various sections either can be repaired or removed without disturbing the other parts.

The buildings for the power stations are of brick and, with the exception of the Vineyard power house, are finished in stucco. The design is such as to give the California "Mission" effect. Particular care was taken in the arrangement of the doors, windows and louvres to allow for the free distribution of light and air, and at the same time keep a perfectly dry interior during rainy weather. The interiors are painted white from the roof to a line about 6 ft. above the floor. The portion of the wall below this line is painted a buff color.

The buildings are picturesquely located in grounds which are laid out with flowers and shrubs. The effect is made more pleasing by artistic cooling fountains situated where they will add to the general attractiveness of the grounds. The flowers are selected from the California varieties which bloom the year round.



Los Angeles Pacific Company—Passenger Depot at North Beach, Santa Monica

COMBINED UNDERGROUND AND ELEVATED RAILWAY IN HAMBURG

The Allgemeine Elektricitäts Gesellschaft and Siemens & Halske are building for the municipality of Hamburg, Germany, a combined underground and elevated railway, which will be opened for service early in 1911. The line is being built in the form of an oval around the Alstersee, a body of water in the center of Hamburg and its suburbs. Short branches from this ring will run to Ohlsdorf, Eimsbüttel and Rotenburg's Ort. The length of the system will be about 17.4 miles of double track, of which 4.15 miles will be underground, 3.41 miles on a viaduct and the balance continued as a surface railway. There will be 33 stations, of which three are finished for the subway station. One subway station passes under the main steam railroad terminal, to which stairways are being built for every platform. The maximum grade is 4.8 per cent, and the shortest curve is over 231 ft. radius. The subway section is being built as a reinforced concrete tunnel, with central steel columns and with its roof as close to the street level as possible. The tracks will be laid on wooden ties in rock ballast. The subway station walls are being rather plainly finished in enameled brick, but the elevated structure will be very elaborate and in its roadbed features will follow Berlin practice. The rolling stock, which will be designed for 800-volt, d.c. third-rail operation, will also be closely patterned after the Berlin subway-elevated cars. The joint contractors are also building a power station, where turbines will generate alternating current at 6000 volts only, on account of the short transmission distances. The two outside substations will probably be equipped with motor-generator sets. The fares will be partly on the zone system, with a minimum third-class fare of 10 pf. (2½ cents) for five stations, or 2.4 miles; the second-class fare for the same distance will be 15 pf. (3¾ cents). The highest third-class fare will be 20 pf. (5 cents), but this will not necessarily include all the stations, since there will be no need to ride more than part of this ring route in any event.

ACTION OF PUBLIC ACCOUNTANTS ON CORPORATION TAX LAW

The American Association of Public Accountants has issued a pamphlet addressed to members, discussing the corporation tax law and including copies of letters between the accountants and the Attorney-General of the United States in relation to this measure. The introductory letter is as follows:

Since the enactment of the short-lived income tax law of 1894, perhaps the most important Federal legislation in its bearing upon the accountancy profession is found in the corporation tax law passed at the last session of the Congress. In view of the necessity of every public accountant familiarizing himself with the provisions of this law, so that he may assist and advise his clients relative thereto, and especially because of the somewhat vague phraseology and altogether unusual provisions of the act, your executive committee has decided to address each member of the association in the hope that a careful study of the law may be promoted, and possibly some interest developed looking to an amendment of the act during the early weeks of the Congress that assembles in December next.

Important legislation is usually enacted by Congress only after careful consideration and full discussion in both the House and Senate, and frequently upon the stump and by the press. The corporation tax law did not run the gantlet in this manner. In a few short weeks after its first appearance as an amendment to the tariff bill it became a part of the law of the land. Even in the brief time devoted to its consideration but little attention seems to have been paid to the provisions of the law relative to the method of determining the amount upon which each corporation is to be assessed. Lack of time, no doubt, prevented trade, economic and accounting bodies from making themselves heard upon the subject, but it is gratifying to note that a number of the prominent members of our association did promptly address the attorney-general, calling his attention to the difficulties that would be encountered in administering the act. The correspondence thus begun did not effect any material change in the then proposed law, but it did serve to bring into a clearer light the intentions of the framers of the bill. Because of its importance in this respect, the entire correspondence, together with the text of the corporation tax law, is attached hereto.

It should be noted that the members of the association who addressed the attorney-general did so in their private capacities, only because it was impracticable to get action taken by the American association officials in time to reach Washington before the passage of the bill. The president of the association was in Europe, and other members of the executive committee were away on vacations, therefore, after full discussion, it was decided to present the matter to the attorney-general at once in the only form available.

It is evident that the corporation tax law was passed by Congress without sufficient consideration having been given to it to insure a proper regard for the business, economic and accounting principles involved. The constitutionality of the act will no doubt be determined by the courts in due course, but in the meantime as members of a professional body, representing very extensive business interests that are affected by this law, we may properly object to and urge the amendment of any feature of the law that is ambiguous, or which makes the law impracticable. Such is evidently the case in the second paragraph of section 38, viz.: "all the ordinary and necessary expenses actually paid within the year out of income in the maintenance and operation of its business and properties." This requirement necessarily brings up questions of inventories which are very serious. It will be impossible to comply with the law as it reads, and estimates must necessarily be introduced of the cost of stock bought for expense purposes as against capital purposes.

The corporation tax law as elucidated by the attorney-general is a curious blending of the archaic and modern. Accounts prepared under rules of court in this country are quite generally stated upon a basis of cash receipts and disbursements, and a survival of this ancient method is found in many governmental accounts. The receipt and payment of cash is, however, only one process in the course of business transactions, and the commercial world has long since passed the time when an account prepared upon this basis can be accepted as a complete statement of financial position or results. It is true that the act (and the attorney-general in the correspondence referred to) does not use the term "cash," and it can be argued ingeniously that the words "received" and "actually paid" as found in the law refer not necessarily to cash, using that term in its ordinary commercial sense, but to a transfer of an asset or the assumption of a liability. In that case the theory of the act would be in accordance with that laid down by the accountants and the question remaining would be merely one of lucidity. The attorney-general, however, states in his letter of July 12: "You contend that this should be changed to read 'expenses incurred.' * * The words 'actually paid' were used advisedly. The theory of the framers of the bill in this respect differs from that which you advocate."

In the light of present information, therefore, it may be assumed that the return to be made by corporations for purposes of taxation under this law must be based upon cash receipts and disbursements, taking into consideration the purely modern item of depreciation and other matters specified in the act.

It is interesting to note that this method of determining a basis of taxation is apparently original with the framers of this law. Taxes are assessed in numerous ways, but we believe this law is the only one in any English-speaking country that attempts to levy an income tax upon the difference between cash receipts and disbursements. It is common enough to assess corporations upon their gross earnings or upon their net income or profits. The income tax law of 1894, and we believe its predecessor of 1862, assessed gains, profits and income, and the income tax law of Great Britain also assesses upon the basis of profits.

The corporation tax law is therefore different in this important respect from any of the laws that might be expected to serve as a pattern. The attorney-general does not advance any reason for this radical departure further than that the framers of the bill adopted a theory different from that followed in well-known precedents.

It is obvious that the peculiar provision relative to the basis of taxation found in the corporation tax law places a great and altogether needless burden upon the corporations of the country. In their letter to the attorney-general under date of July 21 the accountants show clearly some of the difficulties that will be met with from the corporations' standpoint. There is, however, another effect that should receive the attention of members of Congress, and that is the certain loss of revenue to the government that will result from this form of assessment. The difficulties placed in the way of making a correct return will very naturally in all cases of doubt be resolved by honest corporation officials in their own favor, while unscrupulous men will find it an easy matter to make a return that will enable them to evade the payment of the tax in whole or in part.

Taxes upon incomes have always proved to some extent difficult of collection, but the history of the income tax in England proves conclusively that so far as corporations are concerned, an income tax law can be framed and administered in a manner that is equitable to the government and not unreasonably burdensome to the corporation.

It is therefore the judgment of your executive committee that members of Congress should be urged to give favorable consideration to amendments to the corporation tax law, and if steps are taken promptly to this end, it ought to be possible to secure the passage early in the Congress which meets in December next of such amendments as would remove the present objectionable basis of taxation and put in its place the proper method of a tax upon net profits or income.

We believe that in the interests of the public the members of our association should use every effort to arouse a sentiment throughout the business community in favor of the modifications above suggested.

Will you, therefore, give this subject your thoughtful consideration, and if you agree that the corporation tax law should be amended, kindly co-operate by urging these views upon your senator and representative in Congress, and by bringing the matter to the attention of your clients and business acquaintances?

We would also be glad to have from you an expression of your views as to any further action you think should be taken by the association or its officers.

By order of the executive committee,

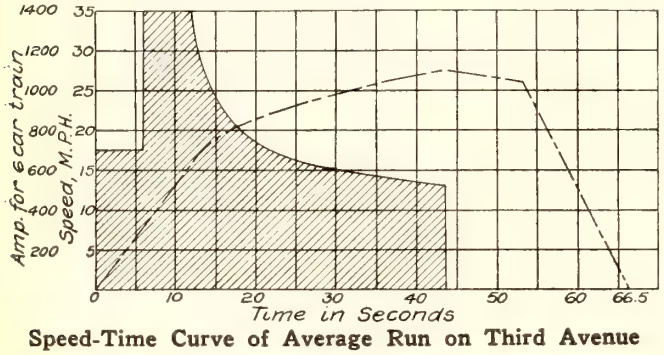
J. E. Sterrett,
President.

T. Cullen Roberts,
Secretary.

COASTING REGISTERS ON THE MANHATTAN ELEVATED

It is well known that there is a wide variation in the expertness of motormen operating cars or trains under similar conditions. The possibilities for effecting economies in current consumption by improving the general average efficiency of the motormen have always been attractive. If a simple efficient record system could be devised for distinguishing between efficient and inefficient motormen a more uniform and economical consumption of current could be maintained. Attempts have been made at various times and by various means to equip cars with current-registering devices, and efforts have also been made to reduce the current used in train movements by installing signals along the line, designed to indicate to the motormen where current should be shut off, how far to coast, and where to apply brakes. These attempts, however, have generally been found unsatisfactory in practice. The ordinary recording wattmeter has also been tried on cars, but has been found to be unreliable and too delicate an instrument to be used under the conditions of rough handling encountered in car service.

Theoretically, the maximum economy in the operation of trains is obtained through the use of successive uniform

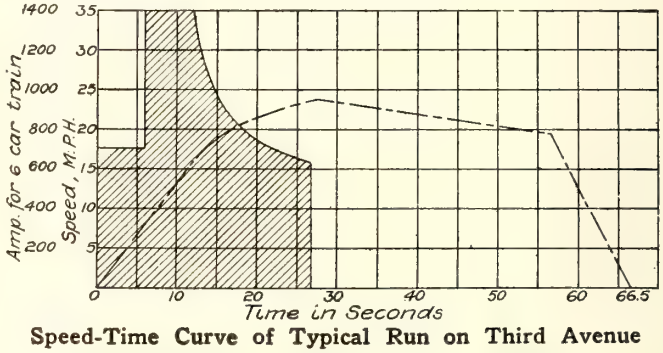


Speed-Time Curve of Average Run on Third Avenue Elevated Before Applying Coasting Register

cycles of acceleration, coasting and deceleration, or braking. The maximum rates of acceleration and deceleration are limited by the mechanical strength of the car equipments and the comfort of the passengers. With the maximum rates of acceleration and deceleration fixed, there is then a maximum possible period of coasting to maintain a given through schedule from terminal to terminal. In general, the nearer this maximum coasting period is approached the less total amount of current will be consumed in making the run.

During the past two years the Interborough Rapid Transit Company of New York has been conducting experiments with a device termed a "coasting register," which is designed to measure coasting time of trains, and also to determine the comparative efficiency of motormen. The use of this device on the first experimental train equipped has demonstrated the practicability of maintaining a given schedule with greatly increased periods of coasting over those originally obtained. In the elevated service of the Interborough Rapid Transit Company the maximum initial rate of acceleration is about 1¼ m.p.h.p.s., which may be increased, however, after the train has started. The maximum initial rate of deceleration for comfortable stops is 2 m.p.h.p.s., but this must be decreased toward the end of the stop to prevent jerking. On the Third Avenue elevated division, where the experimental train was first operated, the schedule time for the run from Bronx Park to City Hall is 51 minutes. The time consumed in coasting during this run, as determined from the average of a number of runs by ordinarily expert motormen, was 6.1 minutes. By careful manipulation of the controller and the brakes, this coasting time, as indicated by the coasting register, was increased to 18.45 minutes, without increasing the total scheduled running time. In other words, it was shown to be possible to operate trains over this line in the same running time with an increase in the total time of coasting of approximately 12 minutes, or an improvement of 200 per cent. There was a corresponding large reduction in current consumption without any undue strain on the apparatus or disturbance of the comfort of passengers.

The coasting register consists of a time-recording apparatus very similar to the shop recording time clocks manufactured by the International Time Recording Company, Endicott, N. Y., which is electrically interlocked with the air brake and the electrical control apparatus. The control circuits are shown in one of the diagrams. One circuit is made through contact *R*-3 of the multiple-unit control system; the other is made through the piston of the brake cylinder, which closes the circuit when the piston is in the off position. Both of these circuits must be closed to allow the clock to run. In other words, the device becomes operative only during the period in which



Speed-Time Curve of Typical Run on Third Avenue Elevated After Applying Coasting Register

current is shut off from the motors and before the application of the brakes. An automatic record of the time during which the clock runs is printed on a strip of paper contained within the case of the clock. In practice each motorman will be provided with a key of distinctive design. When this key is inserted in the clock case at the beginning of a run it will stamp the paper record in the clock with the motorman's distinguishing number or mark. The clock does not begin to run, however, until the car begins to coast, and it stops each time that the car ceases to coast. At the end of the run the motorman removes the key inserted in the clock at the beginning of the run, and by so doing stamps the final time on the paper slip, together with his distinguishing number or mark. The paper record, showing the total coasting time during the run, can then be detached by the motorman and handed in with his time card. The amount of clerical work, which on the Interborough is a very important item, is therefore reduced to a minimum, as are also the possibilities of error. For convenience in calculating, the clock registers unit periods of 100 minutes instead of the usual hourly unit of 60 minutes.

It is interesting to note in this connection that a simple

clock, very similar to those adopted in Berlin, was tried on the Interborough two years ago. The amount of clerical work involved in making up the records with this device was considered excessive and the present apparatus was devised to give a totaled record.

The results with the experimental coasting registers on the Third Avenue division were so satisfactory that it was recently decided to equip all of the trains on the Second Avenue division with these devices. In equipping the Second Avenue line the coasting registers will be installed on

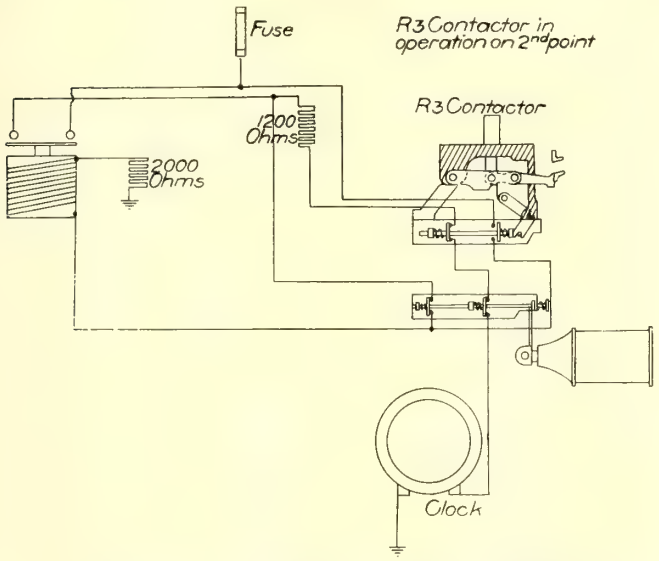


Diagram of Connections of Coasting Register

the trailer cars, instead of the motor cars, in order to reduce the number required, as the company operates only one-half as many trailer cars as motor cars.

The coasting register was developed through the joint efforts of Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, and J. S. Doyle, superintendent of car equipment, of the same company.

FORM OF GENERAL BALANCE SHEET STATEMENT FOR INTERSTATE STEAM ROADS

A pamphlet issued by the Interstate Commerce Commission contains the form of general balance sheet statement prescribed for steam roads as of July 1, 1909. Prof. Henry C. Adams, in charge of statistics and accounts, states in an introductory letter "to carriers concerned" that the form of general balance sheet statement "will be incorporated in the forms for annual report of carriers to the Interstate Commerce Commission for the year ending June 30, unless modified by an order of the commission before that date." Professor Adams continues:

In any case, carriers whose current accounts are kept in such a manner as to enable them to report on the balance-sheet statement herewith promulgated will be able to make any balance-sheet statement which the commission may finally accept as satisfactory.

There will shortly be issued a special report series circular calling for the adjustment of assets and liabilities as of June 30, 1909, to the form of balance-sheet statement promulgated under the present order, with a view of testing its practicability and of collating all difficulties incident to its use. Any modification, should modification be thought desirable, will be made as the result of this test.

The accounts are as follows:

ASSETS.

PROPERTY OWNED AS INVESTMENT:
- I. Physical Property Owned—
  - 1-A. Road and equipment to June 30, 1907—
    - (*a*) Road.
    - (*b*) Equipment.
  - 1-B. Road and equipment since June 30, 1907—
    - (*a*) Road.
    - (*b*) Equipment.
    - (*c*) General expenditures.
- II. Securities Owned—
  - 2. Securities of proprietary, affiliated and controlled companies—pledged.
    - (*a*) Stocks.
    - (*b*) Funded debt.
    - (*c*) Miscellaneous.
  - 3. Securities issued or assumed—pledged.
    - (*a*) Stocks.
    - (*b*) Funded debt.
    - (*c*) Miscellaneous.
  - 4. Securities of proprietary, affiliated and controlled companies—unpledged.
    - (*a*) Stocks.
    - (*b*) Funded debt.
    - (*c*) Miscellaneous.
- III. Investments—
  - 5. Advances to proprietary, affiliated and controlled companies for construction, equipment and betterments.
  - 6. Other permanent investments—
    - (*a*) Physical property.
    - (*b*) Securities.

WORKING ASSETS:
- 7. Cash.
- 8. Marketable securities.
  - A. Securities issued or assumed—unpledged—
    - (*a*) Stocks.
    - (*b*) Funded debt.
    - (*c*) Miscellaneous.
  - B. Other marketable securities—
    - (*a*) Stocks.
    - (*b*) Funded debt.
    - (*c*) Miscellaneous.
- 9. Loans and bills receivable.
- 10. Net traffic, car mileage and per diem balance.
- 11. Net balance due from agents and conductors.
- 12. Miscellaneous accounts receivable.
- 13. Materials and supplies.
- 14. Other working assets.

DEFERRED DEBIT ITEMS:
- 15. Advances—
  - (*a*) Advances to proprietary, affiliated and controlled companies.
  - (*b*) Working funds.
  - (*c*) Other advances.
- 16. Insurance premiums paid in advance.
- 17. Taxes paid in advance.
- 18. Discount on securities issued—
  - (*a*) Discount on stock.
  - (*b*) Discount on funded debt.
- 19. Property abandoned, chargeable to operating expenses.
- 20. Cash and securities in sinking and redemption funds.
- 21. Cash and securities in insurance and other special funds.
- 22. Cash and securities in special trust funds.
- 23. Items in suspense.

DEFICIT:
- 24. Profit and loss—balance.

LIABILITIES.

STOCK:
- 25. Capital stock—
  - (*a*) Common stock.
  - (*b*) Preferred stock.
  - (*c*) Debenture stock.
- 26. Receipts outstanding for capital stock.
- 27. Stock liability for conversion of outstanding securities of constituent companies.
- 28. Premium realized on capital stock sold.

MORTGAGE, BONDED AND SECURED DEBT:
- 29. Funded debt—
  - (*a*) Mortgage bonds.
  - (*b*) Collateral trust bonds.
  - (*c*) Plain bonds, debentures and notes.
  - (*d*) Income bonds.
  - (*e*) Equipment trust obligations.
  - (*f*) Miscellaneous funded obligations.
- 30. Receipts outstanding for funded debt.
- 31. Premium realized on funded debt sold.
- 32. Receivers' certificates.
- 33. Obligations for advances received for construction, equipment and betterments.

WORKING LIABILITIES:
- 34. Loans and bills payable.
- 35. Net traffic, car mileage and per diem balance.
- 36. Audited vouchers and wages unpaid.
- 37. Miscellaneous accounts payable.
- 38. Matured dividends, interest and rents unpaid.
- 39. Matured mortgage, bonded and secured debt unpaid.
- 40. Working advances due to other companies.
- 41. Other working liabilities.

ACCRUED LIABILITIES NOT DUE:
- 42. Dividends declared and interest and rents accrued, not due.
- 43. Taxes accrued.

DEFERRED CREDIT ITEMS:
- 44. Operating reserves—
  - (*a*) Reserves for replacement of property.
  - (*b*) Reserves for other purposes.
- 45. Liability on account of special trust funds.
- 46. Items in suspense.

APPROPRIATED SURPLUS:
- 47. Surplus reserves—
  - (*a*) Reserves invested in sinking and redemption funds.
  - (*b*) Reserves invested in insurance and other special funds.
  - (*c*) Reserves not specifically invested.
- 48. Additions to property through income since June 30, 1907.

FREE SURPLUS:
- 49. Profit and loss—balance.

The Municipal Board of St. Petersburg, Russia, is planning to extend electric operation of the street railway system in St. Petersburg by rebuilding immediately 43 miles of horse-car lines at an expenditure of more than $10,000,000. When this work is completed the entire street railway system of the city will be operated electrically.

ILLINOIS CENTRAL RAILROAD DEFERS ELECTRIC OPERATION OF CHICAGO TERMINAL

At the annual meeting of the stockholders of the Illinois Central Railroad, held in Chicago, Oct. 20, a report from J. T. Harahan, president of the railroad, recommending delay in the adoption of a plan for converting the Chicago terminals to electric operation, was unanimously approved. The text of Mr. Harahan's report follows:

The subject of the electrification of the Chicago terminals of your company has received most careful and thorough investigation during the past year.

There are no precedents at the present time where electric operation has been applied to the handling of freight traffic in large freight terminals, such as exist in Chicago. Up to the present time the use of electricity in heavy railway service has only been attempted where peculiar physical restrictions, such as the operation through tunnels, has been encountered. No such physical restrictions exist in the Chicago terminals.

The existing electric installations on steam roads cover principally the movement of passenger trains, such as the cases of the New York Central and New Haven roads in and near New York City, and in a few instances the movement of freight and passenger trains for short distances through tunnels, such as the cases of the Baltimore & Ohio at Baltimore and the Grand Trunk at Sarnia.

Installations also have been made in some instances for the handling of suburban traffic, where such traffic extends over limited distances and is of sufficient volume to justify frequent service in small train units, but even in such cases the interest on the heavy cost of electric installation and depreciation has exceeded any economy derived from electrical operation.

The practicability of applying electricity to the operation of large terminals, such as exist in Chicago, has not as yet been demonstrated nor satisfactorily worked out. The conditions which obtain on the Chicago terminals of your company, as well as those of other Chicago roads, are peculiar in themselves and offer greater difficulty to the practicability and successful adoption of electric operation than anywhere else in the world.

The Chicago terminals involve the handling of mixed traffic, consisting of freight, passenger and suburban trains using, largely, tracks in common, which is further complicated by heavy interchange of freight traffic between the various roads, causing frequent and complex switching movements on main lines and in yards.

Our suburban traffic at Chicago is the only service which would in any degree be adapted to electric operation, but even in this particular service it can readily be shown to be unjustifiable at the present time.

I submit below a statement of the results which are estimated to accrue if the entire suburban service were electrified, compared with the present steam operation:

Results of Operation of Suburban Business at Chicago by Steam Locomotives for Fiscal Year Ended June 30, 1909.

Gross earnings		$1,056,446
Operating expenses (82.9 per cent)	$872,307	
Taxes (7 per cent)	74,427—	946,734
Net revenue		$109,712

Estimated Result Under Electrification.

Gross earnings		$1,056,446
Operating expenses (66 per cent)	$697,254	
Taxes (7 per cent)	74,427—	771,681
Net revenue electric operation		$284,765
Net revenue steam operation		109,712
Increase		$175,053
Estimated cost of electrifying suburban service		$8,000,000
Interest at 5 per cent per annum		400,000
Depreciation at 5 per cent per annum		400,000
Total fixed charges account electrification		$800,000
Saving in operation under electrification		175,053
Annual deficit in operation under electrification		$624,947

Our suburban traffic is not of sufficient density to warrant the expense necessary to electrify these lines, and it is evident from the above figures that even under electrification there would not be an increase in traffic sufficiently large to offset the annual loss from operation. It simply proves that under present conditions of the cost of electrification of steam railways, where it means a replacement of a plant already installed and serving the purpose, it is not justifiable to electrify either in whole or in part your Chicago terminals at this time.

There is even at the present time great variance of opinion among the ablest electrical engineers as to the merits of the respective systems of electricity in use. The rapid development in the art of electric traction doubtless will result in the future in the adoption of standard methods and practices, such as have been developed in steam operation, and in a great decrease in the cost of its application to heavy railway service, which at the present time makes the use of electricity absolutely prohibitive.

The elimination of smoke has been advanced as the prime object of the electrification of steam railroads in Chicago. We have greatly reduced the making of smoke in our locomotives during the past year by the use of a superior quality of coal, care in firing and discipline among our men. We have also experimented with coke to replace soft coal and are at the present time engaged in building coke ovens to produce a quality of coke that will be almost entirely free from smoke when used in locomotives. We also are negotiating with a view of securing a type of self-contained motor car for use on our suburban lines.

The use of coke on our terminals in such classes of service where it would result in reducing annoyance from excessive smoke with soft coal as fuel would make a considerable increase in operating expenses of Chicago terminals.

We are not unmindful of the rights of the public to be free from the annoyance caused by excessive smoke from locomotives, but if these results can be secured by practical means, without the sacrifice of large expenditures on electrification, all reasonable demands will be met.

On Oct. 14, 1909, the Mayor of the city of Chicago, with a delegation of city officials, called on me and submitted a proposition that the Illinois Central Railroad Company make a start on the electrification of its terminals by installing at an early date electric operation on its local suburban trains, on the two westerly tracks between Randolph Street and Sixty-third Street, a distance of eight miles, with the understanding that any further extension of electrification would not be urged beyond a reasonable extent. The city officials suggested that such a course would carry on the work gradually, but that if the city were obliged to enforce its right to require electrification by law it might involve the electrification of all tracks within prescribed limits at a large expenditure.

I pointed out to the Mayor and the city officials that while a moderate installation, such as they requested, might satisfy the present city administration, such action would not be binding on future administrations of the city, and, therefore, we would be at the mercy of succeeding city officials. They requested, however, that their proposition be submitted to your board of directors, which I agreed to do, with the understanding, however, that it would be submitted without recommendation.

In answer to the proposition made by the city of Chicago, I can only urge the same arguments as set forth above, and to state further that the matter of a partial installation, such as is requested by the city, has been carefully investigated and the conclusion reached that it would not be justified, for the reasons that the expenditure would not be warranted on account of the lack of density of traffic in the local suburban service, and that we hope to accomplish all reasonable demands that can be made in the elimination of smoke by the use of coke or other smokeless fuel, or a self-contained motor car.

The mutual relation existing among the various railways at Chicago, owing to the extensive interchange of traffic and the use of facilities in common, which has no parallel at any other large terminal in this country, nor in the world, will make it imperative that any change in the methods of operation, such as electrification will impose, shall be planned and executed with the joint co-operation of all

the railways, in order that a system may be evolved which is practicable, and, of necessity, interchangeable in its operation and use.

Attention has been frequently called to the electrical installations on the New York Central and New Haven roads in New York, pointing to the success of these experiments. While the operation, independently, of the two systems may be successful, as far as operation is concerned, yet the fact remains that the two systems are not mutually interchangeable. It is impossible to-day for the New York Central locomotives and cars to go upon the tracks of the New Haven road, and it has only been made possible for the electric locomotives of the New Haven to go upon the New York Central tracks after introducing complications and experiencing much difficulty and expense.

It is just such difficulties as are now encountered between the New York Central and New Haven in New York City that must be avoided by the railways in the Chicago terminals, and from the experiences of the New York Central and New Haven roads we have learned the valuable lesson that there must be co-operation among the various railroads in this important matter before a practicable and successful electrical operation is assured.

The elevation of tracks cannot be compared with the electrification of Chicago railways, as in the former each company could proceed independently, while in the latter there must be united action on whatever systems or methods are adopted, otherwise it would make impossible the operation of the railways in the interchange of their traffic.

After the most careful consideration of the entire subject, and frequent conferences with officials who have given the matter the closest study, I have reached the conclusion that the electrification of the Chicago terminals of your company is not justified at the present time for the following principal reasons:

First—The art of electric traction applicable to the operation of large terminals has not progressed beyond the experimental stage sufficiently to justify the large expenditure necessary for its application on your Chicago terminals, and that it would be impracticable to operate the large freight terminals of Chicago railroads, with their interchange of freight traffic and switching movements, with electric traction, as developed at the present time.

Second—The large expenditure necessary to install electric traction in your Chicago terminals would involve fixed charges in interest and depreciation that would greatly exceed any economy that might result from electric operation.

Third—The elimination of smoke, to meet all reasonable public demands, can be accomplished without the use of electric traction.

Fourth—It would be inadvisable at this time for any one railway in Chicago to undertake the electrification of its line, independently, before a comprehensive plan has been developed through the joint co-operation of all the lines, in order that no precedents might be established which might retard rather than promote a possible future development.

The board of directors of the railroad company adopted the following resolution in connection with the report from the president:

Whereas, In the report submitted by the president to the board of directors mention is made of the very complete and exhaustive investigation into the subject of electrifying the Chicago terminals, and special attention is called to the suggestion from the city authorities that the local suburban service be electrified with a view to demonstrating the advisability and practicability of a further extension of the system to the balance of the terminals; and,

Whereas, The report of the experts who have been engaged in the study of the entire problem for the past year or more develops that, in view of the complications brought about by the necessity of providing for suburban and through passenger traffic, through freight, transfer and switching movements, as well as interchange between railroads which deliver business to our line in Randolph Street yard, and the necessity for delivering a large part of our business into other railroad yards, via Sixteenth Street and Forty-third Street, electrification at this time is impracticable, hence the necessity of the greatest possible study in order that intelligent prudence shall form the basis for an expenditure of a very large sum of money. The study and investigation up to this time have developed a decidedly complex situation, distinctly different from that which pertains wherever electrification has been applied; and,

Whereas, The general public is more concerned in the elimination of the smoke nuisance than it is in a change of motive power, and the interest of the public, as well as that of your stockholders, will be conserved by extending the use of coke or other smokeless fuel to engines in the Chicago terminal as rapidly as possible; therefore, be it

Resolved, That this board feels the necessity for deferring a determination as to electrification until such time as a continued study of the subject can intelligently determine the proper line of procedure.

Following the making public of this report and resolution, steps were taken by city officials to compel the Illinois Central to live up to its promise, made last year, to begin electric operation "with all reasonable dispatch." An ordinance has been introduced in the City Council and referred to the committee on local transportation, invoking the police powers of the city to abate a nuisance and making it mandatory on all railroads within the city to abandon the use of steam locomotives, or any motive power giving off noxious odors, after Jan. 1, 1912. It is said that a bill will be introduced at the special session of the Illinois Legislature to be called this winter which will specifically confer upon the city the right to compel the railroads to make a change in their motive power.

B. J. Arnold is quoted in the Chicago *Evening Post* as saying that at least three of the railroads in Chicago could advantageously convert their terminals to electric operation. He did not favor mandatory legislation, as such a step would be most unfair to many of the roads entering the city. He said:

It is an engineering fact, now well established, that our great railway terminals, where traffic is constant, switch engines are shunting back and forth and suburban trains run at frequent intervals, can be operated more economically by electricity than by steam.

On the lines of the Illinois Central conditions apparently exist which are most favorable to this change. To install electrical equipment you incur large fixed charges, but with constant use a large economy is effected. Heavy freight trains running at long intervals provide a poor field for electrification.

The experience of Eastern roads in the abandonment of the steam locomotive has demonstrated the possibility of economy, but it has not as yet been fully realized. The maximum use is not now being obtained on the New York Central or on the New York, New Haven & Hartford. When it is, the full economy will become apparent.

Samuel Insull, president of the Commonwealth Edison Company, of Chicago, made an address on Oct. 20 before the Electric Club of Chicago on the subject of "The Sale and Distribution of Electric Energy in Chicago." Mr. Insull stated in the course of his address that the cheap electricity available in Chicago should have an important bearing upon the agitation in relation to electrifying the terminals of the steam railroads. There were, of course, vast problems to be settled before this electrification could be accomplished, and it was well for all who were not steam-railroad men to treat these problems with respect. But so far as the current-producing side of the argument was concerned, it was a mistake to say that electrification was impossible because of the cost of electric energy. If this objection was based on a knowledge of the cost of electric energy used for the electrification of steam-railroad terminals around New York, it was based on false premises if it was contended that the same cost of electric energy must apply in Chicago. It was a fact that electric energy could be bought in Chicago considerably cheaper than it

was now being produced by the two great traffic lines with electrified terminals in New York.

After the conclusion of his address, Mr. Insull was asked whether in case the railroad companies in Chicago should decide to electrify their terminals, using current purchased from the Edison company, it would be necessary for that company to build new generating stations to care for this demand. Mr. Insull answered that his company could take care of any two railroad terminal electrifications in Chicago, based on the present consumption of current by the roads running into Grand Central Station in New York, with the present capacity of the Edison stations. With additional equipment, which had been ordered to go into service within a year, two additional terminals of like capacity could be served.

PAMPHLET ON STANDARDIZATION OF ROLLING STOCK IN BROOKLYN

The Brooklyn Rapid Transit Company has reprinted for distribution among the salaried employees of the mechanical department of the company the articles on the standardization of the equipment in charge of that department which have appeared in recent issues of the Electric Railway Journal. Standardization of the equipment of the surface and elevated divisions of the company was undertaken under a well-defined program on Jan. 4, 1904, and it has therefore taken 5½ years to complete the work, at a cost of $4,000,000. The reprint contains 62 pages, and is inclosed in a cream-color illuminated cover printed in blue, with the emblem of the company embossed in gold. The publication is officially known as Bulletin No. 1087, and is introduced by a communication from William G. Gove, superintendent of equipment of the company, addressed to the superintendent of the Fifty-second Street surface shop, superintendent of the Thirty-ninth Street elevated shop, foreman of the Southern division elevated shop, foreman of the Eastern division elevated shop, foreman of the Eastern division inspection shed, foreman of the Fresh Pond inspection shed and the foremen of the surface car house shops. In referring to the completion of the work of standardizing the equipment, Mr. Gove says:

There are a number of points which must be given careful and concentrated thought, for the management, who have expended large sums from time to time upon the reconstruction of the equipment, expect to see this reflected in the condition of our cars and equipment, which are now second to none in point of appearance and efficiency; it will also be expected that these results be maintained at the least possible cost. To do this, it is obvious that one of the first moves is to obtain the longest period between inspections and overhaulings that will be possible without endangering the efficiency of the equipment, which is reflected in the "Run-in" list published monthly for your information and distributed so that it may be placed before all interested, both in the mechanical and transportation departments.

A co-ordination of shop methods, rules and regulations makes uniform the practices at all locations, and the operation of the surface, elevated and freight equipment can be made most successful by the hearty and enthusiastic support of each superintendent or foreman in direct charge of the work, and who will follow schedules, plans and instructions of every sort without question, excepting where, in his judgment, there can rightfully be raised a legitimate point as to their practicability, in which case we must be immediately advised of full details, when a prompt decision will be rendered.

We may rightfully feel proud of the results reflected today in the cars of both our surface and elevated lines, as compared with six years ago, but with the elimination of construction and reconstruction work there is greater opportunity for caring for the finer points which, under pressure of busy times, might be termed "refinements," but which, though many in number, are really the fundamental features to be kept up for the proper maintenance of the equipment, especially that portion that is designated in the Classification of Accounts as "Repairs and Renewals of Electrical Equipment of Cars."

PROGRESS OF REHABILITATION IN CHICAGO

Under date of Oct. 1, the Chicago Railways Company reported to the Commissioner of Public Works of the city of the Chicago the progress made during the past season in the work of rehabilitation of its property as required by its ordinance. Work on the various car houses and machine shops, substations and other buildings is rapidly nearing completion. The Lawndale car house and depot at Ogden Avenue and Twenty-second Street, which will have a total storage capacity for 233 cars, is estimated to be about 55 per cent completed. The Kedzie Avenue car house, at Kedzie Avenue and Jackson Boulevard, which is to be 457 ft. long by 451 ft. wide, and which will have a total ultimate storage capacity of 372 double-truck cars, is about 60 per cent completed. Excavation on the site of this car house was begun on Jan. 20 of this year. The Limits car house, on North Clark Street, which will have a capacity of 86 cars, is practically completed. Substations at Lill and Sheffield Avenues, Twenty-fifth and Leavitt Streets, and Grand Avenue and Fortieth Street are completed, as are also a new storeroom at Racine Avenue and Center Street and a repair shop at Thirteenth Street and Ogden Avenue. A new mill and paint shop, at Lake Street and Harding Avenue, is about 50 per cent completed. The paint shop at Fortieth Street and Park Avenue is entirely completed, as is also the new car house at Lincoln and Wrightwood Avenues.

During the present season the Chicago Railways Company has built a total of 95 miles of single track. Last year the company built 75 miles of track, so that to date it has completed approximately 170 miles. The number of men employed this season in reconstructing tracks has averaged between 2500 and 3000. From 8 to 10 separate forces of men have been engaged on this work at the same time.

Up to Jan. 1, 1909, the company had laid 261 miles of single duct conduit. From Jan. 1 to Oct. 1 of this year it laid 296 miles, making a total to date of 557 miles, which is 75 per cent of the requirements. It installed in ducts this year 169 miles of cable feeders, which, in addition to the 22 miles installed up to Jan. 1, 1909, makes a total of 191 miles to date, or 80 per cent of the requirements. Trolley wire has been renewed or newly erected over 122 miles of track, and 63 miles of overhead feeder cables have been put up. A total of 83 miles of auxiliary cables has been laid between tracks.

According to *Electrical Engineering*, of London, trial runs are being made with a trolley omnibus on an experimental road at Hendon, England. The car has two 25-hp motors driving countershafts through bevel gears. A two-wire overhead construction is used, and, contrary to practice in Continental Europe, the frame of the car is electrically connected to the earthed negative trolley wire. A device to warn the driver if the car becomes connected with the positive wire is provided. As an alternative a three-wire line may be employed. The two sets of trolley wheels are mounted on the same head at the end of a double pole, and means are provided to counteract the side pressure when the car deviates from the center of the road.

PARKED STREET RAILWAYS IN GERMAN CITIES

The numerous boulevards which have been laid out through the newer sections of Berlin, Germany, are so wide that the street railway strip is practically free from other traffic. This enabled the Grosse Berliner Strassenbahn to secure permission in 1904 to lay a stretch of track in Charlottenberg covered with grass sod instead of paving with asphalt or Belgian blocks. The experience with this experimental section was so satisfactory both to the city authorities and the railway company that the practice is being extended to other thoroughfares. Berlin now has 5 km (3.1 miles) of double track covered with grass, and more is to follow. Continental tramway managers who have seen the work are enthusiastic over its possibilities. The



Parked Tracks in Bismarck Street, Charlottenberg



Parked Tracks in Hardenburg Street, Charlottenberg

example of the Berlin company is now being followed in Cologne, Frankfort-on-Main and Dresden, while Brussels, Paris and Nürnberg have the subject under consideration. The originator of the sodded tracks is Arthur Busse, chief engineer of way and construction, Grosse Berliner Strassenbahn.

The handsome appearance of several of the parked streets in Berlin is shown in the accompanying half-tones. It will be noted that the grass is allowed to grow right up to the rail. It was first proposed to lay a single row of headers along each rail. By careful cutting, however, the grass never grows high enough to touch the head of the rail so as to impede braking. The roots of the later plantings are deep enough to extend below the base of the rail head, so that a firm sod is developed before any mowing is necessary. It has also been determined to grow flowers to within a few inches of the tracks, thus adding to the beauty of the right-of-way and having it in keeping with the adjoining parts of the boulevard.

The general public is greatly pleased with this novel street railway gardening. The ugliness usually associated with a surface railway is largely eliminated by the sod



Another View of Parked Tracks in Bismarck Street, Charlottenberg

and foliage and the deep grass acts as an excellent noise absorbent. The latter effect is easily noted on certain sections, where asphalt, Belgian block and grass follow each other in order. The asphalt is noisiest, the block less so, and the grass least of all.

It is hardly necessary to state that the railway company prefers the inexpensive grass to the costly asphalt. Repairs at joints can be made with no other preliminary work than the removal of a few square feet of sod, which can be easily replaced when the work is done. The offensive odors of burning asphalt and the noise of the cumbrous steam roller are abolished. The satisfaction which the municipal authorities have found with the work has been of great assistance to the company in obtaining rights to operate over other residential streets in the western suburbs.

FIBER BRAKESHOE USED ON THE LONDON UNDERGROUND RAILWAYS

Shortly after the first tube railways began operation in London it was discovered that many slight fires and minor interruptions were caused by dust from the cast-iron brake shoes penetrating the connection boxes. An attempt was made to correct this evil by using lignum vitæ blocks, but while they gave a fair measure of success, they were soon superseded by a fiber shoe, which has now been in service for nearly four years. This shoe is composed of cotton or jute fibers which are hydraulically compressed into layers of ⅜ in. thickness. As first made, the laminations, which aggregate a thickness of 3¼ in. to 3½ in., were held together only by some adhesive mixture. This method did not prove successful in practice, but was easily corrected by driving pegs of jarrah wood through all the layers. The complete fiber part forms the insert of a cast-iron shell which fits into the brake-shoe head by means of four wood screws. The total weight of the insert and shell is 19 lb. 2 oz. The shell usually outlives two or three inserts before it is scrapped. The fiber, however, may be said to have no scrap at all, for after a shoe has been worn down to the last ⅜-in. lamination, the latter can be joined up to other old or new pieces, as all the peg holes are punched to templets.

LONDON UNDERGROUND ELECTRIC RAILWAYS

STATEMENT OF BRAKE BLOCK SHELLS AND FIBER INSERTS USED DURING 1909

DESCRIPTION	No. in Stock..day of.....1909	No. Purchased during.....1909	No. in Stock....day of...1909	No. Issued	No. in Sub-Store	No. Used
Brake Shells....						
Fiber Inserts....						
Screws.....						

PARTICULARS OF HOW USED ON ROLLING STOCK

	Brake Shells	Fiber Inserts	Screws
Motor Cars.....			
Trailer Cars.....			
Total.....			

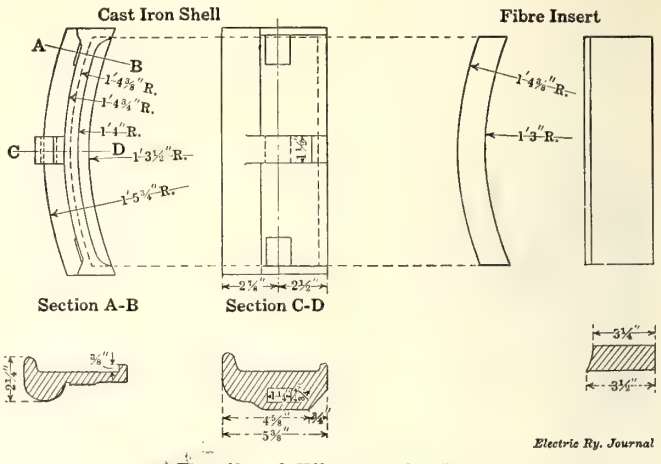
.....*Storekeeper*

.....*General Foreman*

Form for Keeping Record of Fiber Brake-Shoes

Hitherto the fiber shoe could be used to advantage only on the Piccadilly, Charing Cross and Bakerloo tube lines, which are under cover for the greater part of their routes. Several trials were made on the semi-open Metropolitan & District Railway, but it was found that in wet weather the binder of the fiber had a tendency to gum, thereby causing flats and bad stops. The manufacturer, however, is now making the inserts with a new binding solution, which not only overcomes this defect, but even improves the braking effect on wet rails. The new inserts are now being applied as fast as cars come into the shops for brake shoe renewals.

Since the universal adoption of the fiber shoe on the tube railways there has not been a single short-circuit in any connection box, and examination of many trucks and third-rail shoes at the shops showed very little iron dust indeed. It is the experience of the companies, also, that the wear on tires is materially reduced through this kind of shoe.



Details of Fiber Brake-Shoe

Perhaps the most important point of the fiber shoe is its great economy. The cast-iron shoe formerly used cost 36 cents per 1000 car-miles, whereas the cost of the fiber shoe averaged only 24.4 cents per 1000 car-miles, as shown in the accompanying table for the last six months, ended June 30, 1909:

BRAKE SHOE DATA ON LONDON TUBES

Company	Mileage of first 6 mos. of 1909	Cts. cost per 1000 car-miles.
Great Northern, Piccadilly & Brompton	3,671,512	29.48
Baker Street & Waterloo	1,918,562	16.74
Charing Cross, Euston & Hempstead.	3,037,858	23.10
Combined Companies	8,627,932	24.40

The costs given in the foregoing table include the fiber inserts, the cast-iron shell, the pegs, wood screws and the labor of building up, but do not include the labor of installation under the car. The cost per 1000 ton-miles is given at 0.84 cent for the six months ended June 30, 1908. The average life of an insert, as determined on the Charing Cross line, is about 14,000 miles.

The fiber shoe was developed for the United Underground Railways of London by Herbert Froob & Company, Chapel-en-le-Fritch, England. Fiber shoes are also used on the London motor omnibuses.

The system of tramways operated by the Compagnie de Tramway et d'Eclairage Electriques des Tientsin, a Belgian company, has, by extending its lines about Tientsin, opened up to traffic between eight and nine miles of double track, thus providing a direct route between the foreign settlements and the native quarter of that city.

PACIFIC COAST TRAIN PARTY IN CALIFORNIA

The party of street railway delegates, including the officers of the American Street & Interurban Railway Association, which is traveling on the special train of the Massachusetts Street Railway Association, left Portland on Tuesday of last week and arrived in San Francisco on Thusday morning, Oct. 21. Last week San Francisco celebrated with an elaborate festival the discovery of the Bay of San Francisco by Gaspar de Portola in 1769. Historical pageants, athletic sports and other forms of entertainment were provided every day from Oct. 19 to Oct. 23. The street railway tourists had an opportunity of witnessing a number of the most interesting events of the week, including the civic parade and illumination of the city on Oct. 21 and the athletic sports on Oct. 22. Through the courtesy of the United Railroads of San Francisco reserved seats were provided for the party on the grandstand erected on Market Street, near Valencia Street, for the parade on Thursday. Trips around the city in automobiles and sight-seeing cars were also provided by the street railway company. Each member of the party on the arrival of the train in San Francisco was supplied with a book of tickets good for transportation on any of the electric cars. The weather while the party remained in San Francisco was perfect, and this added greatly to the pleasure of the visit. Advantage was taken by many of the members of the party to inspect the novel engineering features of the San Francisco system. While in the city, the members of the party were lavishly entertained by the officers of the United Railroads of San Francisco, including Thornwell Mullally, assistant to the president; Thomas Finigan, purchasing agent; J. H. Handlon, claim agent; B. P. Legare, engineer maintenance of way; J. H. Stott, engineer of steam equipment, and W. T. Bivins, engineer of electric equipment. The special train left San Francisco Friday evening en route for Santa Barbara. A telegram was sent to Mr. Mullally after the party left, expressing appreciation of the hospitality extended and complimenting the United Railroads of San Francisco on the expeditious manner in which the festival crowds of Portola week were handled.

The train reached Santa Barbara Saturday at 11 a. m. It was met at the station by a brass band and G. W. Wilder, general manager; C. A. Merritt, superintendent, and R. H. Cates, electrical engineer of the Santa Barbara Consolidated Railroad. The guests were taken by special cars to Ocean Beach, where a number took advantage of the opportunity to bathe in the surf of the Pacific. Later in the afternoon a visit was made to the historical mission in Santa Barbara. After the train left Santa Barbara a telegram was sent to the railroad company, thanking its officers for their attentions and courtesies extended to the party.

The delegates were met in Santa Barbara by two members of the reception committee representing all of the Los Angeles electric railway companies. This advance guard included D. A. Munger, general passenger agent of the Pacific Electric Railway, and C. H. Burnett, manager of the Los Angeles-Redondo Railway. They accompanied the party to Los Angeles and distributed tastefully printed programs of the entertainment planned for the guests in Los Angeles, and other literature. The programs were illustrated with maps of the city and numerous views of the principal points of interest. The train reached Los Angeles at 7:30 p. m. on Saturday and was met at the station by a reception committee headed by H. M. Littell, assistant to the general manager, Pacific Electric Railway, and composed of 30 of the leading electric railway officials in Los Angeles and vicinity. Special cars were waiting to convey the members of the party to their hotels.

Sunday was devoted to a trip over the lines of the Pacific Electric Railway system. Early in the morning special cars were run to the foot of the Mt. Lowe incline and the delegates were then taken to the top of the mountain, where they enjoyed the magnificent view. From Mt. Lowe the special cars were run to Pasadena and later to the estate of H. E. Huntington, president of the Pacific Electric Railway Company. At noon an elaborate luncheon was served at the Hotel Maryland, Pasadena, during the course of which President Shaw made a brief address. In the afternoon special cars carried the party to Long Beach, which is a popular ocean resort near Los Angeles, reached over the four-track line of the Pacific Electric Railway. Los Angeles was reached on the return trip about 5 o'clock in the afternoon. President Huntington and other officials of the Pacific Electric Railway accompanied the party on the entire trip.

On Monday the party inspected the systems of the Los Angeles-Pacific Railway and the Los Angeles & Redondo Railway. A special 3-train car left the depot of the Los Angeles-Pacific Railway in Los Angeles at 8:30 a. m., and E. P. Clark, president of the company, accompanied the party, which visited Ocean Park, Venice and Redondo Beach. The ride along the ocean shore was particularly enjoyable. Before luncheon was served in the pavilion at Redondo Beach some of the members of the party visited the power station of the Redondo Light & Power Company, while others took a swim in the large bathing pool on shore or in the ocean surf. At luncheon James F. Shaw, president of the American Association; C. H. Burnett, manager of the Los Angeles & Redondo Railway; H. C. Page, general manager of the Worcester (Mass.) Consolidated Street Railway, and Charles C. Peirce, General Electric Company, Boston, Mass, spoke. The representatives of the Los Angeles railway companies expressed great interest in the work of the American Association, while the visitors gave voice to their appreciation of the hospitable entertainment provided for them in all the cities which they had visited. The party returned to Los Angeles on a 3-car special train over the lines of the Los Angeles & Redondo Railway. Late in the afternoon, a visit was made to the shops of the Los Angeles Railway Company, and then an automobile trip was taken through the residential district of the city, stopping at the Chamber of Commerce.

On Tuesday morning, special cars were provided to take the guests from their hotels to the Southern Pacific Railroad station, from which the train left for El Paso at 10 a. m. Before leaving Los Angeles it was announced that H. E. Huntington, president of the Pacific Electric and the Los Angeles & Redondo Railways, had agreed to have these two companies become members of the American Street & Interurban Railway Association. The Los Angeles Railway is already a member of the association. President Shaw received assurances of a large increase in associate membership from among the officers of the Los Angeles railway companies.

E. E. Potter, manager of the Seattle Electric Company, joined the party at San Francisco, and will return to Boston on the special train. The train was two days behind schedule in leaving Los Angeles, and if the original itinerary is followed for the remainder of the trip, the return to New York and Boston will be delayed until the morning of Nov. 4.

WEIGHTS PER PASSENGER OF PREPAYMENT AND OTHER CARS

The Third Avenue Railroad Company, New York, has recently prepared the accompanying detailed table of weights of the several parts of its standard convertible pay-as-you-enter cars. It appears from this table that the dead weight carried per passenger is only 753 lb. in winter and as low as 736 lb. in summer when the panels are removed. This car was the first cross-seat convertible type made for prepayment service, and the principal features of its design were described in the Electric Railway Journal of Jan. 23, 1909. A characteristic feature which has been of great importance in keeping down the weight of this design is the use of platforms only 6 ft. long. It was the

DETAILED WEIGHTS OF ONE CONVERTIBLE P. A. Y. E. CAR AND PARTS.

	Lb.	Lb.
Car body with sand boxes, hand brake and panels (800 lb.)	16,192	16,192
Electrical Equipment:		
2 G. E. K 27 controllers, brackets and handles	476	
1 set main cables, complete with all leads	245	
2 G. E. circuit-breakers	56	
2 Westinghouse fuse boxes, complete with covers, etc.	100	
16 heaters, complete with brackets	214	
Heat, light and trolley wire	67	
½-in., ¾-in., 1-in. and 1¼-in. conduit and fittings	300	
2-in. conduit and fittings	313	
Main junction boxes	160	
Cleats	23	
3 G. E. rheostats and hangers	281	2,235
Brake Equipment:		
Compressor, National A4	600	
Cradle	160	
Reservoir, 16 x 48-in.	210	
Cylinder, 8 x 12-in., with plunger, but no jaws	156	
Slack adjuster	47	
Governor	41	
2 levers and tie rod	60	
2 pull rods	86	
2 motorman's air valves	26	
Air pipe	113	
Air fittings	29	1,528
Motors:		
2 G. E. 210, with gears and gear cases	6,622	6,622
Trucks:		
2 Brill 39 E, with plow attachment, but without plow or gears	9,400	
Plow, complete	67	9,467
Miscellaneous	90	90
Total		36,134
Car weight per passenger	753	

belief of the company's engineers that a longer platform was unnecessary for New York conditions, and experience in operation has justified them therein.

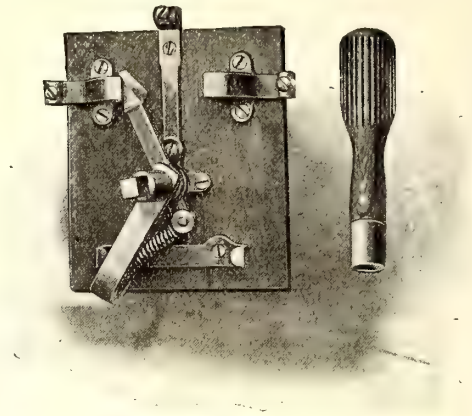
The Metropolitan Street Railway Company, New York, operates two types of closed pay-as-you-enter cars, both of which are equipped with longitudinal seats. The first car weighs about 1140 lb. per passenger and the second only 810 lb. per passenger. The chief points of the later Metropolitan design were presented in the Electric Railway Journal of Dec. 5, 1908. Another low weight pay-as-you-enter car is the Cleveland type, described in the Electric Railway Journal of Oct. 24, 1908, which weighs 833 lb. per passenger. The heaviest pay-as-you-enter cars are those operated in Chicago and Buffalo, which weigh from 1325 lb. to 1330 lb. per passenger. The latest Chicago car was described in the Electric Railway Journal of Nov. 7, 1908.

Statistics from other cities, where prepayment cars are not in use or where the old double-truck cars have been modified slightly for platform fare collection, show weights per passenger varying from 940 lb. to 1180 lb. These figures are higher than those mentioned for the New York cars and prove that pay-as-you-enter operation does not necessarily imply any appreciable increase in the dead weight to be transported per passenger.

On Oct. 1 the Lancashire & Yorkshire Railway commenced electric service between Liverpool, England, and Aintree. The line will be extended to Maghull.

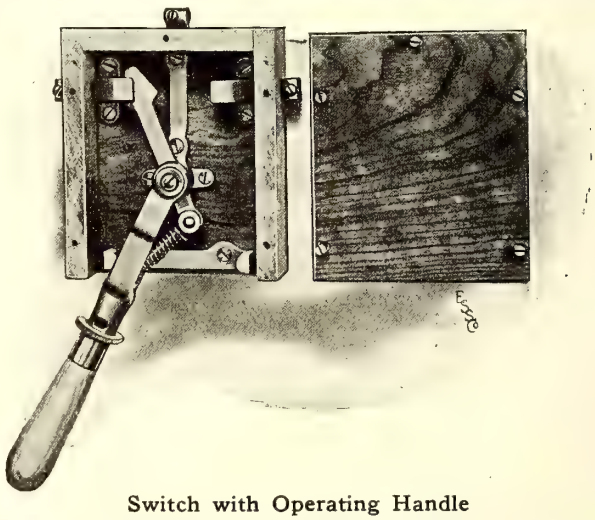
IMPROVED SIGNAL SWITCH

Two forms of trouble have been experienced with various types of signal switches, one because the contacts were so close to the handle that the hand of the operator was very often burned, and the second because the switch often became centered so that it was ineffective. The Electric



Switch Operated with Key

Service Supplies Company has recently designed a signal switch to overcome both of these troubles. The switch is double-throw, especially intended for operating hand block signals, and will satisfactorily break 600 volts. A spring is so fitted between the switch blade and handle that it gives a quick break, making the switch very positive in action and impossible to be held on a dead center. The illustrations show the interior of the switch, the contact points



Switch with Operating Handle

being at the top of the switch and separated from the handle as far as possible.

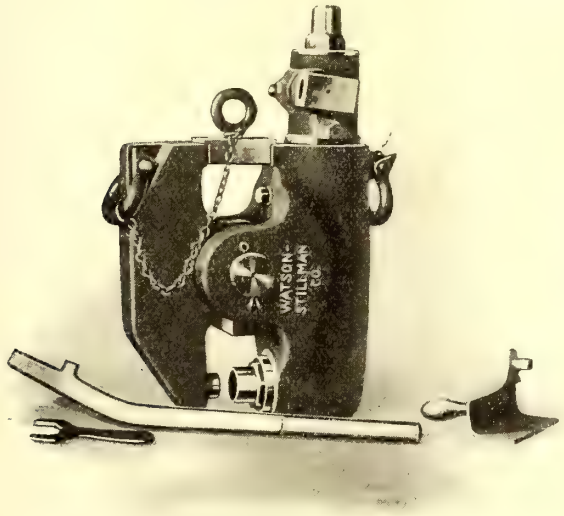
This switch is made in two types, with either a permanent handle extending below the switch, or with a special key. The special key type of switch has the particular advantage that it can only be operated by a person having the proper key.

HYDRAULIC RAIL BOND COMPRESSOR FOR T-RAILS

The accompanying illustration shows a hydraulic rail bond compressor for T-rails, which was built by the Watson-Stillman Company, New York, for the special conditions of the Interborough Rapid Transit Company of the same city. On the lines of the railway mentioned the heading of the bonds is hindered for two reasons—first, the rail is situated between guards which closely limit the working space, and, second, the train frequency demands

that the compressor be placed, operated and removed in the shortest possible time. To comply with these conditions a hydraulic pump was substituted for the slower and less powerful hydraulic screw.

In using this tool the gage at the right is first placed over the rail with the pin in the hole through which the bond end is to pass. The rail is then marked on top so that the compressor can be set without having to hunt for the hole. A sleeve surrounding the ram is forced out by a spring to limit the spread of the bond head under pressure, thereby compelling a closer contact of the bond with the rail. The block between the upper ends of the jaws is proportioned so that when it is removed the jaws will slip over the rail head, and when it is in place the bond can be headed with a very short ram action. It should be noted that when the compressor is being held by the two handles and the block is out the jaws are open to slip on or off the rail easily. The jaws open up to a width of 3½ in. and to a height of 3½ in. above the center of the ram. This compressor is made in the capacities of 25 tons and 35 tons, respectively.



Hydraulic Rail Bond Compressor

ELECTRIC RAILWAY PROGRESS AND THE GROWING INFLUENCE OF THE ASSOCIATION

Under this title the American Street & Interurban Railway Association has reprinted in pamphlet form the address of President James F. Shaw, read at the annual convention of the association in Denver, Colo., Oct. 5. This address was the subject of so much favorable comment that it was decided to print 5000 copies of the pamphlet, which will be distributed generally.

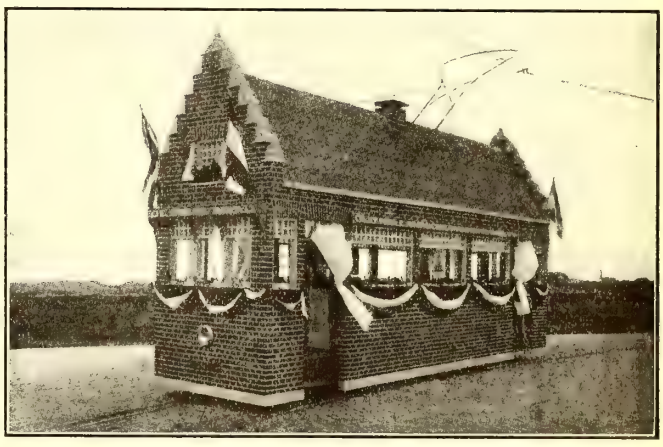
When electricity was substituted for horses in the operation of street railway lines in Berlin, the railway company claimed it was entitled to a rebate from the city for the difference in the cost of repairing the pavement between tracks, which, under its charter, it was obliged to fully maintain. The company pays contractors 11.9 cents per square meter for keeping asphalt pavement in repair and 14.25 to 16.6 cents per square meter for wood pavements, and the city allows the following rebates annually: For single-track lines in asphalt pavement, 20.5 cents per linear meter, double-track line, 37 cents. For wood pavement, 20.5 cents and 37.8 cents per linear meter.

DECORATED CARS IN HOLLAND

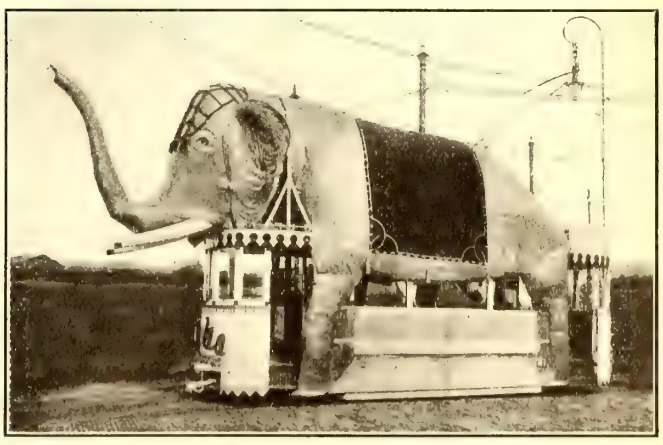
During the celebration at Hague recently in honor of Queen Wilhelmina's birthday the Haagsche Tramweg-Maatschappy designed and operated a number of very novel and decorated cars, which attracted wide attention. One represented a mounted elephant astride a car; another a steam railroad train crossing a bridge built on the deck of the car and a third an old Dutch house of brick with chimneys and tile roofing through which the bow on the current collector projected. Other subjects were a grotto, a Chinese temple surmounted by a dragon and the four seasons. Some of these cars are shown in the accompanying engravings.



Chinese Temple Float



Old Dutch Waffle Bakery Float



Elephant Float

News of Electric Railways

Hearing on Boston & Eastern Electric Railroad Plans

The Massachusetts Railroad Commission and the Boston Transit Commission, sitting as a joint board at the request of the Legislature of 1909, gave a public hearing at the State House, Boston, on Oct. 20, on the proposed Boston & Eastern Electric Railroad, a high-speed line seeking the right to build between Boston, Lynn and Salem, with extensions to Beverly and Danvers. The company's case was conducted by Moorfield Storey of Boston, general counsel, and Chief Engineer John H. Bickford, of Boston. The Boston & Maine Railroad was represented by William H. Coolidge, and the Boston & Northern Street Railway by Bentley W. Warren, general counsel. Corporation Counsel T. A. Babson of the city of Boston, represented that municipality, F. E. Snow the Boston Elevated Railway, and Woodward Hudson the New York Central lines. The joint board is to report on the advisability of the project early in January, 1910.

Counsel Storey, in opening the case, stated that the road would not cut into the earnings of the existing roads, but would tend to increase them.

Mr. Bickford submitted an exhaustive argument discussing transportation questions in the northern suburban district in particular and showing the relations of this class of travel to existing and future facilities on the steam railroads and the street railways and rapid transit lines of Boston. He stated that there was a demand for an entirely different type of railroad to handle suburban traffic than is represented by existing systems. A separation of traffic was absolutely necessary for proper handling, in such a thickly populated territory. The steam railroads would like to be rid of their suburban traffic, according to President Tuttle of the Boston & Maine and President Mellen of the New York, New Haven & Hartford roads. Joint operation and interchange of steam and electric equipment were impracticable. Neither were the permanent way clearances of the present elevated and subway structures sufficient to accommodate standard multiple-unit equipment of the modern type for suburban service, with cars about 10 ft. wide and 60 ft. long. Mr. Bickford stated that the company planned to use steel cars in trains of from two to six cars, each according to the traffic, with multiple-unit control, express and local service. The frequency of trains would vary from four to eight per hour and an all-night service would be provided. Fares had been established on a basis of 1.25 cents per mile, with a 5-cent minimum. Nineteen stations had been located along the 22 miles of roadway. Express trains making stops at Lynn and Salem would run from Boston to Beverly in 23 minutes; local trains, with eight stops, would make the trip in 30 minutes. Danvers would receive a similar service. The schedule had been prepared on the zone principle and no train would make more than eight stops in a single run. The Post Office Square station had been designed for a traffic of 15,000 passengers per hour without congestion. A footway from this terminal would be provided to connect with the Milk Street station of the Washington Street tunnel. Complete detailed estimates of the cost of construction and operation (about $11,000,000) had been made and verified by William Barclay Parsons of New York and J. R. Worcester of Boston. The average speed of express trains would be about 45 m.p.h. and of locals, 30 m.p.h. The total population served was estimated at 230,000, exclusive of Boston, and per capita earnings of $7 were figured. The density of population in this territory was 3300 per square mile and the average increase in population had been 2.31 per cent per year for the past five years. The territory was growing 88 per cent faster than Boston and 63 per cent faster than the State as a whole.

Mr. Bickford then discussed the spheres of through express service on steam railroads, suburban service, street car and rapid transit facilities, pointing out the limitations of each class. He stated that the street railways had attempted with little financial success to carry the neglected traffic of the steam roads in addition to the very large and legitimate short-haul traffic which they had created.

The possible electrification of the steam railroads in the Boston district was next considered. Mr. Bickford emphasized the slowness of the railroads in electrifying their suburban service and pointed out that the substitution of electric for steam locomotives would not meet the situation. In such a case the roads would be burdened with a larger fixed charge without obtaining the requisite increase in traffic to counterbalance it. The smoke nuisance would be eliminated, but the public would not gain the flexible and additional facilities demanded. If electric locomotives were adopted for the through trains around Boston and multiple-unit car equipments chosen for the suburban travel it would call for a duplication of the main trackage for a considerable distance from Boston on each important division, resulting in a very large additional fixed charge, which in part only would be offset by an increase in suburban traffic. The public would gain a much improved service, but could look for no voluntary reduction in fares. A rotating schedule of fast and frequent train units could not be maintained on the present two-track lines, and not except at a sacrifice of the movement of freight traffic during the same hours in most cases, even if the main trackage was doubled. The suburban passenger who had included in his fare to-day a terminal charge of four or five cents in each direction was paying a very large proportion of the expense of maintaining terminals the size and cost of which were unnecessary for his purpose and unsuited to his needs. For an equal volume of subway traffic less than half this amount would support the best-designed and equipped subsurface electric railroad terminal in Boston, including tunnel or subway approaches of the requisite length to reach points where conditions would admit of open construction.

Discussing the Boston system of elevated, subway and surface lines, Mr. Bickford said that there was a uniform fare of five cents on the rapid transit lines with liberal transfer to and from surface lines, which meant that only a part of this fare of five cents was applicable to expense and profit, if any, on the strictly rapid transit lines. On a dual system like this, where the combined average speed of the surface and rapid transit lines did not exceed 10 to 11 m.p.h., the average fare per passenger mile should not fall below 1.5 cents. The rapid transit lines, however, did not earn this rate per passenger mile, as they had not the power to originate short-haul riders in the required proportion. The ratio of gross earnings to capitalization was steadily falling. Being in large part a terminal for the surface lines they constituted to a great degree a fixed charge upon the net earnings of the latter; that is, the operating expenses and rentals paid partook of the nature of a terminal charge, similar to that carried by the steam railroads at their large urban terminals. Assuming that 1.5 cents was the minimum rate per passenger mile, the average haul for five cents on the combined system should not exceed 3.33 miles. If the original purpose of these lines is departed from and extensions made that would cause the average haul to exceed the limits given, it was questionable whether the present rate of dividends could be maintained, and a continued extension must decrease them materially. The public should become acquainted with these facts and give them due consideration when it clamored for unreasonable extensions at the prevailing rate of fare. Mr. Bickford said that if the rapid transit lines were extended to new areas the congestion would become serious, forcing the riders from the immediate suburbs to stand. Improvements must provide for the future and extensions should not be made unless the service in its entirety would benefit. The establishment of a new transfer station at the end of an extended rapid transit line might relieve congestion temporarily at the original station, but the growth of traffic would soon reproduce the undesirable conditions at the end of the line.

Mr. Bickford then discussed the proposed route of the Boston & Eastern Railroad with reference to the East Boston district. Regarding the suggestion that the Boston & Eastern would interfere with the profits of the East Boston tunnel, he stated that if the present East Boston tunnel should be extended to form a through rapid transit route to Bellingham Square, Chelsea, there would be no danger from competition. The extension would be somewhat indirect, but the time of transit would be sufficiently short to be acceptable. The Boston & Eastern right of way is suited to four-track construction when the traffic demands it. The plan is to build a second tunnel under the harbor at Boston when conditions require. The safe, practical capacity of each track in the tunnel at a speed of 30 m.p.h. is 40 trains per hour. Three minutes will be allowed in the terminal for each train to unload and adjust itself to any slight deviation from the schedule. On each track 240 cars per hour can easily be run, giving a seated capacity of 15,000 passengers per hour in each direction. Loading and unloading traffic will be separated. He then discussed the service on the present Boston, Revere Beach & Lynn Railroad, and argued that the proposition to electrify that road and turn its trains into the Boston & Eastern tunnel was not objectionable so far as the year-around traffic is concerned, but is decidedly disadvantageous so far as the summer pleasure business affects the situation. About

one-third of this road's total traffic per year is the recreation beach service, and is carried within a three-months' period. Fifty per cent of its equipment is idle eight or nine months in the year. The added fixed charge on an equal idle electrical equipment of two or three times greater cost, including a proportionate part of the power-plant installation, would more than offset any saving from decreased operating expense.

In conclusion Mr. Bickford emphasized the inability of existing facilities to handle the suburban traffic and the value of the electric railroad as such for this class of work. He reiterated that the present companies would be benefited by the road, and that the street railways would profit from increased lateral feeding business on the short-haul principle. The question of fares would adjust itself gradually as these two types of transportation reached working agreements. The public must bear in mind that if it was to have these improved and additional facilities it must pay reasonable fares; that is, it could not expect to ride 10 miles for 10 or 12 cents on a high-speed electric road and then ride from 0.5 to 2 miles farther into the suburbs on the street railway at no additional cost. It should be willing to pay the extra fare for the time saved on the long leg of the journey. It could choose between this and riding the entire distance for 10 cents on the street railway. The public was mistaken in the idea that because the Boston Elevated Railway Company could take over many millions of dollars worth of subways in Boston and operate them in addition to its surface lines without extra fare and with little or no curtailment of its transfer privileges, the same thing would hold good in the suburbs for indiscriminate distances. The fact was that the public had pressed this matter so far in Boston that the elevated had announced its inability to assume additional obligations in this direction for at least five years. The electric railroads should not attempt to do a general freight business in Massachusetts. They could not afford to provide the necessary terminals in the metropolitan district. On account of their inability to give free transfers to the urban system, the electric railroads should not attempt to handle distinctly local urban traffic to any extent. Each type of road should be managed by those best acquainted with the class of service to which it catered, and the most permanently satisfactory developments were those based on individual initiative.

Preceding cross-examination by Counsel F. E. Snow, for the Boston Elevated Railway Company, Mr. Bickford stated that as a result of the competition of electric car service, trains on the Boston & Maine Railroad in 16 municipalities or stations within about 20 miles of Boston had been reduced in large proportions as to intervals; in some cases the number of trains per day had increased slightly, but in others from 3.9 to 100 per cent decrease had been noted within the past 15 years, while the population had in practically all cases increased. Mr. Snow cross-examined the witness on the cost of the proposed tunnel under Boston Harbor, the estimated earnings, in the territory and the success of the Aurora, Elgin & Chicago Electric Railway in entering the city over the existing elevated structure. Mr. Snow then stated that the conditions at Sullivan Square would be greatly improved soon by changes at the station, and that that terminal would be much better suited to receive traffic from outside roads than ever before.

Boston, Lowell & Lawrence Electric Railroad Hearings Continued

Hearings upon the proposed Boston, Lowell & Lawrence Electric Railroad were resumed by the Massachusetts Railroad Commission on Oct. 12 and the cross-examination of James C. Boyd, consulting engineer of Westinghouse, Church, Kerr & Company, was continued. Mr. Boyd stated that a third turbo set would be installed in the power house of the railway company as a reserve unit, two machines being sufficient to carry the load as indicated during the preceding hearing. Replying to questions by City Solicitor Kaan, of Somerville, Mr. Boyd said that the average daily number of passengers which the road expected to deliver at the Sullivan Square terminal of the Boston Elevated Railway was about 4000. About three years would be required for the road to commence operation after permission to build it had been received. It was not anticipated that this volume of traffic would make any serious difference in the conditions at Sullivan Square. Every elevated train in the country was crowded during the rush hours and carried standing passengers. The operation of 8-car trains by the Boston Elevated Railway would do much to improve conditions. Changes in the station design at Sullivan Square were contemplated which would improve the traffic conditions.

Under cross-examination by Bentley W. Warren, for the Boston & Northern Street Railway, Mr. Boyd stated that the estimated cost of the Lawrence branch of the new road was $776,900, excluding real estate, power house, substations, transmission lines, car houses, repair shops, and rolling stock. The total cost of the branch, exclusive of real estate, was estimated at $1,202,800, pro-rated. The actual cost might easily be quite different. Gross earnings should be about $1,000,000 per year, after three years of operation, for the entire railway. It was estimated that the revenue derived from travel between Lowell and Lawrence would be about $160,000 per year. The traffic between local stations alone would be a small proportion of the total. On the Lackawanna & Wyoming Valley Railroad there was an increase of approximately 50 per cent in traffic the second year and 20 per cent the third year over the second. The company expects to operate between Boston, Lowell and Lawrence for 50 per cent of the gross receipts, in the third year after the commencement of the service. The Lackawanna & Wyoming Valley Railroad operated for 51.7 per cent of its gross earnings (1907), the Boston & Worcester for 51.2 per cent (1907), the Aurora, Elgin & Chicago for 54.6 per cent in 1907, the Grand Rapids, Grand Haven & Muskegon for 53.7 per cent in 1908, the Indianapolis, Columbus & Southern Traction Company for 56.5 per cent in 1907, and the Scioto Valley for 52 per cent in the same year. Mr. Boyd said that there was no connection whatever between Westinghouse, Church, Kerr & Company and the Westinghouse Electric & Manufacturing Company, other than a possible interest of George Westinghouse in each.

A long discussion then took place between the witness and Mr. Warren in regard to the financial results on several roads quoted as examples for the comparison of passenger revenue. Mr. Boyd stated that in using any road as a basis for the number of passengers to be carried elsewhere, the point as to the making or losing of money has nothing to do with the situation. He stated that there had never been a road built by his organization which had not at least come up to the estimates of earnings. Mr. Warren contended that the Lackawanna & Wyoming Valley was not a suitable road for proving the financial prosperity of the proposed line to Lowell and Lawrence. He stated that his view was that no road could be operated for 50 per cent except for a short time when new, and pay interest on its bonds and dividends, at the outside.

Continuing under cross-examination, Mr. Boyd stated that a 600-ft. viaduct would be required to connect the road with the elevated station at Sullivan Square. Exclusive of general expenses, the cost of this would be about $38,360. Counsel W. H. Coolidge for the Boston & Maine Railroad then undertook the cross-examination. Mr. Boyd said that Vice-President C. F. Conn of the Lackawanna & Wyoming Valley Railroad had stated that road had no so-called rush hours, as it did not do any suburban business of consequence, but that travel between 4 and 7 p. m. was somewhat heavier than during the forenoon. A large amount of created business was anticipated by the projectors of the Boston, Lowell & Lawrence line. Mr. Coolidge then asked the witness if the Boston & Maine Railroad should be electrified between Boston and Lowell, as well as between Lawrence, Salem and Boston, what would be the need of a new electric railroad in the territory. Mr. Boyd stated that even with two new tracks it was doubtful if the Boston & Maine could handle trains into the present terminals with the frequency which the Boston, Lowell & Lawrence planned. The North Station was not fitted at all to handle this class of business. The cost of electrifying the Boston & Maine Railroad to Lowell and Lawrence would be enormously greater than the cost of the Boston, Lowell & Lawrence line.

Answering inquiries of Mr. Hight, counsel for the Lexington & Boston Street Railway Company, Mr. Boyd stated that it was his belief that the short-line haul business of the street railway would be increased sufficiently by the new road to offset any diminution in through patronage which it might sustain. Mr. Hight stated that 12½ per cent of the passenger receipts of the Lexington & Boston consisted of fairly constant through travel, as indicated by the sale of ticket books, and the witness admitted that this business would probably be taken by the new road. Mr. Boyd said that in his opinion the operation of through street railway facilities for distances of 25 miles and upward on running times of two hours and over was an out-of-date transportation method. He did not consider a subway through Somerville a commerical proposition. The estimated cost of operation per car mile for the Boston, Lowell & Lawrence was 15.3 cents. The subdivided estimate of operating cost was: Maintenance of way and structures, $46,900; maintenance of equipment, $120,000; operation of power plant, $84,000; conducting transportation, $234,000; miscellaneous and general expenses, $50,000; total, $534,900. These figures were obtained by taking an estimate per mile

of track for maintenance of way, and figuring the balance on car-mile cost, with a service of 3,500,000 car-miles. Mr. Boyd stated that in his opinion the shortest practicable headway to-day on the Boston Elevated rapid transit lines was 1.5 minutes.

In re-direct examination the witness stated that the project would be a financial success, even if the operating ratio rose above 50 per cent. The possibilities of operating economy arise from the absence of track maintenance in paved streets, the absence of grade crossings, absence of heavy peaks on the traffic from hour to hour and throughout the day, and the moderately steady load anticipated upon the power house. The use of turbo units would tend toward further economies, and, in addition, the company would have the benefit of high speed and resulting low platform labor. All consideration of the freight traffic possibilities had been dropped from the line. The clearances and structural designs were not arranged for such service. It was out of the question for the road to consider competition with the Boston & Maine in the freight business. Mr. Boyd concluded with a short discussion of the possibilities of created traffic in the territory, and cited as an extreme instance of what may be done by newly established high-speed electric facilities the growth of traffic 25-fold on the Detroit, Ypsilanti & Ann Arbor Electric Railroad, which operates out of Detroit to Ypsilanti and Ann Arbor and parallels the Michigan Central Railroad.

Transit Affairs in New York

It is very unlikely that the bids for the proposed new subways in New York will be asked before Jan. 1, 1910. The Board of Estimate in July, 1909, authorized the Public Service Commission to advertise for bids according to the plan permitted by the amended statutes of New York, and the engineers of the commission have completed specifications for the Broadway and Lexington Avenue road and the Canal Street line in Manhattan, for the two elevated extensions to the Broadway-Lexington Avenue route in the Bronx, and for the Broadway-Lafayette Avenue route and the extensions to the Fourth Avenue subway in Brooklyn, but the work of preparing the several forms of contracts has progressed slowly on account of the large amount of detail which has to be covered. Bids are to be asked for construction, equipment and operation by private capital; for construction and equipment and operation alone, by private capital; for municipal construction and private operation, and for construction by private capital with the title invested in the city and operation by private capital. All of the forms of contracts must be submitted to the Corporation Counsel of New York for approval, and it is expected that it will take the Corporation Counsel at least three weeks to consider the documents. Before the contracts are let they must be advertised for three weeks, at the end of which a public hearing on the forms of contracts must be held. After the contracts have been awarded by the Public Service Commission the Board of Estimate must give its approval before work under them can be begun.

The decision of the Court of Appeals on the question of the debt limit of New York City was handed down at Albany on Oct. 21, and, according to the decision, the opinion of General Benjamin F. Tracy, who acted as referee, that the city had a borrowing capacity on June 30, 1908, of $106,000,000, is lowered to $52,000,000. As the city has since earned against that amount $2,553,933.92, the debt limit on June 30, 1908, was in round numbers $54,500,000. After the date in question, however, the assessment rolls for 1908 went into effect. These showed an increase in the real estate valuations of the city of $481,915,187, adding to the borrowing capacity the sum of about $48,000,000. Of that amount approximately $10,000,000 has been expended, leaving the debt limit at present about $92,000,000. In the summer of 1908 Controller Metz of New York contended that the borrowing capacity of Greater New York had been reduced to $1,500,000, and Jefferson M. Levy, a taxpayer, secured an injunction restraining the Board of Estimate from approving the contracts for the construction of the Fourth Avenue subway in Brooklyn. Under the decision of the Court of Appeals the city has ample money to construct the Fourth Avenue and the Broadway-Lafayette Avenue subways, and to institute many other improvements.

Four proposed amendments to the constitution of the State of New York are to be voted on at the general election on Nov. 2. The proposed amendments will be numbered 1, 2, 3 and 4 on the ballot, but the nature of each amendment will be set forth only in a brief paragraph opposite blank squares, in which the voter is expected to register his approval or disapproval. The fourth amendment, known as the "debt limit amendment," is designed chiefly to extend the borrowing power of the City of New York by permitting the city, under control to be prescribed by the Legislature, to exclude from the computation of the debt limit bonds issued exclusively for rapid transit and dock improvements so long as such bonds are self-sustaining and self-extinguishing.

By a decision of the Court of Appeals it has been determined that when the City of New York undertook by suit to declare that the franchise for the Steinway, or Belmont tunnel, as it is now called, had lapsed, and to take possession of the franchise it was interfering in a matter in which it had no concern. The suit it instituted was carried to the Court of Appeals, and that court now holds that the franchise under which the tunnel was built was a gift, under certain conditions, of the people of the State of New York. Under this decision the matter is taken back to the conditions as they existed prior to the beginning of the city's suit. The trustees who have been holding the property since the decision of the Appellate Division must retire, and the directors of the Interborough Rapid Transit Company can take possession again. Another suit may be begun to establish the legal status of the present holders of the franchise, but if it is, it must be by the State. Chief Justice Cullen, who wrote the opinion, in commenting on the situation, says that the statement of facts before the court was inadequate to enable it to render any judgment on the rights of the defendants and present legal status of the holders of the franchise.

The Court of Appeals of New York has rendered a decision in the case of the Jamaica Bay Water Supply Company against the State Board of Commissioners which is expected materially to assist in fixing franchise values in New York State. In the Jamaica Bay case it was laid down that from the gross earnings of the company the operating expenses and 6 per cent interest on the capital must be deducted. The franchise tax will then be assessed on the capitalization of what remains of the earnings and the value of any real estate owned by the corporation. This may be taken as a basis for a compromise in cases now pending so as to avoid further litigation. The only companies in New York City which have so far paid their franchise taxes are the Manhattan Railroad and the New York Edison Company, both of which have paid the city, subject to the final decision of the claims against them by the courts.

Cleveland Traction Situation

On Oct. 19, after the matter had been brought to his attention, Judge Tayler announced that the acceptance of the new ordinance by the Municipal Traction Company, the Forest City Railway, the Low Fare Railway and the Central Traction Company, all organized for different purposes during the movement for 3-cent fares, would be necessary and that their decision must be made known before the work of valuation proceeded. He said that the slightest possibility of the settlement being held up by the refusal of any one of these companies to accept the ordinance should be removed so that the work he is about to undertake shall not be rendered valueless. Mayor Johnson said that he would do all he could to secure the consent of the companies to the acceptance of the ordinance in advance. He recommended that the Cleveland Railway write the companies, asking for their acceptance. Horace Andrews, president of the Cleveland Railway, has said previously that he did not desire to write the companies, as such action might jeopardize the company's advantage in other matters by recognizing the corporate existence of the low-fare companies.

During the taking of testimony on Oct. 19 Mayor Johnson said he would accept the Goff-Johnson valuation of cars if Mr. Andrews would waive overhead charge claims. Judge Tayler asked the Mayor if he would accept the schedule of car values if nothing is added to the item of overhead charges. The Mayor replied that if Mr. Andrews accepted the schedule it would settle the matter. Judge Tayler characterized the proposition as dickering, and the Mayor then said he would offer no more trades. Testimony was taken on the car schedule in the afternoon, A. B. DuPont, Warren Bicknell, receiver of the Cleveland Railway; W. T. Cook, superintendent of the Cleveland Railway, and others being questioned. Mayor Johnson contends that at least $500,000 should be deducted from the total amount of the schedule of $2,600,000. Special attention has been given to depreciation in the value of motors in an effort to reduce the value of the cars.

The directors of the Cleveland Railway voted on Oct. 20 to accept the ordinance as formulated by City Solicitor

Baker, the clauses entrusted to Judge Tayler for settlement to be filled in later.

It has been agreed to count the passengers riding in and out of East Cleveland, so that Judge Tayler can use the information in considering the East Cleveland franchise and rate.

On Oct. 20 the directors of the low-fare companies agreed to submit their differences with the Cleveland Railway to Judge Tayler for adjustment. These differences include the legal status of certain claims that the Forest City Railway is making for its original stockholders, who are now stockholders of the Cleveland Railway, claims of the Municipal Traction Company on its guaranteed stock and some other matters which have not yet been decided by the Federal Court. Subsequently the judge said that the points which the low-fare companies wish him to consider should be submitted to him in writing in detail.

In the second letter to Judge Tayler from the low-fare companies the following statements appear:

"By reason of the use of unhappy and inadequate language in our letter to you of yesterday, it now appears that the purpose and meaning of that letter are not clearly expressed. We, therefore, beg leave to state that by it we intended to agree to accept the ordinance now pending in the Council which is to be passed when amended by the insertion of your findings upon the four questions submitted to you as arbitrator. We further intended to submit on our behalf the determination of the extent to which the claims against the Municipal Traction Company referred to are morally binding and of such character that provision should be made for meeting them, and also the method of making such provision.

"We have not at any time considered requesting you to decide the other questions referred to in our letter, our purpose and wish being to waive them all by accepting the ordinance and making possible a complete settlement of the street railroad question without any arbitration of or judicial determination of those questions. The recital of them was for the purpose of showing that in our view it might well be thought that from the various transactions which gave rise to those contentions, the particular moral obligations of the Municipal Traction Company should be treated as a public obligation, and so provided for. This is the only question we desire to add to those already submitted to your determination by the Council and the Cleveland Railway."

Judge Tayler stated that he would accept the proposals in this letter and pass upon the moral obligations after hearing statements and arguments from both sides. The second letter omitted the requests made in the first and stated that the franchise will be accepted.

The examination of witnesses on the car schedule proceeded on Oct. 22. The principal points were whether it is more economical to use large cars than small ones, the wearing effect on the tracks and equipment and the power required. Most of the testimony was in favor of the large cars with cross seats.

Offer from Edison Company to Supply Power for New Subways in New York

The New York Edison Company, through J. W. Lieb, Jr., third vice-president, on Oct. 20 addressed a letter to the Public Service Commission of the First District of New York, in which an offer is made to submit bids for supplying the current necessary to light and operate the new subways in New York, and in which the suggestion is made that the specifications for the new subways be so drawn as to permit those who equip the new lines, whether the city itself or a private concern, to obtain current by purchase instead of by the erection and maintenance of power plants. The letter from the New York Edison Company follows:

"We understand that the Public Service Commission for the First District has under consideration plans and specifications for the new Broadway-Lexington Avenue subway and other subways and connecting lines to be constructed or already constructed, but for which no arrangements for operation have yet been made.

"The New York Edison Company respectfully requests an opportunity at the proper time to present bids for the supply of electric current for the lighting of the subways and tunnels and also for the supply of electric power necessary for the operation of the cars and trains. We beg leave, therefore, to offer the suggestion that where specifications provide for the construction of a power plant they be so drawn that they will also permit the contractor, who may assume the operation of the subways, to propose an alternative arrangement under which he may obtain the supply of power from a properly equipped electricity supply company.

"Should it appear to be to the advantage of the city and the operators of the subways or tunnels to purchase power for lighting and traction in preference to making the large investment necessary for the construction and operation of a special generating plant exclusively for that purpose, the contractor should have the option of providing for the necessary current by contract with a company in the business of supplying electricity for lighting and power.

"The generating plants of the Edison Company are of large capacity, provided with adequate reserve in every part and equipped with the latest and most improved types of apparatus for the economical generation of electrical energy. It is prepared to supply any lighting or power service, existing or prospective, for street railways, subways or other means of transportation, however extensive the service may be.

"With the already large current output from the existing plants, the opportunity for taking advantage of the diversity factor in the demands for the various industries to which power is now being supplied, the considerable margin of capacity always available, and the possibility of providing a reserve held in common instead of its unnecessary multiplication should place this company in a position to provide adequate power supply under most advantageous terms, reducing to a large extent the investment which would otherwise have to be made for a special generating plant. We, therefore, believe that it will be found alike to the advantage of the City of New York and the contractors for the construction and operation of the subways and tunnels to contract for their power service rather than to make the large investment that may be necessary to provide a special power plant."

New Member Companies and Associate Members of the A. S. & I. R. A.

Secretary Swenson, of the American Street & Interurban Railway Association, reports that between Oct. 1 and Oct. 26, 1909, nine new member companies were enrolled and that for the same period 53 new applications for associate membership were received. These additions make the total of active railway member companies of the association 327 and the total of associate members 873. Lists of the new member companies and the associate members, arranged alphabetically by name in the case of the companies and alphabetically by cities, and then by name in the case of associate members, follow:

MEMBER COMPANIES

Albia Interurban Railway Company, Albia, Ia.
Asheville & East Tennessee Railroad, Asheville, N. C.
Coast Counties Light & Power Company, Santa Cruz, Cal.
Denver & South Platte Railway Company, Denver, Col.
Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Ind.
Lincoln Traction Company, Lincoln, Neb.
New York & North Shore Traction Company, Roslyn, L. I., N. Y.
Portsmouth Street Railroad & Light Company, Portsmouth, Ohio.
Tama & Toledo Electric Railway & Light Company, Toledo, Ia.

ASSOCIATE MEMBERS

Altoona, Pa.—B. F. Wood.
Amagasaki, Settsu, Japan.—S. Misaki.
Boston, Mass.—A. G. E. Anderson, Edgar Warren Bright, Frank R. Coates, Nugent Fallon, C. E. Learned, H. E. Reynolds, James W. Rollins, Jr., Maurice P. Spillane, H. L. Wilson.
Buffalo, N. Y.—J. C. Calisch.
Cambridge, Mass.—S. E. Whiting.
Camden, N. J.—F. G. Grimshaw.
Charleston, W. Va.—J. C. Rockwell.
Chicago, Ill.—D. I. Cooke, George S. Davis, H. A. Johnson, H. M. Sloan.
Cleveland, Ohio.—W. B. Brady, Charles H. Clark.
Denver, Col.—J. H. Hardcastle.
Evansville, Ind.—L. C. Shipherd.
Fort Collins, Cal.—Frederic A. DeLay.
Fort Wayne, Ind.—C. D. Emmons.
Green Bay, Wis.—R. M. Howard.
Johnstown, Pa.—J. L. Replogle.
Kobe, Japan.—Y. Okitsu.
Los Angeles, Cal.—A. W. Arlin, W. S. Heaton, W. C. White.
Marinette, Wis.—W. R. Putnam.
Michigan City, Ind.—L. M. Sheldon.
New York, N. Y.—David Murdock, A. J. Vasselman.
Norfolk, Va.—T. B. Ogle.

Philadelphia, Pa.—Walter S. Adams, W. P. Barba, J. Clifford Rosengarten.
Pittsburgh, Pa.—Harry H. Farren.
Pittsfield, Mass.—Frank J. Dolan.
St. Petersburg, Russia.—Alexandre Kogan, A. Voronoff.
San Francisco, Cal.—C. M. Bliven.
Schenectady, N. Y.—A. H. Armstrong, H. N. Ransom.
South Framingham, Mass.—M. V. Ayres.
Springfield, Mass.—Henry C. Page.
Syracuse, N. Y.—W. K. Archbold, W. B. Rockwell.
Texarkana, Ark.—R. G. Stewart.
Toronto, Can.—H. C. Small.
Webb City, Mo.—E. J. Pratt.

New Texas Road Opened.—The Marshall (Tex.) Traction Company has placed 4 miles of electric street railway in operation in Marshall.

New Idaho Line Opened.—The Boise Valley Railway, Boise, Idaho, has placed its line between Boise and Nampa in regular operation.

Loss at Havana from Storm.—The reports published in the daily newspapers of the damage done at Havana, Cuba, by the cyclone on Oct. 11, 1909, were greatly exaggerated. The total loss to the Havana Electric Railway from the storm amounts to about $5,000.

List of Expiring Grants in Detroit.—The Corporation Counsel of Detroit has prepared a list of streets covering 66 miles of line of the Detroit (Mich.) United Railway on which, in his opinion, the rights of the company to operate will expire on Nov. 14. A resolution providing for indeterminate rights on these streets has been prepared for introduction into the Council pending the settlement of the extension by the Council of the franchise rights of the company.

Meeting of Technical Publicity Association.—The first monthly meeting of the Technical Publicity Association for 1909-10 was held on the evening of Oct. 14 at the headquarters of the association in New York. An informal dinner preceded the program. The only extended address was that of George French, editor of "Advertising and Selling." Howard M. Post discussed plans for a systematic, analytical study of tracing results from trade-paper advertising. Mr. Post was made chairman of a committee to outline this study work for the association. Mr. French discussed the psychological and artistic aspect of advertising. The association will meet again on Nov. 11.

Request for Valuation of Omaha Property Denied.—The Nebraska State Railway Commission has replied to the request of the City Council of Omaha for a physical valuation of the Omaha & Council Bluffs Street Railway. The secretary of the commission informs the Council that the State law demands the physical valuation of railroads first, and that until such valuation is completed the commission would not be permitted to expend any of the State appropriation for the valuation of any other than a steam road; but that if the city of Omaha desires to intervene in the complaint of Howell and others against the street railway, a complaint dealing with capitalization and rates, the railroad commission would be pleased to hear what its experts have to say, and might use its own expert accountant in addition to the evidence placed before the commission by the city. The cost of valuing the property of the Omaha & Council Bluffs Street Railway by an expert chosen from outside sources would not, in the judgment of the commission, exceed $2,500.

Resolution to Consider Philadelphia Agreement.—Both branches of the Philadelphia Councils passed the following resolution on Oct. 21 to appoint a committee to consult with the City Solicitor regarding the steps that can be taken to annul or modify the agreement between the city and the Philadelphia Rapid Transit Company: "*Whereas*, Questions have arisen as to the real intention of the parties to the contract between the city and the Philadelphia Rapid Transit Company, known as the Retail Merchants' plan; and whereas, certain political interests, in order to further their own personal ends, have so exaggerated and exploited these differences as to render any fair businesslike adjustment of them difficult; therefore be it resolved, that a joint committee (five members to be appointed by the president of each chamber) be constituted to consult with the City Solicitor and report as soon as possible what steps can be taken to annul the said contract, or to so amend it as to take the transportation question entirely out of politics, or to suggest such modifications as may be more satisfactory to public demand." Resolutions offered before the Council in behalf of the committee of 15 demanding the restoration of the six-for-a-quarter tickets have been referred to the committee which is to consult with the City Solicitor.

Financial and Corporate

New York Stock and Money Market

October 26, 1909.

The stock market during the last week has been easily influenced by the condition of the money market and the volume of trading has been considerably reduced. Although the quoted rates for money to-day were no higher than yesterday, the tendency of the market almost from the opening was to sag, and the losses for the day were practically equal to the gains of yesterday. Uncertainty is felt by traders as to the future and bankers are much more conservative. Rates to-day were: Call, 3½ to 4¼ per cent; 90 days, 5 per cent.

Other Markets

After indicating some tendency toward recovery earlier in the week Chicago Subway declined to-day to a new low level, selling as low as 6 and closing at 6¼. Other issues were neglected.

In the Boston market, Massachusetts Electric and Boston Suburban have been traded in to some extent during the week. Prices for the former issues remained about stationary while those of the latter have shown a tendency to advance.

In Philadelphia there has been quite a marked revival of activity in Rapid Transit trading. There has been considerable pressure to sell and prices have declined 2 points within the week. Union Traction has also been weaker.

As usual, there has been no trading in the Baltimore market in traction issues, except in the bonds of the United Railways Company.

The following traction securities were sold in New York last week at the regular auction sales: 1200 shares Brooklyn City Railroad Company, 194⅛ to 195⅜; $10,000 Metropolitan Street Railway Company collateral trust 5s, 78⅜.

Quotations of various traction securities as compared with last week follow:

	Oct. 19.	Oct. 26.
American Railways Company	a46	a45½
Aurora, Elgin & Chicago Railroad (common)	a45	a45
Aurora, Elgin & Chicago Railroad (preferred)	a95	a95
Boston Elevated Railway	130½	130
Boston & Suburban Electric Companies	15	*18¼
Boston & Suburban Electric Companies (preferred)	73¼	*75
Boston & Worcester Electric Companies (common)	a11½	a12
Boston & Worcester Electric Companies (preferred)	a54	a54
Brooklyn Rapid Transit Company	78⅜	74½
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	86⅝	85
Capital Traction Company, Washington	a140	*139
Chicago City Railway	a190	a180
Chicago & Oak Park Elevated Railroad (common)	*2	*2
Chicago & Oak Park Elevated Railroad (preferred)	*10	*10
Chicago Railways, ptcptg, ctf. 1	a110	a105
Chicago Railways, ptcptg, ctf. 2	a37	a36
Chicago Railways, ptcptg, ctf. 3	a25	a24
Chicago Railways, ptcptg, ctf. 4s	a10	a10
Cleveland Railways	a84	*84
Consolidated Traction of New Jersey	a77	a76½
Consolidated Traction of N. J., 5 per cent bonds	a106½	a106
Detroit United Railway	a68	a67
General Electric Company	164	161
Georgia Railway & Electric Company (Common)	a99½	a99½
Georgia Railway & Electric Company (preferred)	a88½	a88
Interborough-Metropolitan Company (common)	17½	18
Interborough-Metropolitan Company (preferred)	49⅞	49¼
Interborough-Metropolitan Company (4½s)	83⅝	82½
Kansas City Railway & Light Company (common)	a40	a40
Kansas City Railway & Light Company (preferred)	80¾	a82
Manhattan Railway	a142	140½
Massachusetts Electric Companies (common)	17¾	16¾
Massachusetts Electric Companies (preferred)	81	80
Metropolitan, West Side, Chicago, (common)	a18	a17
Metropolitan, West Side, Chicago, (preferred)	a53	a51
Metropolitan Street Railway	a24	a24
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	a80	77½
Northwestern Elevated Railroad (common)	a20	a20
Northwestern Elevated Railroad (preferred)	a69	a70
Philadelphia Company, Pittsburg (common)	a48½	a48½
Philadelphia Company, Pittsburg (preferred)	a44½	a45
Philadelphia Rapid Transit Company	a28	a25½
Philadelphia Traction Company	a90	a90
Public Service Corporation, 5 per cent col. notes	a100⅞	a100⅞
Public Service Corporation, ctfs.	a95	a97
Seattle Electric Company (common)	a114¾	114⅜
Seattle Electric Company (preferred)	a104	104
South Side Elevated Railroad (Chicago)	a52	a52
Toledo Railways & Light Company	a10	8
Third Avenue Railroad, New York	21	19⅜
Twin City Rapid Transit, Minneapolis (common)	109	107½
Union Traction Company, Philadelphia	a53¼	a52
United Rys. & Electric Company, Baltimore	a14	a13¼
United Rys. Inv. Co. (common)	43	40
United Rys. Inv. Co. (preferred)	72½	68¼
Washington Ry. & Electric Company (common)	a47	*47
Washington Ry. & Elec. Company (preferred)	a93⅜	*94
West End Street Railway, Boston, (common)	94	93
West End Street Railway, Boston (preferred)	103	103½
Westinghouse Electric & Manufacturing Company	86	*86
Westinghouse Elec. & Mfg. Company (1st pref.)	140	a140

aAsked. *Last Sale.

Quarterly Reports of New York City Companies

The New York Public Service Commission, First District, has issued a statement compiled by A. F. Weber, chief statistician, giving a summary of the reports for the quarter ended June 30, 1909, of the railroads and street railways operating in New York City. The principal figures in relation to the results of operation for a number of the properties and the totals for all the companies reporting are as follows:

Name of Company	Gross earnings from operation	Operating expenses	Net earnings from operation
Total—Interborough Rapid Transit Company....	$6,816,849.76	$2,656,315.49	$4,160,534.27
Subway	3,180,639.96	1,129,292.20	2,051,347.76
Elevated	3,636,209.80	1,527,023.29	2,109,186.51
Total — Brooklyn Rapid Transit System.....	$5,258,125.08	$3,480,663.09	$1,777,461.99
Total Elevated Division.....	$2,026,708.02	$1,154,850.16	$871,857.86
Brooklyn Heights Railroad....	1,829,936.53	1,292,263.61	537,672.92
Brooklyn, Queens County and Suburban Railroad.....	328,261.44	241,500.57	86,760.87
Coney Island and Gravesend Railway	12,421.39	10,937.27	1,484.12
Nassau Electric Railroad.....	1,060,797.70	781,111.48	279,686.22
Dry Dock, East Broadway & Battery Railroad.....	139,968.80	112,277.10	27,691.70
Forty-second Street, Manhattanville & St. Nicholas Ave. Railroad	366,001.20	198,770.63	137,230.57
Third Avenue Railroad, Kingsbridge Railway.....	752,947.41	449,618.16	303,329.25
Metropolitan Street Railway..	3,246,493.91	1,930,571.40	1,315,922.51
Central Park, North & East River Railroad.....	149,623.74	110,903.75	38,719.99
Second Ave. Railroad.....	218,496.23	211,430.20	7,066.03
Twenty-eighth & Twenty-ninth Sts. Crosstown Railroad....	6,046.65	7,913.97	*1,867.32
New York City Interborough Railway	43,991.73	35,724.29	8,267.44
Union Railway.....	528,499.62	350,572.77	177,926.85
Westchester Electric Railroad.	97,747.15	104,102.60	*6,355.45
Coney Island & Brooklyn Railroad	409,550.76	248,912.66	160,638.10
Long Island Electric Railway..	44,376.70	33,236.33	11,140.37
New York & Long Island Traction Co.....	88,430.50	53,425.86	35,004.64
New York & Queens County Railway Co.....	262,911.02	156,512.64	106,398.38
Richmond Light & Railroad Co.	84,270.86	77,699.63	6,571.23
Staten Island Midland Railroad	64,411.65	44,740.53	19,671.12
Grand Total—Street Railways reporting.....	$18,614,016.75	$10,320.003.43	$8,294,013.32
Grand Total — All companies reporting.....	$18,851,101.86	$10,494,152.57	$8,356,949.29
Hudson & Manhattan R. R. (†)	$196,049.10	$107,997.31	$88,051.79

*Deficit.
†The Hudson & Manhattan Railroad is excluded from the "total of all companies."

Annual Report of Quebec Railway, Light & Power Company

The annual report of the Quebec Railway, Light & Power Company for the year ended June 30, 1909, shows gross earnings of $724,648 and operating expenses of $444,300. The net earnings of $280,348 compare with a corresponding result of $238,461 in the preceding year. From the net earnings for the year just ended there were deducted the following amounts: Interest on bonds, $125,000; city percentage on earnings, $10,684; interest, etc., paid and accrued, $10,239; dividends on preferred stock, $44,124; dividends on common stock, $50,000; a total of $240,046. The surplus of $40,302 remaining from the operations of the year, added to the surplus on hand, made a total in that account of $462,948.

W. G. Ross, the president, states in his annual report:

"The gross earnings increased during the year, $68,815, or 10.49 per cent; the operating expenses, $26,381, or 6.31 per cent, and the net earnings $41,887, or 17.57 per cent.

"The increase in gross earnings of 10.49 per cent compares favorably with the increase of 1907-08, which was 8.59 per cent. The operating expenses during the year 1908-09 were 61.31 per cent of the gross earnings, as against 63.72 per cent the previous year, or a decrease of 2.41 per cent. The fixed charges, however, exclusive of the dividends on the common stock, have increased $38,652, or 25.53 per cent. This increase is due to the dividend upon the additional preferred stock, which was issued last year for the new power developments."

The report of Edward A. Evans, general manager, says in part:

"The total number of passengers carried upon the city division was 6,859,679, an increase of 810,476. The average fare per passenger was 4.19 cents as against 4.22 cents; the income per capita of the population increased from $3.55 to $3.65 (the income per capita in 1899 being $2.04). The operating expenses show an increase of $12,653, principally due to increased wages, etc. The car mileage was 1,394,744, an increase of 62,434 miles.

"The total number of passengers carried upon the Montmorency division was 1,442,327, an increase of 43,982; the average fare per passenger was 10.28 cents. Upon the elevator 266,814 passengers were carried, an increase of 26,904. The operating expenses have increased $1,719.52, principally due to increase of wages. The business upon this division is increasing rapidly and it will be necessary to purchase additional electrical machinery and rolling stock to effectually handle the traffic upon this division.

"The earnings from the power division have increased 15.55 per cent. The cost of generating and distribution has increased 14.19 per cent; a large proportion of this can, however, be considered an extraordinary expenditure, consisting of the re-winding of the motor generators in the substation, very considerable renewals to the pole and distribution lines, etc., all of which have been charged to operating for this year, instead of distributing the same over a number of years. The re-modeling and fire-proofing of the power house has been completed, and as a consequence, this building may now be considered as modern and fireproof.

"All the rolling stock, plant and equipment of the company have been kept in a thorough state of repair."

Coney Island & Brooklyn Railroad, Brooklyn, N. Y.—At the annual meeting of the stockholders of the Coney Island & Brooklyn Railroad on Oct. 18 the annual report of the company for the year ended June 30, 1909, was presented. The income account of the company for 1909 compares as follows with the previous year: Gross receipts for 1909, $1,479,173, as compared with $1,557,456 for 1908; operating expenses for 1909, $1,007,285, as compared with $1,246,255 for 1908; net earnings from operation for 1909, $471,888, as compared with $311,201 for 1908; receipts from other sources for 1909, $12,767, as compared with $4,605 for 1908; gross income for 1909, $484,655, as compared with $315,806 for 1908; interest and taxes for 1909, $208,921, as compared with $210,402 for 1908; balance for 1909, $275,734, as compared with $105,404 for 1908; rent of leased lines for 1909, $100,000, as compared with $100,000 for 1908; surplus for 1909, $175,733, as compared with $5,404 for 1908. The Public Service Commission has approved the sale by the company of $107,000 of 4 per cent bonds at not less than 80, the proceeds, about $85,000, to be applied to track reconstruction work in Franklin and De Kalb Avenues and Smith Street.

Grand Junction & Grand River Valley Railway, Grand Junction, Col.—On page 886 of the Electric Railway Journal of Oct. 16, 1909, mention was made of the filing by the Grand Junction & Grand River Valley Railway of a mortgage for $2,000,000 in favor of the Colorado Title & Trust Company, as trustee. Of this $2,000,000 authorized, $850,000 bonds have been sold and the proceeds will be used to cover the purchase of the property of the Grand Junction Electric, Gas & Manufacturing Company and the property and franchise of the Grand Junction Electric Railway, operating 3 1-5 miles of street railway in Grand Junction. The Grand Junction & Grand River Valley Railway has also provided funds for the construction of 20 miles of interurban railway between Grand Junction and Fruita and has placed contracts for the material to be used in constructing the line. A permanent location on a private right of way has been secured, and the construction of the line will be begun in November or December. The bonds are secured by a first mortgage which bears interest at 6 per cent., with sinking fund and redemption clauses.

Interstate Railways, Philadelphia, Pa.—It is stated that the delay in declaring the reorganization plan of the Interstate Railways operative is due to offers made for the purchase of the property. Some of these offers are said to be for part of the system while one is understood to be for the entire property. It is announced that interest will be paid on Nov. 1, on the bonds on which interest was defaulted on Aug. 1, 1909.

Otsego & Herkimer Railroad, Oneonta, N. Y.—The Otsego & Herkimer Railroad, successor to the Oneonta & Mohawk Valley Railroad, which was previously the Oneonta, Cooperstown & Richfield Springs Railway, has applied to the Public Service Commission of the Second District of New York, for authority to issue $1,500,000 in common capital stock, for consent to issue first, second and third mortgages and for authority to issue $500,000 first mortgage bonds, $300,000 in second mortgage bonds and $700,000 in third mortgage bonds.

Traffic and Transportation

Circular Announcing Increase in Fares of Hartford & Springfield Street Railway

The circular announcement to the traveling public, issued by the Hartford & Springfield Street Railway, to which brief reference was made in last week's issue, is as follows:

"Beginning with Nov. 1, 1909, until further notice, the unit of fare on the Hartford & Springfield Street Railway will be six cents instead of five cents as heretofore. All fare limits and transfer privileges will remain the same.

"The decision to increase the unit of fare to six cents was authorized by the board of directors only after the most careful consideration of the subject and after every other reasonable alternative had been exhausted.

"The management and directors of the Hartford & Springfield Street Railway recognize their responsibility, not only to the stockholders of the community, but to the traveling public as well, and hence take this opportunity of giving a brief history of the company, the conditions under which it is operated at the present time and why, in their judgment, the increase of unit of fare from five to six cents at this time is justified.

"For the last two or three years every street railway company in New England has been laboring under very adverse circumstances, due to the rapidly increasing cost of operation. This increasing cost is primarily due to the continued rise in price of all commodities entering into the operation of these companies, such as higher wages to motormen and conductors, increased cost of fuel, oil and supplies generally. Furthermore, most of the street railways have now been in operation so many years that the roadbed, equipment and cars are beginning to wear out, and the cost of repairs, new equipment and the amount necessary to be set aside for depreciation is growing larger and larger each year. The experience of this company with these conditions has been similar to all the rest.

"The Hartford & Springfield Street Railway system consists of some 45 miles of interurban street railway, connecting the Hartford Street Railway system with the Springfield Street Railway system on both the east and west side of the Connecticut River, with branches from Warehouse Point to Rockville, and from Thompsonville to Somers. The original main line on the east side of the Connecticut River and the Somers branch were constructed some eight years ago and the west side line and the Rockville branch more recently.

"The capital stock of the Hartford & Springfield Street Railway consists of $500,000 of common stock and $285,000 of the 6 per cent preferred stock, all paid for in cash. The combined sums represent the actual cost of the property above its bonded indebtedness. The only dividend paid on the common stock was one of 2 per cent paid about six years ago, and no dividends have been earned or paid on the preferred stock for the last two years.

"The most direct way to get at the operating conditions of this company is by examining its annual report made to the State Board of Railroad Commissioners, which by law is required to be sworn to by the officers of the company, and comparing this report with the reports furnished by the other street railways in Connecticut to the same board. All of these reports are furnished on similar blanks and show not only the receipts but all the expenditures of each street railway in great detail.

"In examining this report, the first question presented is the question of the capitalization of the company. From the report of 1908 it appears that the average amount of bonds and stocks of all the street railways in Connecticut amounts to $99,156 per mile of track operated. The capitalization of the Hartford & Springfield Street Railway, adding both stocks and bonds together in the same way, is only $38,843 per mile, showing that the company is not overcapitalized.

"To show the total receipts of the Hartford & Springfield Street Railway as well as the cost of operation, in comparison with the other street railways in this State, the following table, taken from the Railroad Commissioners' report for the year ending June 30, 1908, will be of interest. The report for the year ending June 30, 1909, has not yet been published.

Name Year ending June 30, 1908.	Total receipts per mile operated	Operating expenses per mile operated
Bristol & Plainville Tramway Company	$6,801.06	$4,419.89
Connecticut Company	8,990.92	5,785.62
Danbury & Bethel Street Railway	8,013.44	5,801.51
Farmington Street Railway	4,745.38	4,152.85
Groton & Stonington Street Railway	5,420.26	2,703.18
The Hartford & Springfield Street Railway	4,107.06	2,647.84
New London & East Lyme Street Railway	4,106.38	2,937.38
Norwich & Westerly Railway	3,116.09	2,999.98
Providence & Danielson Street Railway	3,587.93	3,299.07

"Taking first the question of operating expenses, you will note the fact that the Hartford & Springfield road is operated for less cost per mile of track than any other road in the State of Connecticut, thus settling beyond question the fact that this road is not extravagantly operated. It might be here stated that in every instance the operating expenses given do not include salaries to officers, interest on bonds, taxes paid to the State, allowance for accidents and depreciation of the property, which must be added to these figures. The only salaries paid by the Hartford & Springfield Street Railway are those paid to the general manager and treasurer, which are very moderate. All the other officers of the company give their time and attention to its best interests without any remuneration whatever.

"Taking up the question of income upon reference to the above table it will be found that there are three roads in this State which have less income per mile of track operated than the Hartford & Springfield road. They are the Norwich & Westerly Street Railway, now in the hands of a receiver; the Providence & Danielson Street Railway, which has never earned the interest on its bonds and the New London & East Lyme Street Railway, which is just barely coming out even.

"On the other hand it will be noted that whereas the Hartford & Springfield company has total receipts of a trifle over $4,000 per mile of track operated, the Connecticut Company shows earnings of over $8,000 per mile, the Danbury & Bethel Street Railway also over $8,000 per mile, the Bristol & Plainville Tramway Company over $6,000 per mile, etc.

"For the year ending June 30, 1908, according to the sworn report furnished the Railroad Commissioners, the Hartford & Springfield Street Railway, after paying its operating expenses, taxes, and interest on bonds, had left a little over $1,800 applicable to dividends and surplus.

"For the year ending June 30, 1909, according to the sworn report furnished the Railroad Commissioners, the Hartford & Springfield Street Railway, after paying its operating expenses, taxes, and interest on bonds, showed a deficit of $257. If a proper amount had been charged off for depreciation the deficit would have been still greater.

"During the last year the Hartford & Springfield Street Railway collected more than three million five-cent fares and yet, after paying expenses, it showed a deficit for the entire year's business of $257. This showing not only allows no dividend on either the preferred or common stock, but it fails to enable the company to keep up the physical condition of its property. It therefore must be plain to everyone that the earnings must be considerably increased if proper and satisfactory service is to be provided for the public in future, and a fair return made on the investment.

"Those not familiar with the street railway business may be surprised to learn of the present situation of this company. We are, however, not the only company that has faced this crisis recently. In Massachusetts similar conditions are producing similar results, and already 14 of the street railroads in that State have been compelled to raise their fares from five to six cents. These roads are as follows: Boston & Worcester Street Railway; Connecticut Valley Street Railway; Portsmouth & Exeter Street Railway; Newton Street Railway; Newton & Boston Street Railway; Lexington & Boston Street Railway; Natick & Cochituate Street Railway; Middlesex & Boston Street Railway; Westboro & Hopkinton Street Railway; Blue Hill Street Railway; Brockton & Plymouth Street Railway; Concord, Maynard & Hudson Street Railway; Taunton & Pawtucket Street Railway; Western Massachusetts Street Railway.

"It is perfectly apparent that no public service corporation can furnish the public with improved and up-to-date facilities unless such company can earn enough money to cover at least the actual cost of such service.

"Due to the rapidly increased cost of living and the increase in price of all commodities in general the operating expenses of this company will unquestionably continue to increase in the future rather than decrease, and it is the opinion of the management and directors of the Hartford & Springfield Street Railway that the company cannot continue to operate and furnish satisfactory service to the public unless the fare is increased.

"The only alternative would be to endeavor to reduce the operating expenses by reducing the wages of the motormen and conductors and by allowing the property to deteriorate still further. This, the management and directors do not feel justified in doing, as it would not be fair to the company's employees, its stockholders, or to the traveling public in general.

"The above are the reasons why the management and directors have decided to make the unit of fare on the Hartford & Springfield road six cents on and after Nov. 1, believing that the public would prefer to have good serv-

ice, good cars, well kept up, and a 6-cent fare, rather than pay five cents for an unsatisfactory service."

The circular is signed by Francis R. Cooley, Thomas C. Perkins, and Chauncey Eldridge, comprising the executive committee of the board of directors.

Hearing on Heating Cars in New York

A hearing was held before the Public Service Commission of the First District of New York on Oct. 25 to determine why an order substantially in the form of the following, directing the heating of closed electric and horse cars should not be made by the commission:

"ELECTRIC CARS

"Heating Regulations

"1. All closed cars (except horse cars) in service for the transportation of passengers between Oct. 15 and April 15, in each year, shall be equipped with suitable apparatus for heating by electricity.

"2. All companies shall, during the period above named, maintain in all closed cars in service for transporting passengers, an inside temperature of not less than 45, nor more than 65 deg. above zero (Fahr.), unless the company is temporarily prevented from so doing by storm, accident or other controlling emergency for which it is not responsible and which is not due to any negligence upon its part.

"3. This order, in approved form, together with a thermometer indicating the temperature, shall be displayed conspicuously in each closed car.

"HORSE CARS

"Heating Regulations

"1. All closed horse cars in service for the transportation of passengers between Oct. 15 and April 15, in each year, shall be equipped with suitable heating apparatus.

"2. All companies shall, during the period named, maintain in all closed horse cars in service for transportating passengers, an inside temperature of not less than 45, nor more than 65 deg. above zero (Fahr.), unless the company is temporarily prevented from so doing by storm, accident or other controlling emergency for which it is not responsible and which is not due to any negligence upon its part.

"3. This order, in approved form, together with a thermometer indicating the temperature, shall be displayed conspicuously in each closed horse car, not nearer than within 6 ft. of the heating apparatus."

Representatives of railway companies to which the communication of the commission was addressed were in attendance and several of them were called upon by Commissioner John E. Eustis to state their objections to the proposed order. James L. Quackenbush for the Interborough-Metropolitan Company said that there was no real objection to complying with the proposed order of the commission so far as elevated and subway lines were concerned, but that he felt that the minimum temperature of 45 deg. was somewhat too high and ought to be reduced to at least 40 deg. He also said that the communication of the commission had only been before the Metropolitan Street Railway for a few days and that the officers of that company had not really had sufficient time to consider the proposed order in detail, but that in the course of a week they would be prepared to present their objections to the commission.

W. S. Menden, assistant general manager and chief engineer of the Brooklyn Rapid Transit Company, said that his company would be perfectly willing to comply with the spirit of the order, but that it would be almost impossible to meet all the regulations at all times, and that he considered 45 deg. too high a minimum temperature. He particularly objected to Clause 3 of the order, which stipulates that the approved form of the order together with a thermometer indicating the temperature, shall be displayed conspicuously in each car. Mr. Menden said that some years ago the Brooklyn Rapid Transit Company experimented with thermometers on cars and found them most unsatisfactory, and that in the course of a week or 10 days he would be prepared to place before the commission the results of the use of thermometers by his company. Heating in Brooklyn is regulated from the central office of the company, an employee in each barn appraising conductors by a printed sign of the amount of heat that shall be turned on in each car.

The representatives of the Coney Island & Brooklyn Railroad, the Second Avenue Railroad, the Central Park, North & East River Railroad and other companies, all stated that they had scarcely had time properly to consider the proposed order, and it was finally decided to postpone the hearing until Nov. 4.

Smoking on Platform in Los Angeles.—The City Council of Los Angeles has passed an ordinance calling upon the electric railway companies in Los Angeles to issue orders permitting smoking only on the back platform of cars.

Ordinance Passed Fixing Speed in San Francisco.—The Board of Supervisors of San Francisco has passed an ordinance restricting the speed of street cars to 15 m.p.h. within limits comprising the business and most thickly populated sections of the city.

Conductor Charged with Stealing.—The Toronto (Ont.) Railway has caused the arrest of another conductor for stealing fares from the fare boxes. The man was held for trial before the higher court when arraigned before the police magistrate.

Limited Service During Winter Between Allentown and Philadelphia.—The Lehigh Valley Transit Company, Allentown, Pa., which last summer placed in operation a limited service between Allentown and Philadelphia, has decided to continue the service during the winter. This unusual decision was reached because the patrons of the company requested the company to continue the service and because the summer season was one of the most successful of the company. Under the winter schedule for the Liberty Bell route, as the line between Allentown and Philadelphia is known, there are two round trips between the cities every day.

Increase in New York Subway and Elevated Service.—The Interborough Rapid Transit Company, New York, N. Y., on Oct. 25 put into effect a new schedule on its subway and elevated lines which increases the service 14 or 15 per cent. The company has extended the rush-hour service for another hour both morning and evening, and during those hours as many trains are run as the physical limitations of the tracks and stations permit. Side doors on side-door trains are used all day, and the operation of trains over the Third Avenue line of the elevated railroad in the morning rush hour has been expedited by the omission of the first stop at Chatham Square for South Ferry trains.

Suit by Commission to Compel Transfers.—The Public Service Commission of the First District of New York has instructed its counsel to begin a proceeding in the Supreme Court either by mandamus or injunction, to compel the Staten Island Midland Railway and the Richmond Light & Railroad Company to exchange transfers at three points in West New Brighton as claimed to be required by law and as ordered by the commission. Complaint was made to the commission early in 1909 that the companies refused to exchange transfers at several places where their lines intersect. On June 4, the commission, upon an opinion rendered by Commissioner William McCarroll, ordered the companies to exchange transfers at the three designated points.

Illinois Traction System.—The Illinois Traction System was the subject of a very interesting article in the St. Louis *Republic* for Oct. 3, 1909, entitled "St. Louis's New Gateway to the Trade of Illinois," in which the lines of the company and its plans for operating into St. Louis from East St. Louis over the new bridge across the Mississippi River were described. A map was shown of the territory served and a diagram was published of the route of the road in St. Louis from the approach to the bridge across the Mississippi River to the terminal station and train shed on Gay Street, between Twelfth Street and Thirteenth Street. Illustrations were also published of the interior of the Decatur car shops, a standard limited car, the interurban bridge over the Sangamon River and a typical passenger station. The text also contained brief biographical sketches of William B. McKinley, president of the company, and H. E. Chubbuck, general manager.

Preparing for Pay-as-You-Enter Service in Detroit.—The Detroit (Mich.) United Railway, which proposes soon to place pay-as-you-enter cars in operation on its Woodward Avenue line, has prepared a poster instructing passengers in the use of the car which will be hung in each car, and a four-page leaflet of which 50,000 copies have been printed to be placed in small boxes in the cars. The poster is introduced with a diagram showing the passengers where to get on and off of the cars, the direction of travel being indicated by arrows. Passengers are requested to remember the following: "1. Have your fare ready on boarding car. 2. Board car at the *rear* end only. 3. Deposit cash or ticket in fare box in front of conductor. 4. Unfold transfer and hand to conductor; do *not* place it in fare box. 5. Pass into body of car immediately on paying fare. 6. Leave by front door." The company has also issued a book of rules for the guidance of conductors and motormen operating the pay-as-you-enter cars. It is also proposed to make the public familiar with the new service by advertisements in the daily newspapers.

Personal Mention

Mr. F. W. Darlington has resigned as electrical engineer of the Denver & Interurban Railroad, Denver, Col.

Mr. R. M. Howard has resigned as general manager of the Green Bay (Wis.) Traction Company and is succeeded by Mr. John T. Huntington.

Mr. John T. Huntington, formerly connected with the Topeka (Kan.) Edison Company, has been appointed general manager of the Green Bay (Wis.) Traction Company to succeed Mr. R. M. Howard, resigned.

Mr. C. L. Haynes, vice-president of the East St. Louis & Suburban Railway, East St. Louis, Ill., was given a chest of silver by the employees of the company at the time of his silver wedding anniversary.

Mr. Adrian H. Joline, receiver with Mr. Douglas Robinson of the Metropolitan Street Railway, New York, N. Y., has resigned as chairman of the board of directors and as president of the Missouri, Kansas & Texas Railway.

Mr. Theodore P. Shonts, president of the Interborough Rapid Transit Company and the Interborough-Metropolitan Company, New York, N. Y., has been elected a member of the executive committee of the Chesepeake & Ohio Railroad.

Mr. Wesley W. Sargent has been elected president of the Fitchburg & Leominster Street Railway, Fitchburg, Mass., to succeed Mr. Henry A. Willis, resigned. Mr. Sargent has been general manager of the company since its organization in 1892 and will continue to act in that capacity.

Mr. C. N. Wilcoxon, who has assumed the duties of general manager of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., was tendered a reception at Maple Cliff Villa recently, by the officers of the Cleveland, Southwestern & Columbus Railway, from which he retired to accept the position with the Chicago, Lake Shore & South Bend Railway.

Mr. E. L. Kasemeier, auditor of receipts of the Ohio Electric Railway, has been appointed auditor, effective on Nov. 1, to succeed Mr. M. W. Glover, who, as stated elsewhere, has resigned to become assistant to the traffic manager of the Illinois Traction System. Mr. Kasemeier was auditor of disbursements of the Seaboard Air Line Railway prior to his appointment as auditor of receipts of the Ohio Electric Railway.

Mr. William V. Polleys has been appointed superintendent of construction in charge of a contract which Stone & Webster, Boston, Mass., have with the Jacksonville (Fla.) Electric Company for reconstruction and extension work. Before becoming connected with Stone & Webster, Mr. Polleys was resident engineer and manager of construction for Westinghouse, Church, Kerr & Company on 40 miles of double-track electric railway in the Ohio Valley. Previous to that he was a member of the R. H. Tingley Company, engaged in general railway and miscellaneous engineering and construction work. Mr. Polleys has also been connected with the Dominion Iron & Steel Company and the New York, New Haven & Hartford Railroad.

Mr. Henry A. Willis has resigned as president of the Fitchburg & Leominster Street Railway, Fitchburg, Mass., and Mr. Wesley W. Sargent, general manager of the company, has been elected to succeed him. Mr. Willis has been connected with street railway affairs in Fitchburg for 20 years. He was president of the Fitchburg Street Railway, which was organized in 1886, and when the Fitchburg Street Railway and the Leominster Street Railway were consolidated in 1892 as the Fitchburg & Leominster Street Railway, Mr. Willis was elected president of the company. Mr. Willis retired from the company because his other business interests demanded so much of his time that it became impossible for him to give to street railway matters the attention which their importance demanded. Mr. Willis has also retired as a director of the company, and Mr. Walter B. Clifford has been elected to succeed him in this capacity.

Mr. William F. McCoy has resigned as master mechanic of the Hartford & Springfield Street Railway, Warehouse Point, Conn., to become master mechanic of the Pittsfield (Mass.) Electric Street Railway. Mr. McCoy was master mechanic of the Hartford & Springfield Street Railway for six years. Before becoming connected with the Hartford & Springfield Street Railway he was chief engineer and master mechanic of the Beaver Valley Traction Company, Beaver Falls, Pa., and for two years was chief engineer of the Syracuse, Lakeside & Baldwinsville Railway, Syracuse, N. Y. Before entering railway work Mr. McCoy was connected with Barber Brothers, Syracuse, N. Y., for 16 years as a machinist. When he left the employ of the Hartford & Springfield Street Railway Mr. McCoy was presented by the management and the employees with a Masonic ring set with diamonds. Mr. H. S. Newton, general manager of the Hartford & Springfield Street Railway, gave Mr. McCoy a watch as a token of personal esteem.

Mr. W. R. Morrison, general superintendent of the Wichita Light & Railroad Company, Wichita, Kan., and Mr. A. J. Crow, superintendent of transportation of the company, were the guests of honor at a banquet given by the members of the operating and transportation departments of the company in Wichita, on Oct. 20, as a surprise to both gentlemen. Officials of the company and employees representing the motormen, conductors, shop employees and linemen attended. The menu was printed on a card in the form of a pay-as-you-enter car and at the top was the legend, "Eat, drink and be merry for at five o'clock you work again." Both Mr. Morrison and Mr. Crow responded to toasts in the course of which they spoke in appreciation of the honor conferred on them and expressed their gratification at the efficiency of the service of the company. Other heads of departments also made short addresses.

Mr. J. J. Riley has been appointed general inspector of the Brooklyn (N. Y.) Rapid Transit Company in charge of the operation of surface cars through lower Fulton Street, Brooklyn, and over the Brooklyn and Williamsburg bridges, and will report to Mr. William Siebert, superintendent of surface lines of the company. Following the death of Mr. Martin Wulstein, who was district superintendent of the surface lines of the company in the eastern district, the positions of district superintendents were abolished. Assistant superintendents at the different car houses will hereafter report to and receive their instructions direct from Mr. Siebert, superintendent of surface lines. For administration and control the Halsey Street car house has been withdrawn from Ridgewood and attached to the Bergen Street car house. Assistant superintendents at the different car houses have been reassigned as follows: Mr. F. O'Keefe to Ridgewood, vice Mr. H. Bongard; Mr. C. Hogberg to East New York, vice Mr. F. O'Keefe; Mr. C. W. Roe to Crosstown and Maspeth, vice Mr. E. Gilchrist; Mr. E. Gilchrist to Fifty-eighth Street, vice Mr. C. Hogberg; Mr. H. Bongard to Bergen and Halsey Streets, vice Mr. C. W. Roe; Mr. H. Muller to Ninth Avenue, vice Mr. M. Cornell; Mr. M. Cornell to Flatbush Avenue, vice Mr. H. Muller; Mr. F. Brush to Carnarsie.

Mr. M. W. Glover has resigned as auditor of the Ohio Electric Railway, effective on Oct. 31 and has been appointed assistant to the traffic manager of the Illinois Traction System with headquarters at Springfield, Ill. Mr. Glover began his first railroad work on Dec. 1, 1889, in the local freight office of the Southern Carolina Railway, then in the hands of a receiver. He was transferred later to the auditor's office and there handled the freight and passenger as well as other accounts. The property was purchased by the Southern Carolina & Georgia Railroad and the receivership terminated prior to July, 1895, when Mr. Glover was appointed traveling auditor. In May, 1899, the road was absorbed by the Southern Railway and Mr. Glover remained as traveling auditor for that company until June, 1901. At that time he was advanced to the position of chief traveling auditor of the Southern Railway, from which he resigned in June, 1903, to accept the position of chief clerk to the auditor of the Atlanta & West Point Railroad and the Western Railway of Alabama. On July 1, 1906, Mr. Glover resigned from that position to accept the position of auditor of the lines now comprising the Ohio Electric Railway, Cincinnati, Ohio. He has now resigned from that position to become assistant to the traffic manager of the Illinois Traction System. Mr. Glover was active in the formation of the Central Electric Accounting Conference and has been its president since the organization was effected in 1907.

OBITUARY

James Thomas Nelson, formerly treasurer of the New York & Sea Beach Railway, now part of the system operated by the Brooklyn (N. Y.) Rapid Transit Company, is dead.

The effect of the operation of the Hudson & Manhattan Railroad under the Hudson River between New York and New Jersey on the ferries was strikingly shown by the testimony presented recently by C. C. Hubbell, assistant auditor of disbursements of the Delaware, Lackawanna & Western Railroad before the State board of equalization of taxes, which is hearing an appeal by the railroad from the assessment levied by the Board of Assessors of Hoboken. Mr. Hubbell testified that the total receipts from the ferries operated by the Delaware, Lackawanna & Western Railroad for the fiscal year ending June 30, 1908, were $7,317,372.94, and that the number of passengers carried, exclusive of railroad passengers, was 37,777,696. He said that 58 per cent of ferry traffic was local, and that the opening of the Hudson & Manhattan Railroad had made a decrease of 30 per cent in the traffic.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

North Chicago Railways, Chicago, Ill.—Application for a charter has been made by this company, as the successor of the Chicago Consolidated Traction Company, to be taken over on terms arranged by the reorganization committee.

***Decatur (Ill.) Belt Railway.**—Incorporated by interests connected with the Illinois Traction System, Champaign, to build an electric railway in Decatur. Incorporators: George M. Mattis, W. H. Carnahan, Charles Zilly, B. E. Bramble and C. E. Cox, all of Champaign.

***Edwardsville (Ill.) Belt Railway.**—Incorporated by interests connected with the Illinois Traction System, Champaign, to construct an electric railway in Edwardsville. Incorporators: George M. Mattis, W. H. Carnahan, Charles Zilly, B. E. Bramble and C. E. Cox, all of Champaign.

Lawton & Fort Sill Electric Railway, Lawton, Okla.—Incorporated to build an electric railway from Lawton to Fort Sill, Medicine Park and other points in Comanche County. The estimate length of the railway is 20 miles, and the estimated cost $140,000. Headquarters, Lawton. Capital stock, $200,000. Incorporators: Simon Smith, Oklahoma City; W. H. Pattie, D. L. Sleeper and J. H. Miller, Tulsa, and J. B. Sleeper, Lawton. [E. R. J., Sept. 18, '09.]

***Coffeyville-Nowata Railway & Power Company, Nowata, Okla.**—Incorporated to build a standard-gage electric railway from Coffeyville, Kan., to Nowata, Okla., a distance of 23 miles. The railway is estimated to cost $25,000 per mile. Headquarters, Nowata. Capital stock, $200,000. Incorporators: J. C. Denton, W. V. Thraves and J. A. Tillotson, Nowata; John B. Pollard, Kansas City, Mo., and W. P. Brown, Coffeyville, Kan.

***Altoona, Hollidaysburg & Bedford Springs Electric Railway, Altoona, Pa.**—Incorporated to build a single-track electric railway from Altoona to Bedford Springs, 50 miles distant. John G. Burns, Thirty-first Street and Liberty Street, Pittsburgh, president. Surveys are being made by F. W. Patterson, Altoona, engineer.

***Philipsburg & Susquehanna Valley Railroad, Philipsburg, Pa.**—Incorporated to take over the properties of the Philipsburg Railroad, the Center & Clearfield Street Railway, the New Steam Company and the Philipsburg Electric Light, Gas, Power & Heating Company. A bond issue of $2,000,000 has been authorized. Incorporators: Thomas F. Barrett, New York, N. Y., president; Howard M. Van Court, Philadelphia, treasurer; Charles H. Rowland, Philipsburg, assistant and first vice-president; George W. Zeigler, secretary; W. W. Cole, second vice-president and electrical engineer, and J. O. Reed, general manager.

FRANCHISES

San Francisco, Cal.—The Board of Supervisors has granted to the Stockton Street Railway a franchise to construct a street railway over Stockton Street from Market Street to North Beach. The plans of this company includes a tunnel under Bush, Pine and California Streets. Frank D. Stringham is said to be interested. [E. R. J., July 10, '09.]

Macon, Ga.—C. C. Foor, Jesse B. Hart and Frederick Kauffmann, of the Macon Traction Company, have petitioned the City Council for a franchise to build an electric railway over certain streets of Macon. [E. R. J., Oct. 16, '09.]

Humboldt, Kan.—The Kansas Southern Electric Railroad has been granted an extension of time by the City Council to extend its electric railway into Humboldt. The amended franchise provides that construction shall be under way within a year, and completed within two years after the adoption of the franchise.

Everett, Mass.—The Boston & Northern Street Railway has petitioned the Board of Aldermen for permission to relay its tracks in Everett. A hearing will be given Nov. 1.

Winona, Minn.—The La Crosse & Winona Traction Company has petitioned the City Council for a 50-year franchise to build an electric railway through Winona. The company proposed to build an electric railway from La Crosse, Wis., to Winona, via Galesville and Sparta, Wis. W. J. Ferris, president of the Winona Railway & Light Company, is said to be interested. [E. R. J., Oct. 23, '09.]

Auburn, N. Y.—The Auburn & Syracuse Electric Railroad has petitioned the City Council for a franchise to extend its East Genesee Street route from Seward Avenue east to the city limits.

Fulton, N. Y.—The Common Council has determined to grant the franchise for the right to build an electric railway across Hannibal Street near West First Street and across Walradt Street applied for by the Syracuse, Lake Shore & Northern Railroad. The sale of this franchise was authorized to take place on Nov. 9 at the City Hall. The company proposes to build an extension from Syracuse through Oswego to Fulton, 20 miles distant.

***Ontario, Ore.**—D. G. Sutherland, Ontario, has applied to the City Council for a franchise to construct an electric railway or steam railway on any and all streets of Ontario. The proposed railway is said to extend throughout the Snake River Valley section.

Easton, Pa.—The Stroudsburg & Water Gap Street Railway, Stroudsburg, has applied to the Town Council for a franchise to extend its railway to the borough limits. The company will extend the railway from Easton to Portland.

McKeesport, Pa.—The Pittsburgh, McKeesport & Westmoreland Railway has been granted a franchise to operate a street railway in McKeesport. The railway will connect McKeesport and Westmoreland, 19 miles, and is to be in operation in McKeesport within a year.

Memphis, Tenn.—The Memphis Street Railway has applied to the City Council for a franchise to lay track on South Third Street for a new cross-town railway. E. W. Ford, superintendent.

***Dalhart, Tex.**—W. J. Blair and associates have been granted a franchise by the Council to build an electric railway in Dalhart.

***Colonial Beach, Va.**—J. R. Benton, representative of a Philadelphia syndicate, has applied to the Municipal Council of Colonial Beach, asking for certain concessions in furtherance of a plan to build an electric railway from Colonial Beach to the nearest point on the Richmond, Fredericksburg and Potomac Railroad, which is Quantico, a distance of 22 miles. The power plant is to be built at Classic Shore.

Seattle, Wash.—The Supreme Court has rendered a decision in favor of the Seattle Electric Company, which intervened in the hearing of an injunction secured by Edwin C. Ewing against the City Council to prevent the issuance of a street railway franchise to this company covering a route over Rainier Boulevard.

Mannington, W. Va.—The Fairmont & Mannington Traction Company has been granted a franchise by the City Council to connect with the Morgantown & Dunkard Valley Electric Railway, which has also been granted a franchise and will build from Mannington to Blacksville, W. Va.

Milwaukee, Wis.—The Milwaukee Western Electric Railway has petitioned the Railroad Rate Commission for a certificate of convenience and necessity to change its route over certain streets of Milwaukee.

TRACK AND ROADWAY

British Columbia Electric Railway, Vancouver, B. C.—This company expects to place contracts in a few weeks for constructing a 2½-mile single-track extension in North Vancouver and a 7-mile suburban system east from Vancouver through Burnsby.

***Burbank, Cal.**—L. C. Brand has made a proposition to the citizens of Burbank to build an electric railway from Burbank along Fourth Street to Grandview Avenue, easterly to Brand Boulevard, Glendale. Mr. Brand's plan provides that a bonus of $40,000 be raised and right of way given along the route mentioned. The fare between the two points is to be 10 cents each way. Construction will be started within six months after the bonus is raised and right of way obtained.

Peninsular Railway, San José, Cal.—The electric railway extension from Palo Alto to Stanford University has been completed and is in operation. This extension is owned by Stanford University, but will be operated and maintained by the Peninsular Railway. W. H. Yount, manager of this division.

Grand Junction & Grand River Valley Railway, Colorado Springs, Col.—E. A. Sunderlin, vice-president and general manager, announces that this electric railway to connect Grand Junction, Fruita and Clifton, 20 miles distant, has 3 miles of the line completed, and 17 miles under construction. The company will operate ten cars and will furnish power outside of Grand Junction. The power station and shops will be located at Grand Junction. Headquarters, Mining Exchange Building, Colorado Springs, and superintendent's office, Grand Junction. Capital stock, authorized, $2,000,000; issued, $1,000,000. Bonds, authorized, $2,000,000; issued, $850,000. Officers: Thos. E. Curtis, Colorado Springs, president; Orson Adams, secretary and treasurer; Thos. L. Harvey, superintendent and electrical engi-

neer, and E. L. Mooley, chief engineer, Grand Junction, and S. M. L. McSpadden, purchasing agent. [E. R. J., Oct. 9, '09.]

City & Suburban Railway, Brunswick, Ga.—This company advises that its electric railway, extending 6 miles in Brunswick, is completed and in operation. The company operates four to six cars by the overhead system. The power station and repair shops are located at Brunswick. Officers: F. D. Strachan, president; Albert Fendig, vice-president; George H. Smith, secretary and treasurer, and J. M. Armstrong, general manager and electrical engineer. [E. R. J., June 26, '09.]

Macon (Ga.) Traction Company.—The survey for this proposed electric railway from East Macon to Recreation Club, a distance of 5 miles, has been started. Jesse B. Hart and Frederick Kauffmann are said to be interested. [E. R. J., Oct. 16, '09.]

Woodstock & Syracuse Traction Company, Chicago, Ill.—Charles A. Spenny, 709 Tacoma Building, Chicago, secretary, advises that 20 miles of grading have been completed to connect Woodstock, Franklinville, Marengo, Genoa and Sycamore, 36 miles distant. The company recently contracted for 16 miles of rails and will commence at once the laying of track, having 5 miles of ties laid. B. Armstrong, Sycamore, chief engineer.

Belleville & Mascoutah Transit Company, Mascoutah, Ill.—G. J. Scheve, secretary and treasurer, confirms the report that the grading on this electric railway from Mascoutah to Belleville, via Rentchler Station, has been started. Officers: Adolph Knobeloch, president; E. R. Haguist, vice-president, and David O. Thomas, general manager and superintendent. [E. R. J., Aug. 28, '09.]

Murphysboro Electric Railway, Light, Heat & Power Company, Murphysboro, Ill.—This company expects to place contracts, during the next 90 days, for constructing about ¾ of a mile of track and a bridge across the Big Muddy River. C. H. Clay, manager.

Indianapolis, Columbus & Southern Traction Company, Columbus, Ind.—This company is taking down about 40 miles of 00 round trolley wire between Indianapolis and Columbus and putting up in its stead 40 miles of 0000 grooved trolley wire. The company will also reconstruct its high-tension line from Greenwood to Reddington, a distance of about 45 miles. The present construction is with one insulator on the top pole pin and two on a cross arm below, giving a triangular spacing of about 30 in. The high-tension wire is aluminum, and owing to the stretching of the wire it will be necessary to install a new two-pin arm about 13 in. below the present arm, making the triangular separation between the three wires about 45 in.

Delphi, Flora & Burlington Traction Company, Delphi, Ind.—E. W. Bowen announces that this company has petitioned the County Commissioners for subsidy elections to be held in Deercreek, Monroe and Burlington Townships for constructing the electric railway to connect the cities named in the title. The company intends to operate gasoline cars. [E. R. J., Oct. 16, '09.]

Indianapolis, New Castle & Toledo Railway, New Castle, Ind.—The Union Trust Company, Indianapolis, receiver for this company, has awarded the contract for the construction of several bridges to the National Concrete Company, Indianapolis. The company is building 30 miles of electric railway; all material has been purchased.

Albia (Ia.) Interurban Railway.—This company expects to build next year a 9-mile extension from Albia to Buxton. W. E. Gant, manager.

Des Moines & Sioux City Railroad, Des Moines, Ia.—The officers of this company, given on page 925 in the issue of the Electric Railway Journal of Oct. 23, 1909, were inadvertently reported wrong. The correct officers are: J. W. Reed, president; M. H. Miller, vice-president and general manager; J. W. Russell, treasurer; M. F. Coons, secretary, and C. E. Russell, auditor.

New Orleans Railway & Light Company, New Orleans, La.—Preliminary arrangements are being made by this company for the sale of $5,000,000 of 5 per cent bonds, of which $3,000,000 will be used for improvements.

North Jersey Rapid Transit Company, Paterson, N. J.—According to an announcement, this electric railway, which is to connect Paterson, Glen Rock, Ridgewood and Hohokus, will be in operation some time in 1910. Later the railway will connect Waldwick, Allendale, Ramsey, Mahwah and Suffern, and it is to be extended south from Paterson to Jersey City to connect with the Hudson & Manhattan Railroad at Marion. Malcolm R. McAdoo, Montclair, vice-president.

***Northern New York Construction Company, Vineland, N. J.**—This company has been organized here to build an electric railway between Vineland and Bridgeton. George E. Stevenson is president of the company and B. F. Patterson, New York, and Frank Parvin, vice-presidents; T. H. Coggey, New York, secretary, and H. C. Bartlett, treasurer. A survey is being made and the right of way solicited by the company.

Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y.—It is the intention of this company to award the contract for constructing its proposed extension between Syracuse and Fulton early next month. The right of way has been all secured.

Ardmore, Okla.—It is announced that M. T. Forsythe, engineer, has started the survey of the proposed electric railway from Ardmore to Chickasha, Duncan and Fort Sill, a distance of 170 miles. Oscar Ayres, promoter. [E. R. J., June 26, '09.]

Coos Bay & Inland Railroad, Portland, Ore.—At a meeting of the Coos County and Douglas County railroad committees with Frederick D. Kuettner and Charles Ringler, representing this company, in Roseburg, the contract between the committees and the company was signed, providing that the company shall deposit with the committees as trustees the sum of $100,000, half in stock of the company, to secure the performance of the company's agreement. The company agrees to complete the electric railway which is to extend from Marshfield to Roseburg via Coos Bay within three years after the preliminary survey is completed. [E. R. J., Oct. 16, '09.]

Lehigh Valley Transit Company, Allentown, Pa.—R. P. Stevens, president of this company, has awarded a contract to George H. Hardner involving an expenditure of about $50,000 for the regrading and straightening of 21 miles of this electric railway from Allentown to Slatington.

Canonsburg & McDonald Railway, Canonsburg, Pa.—Right of way for this electric railway has been obtained. Promoters will meet in Pittsburgh this week to organize and apply for a charter. J. B. Holland, Cecil, is said to be interested. [E. R. J., Sept. 25, '09.]

Huntingdon, Lewistown & Juniata Valley Traction Company, Huntingdon, Pa.—This company has filed a mortgage of $1,500,000 to the Empire Trust Company, New York, to be used for the construction of its electric railway from Huntingdon to Lewistown and Mount Union. [.E R. J., Oct. 23, '09.]

Pittsburgh, Monongahela & Washington Railways, Pittsburgh, Pa.—This company expects to place contracts, within a few weeks, for laying ¾ of a mile of track and grading and constructing a street railway on Park Avenue. J. W. Bridge, general manager.

South Dakota Interurban Railway, Centerville, S. D.—It is reported that the survey on this proposed electric railway to extend from Sioux City, Ia., to Bijou Hills, S. D., a distance of 160 miles, has been started on the Sioux River in Union County, Ia. William E. Miller, Centerville, is said to be interested. [E. R. J., May 15, '09.]

Beaumont (Tex.) Traction Company.—This company expects to place contracts, within a few weeks, for constructing about a mile of track in paved district with 90-lb. 7-in. T rail. C. H. Kretz, manager.

Bryan, Tex.—A bonus of $10,000 has been subscribed for the electric railway between Bryan and the State College, 5 miles. J. T. Maloney, Mayor, and others are interested. [E. R. J., Aug. 28, '09.]

San Angelo (Tex.) Street Railway.—This company expects to place contracts within six weeks for the construction of a 2-mile extension. The company has on hand the necessary steel and trolley wire, but will need the other material.

Twin City Light & Power Company, Chehalis, Wash.—This company is said to be endeavoring to secure a contractor to build the electric railway connecting Chehalis and Centralia. The plans and specifications are all ready and are being figured on by the company. C. L. MacKenzie, Colfax, is said to be interested. [E. R. J., May 29, '09.]

Waterville (Wash.) Railway.—This company has been organized to build an electric railway from Douglas Station, on the Great Northern Railroad extension from the Columbia River, to Waterville, 5 miles distant. Capital stock, $100,000. Officers elected: C. A. Granis, president; F. C. Kennedy, vice-president; George C. Wiley, secretary and treasurer, and A. L. Rogers, chief engineer. The company will furnish passenger transportation, but will handle all of its freight in the freight cars of the Great Northern Railroad which it will receive and deliver at Douglas. The company has asked for bids for the grading of the right of way, and expects to lay rails in about six months. [E. R. J., Oct. 9, '09.]

Merrill (Wis.) Street Railway.—This company has completed the relaying of track over its entire system. The improvement involved an expenditure of about $15,000.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—This company expects to place contracts within a few weeks for constructing an extension to its car house shops.

Grand Junction & Grand River Valley Railway, Grand Junction, Col.—This company expects to place contracts during the next six months for constructing a car house. General office, Colorado Springs.

Chicago, Ottawa & Peoria Railway, La Salle, Ill.—This company has leased a room in the Hillenbrand Building at 111 East Hickory Street, Streator, to be used as a station. This station will include the ticket office, passenger waiting room and baggage room.

Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.—This company has begun the construction of a car house on the Bluffton division at the Smith gravel pit 3 miles south of Fort Wayne. The building will be made as near fireproof as possible.

Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind.—G. W. Milliken has the contracts for the construction of a car house and repair shops for this company.

Springfield (Mass.) Street Railway.—It is stated that this company will build two storage car houses, to be located on Westfield Street, West Springfield, at a probable cost of about $20,000. These buildings will be used to relieve the congestion of the Hooker Street car house.

Cape Breton Electric Company, Sydney, N. S.—This company has placed contracts for the erection of a one-story stock room and freight shed, 45 ft. x 60 ft. A. F. Townsend, manager.

Hummelstown & Campbellstown Street Railway, Hershey, Pa.—This company has lately completed the construction of a car house 56 ft. x 183 ft.

Quebec Railway, Light & Power Company, Quebec, Que.—This company expects to place contracts early next year for the construction of a car house.

POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway, Vancouver, B. C.—This company has let contracts for the construction of five reinforced concrete substations along the 60-mile extension through the Fraser Valley. The company has purchased and is installing in its power plant at Vancouver a second 2000-kw, 60-cycle, six-phase rotary converter.

Grand Junction & Grand River Valley Railway, Grand Junction, Col.—This company expects to place contracts within the next six months for constructing a substation and for new equipment. The company has purchased a steam turbine, two 250-hp boilers and a 500-kw generator.

Peoria (Ill.) Railway Terminal Company.—This company expects to place contracts within the next three months for two generators, two turbines and other necessary equipment.

Binghamton (N. Y.) Railway.—This company has commenced work on the addition to its State Street power plant for the installation of additional equipment and the construction of a new smokestack. The cost will be approximately $40,000.

Durham (N. C.) Traction Company.—This company expects to place contracts, within a few weeks, for a 500-hp cross-compound Corliss engine, direct connected to a three-phase, 60-cycle, 2300-volt generator, or for a 500-kw turbo-alternator. If the engine and generator are purchased the engine will be run condensing.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company has purchased from the Heine Boiler Company two 500-hp boilers.

Hull Electric Company, Aylmer, Que.—This company has placed contract for the steel work for bulkhead on its power house at Deschenes.

Whatcom County Railway & Light Company, Bellingham, Wash.—The alterations in the power plants of this company, mentioned on page 638 of the Oct. 2, 1909, issue of the Electric Railway Journal, are to be made by the Stone & Webster Engineering Corporation, Boston, Mass. In the Nooksack Falls water power plant an impulse wheel will be substituted for the present 3300-hp Francis turbine. The York Street power station will be enlarged to accommodate a new 1500-kw turbo-generator with boilers, condensers and other steam and electrical auxiliaries.

Manufactures & Supplies

ROLLING STOCK

Illinois Traction System, Peoria, Ill., is in the market for four double-truck express car bodies.

Louisville (Ky.) Railway has placed an order with the Cincinnati Car Company for 33 city cars.

Central Railroad of Brazil is contemplating the purchase of 100 closed motor cars for extra wide gage.

Denison & Sherman Traction Company, Denison, Tex., has ordered two cars from the American Car Company.

Columbus, Marion & Bucyrus Railway, Marion, O., is reported to be planning the purchase of two interurban cars.

Beaumont (Tex.) Traction Company is in the market for three or four double-truck, semi-convertible cars, complete.

T. N. Motley & Company, New York, N. Y., will be in the market soon for about 15 combination baggage and passenger cars.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill., will place an order soon for five single-truck cars and one interurban express car.

Municipal Traction Company, Cleveland, Ohio, placed an order several days ago with the G. C. Kuhlman Car Company for 25 city cars.

Toledo Railway & Light Company, Toledo, Ohio, is reported to have placed an order for 20 city cars with the G. C. Kuhlman Car Company.

Atchison Railway, Light & Power Company, Atchison, Kan., is in the market for five semi-convertible cars 18 ft. 6 in. long inside and having 5-ft. vestibules.

Chippewa Railway, Light & Power Company, Eau Claire, Wis., expects to purchase two pairs of trucks for 45-ft. interurban cars within the next six weeks.

Rockland Railroad, Nyack, N. Y., it is reported will purchase 23 cars in the next three or four months for interurban passenger purposes. This road is under construction.

Olympia Light & Power Company, Olympia, Wash., is considering the purchase of two closed, convertible or semi-convertible, small double-truck cars with complete equipment.

Grand Junction & Grand River Valley Railroad, Colorado Springs, Col., will buy two combination passenger and baggage cars and one passenger car during the next six months.

Los Angeles-Pacific Railroad, Los Angeles, Cal., through the Southern Pacific Railroad, will purchase 84 all-steel passenger motor cars for use on the Santa Monica branch of the Southern Pacific Railroad, which is electrically operated.

Wabash & Northern Indiana Traction Company, Warsaw, Ind., mentioned in the Electric Railway Journal of Oct. 23, 1909, as expecting to buy its rolling stock from The J. G. Brill Company, it is learned is in the market for nine 50-ft. interurban cars.

Visalia (Cal.) Electric Railroad has placed an order for two 50-ft. car bodies with the Moran Shipbuilding Company, Seattle, Wash. These cars are to be of the three-compartment type, the compartments to have the following lengths: Baggage, 12 ft.; smoking, 14 ft.; passenger, 24 ft.

Rock Island-Southern Railroad, Monmouth, Ill., has ordered from Haskell & Barker, Michigan City, Ind., 75 gondola coal cars of 80,000 lb. capacity and 50 box cars of 60,000 lb. capacity, to be used in hauling coal between the Gilchrist and Matherville mines and Davenport. They are to be delivered early in 1910.

Michigan United Railways, Lansing, Mich., is rebuilding nine interurban cars to be used between Jackson and Kalamazoo and from Lansing to Jackson. Three of these car bodies were purchased from the Detroit United Railway and reconstructed in the company's shops at Lansing. All of the cars have been fitted with Baldwin trucks, having 7-ft. wheel base. Five of the cars have been equipped with new GE-205 motors. The company advises that it has overhauled all of its interurban cars during the summer.

Chicago & Milwaukee Electric Railroad, Highwood, Ill., mentioned in the Electric Railway Journal of Sept. 25, 1909, as being in the market for a number of cars, has ordered the following: One dining and buffet car, three first-class coaches for limited train service, one combination smoking and first-class coach and 13 standard interurban cars from the American Car Company; 13 pairs of trucks were ordered from McGuire-Cummings Manufacturing Company. Five pairs of Baldwin trucks were ordered for five of the standard cars being built by the American Car Company. Hale & Kilburn seats, Smith No.

2 heaters, Westinghouse AMM automatic air brakes and four General Electric 75-hp motors with type M control will be used on all the above-mentioned cars. The company has also purchased one express car and one double-truck snow sweeper from the McGuire-Cummings Manufacturing Company.

Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., reported in the Electric Railway Journal of July 10, 1909, as contemplating the purchase of some rolling stock, has ordered four combination passenger and baggage cars, 20 single-truck, semi-convertible city cars, four trailer freight cars and two interurban freight cars from the Cincinnati Car Company. The details of the 20 city cars follow:

Seating capacity.....32
Weight .....17,000 lb.
Length of body..32 ft. 1 in.
Width over sills.. 8 ft. 1½ in.
Length over vestibule .....31 ft. 1 in.
Width over posts at belt..... 8 ft. 4 in.
Sill to trolley base.....9 ft.
Height, top rail to sills.32 in.
Body .....wood
Interior trim.....white oak
Underframe .....Composite
Control system, General Electric K-10
Bumpers .....Cincinnati
Couplers...Van Dorn No. 5
Curtain fix....Curtain S. Co.
Curtain material...Pantasote
Destination signs....Hunter
Fenders ..... Providence
Gears and pinions.Gen. Elec.
Gongs .....Adams-Westlake
Hand brakes.....Peacock
Heating system.Consolidated
Headlights, Electric Ser. Sup. Co.
Journal boxes....Symington
Motors.....Two GE-80
Push button signal.Cincinnati
Registers .....International
Roofs .....Cincinnati
Sash fixtures, O. M. Edwards Co.
Seats..Hale & Kilburn, long rattan
Springs, Railway Steel Spring
Step treads.....Cincinnati
Trolley poles, General Electric
Trolley base.....GE-6
Trolley wheels.....GE
Trucks.....Curtis CGJ8-96
Wheels...Bass Foundry Co., cast iron

TRADE NOTES

Thomas Barlow & Sons, Durban, Natal, have been appointed agents for The J. G. Brill Company for Natal, Transvaal and the Orange River Colony.

Guy H. Gibbs, who has been connected with the Westinghouse Electric & Manufacturing Company for the last eight years, four of which have been served with that company at its Cincinnati office, has entered the employ of the Western Electric Company at Cincinnati.

H. W. Johns-Manville Company, New York, N. Y., announces that it has taken the exclusive sales agency for the New Lexington High-Voltage Porcelain Company, New Lexington, Ohio, which manufactures a complete line of high-grade porcelain insulators adaptable for all purposes and all voltages.

James Paton, who for some time has been associated with the St. Louis Car Company, St. Louis, Mo., has accepted a position as sales engineer with the Chicago office of the National Brake & Electric Company. Mr. Paton has had a wide experience in electric railway and engineering work and is well acquainted in the electric railway field. Before becoming associated with the St. Louis Car Company he was for several years employed by Ford, Bacon & Davis, engineers, and at one time was master mechanic of the Birmingham Railway, Light & Power Company, Birmingham, Ala.

John A. Roebling's Sons Company, Trenton, N. J., received a grand prize, highest award, for its exhibit of catenary trolley construction at the Alaska-Yukon-Pacific Exposition. The exhibit, which formed part of the company's display of wires used for electrical purposes, consisted of a model span 14 ft. 6 in. long, with a miniature trolley car beneath. Wire strand, similar in design to that employed in catenary construction, but only 3-16 in. thick, was used to support the trolley wire. The spreaders consisted of triangles made of No. 8 galvanized steel wire, while the trolley wire was a grooved section, No. 8, B. & S. gage copper wire. The entire exhibit, including the miniature trolley car, was made at the Roebling works.

ADVERTISING LITERATURE

Cooper Heater Company, Dayton, Ohio, is distributing a folder in which the improved Cooper hot-water heater is described and illustrated.

St. Louis Frog & Switch Company, St. Louis, Mo., has issued a very complete catalogue of its track work for steam, electric and industrial railways.

Automatic Ventilator Company, New York, N. Y., has published a 30-page catalog in which its system of automatic ventilation as applied to steam and electric cars is fully described and illustrated.

Allis Chalmers Company, Milwaukee, Wis., has published Bulletin No. 1618, entitled "Fighting Fires with High-Pressure Streams." It contains the official report of the efficiency tests of the New York high-pressure system conducted by Prof. R. C. Carpenter, of Cornell University.

Bergoff Bros., 1416 Broadway, New York, N. Y., have issued a card calling attention to the service performed by them during the strike of the employees of Pressed Steel Car Company at McKees Rocks, Pittsburgh, and the strike of the motormen and conductors of the Philadelphia (Pa.) Rapid Transit Company.

John F. Scott & Company, Highland Park, Ill., have printed a leaflet in which their combination hanger and ear is described. Two tables of costs are presented, in connection with the reading matter, one for 5 years and the other for 7 years, showing the saving which can be effected by the use of the firm's product.

Ohio Filler Shield Company, Columbus, Ohio, is distributing a folder containing samples of the three types of shield which it manufactures, the graphite iron, metal and roof shields. A paragraph describing the various uses to which the company's product may be adapted accompanies each of the three samples. Attention is also called in the folder to the company's waterproof concrete shield.

National Electric Lamp Association, Cleveland, Ohio, has issued Bulletin No. 5 B which is devoted to modern railway lamps. Two types described, those for d. c. service with tantalum filaments and those for a. c. service with carbon filaments. In connection with the descriptive matter a number of data tables and a set of curves are printed showing the variation of candle power with voltage for 4 watts per candle carbon lamps and for tantalum street railway lamps.

J. P. Devine Company, Buffalo, N. Y., has published two small placards, one entitled "The Long and Short of It," and the other containing extracts from the report of the committee on equipment of the American Street & Interurban Engineering Association. "The Long and Short of It" shows by diagrams giving costs the operations through which coils were put under the old process and the operations through which they pass when subjected to the Passburg process.

Electric Railway Improvement Company, Cleveland, Ohio, has printed an illustrated 30-page catalog on the installation of rail bonds by electric and copper welding. The catalog opens with an interesting chapter on the early history and present facts of rail bonding. The company's apparatus for electric and copper welding is fully described and illustrated. Brief directions are also given of the method of applying both of these welds. In addition, the publication contains illustrations of the various types of bonds.

Duplex Metals Company, New York, N. Y., has issued a circular entitled "Is Copper-Clad Steel Wire an Experiment?" A list of 18 steam railroads using 9600 miles of copper-clad wire is published. The company has also issued an illustrated catalog describing the features of its copper-clad steel wire. It contains a number of tables showing the comparative gages, approximate weights of weather-proof copper-clad steel wire, comparative weights and resistance per 1000 ft., etc., and comparative characteristics of copper and copper-clad wire.

National Brake Company, Inc., Buffalo, N. Y., has issued, for distribution in the United States only, an attractive 30-page catalog on the Ackley adjustable brake and the Peacock brake. Each of these types is fully described and illustrated, and accompanied by a number of drawings. In connection with the description there are printed code words for ordering the apparatus, and price lists. The National Brake Company has issued a similar catalog descriptive of the Ackley adjustable brake alone. This publication is for use in all other countries, and is printed in English, German, French and Spanish.

NEW PUBLICATIONS

Railway Signaling in Theory and Practice. By James Brandt Latimer. Chicago, 1909: Mackenzie-Klink Publishing Company; 420 pages with index; illustrated. Price, $2.50.

The author of this work has had over 25 years' experience in the operating and signal departments of steam railroads and is now signal engineer of the Chicago, Burlington & Quincy Railroad. He has written a painstaking analysis of signal practice and apparatus, making his book particularly valuable by the many practical comments drawn from his experience. Several chapters are devoted to the preparation of contracts, dealings with public authorities and with the making up of specifications.

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Amendment of Corporation Tax Law Urged

In the interest of amendment of the corporation tax law when Congress meets in December, the American Association of Public Accountants has addressed a letter to its members, directing their close attention to the importance of this measure. The law, under the construction of the attorney-general of the United States, is declared in the letter to be "a curious blending of the archaic and modern." J. A. Sterrett, president of the association which is thus urging prompt action in this matter, states his belief that this law is the only one in any English-speaking country that attempts to levy an income tax upon the difference between cash receipts and disbursements. Among the various objections which the accountants of the country are requested to consider are the needless burden placed upon the corporations by the peculiar provisions and interpretation thereof and the ease with which unscrupulous men will be able to make returns that will enable them to evade the payment of the tax in whole or in part. At the Denver meeting the attention of electric railway managers was called to this law by President Shaw, of the American Street & Interurban Railway Association, and by A. L. Linn, Jr., general auditor of the New York State Railways; and it is evident that the movement for careful consideration of the effect of this added burden of taxation is spreading.

Preparing for Snow

The summer season is over and the first snow storm of winter may arrive any day or night, finding some laggard street railway companies unprepared to cope with it. No time should be lost in going over carefully, from the wheels to the trolley, all sweepers, snow plows and salt cars, and preparing them for the hard work to come. These preparations are just now more important than making ready the passenger cars for winter service. The crews to man the sweepers and plows and the track forces which may be called upon to aid in keeping the lines open with hand tools need to be organized and instructed in their duties. In each car house where the snow-fighting equipment is to be placed for the winter the track on which it is stored should be cleared and kept open to the street, so that there will be no delay in running the cars out of the house when called for. From now on this part of the equipment will play as important a rôle in maintaining schedules as the emergency wagons, and no details of preparation can be safely overlooked.

Thorough overhauling of the snow-fighting equipment in the shops is absolutely necessary at least once a year, and regular inspection should not be neglected during the winter. These equipments are subjected to the very hardest service when in use, and usually are stored after the last storm of the season in some out-of-the-way corner of a car house or in the open. The mud and salt brine are allowed to dry and rust on the trucks, motors, sprockets, chains and other parts of the running gear. Bearings are drained of oil, insulation on the exposed wiring rots, nuts work loose and are lost, and the wear-and-tear in general during the idle months is as severe as that resulting from actual operation. In overhauling, every worn part should

be adjusted or renewed, nuts tightened, wiring inspected and replaced if necessary, bearings lubricated, and the equipment restored to as nearly perfect condition as possible. Particular attention should be given to the chains and sprockets of sweepers to insure that they are not worn to the danger point. The motor resistances also need careful examination, as they must be ready to withstand much hard usage. It is essential to supply each sweeper or plow with a liberal stock of small repair parts and tools, such as extra links for the chains, motor brushes, resistance grids, wrenches and similar parts, so that the minor breakdowns on the street can be remedied at once, without calling for help, which sometimes cannot be given from the shops when the lines are tied up.

Comparison of New Haven Properties

The annual report of the New York, New Haven & Hartford Railroad for the year ended June 30, 1909, includes some figures in reference to the operations of the Connecticut Company and the Rhode Island Company, which operate the street railways controlled by the system in the States named. The detail in which the statements of these companies are presented permits some analysis of the distribution of operating expenses and of the sources of earnings.

According to the latest statements available showing the miles of track operated by these two properties, the Connecticut Company has a total of 755 miles and the Rhode Island Company of 319 miles. The variation in the extent of railway which these figures indicate is borne out by the gross earnings for the respective companies, but there is some discrepancy in the total revenue per mile of track of the two roads. With gross earnings of $7,988,832, the average of the Connecticut Company per mile of track was $10,581, and the Rhode Island Company, with a total revenue of $4,160,785, did materially better. Its average per mile of track was $13,043.

In each instance the large part of the total revenue was obtained from the passenger traffic, but the proportion of the gross earnings derived from this portion of the business was much smaller in the case of the Connecticut Company than with the Rhode Island Company. Earnings from passengers carried by the former company amounted to 80.3 per cent of the total, while the results reported by the Rhode Island Company show that its passenger earnings reached 93.2 per cent. Another difference in the sources of earnings is shown in the inclusion in the statement of earnings of the Connecticut Company of one item entitled "Miscellaneous, including gas, light and water," the revenue from which was $1,178,782, which is equivalent to 14.8 per cent of the total operating revenue from all sources. The miscellaneous earnings of the Rhode Island Company aggregated only $26,225. Express earnings of the Connecticut Company are stated as $224,294, as compared with $169,581 from the freight and express carried by the Rhode Island Company. These sums are respectively 2.8 and 4.1 per cent of the total operating earnings. Park earnings of the Connecticut Company are stated at $62,116, but no reference to any revenue from this source appears in the Rhode Island report. Earnings from mail carried by the Connecticut Company were larger than the sum reported by the Rhode Island Company, but the former company obtained a total revenue of $39,778 from the sale of power as compared with a corresponding total of $56,076 by the latter company.

Some discrepancy is shown in the operating ratio, which was 53.8 per cent for the Connecticut Company as compared with 55.5 per cent for the Rhode Island Company. Of the total percentages used in operating expenses the former property applied a little more than the latter in maintenance. The divisions, as between way and structures and equipment, in per cent of gross earnings, are as follows: Connecticut Company, way and structures 7.2 per cent, equipment, 5.6 per cent; total 12.8 per cent. Rhode Island Company, way and structures 4.8 per cent, equipment 6.3 per cent; total 11.1 per cent. Operation of power plants and operation of cars cost the Connecticut Company 9.4 and 20.3 per cent, respectively, of its gross revenue from operation. The corresponding expenditures of the Rhode Island Company amounted to 8.8 per cent and 24.2 per cent. General expenses were 7.1 per cent for the Connecticut Company and 11.4 per cent for the Rhode Island Company. These figures represent the total expenditure for the Rhode Island Company. The Connecticut road shows an additional $337,345 for miscellaneous expenses. This sum is equivalent to 4.2 per cent of the gross revenue, and it may represent in part the operating expenses chargeable against the miscellaneous earnings.

While the Connecticut Company, therefore, expended a larger proportion of its gross earnings in maintenance and its cost of power plant operation was higher than with the Rhode Island Company, the Connecticut properties operated their cars for almost 4 per cent less than the Rhode Island lines.

Motor Bearings

The prevention of hot motor and journal bearings depends upon the use of suitable material for both journals and bearings, reasonably smooth surfaces between the bearing metals, proper design and fit of bearings to avoid excessive pressure on contact surfaces, and, above all, the constant maintenance of a sufficient quantity of lubricant between the bearing surfaces. The use of babbitt metal for motor bearings has become practically universal during the past few years, and excellent results are being secured with babbitt having a tin base. Even after motors are converted to oil lubrication it is desirable to continue using the more expensive tin base metal than to adopt a cheaper lead base babbitt. Whatever the composition of the babbitt, it is important that the bearing metal should have sufficient mechanical strength to withstand the pressure to which it is subjected in service without displacement or crumbling. Tin base babbitt metal possesses this degree of strength, but it must be properly anchored or amalgamated to the bearing shell. Hence the shells should be carefully tinned before lining them with babbitt. Heating the shells to a proper temperature before pouring in the babbitt is also an important point. The slight increase in the cost of making bearings out of the best materials and with the greatest care is trifling in comparison with the cost of bearing failures in service.

It is now considered the best practice to roll the jour-

nals of steel shafts, to secure not only a smoother surface, but also to harden the steel and improve its wearing qualities. In this connection the matter of applying sleeves to worn armature shaft bearings deserves consideration. In former practice it was common to provide several diameters of bearings, so that when an armature shaft became worn down it could be used with a bearing bored to a smaller diameter. On large systems this was the cause of endless trouble. It frequently happened that when car houses received armatures with small shafts there were no bearings of suitable size to apply to them. To keep on hand a supply of bearings, often four sizes to each motor at a number of different houses, required a large surplus stock to be carried. Most progressive master mechanics now maintain armature shaft journals at a standard size, renewing when worn down by putting a sleeve on the journal. In many cases where the sleeves have not been made the proper thickness, the surfaces badly finished or poor shrinkage fits made, these sleeves have worked loose. It is necessary to apply sleeves with great care and to establish absolute limits of wear for armature journals in particular. There is little evidence, however, that loose sleeves are the cause of hot bearings. Sleeves bored to a smaller diameter than the journal and shrunk on by heating tend to become loose when the bearing itself overheats in service.

It is usual to machine babbitted bearings or to babbitt to the correct size around a core. The plan of forcing a mandrel through tin base babbitt or rolling it should be discouraged on account of the resulting crystallization and tendency toward breaking up of the thin shell of metal. In fitting bearings it is desirable to avoid clamping or pinching the journal. Armatures should be revolved by hand after the bearing caps have been tightened. Cylindrical bearings should be slightly larger than the diameter of the journals, to allow for differences in the expansion of the metals and to permit the oil film to be carried under the bearing surface. Oil channels are desirable at the tops of bearings likely to carry upward pressure, and another important point is to round off or cut the edges of bearings so that they do not wear to sharp, cutting corners. The edges should approach the journal at an angle which will permit the oil to be carried between the bearing surfaces. Lack of end play, loose journal box caps and poorly fitted dust guards are frequent causes of bearing troubles. Even a perfectly lubricated bearing may run hot if the end play is not right. In some cases good results have followed the plan of numbering bearings and armature shafts and so far as possible keeping journals and bearings together in operation. There is no doubt that the exercise of greater care in packing bearings and in inspecting them after initial trips on the road, following readjustments and replacements in the car house or shop, will in many cases result in decreased failures in service.

Sources of Interurban Patronage

Apart from their merits as transportation projects, the two high-speed electric interurban railroads for which applications for franchises are now being heard by the Massachusetts Railroad Commission afford interesting side lights upon the sources of passenger revenue in thickly populated territory. The engineers of the Boston & Eastern and the Boston, Lowell & Lawrence electric railroads have presented comprehensive evidence to the commission regarding the traffic possibilities of the respective territories to be traversed. Without attempting to analyze the probable division of traffic between competing lines, certain fundamental facts relating to interurban earnings may be deduced from the testimony offered by the established and the proposed organizations. These points deserve the attention of electric railways wherever the keen edge of competition cuts into receipts.

The attraction of interurban patronage depends upon the speed, frequency, convenience, cost and comfort of the service rendered in comparison with similar facilities offered by competing lines. The road which combines these features best in the long run will secure the largest share of the traffic. Probably speed, with safety, is the most important quality of service, but this does not mean maximum speed between stations, nor in all cases maximum theoretical schedule speed, including stops. The final controlling factor is the total average time from origin to destination. Accessibility of electric railway facilities plays an important part here. The time of transit between home and office may be less by a trolley road of moderate schedule speed than by a steam line requiring two changes in the journey at the ends of the trip. The time required to traverse a large terminal station or to walk from a station to a certain point in the business center means far more to the suburban patron of a transportation system in relation to the total length of his journey than to the long-distance passenger.

It is unnecessary to emphasize the importance of frequent service in obtaining traffic for a new line or in stimulating new travel on an established line. In bad weather, particularly, frequent service is the best business getter. Making a special feature of any one service characteristic tends to create new patronage. Speed attracts the stream of commutation and commercial travel from slow routes; low fares appeal to the shopper, and comfort draws the pleasure rider. When these factors are fairly combined in the service offered a community the results are quickly apparent in the per capita expenditures for travel of the contributory population. The service must appeal to the entire riding public, taking into account the needs of numerous individual groups or classes of patrons.

Advertising for Traffic

Like any other commodity, electric railway transportation cannot be sold successfully unless the service is advertised. During the next few months most companies will be considering the issue of traffic circulars and other advertising matter for attracting patronage next summer. For this reason, and also because the elaborate display of advertising circulars which was made at the Denver convention is still fresh in the minds of those who inspected it, it may be appropriate at this time to consider some phases of the subject of advertising literature for electric railways.

There has certainly been a great change during the past few years in the methods followed by the electric railway companies in advertising their service. Half a decade ago little thought was given to the subject by most companies,

other than occasionally to provide dash signs or issue a circular of very modest proportions. Now the electric railway publications often rival in size and typographical appearance those issued by the steam railroad companies which have gone most extensively into this method of traffic promotion. The circulars contain news of points of historic or scenic interest passed by the cars, often with many pages of text, and they are frequently printed in two or more colors and bound in artistic covers.

The profusion of circulars of this character at the Denver convention and the strong testimony there presented as to their value by many managers ought to be convincing to those who may be skeptical about the success of the plan as a general proposition. Undoubtedly, these circulars in a great many cases, possibly in the majority of instances where they have been tried, have brought good results and more than paid for their cost of publication. At the same time, it is worth while to call attention to the fact that this is a matter which can easily be overdone. It is difficult, if not impossible, to trace the direct returns of solicitation of this kind, and a passenger agent or firm of printers, ambitious to make the circular of a road excel that of the previous year or of a neighboring road, may easily run the printing bills up to a larger sum than the manager really wanted or planned in the first place to spend.

The conditions on the steam railroads, so far as this subject is concerned, are hardly analogous. It is true many of these lines publish very expensive booklets, which are sent free upon application to prospective tourists, and that they make large appropriations for this class of publications. But those companies which have gone most extensively into this method of traffic solicitation, like the transcontinental lines, are those which have long trips to advertise, and the selection of a particular route by a single traveler will pay for many circulars. The shorter the steam line and the lower the average fare, the less, as a rule, is the cost of each circular issued by the company's passenger traffic department.

Summer travel on most interurban lines is so much heavier than the winter travel that some traffic managers are misled into believing that opportunities for developing additional traffic occur only during the warm weather. Their advertising campaign begins in the spring and ends in the fall. The fact is often overlooked that the people who ride on the cars of the company for business purposes only during the day can be induced throughout the entire year by attractive, but not necessarily expensive, advertising to patronize the interurban line at night and on holidays when they are bent on pleasure only. A small poster at each station ticket window, giving a summary of all the theater bookings, amusement resorts and special social events, the cost of admission and carfare and the most convenient car to take, both going and returning, through the subtle force of suggestion would guide many seekers of amusement to select some one of the entertainments advertised, and incidentally patronize the cars of the railway company. These posters should be revised every week, and the traffic manager should be alert to obtain in advance notices of events which might attract patrons of any class from the cities or towns reached by the company's lines.

Newspaper advertising, while it may be very effective, is usually so expensive that a small railway company does not feel justified in buying enough space to accommodate a large and comprehensive advertisement of its attractive features, schedules and fares. Where a number of companies interchange through business between cities some distance apart, or enter the same terminal city, co-operative newspaper advertising offers many advantages. Large descriptive advertisements of service given in connection with special events, such as fairs or conventions, or general advertising designed to promote electric railway travel, can be carried in the principal newspapers throughout a large territory at a comparatively small expense to each of the companies subscribing to the plan.

There is one class of advertising for which an electric railway company can afford to spend large sums. This is the advertising intended to secure new and permanent residents along an interurban line. Here every person influenced to build near the line by the advertisements of service means a regular patron who, instead of paying single fares at long intervals, will spend in traveling on the cars perhaps 10 cents or more every day during the year. This, of course, is a different proposition from attracting the single riders, and a company can afford to pay much more proportionately to secure this class of patronage.

While we do not mean to decry the growing use of expensive advertising mediums, such as descriptive folders and elaborate timetables, a note of warning should be sounded regarding the promiscuous publication of more expensive advertising matter than the profit in the traffic to be obtained will warrant. In planning next year's advertising expenditures the possibilities of the cheaper methods of advertising. such as utilizing the unoccupied space on the cars, both inside and out, small bill boards affixed to the poles supporting the overhead structure and similar places for displaying posters announcing special events or features of the regular service should not be overlooked.

The Pacific Coast Party

The Pacific Coast trip of the Massachusetts Street Railway Association, now just completed, constitutes a unique departure from all precedents in electric railway annals. The presence in the party of the president and of other officials of the American Street & Interurban Railway Association imparted to the tour an official character which it would otherwise have not possessed. In a sense the journey was a series of local conventions, not dissimilar to those formerly held by the American Street Railway Association when the attendance at the annual meetings of that body did not exceed 80 or 100. At that time one of the principal purposes of attending a convention was to inspect the street railway construction used and the operating methods employed in the city where the convention was held. A different locality was selected each year, and the choice was based largely upon the variety in railway conditions and character of the system in the convention city. This plan had to be discontinued in later years, when the attendance and exhibits grew to be so large and numerous that but few cities could accommodate both comfortably, and recently the selection has been dictated almost entirely by the available first-class hotel capacity and exhibit hall space.

The post-convention tour of the Pacific Coast party has had, however, as mentioned, most, if not all, the characteristics of the small convention, with the added merit that both visiting and resident delegations were from opposite sides of the continent. Far Eastern and Far Western practices have many points of divergence, and a comparison of these variations and the analysis of the extent to which they could or could not be justified by local conditions afforded instructive subjects for debate. Most, if not all, the Eastern visitors were familiar, through published descriptions, with the systems and methods of the properties visited, and so had a general acquaintance with them, but, as every one knows, this kind of knowledge is very unsatisfactory compared with that derived from a personal inspection. The space here available does not permit an extended analysis of the variations in Eastern and Far Western practice, but a few of the points which seem to stand out with especial prominence will be mentioned.

In rolling stock the almost universal practice on the roads from Denver west is toward a combination open and closed car, sometimes with one open compartment, sometimes with two. The latter is the direct successor of the old cable grip car, whose arrangement of lever and track brakes has in many instances been retained. The more usual form of car, however, is the half-open and half-closed design, with either end or center entrances, often protected by gates. The center-entrance car has the merit of centrally locating the conductor, but if the truck swings under the sills introduces complications in the design of the steps because, if the side sill is kept intact the steps have either to be rather high or else project beyond the contour of the car.

The general design of the combination car, however, seems well adapted to climates like those upon our Western slope, which are fairly equable throughout the year. The open compartment in the West is rarely too cool for some passengers or the closed compartment too warm for others. It is doubtful, however, whether the same car would prove desirable in the East, where the chances are that but half of it would be patronized for the greater part of the year. Nevertheless, the good features of the car impressed some of the visitors so favorably as to suggest to them the possible modification of the type for Eastern conditions as an "all the year" car by making the open compartment full-convertible and the closed compartment semi-convertible, while still preserving the center entrance. This change would give a half-open car in summer and a full-closed car in winter. The center entrance would constitute somewhat of a daring novelty in the East and might not be well adapted for use in cities with a dense vehicular traffic, as the car must occupy a part of the cross street while making a stop if the steps are brought opposite the crosswalk. The center vestibule would also probably have to be made larger than that used in Denver if the pay-as-you-enter plan is used. Nevertheless, the general idea of a center-entrance car has many good features and would seem at least to be worthy of trial by some Eastern roads.

Power station practice on the Pacific Coast differs from that on the Atlantic Coast and in the Mississippi Valley principally in the more extended use of water-powers and in the occasional employment of other fuel than coal, notably crude oil and sawdust, the former in the oil district of Southern California and the latter in the lumber region. Owing to the high price of coal, available water-powers are keenly sought, and the low cost of obtaining rights-of-way for transmission lines through an unsettled country makes the proposition an inviting one. Moreover, the climatic conditions in the Far West permit higher transmission voltages, and hence longer transmission lines, than those common in the Eastern States, so that the electrical conditions are favorable. Two hundred and fifty miles and 120,000 volts are not classed in the Rocky Mountain district and on the Pacific Slope as without the present range of engineering possibilities or as being commercially impracticable. It will undoubtedly be in this region that the greatest development in the near future in hydro-electric plants and transmission lines will occur.

Very wisely, practically all of the long-distance interurban lines have been built with double track, and in Los Angeles four tracks are used on the most congested line. This provision for the future is worthy of commendation. In fact, it is safe to say that with a great majority of interurban lines, if they are not worth double tracking they are not worth building at all. But if we except this condition and the more general use of T-rail on city streets, the differences between the two sides of the continent in track construction are in detail only. It is true that several of the important city lines in the Far West are built with a 3-ft. 6-in. gage, but this condition can be classed more as an inheritance from earlier days, like the broad gages in Eastern Pennsylvania, Delaware and Maryland, than as a fixed engineering principle. The important interurban lines in the region under consideration are standard gage, one of the longest, the Los Angeles-Pacific, having been widened during the last few months.

In this cursory view of the Pacific Coast railway situation no attempt has been made to refer to details of equipment, such as the methods of controlling cars on grades, repair shop practice or operating methods. It is universally true that each railway system and each group of railway systems, no matter where situated, develops along lines of its own, so that an inspection of each reveals new methods which cannot but be instructive, even if not always adaptable to other conditions. So it is safe to say that each delegate from the East to Denver, and each member of the Pacific Coast party of the Massachusetts Street Railway Association, has returned with a broader horizon and with new ideas, and has perhaps left behind him with those railway men with whom he talked equally helpful suggestions. Of these latter one only will be mentioned here. The low fares charged on many of the Western roads were a frequent occasion of remark. With the cost of transportation added to that of manufacture for most of the supplies used in electric railway work, and with the existing high rate of wages, how can the Western roads carry passengers at an average lower fare than those elsewhere in the country? In many cases the schedule speed is higher, but still the rates charged, in many cases only 1 cent a mile for interurban service, look far too low. One of the important interurban lines on the Pacific Coast has already taken the step to raise fares. If Eastern experience counts for anything, at least some of the others must follow this precedent before many years.

NEW CAR REPAIR SHOPS OF THE ONEIDA RAILWAY COMPANY AT SYRACUSE, N. Y.

The Oneida Railway Company has under construction at Syracuse, N. Y., a car repair shop which embodies several new and distinctive features. The shop is intended to handle all of the car repair and maintenance work, including carpentry and painting, of the Oneida Railway Company, which operates the electrified division of the West Shore Railroad between Utica and Syracuse. It also will care for the repairs and maintenance of the city and suburban cars of the Syracuse Rapid Transit Railway Company. The Oneida Railway has never had a repair shop of its own, and as the Tallman Street shops of the Syracuse Rapid Transit Railway were outgrown, it was decided to combine in one new group of buildings in Syracuse, facilities for caring for all of the rolling stock of both companies, which are operated under practically the same management.

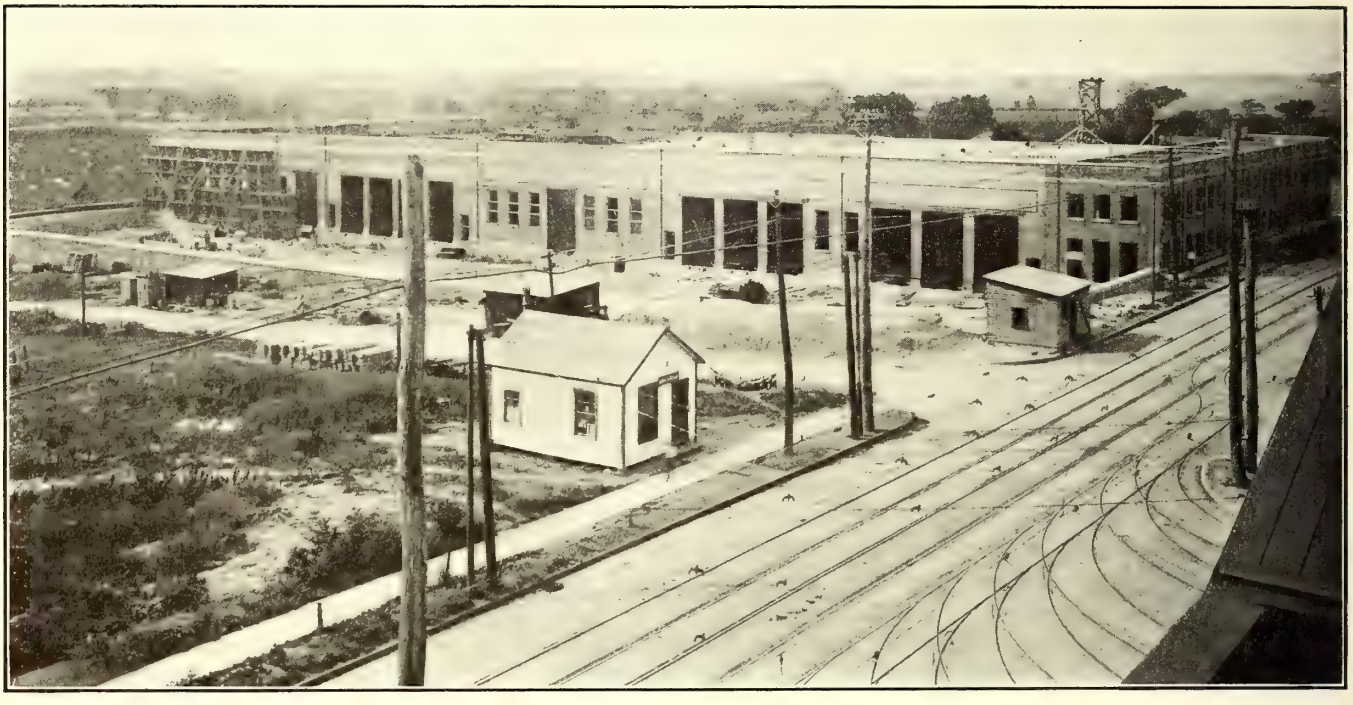
The lay-out of the shops and storage tracks was designed to accommodate maintenance and repairs on 200 cars, but space has been provided for adding a 75-ft. extension to one end of all bays, which would give an ultimate capacity for maintaining 300 cars. It is believed, however, that the buildings now under construction will accommodate both railways for the next 10 years without making necessary the construction of the possible extensions.

LOCATION

The shops are located on the Wolf Street line of the Syracuse Rapid Transit Railway between Fifth North Street and Sixth North Street. The shop tract is bounded by Wolf Street on one side and by Free Street on the other. This site was selected chiefly because of its proximity to the Wolf Street car house of the Syracuse Rapid Transit Railway, which is diagonally across the street from the shop tract. The capacity of this depot was recently increased by the addition of 19 uncovered storage and layover tracks in an adjoining yard, thus making it the largest operating car house in Syracuse. The cars of the Oneida Railway also lay over at this car house. The erection of main repair shops near this car house was specially advantageous therefore because this location will reduce the dead mileage of cars between the depot and the shops and will make available for shop use the large storage capacity of the car house and its adjacent tracks.

GENERAL DESIGN

The accompanying plan of the new shops shows a double transfer table lay-out. Extending around the entire property is a concrete retaining wall in which there are only two openings, each wide enough to admit a single track. A spur track of the New York Central & Hudson River Railroad runs along Free Street, thus giving the shops a connection with the steam railroad for receiving material and supplies in standard freight cars. This spur on Free Street forms a part of a loop track extending around the entire property. At the junctions of Fifth North and Sixth North Streets with the double-track line of the Syracuse Rapid Transit Railway, on Wolf Street, two wyes have been put in. A single-track branch-off from this loop track on Fifth North Street and a similar branch-off from the other side of the loop on Sixth North Street form the only track entrances into the shop property. These branch-off tracks lead to two transfer tables on opposite sides of the shop buildings. These two transfer tables are each 55 ft. wide and, as indicated in the plan, serve all of the tracks running into the shop buildings.



Oneida Railway Shops—General View During Construction

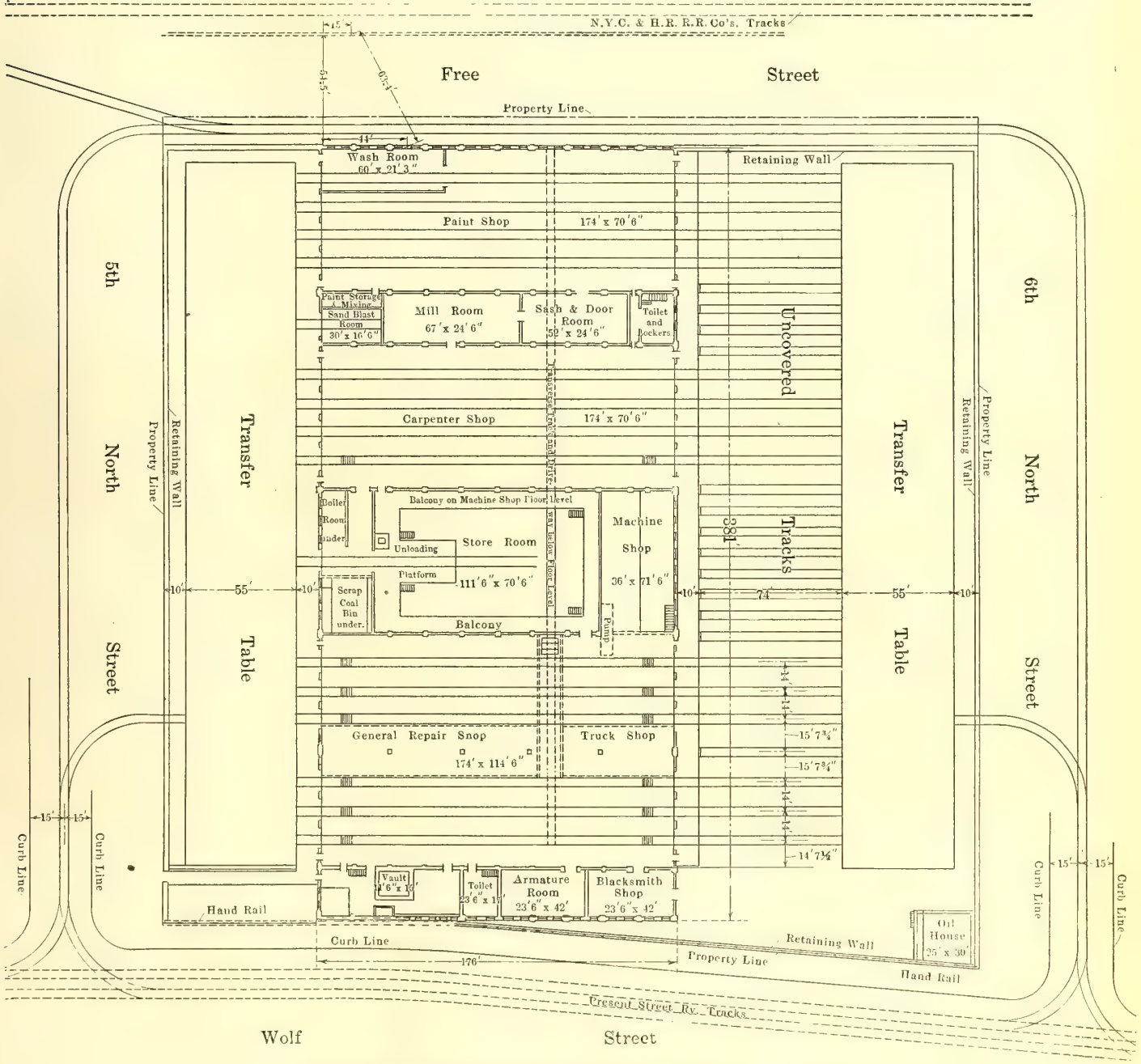
The shop buildings occupy a space 174 ft. wide and 381 ft. long between the two transfer tables. Between the Sixth North Street wall of the buildings and the parallel transfer table pit, there is a strip of ground 74 ft. wide. This space will be used ultimately for future extensions of the buildings toward the rear. Of the 27 tracks crossing this open space, 14 are extensions of shop tracks to the transfer table pit and the remaining 13 tracks are dead-end storage tracks which are available for storing cars about to be shopped or they may be used to facilitate the shiftings of cars. The plan for future enlargement contemplates covering only the 14 tracks which, at the present time, enter the shops. The 13 short storage tracks will not be covered and will still be available for open-air storage or switching cars between shop departments.

ADVANTAGES OF TRANSFER TABLES

The designers of the Syracuse shops made a careful study of the relative advantages of transfer tables and track entrance lay-outs. The most serious objection urged against the transfer table installation in a Northern climate was the possibility of the pit filling up with snow and ice and interfering with the movement of the table. This disadvantage is also present with a track entrance lay-out, as in numerous instances snow and ice have seriously interfered with the movement of cars over the switches and special work of shops entered by separate tracks and switches. It was thought that no more trouble would be experienced with a transfer table on this account than with a complicated special work track entrance. In designing the transfer tables for the Syracuse shops, the pits were made 2 ft. deeper than the run-ways on which the tables move, in order to prevent interference with the movement of the tables by a small accumulation of snow in the pit.

It is believed that the two transfer tables will meet all the needs of shifting cars in and out of the shops and will not result in delays or lost time. A shifting crew would be required for either a transfer table or a track entrance scheme. The only other possible disadvantage of a transfer table lay-out which the designers considered was the difficulty of getting cars out of the shops in case of fire. This objection was thought to be largely theoretical. The danger from fire has been minimized in these shops by fireproof construction of the buildings and sectionalization of the different shop departments by fire walls.

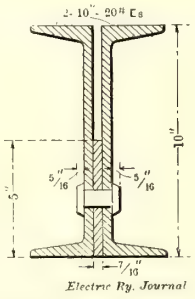
The difference in cost of installation and maintenance of transfer tables and a special-work track entrance was found to be all in favor of the transfer tables. The engineers estimated that the cost of the two transfer tables installed complete with the pits and foundations was approximately 50 per cent less than the expense of building ladder tracks and entrances. The cost of maintaining the tables, it is believed, will be much less than would be the repairs of overhead work and switches in a track lay-out. The transfer table plan also lends itself more readily to making provision for future extensions to the plant.



Oneida Railway Shops—General Plan of Buildings and Tracks

ARRANGEMENT OF BUILDINGS

In studying the shop facilities, it should be borne in mind that the plant was designed primarily as a repair shop and not as a manufacturing plant. It is the policy of the management of the Oneida Railway to make at its own shops only such parts and supplies as are absolutely necessary and to buy repair parts complete in the open market as far as possible. In this connection it will be noticed that no provision has been made for a foundry, although there is room in the shop tract to add such a department in the future if it is deemed advisable. The policy of buying in the open market also influenced the construction of a storeroom of unusual size. The storeroom has been made large enough to accommodate a complete stock of all the repair parts and supplies required. Another reason for providing such a large storeroom was the desire to permit the storekeeper to have a systematic and orderly arrangement of materials and supplies, so that the stock could be at all times easily reached and inventoried.



Section of Roof Beams

The ground on which the shops are erected slopes downward from Wolf Street to Free Street. This required a fill at the lower end of the transfer table pits, but advantage was taken of this grade to provide a basement under the buildings. The slope of the ground also permitted the construction of a transverse track running below the shop floor from the Free Street side and crossing the building at right angles to the shop tracks above. The space between the rails of this track is paved so that it can be used for handling material either by a small push car or by wagons.

FIRE PREVENTION

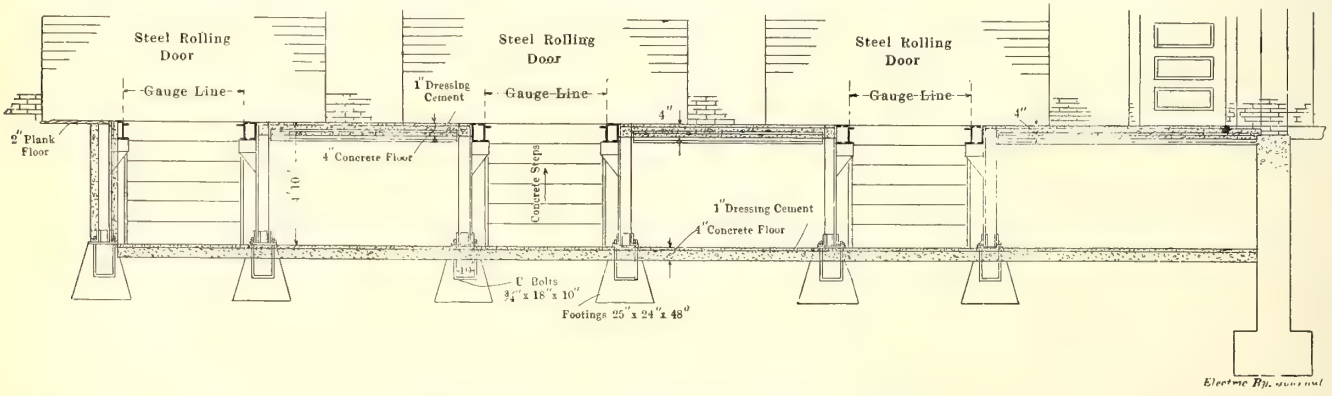
The buildings have been sectionalized by fire walls into a number of small fire areas, varying in size and shape according to the requirements of the work to be performed in each. These fire walls are carried up through and 3½ ft. above the roof. All openings through the fire walls from one area to another are protected by fire doors. Some of the areas can be entered only through a single opening, which, if closed, shuts them off completely. Sprinklers have not been installed, as it was not thought practicable to put in side line sprinklers and roof sprinklers alone were not believed to be effective in extinguishing fires which might originate in a car body. The recommendations of the National Underwriters Code have been followed throughout in installing stand pipes, sand pails and fire extinguishers. Stand pipes are provided in every bay to cover a radius of 50 ft., and in all instances the areas covered by a stream from one stand pipe overlap the areas covered by one or more adjacent stand pipe streams. There are city water main hydrants at each corner of the building tract. In addition to these there are three standard hydrants on the private fire system standing in the yard at one end of the building and four at the other end. Each hydrant is equipped with an underwriters' standard hose house. No special fire pumps or storage tanks have been provided. The openings of the track entrances to the buildings from the transfer table pits are closed by motor-operated Kinnear steel rolling doors.

SHOP DEPARTMENTS

Beginning at the Wolf Street side of the buildings, there is first a narrow bay, 23 ft. 6 in. wide extending the full depth of the building, 174 ft. This bay, which is two stories in height, is divided by transverse fire walls into four rooms. The first of these rooms, facing Fifth North Street, will be used as an office by the electrical engineer and shop department clerks. In the rear is a motorman's instruction room, which also contains a fire-proof vault, 11 ft. x 15 ft., extending up into the second story. The ground floor compartment of this vault will be used for storing the shop and store keeper's records. The second story of the vault will be used for storing maps, tracings, and miscellaneous shop drawings. The second floor in this section will be a draughting room and blue printing room.

In the rear of the motorman's instruction room is a toilet room 23 ft. 6 in. x 17 ft., which will be connected with a locker room on the floor above, reached by an iron stairway. The toilet facilities provided in this room are for the exclusive use of the employees in the general repair shop. Similar accommodations for the employees of the carpentry and paint shop are provided elsewhere.

Back of the toilet room is the armature repair shop 42 ft. long, entered only through a single fire door leading to the general repair shop. This section is open to the roof, but a mezzanine gallery 15 ft. wide at one end of the room adjoins the locker room in the next section. This gallery will be used as a lunch and smoking room for the men. Openings have been provided in the fire wall between the armature room and the general repair shop, through which armatures and material can be passed on I-beam travelers running on the lower flanges of the transverse roof girders.



Oneida Railway Shops—Section Through Pits

The last room in this narrow bay is occupied by the blacksmith shop, which covers an area of 23 ft. 6 in. x 42 ft. This room is open to the roof, and is entered through a door leading to the general repair shop and also through an outside door opening on the yard in the rear. Two chimneys have been provided to accommodate two or four forges. As in the armature room, openings have been provided in the fire wall through which material carried on travelers can be passed.

GENERAL REPAIR AND TRUCK SHOP

The second main bay from Wolf Street is to be used as a general repair and truck shop. This bay is 114 ft. 6 in. wide and extends the full depth of the building, 174 ft. At the rear of the building and extending the full width across the adjoining bay 71 ft. 6 in. is an L extension 36 ft. deep in which all machine tools will be located. The general repair and truck shop contains six tracks which will accommodate 24 double-truck cars of average length or 30 single-truck cars. It is planned to use two of these tracks for overhauling, two for general repairs and track work and two for miscellaneous work. These tracks are arranged in two groups of three tracks each, the two groups being separated by an aisle floor space 25 ft. wide. The tracks in each group are spaced 14 ft. center to center, and a space 10 ft. wide has been allowed between the gage line of the outer track on each side of the bay and the adjoining wall. This arrangement gives a 5-ft. clear space between car bodies standing on adjacent tracks, while the 10-ft. strip along the walls will provide ample space for erecting work benches and light tools.

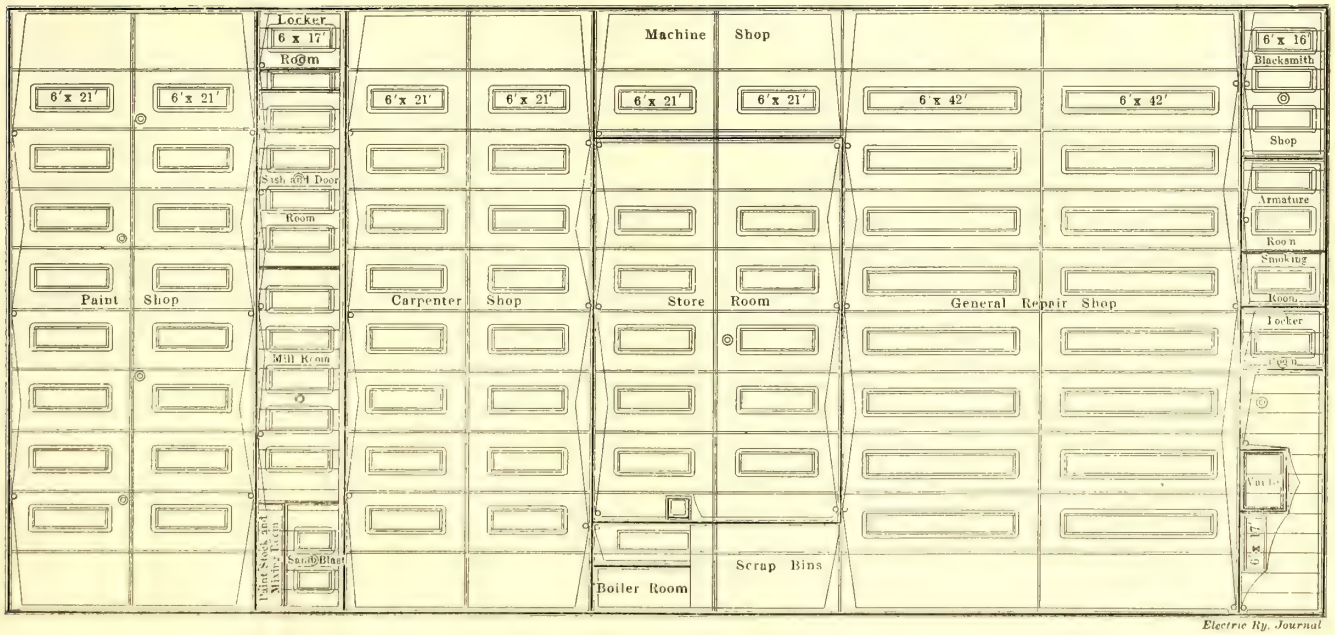
Open pits have been built under the entire length of each of the tracks in this bay. The reinforced concrete floor between the tracks is carried on an independent steel floor system. The rails of the pit tracks are of 9-in. girder section and are carried on offset brackets riveted to the sides of the pit posts. The extra width gained in the pits by carrying the rails on offset brackets instead of on top of the posts or the pit walls, it is believed, will be found useful in handling large motors which could not be conveniently turned in a pit of limited width.

The reinforced concrete roof of this bay is supported directly on transverse girders composed of two 10-in. channels riveted back to back. Each girder spans half the width of the bay and rests on a pilaster in the brick partition wall at one end and at the other end is carried by a single continuous built-up truss which runs the full depth of the building. This longitudinal truss is supported on but four columns, which offer a minimum obstruction in the center aisle between tracks. The transverse girders are not fastened to the partition walls, and in the event of a fire one or more of the girders might warp and fall without pulling down the walls or the roof.

The bottom flanges of the transverse roof girders form runways for trolley hoists and travelers crossing the full width of the bay. They are designed to support a concentrated live load of 5 tons in addition to the dead load of the roof. The four columns supporting the center truss are located so as not to interfere with the passage of any load ordinarily carried by a trolley running on the nearest



Oneida Railway Shops—General View of Roof, Showing Skylights and Fire-Wall Parapets



Oneida Railway Shops—Roof Plan, Showing Fire Walls and Location of Skylights

adjacent transverse girder. The machine shop in the rear of the store room is also served with a similar system of runways and carriers. A continuous overhead track is provided from the machine shop across the repair bay and into the blacksmith shop.

The machine shop, which occupies the rear of the third bay, is 8 ft. below the level of the main repair shop floor. On a level with the main repair shop floor, however, and extending over half the width of the machine shop, is a reinforced concrete floor which forms a gallery above the basement floor. All the heavy tools, such as wheel lathe, wheel press and boring mill, will be mounted on the basement floor, but the lighter machine tools will be mounted on the gallery, which is at the same level as the main repair shop.



Oneida Railway Shops—Skylight Construction

In the third bay at the front of the building is located the heating apparatus and coal storage space. This section is entirely surrounded with fire walls. Two return tubular boilers supply steam for heating the buildings by the low-pressure gravity-return system. These boilers are mounted in a pit below the basement floor level to permit the use of gravity-return in the heating system. Storage space for coal is provided in the east end of the boiler room.

A track enters the third bay from the transfer table at the main floor level, passes through the room over the boilers and continues into the store room. This track can be used for bringing in cars of coal, which can be dumped directly into the coal storage space below. It is used also for bringing cars containing material and supplies directly into the store room. The space on the main floor on each side of this track over the boiler room is available for the storage of second-hand material and scrap.

STORE ROOM

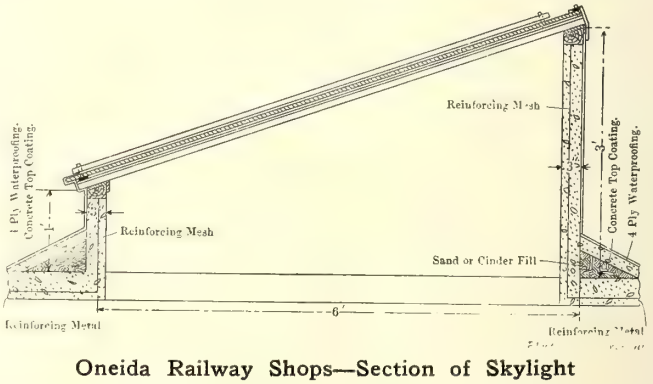
The store room occupies the greater part of the third bay and is noteworthy because of its size and because it is located almost in the exact center of the plant. Special facilities have been provided for bringing all material and supplies directly into the room with minimum handling and expense. The store room occupies a space 111 ft. 6 in. x 70 ft. 6 in. and is completely enclosed on all four sides by fire walls. The slope of the ground permitted the construction of a basement 10 ft. 6 in. deep under the store room, which will be used for the storage of heavy material and supplies, which will be brought in over the transverse depressed track from Free Street. This track extends beyond the store room under the general repair and truck shop and will facilitate the handling of heavy material from the store room into the shop. Under the repair shop the transverse track is at such a level as to bring the platform of a standard push car on a level with the floor of the pits.

The store room is not floored over at the level of the main floor of the rest of the building, but a gallery 8 ft. wide is built around all four walls at this level. The entrance track from the transfer table permits a standard freight car to be brought into the store room for unloading and the gallery floor, which is on the same level as this track, is extended along each side of the track to form an unloading platform. On the gallery around the store room will be stored the lighter supplies and material. Fire-proof shelving and bins are built around the walls from the floor level up. A total of 6300 sq. ft. of wall space is available for shelving and bins on the gallery and 2100 sq. ft. of wall space is available in the basement. Four iron stairways lead from the basement up to the gallery floor.

Most of the supplies will be issued from the store room at the gallery floor level. It will be seen from the plan that the store room is immediately adjacent to the general repair and truck shop, machine shop and carpenter shop. These three departments use most of the supplies issued, and those parts most frequently called for by each of these departments will be installed in bins or shelves on the wall nearest that department. Supplies will be issued through small windows opening into the different departments. One window opens into the gallery of the machine shop, three windows open to the general repair shop and three to the carpenter shop. Bulky material can be passed out through fire doors at diagonally opposite corners of the store room. The same design of roof construction is used in the store room as in the main repair shop. A system of trolley carriers and hoists will be used for handling all heavy material.

CARPENTER SHOP

The carpenter shop occupies the next bay adjoining the store room and is 174 ft. deep x 70 ft. 6 in. wide. It contains four tracks having a total capacity for holding 16 double-truck cars of average length, or 20 single-truck cars. The same spacing between centers of tracks has been adopted in the carpenter shop as in the general repair shop. The tracks in the carpenter shop, however, do not have pits. A basement 11 ft. high is formed under the carpenter shop and this space is to be used for storing iron, steel, lumber and other bulky supplies.



Oneida Railway Shops—Section of Skylight

MILL SECTION

The next bay adjoining the carpenter shop is 24 ft. 6 in. wide and is divided by fire walls into five rooms. At the front of the building in this bay is the sand-blast room, 30 ft. x 16 ft. 6 in. This room will be used for chipping glass, cleaning metal parts and other similar purposes. A short spur track enters the room, and it will be possible to push a car in on this track for half its length in order to sand blast and clean the dashes and other metal parts.

Adjoining the sand-blast room is a small paint-mixing room 30 ft. x 7 ft. Only sufficient paint and varnish for each day's consumption will be kept in this room, as the main storage of paint will be in a separate building in the yard where both paint and lubricants will be kept.

In the rear of the paint-mixing and sand-blasting rooms is the wood-working or mill room, 67 ft. long and the full width of the bay. All of the wood-working machinery required for the carpenter shop will be installed in this room and arranged for group driving.

Next is a room measuring 52 ft. x 24 ft. 6 in. which will be used for cleaning and varnishing sash, doors and signs.

Back of the sash and door cleaning and varnish room is a passageway 5 ft. wide which affords the only means of communication within the building between the paint shop and the carpenter shop. This passageway is closed at each end by a fire door. Opening off of it is a toilet and wash room for the exclusive use of the employees in the carpenter and paint shops. Above the toilet room and reached from it by an iron stairway is a smoking and lunch room for the carpenters and painters.

PAINT SHOP

The end bay adjoining Free Street will be used as a paint shop. This section of the building has the same dimensions and track arrangements as the carpenter shop. The paint shop has a reinforced concrete floor and drainage openings have been provided through this floor under each track so that the floor can be washed down at frequent intervals. At the other end of the paint shop, a part of one track long enough to hold one car has been enclosed with glass partitions for use as a wash room for cars.

MATERIALS OF CONSTRUCTION

All the footings and foundation walls of the building up to the level of the main floor are of concrete. The exterior and partition walls are of brick 12 in. thick, and all fire walls are extended 3½ ft. above the roof.

The roof throughout is of reinforced concrete. The steel reinforcement was designed and supplied by the Trussed Concrete Steel Company, Detroit, Mich. The concrete roof is covered with four-ply tarred felt roofing covered with slag. Most of the steel work and the transfer tables were designed and fabricated by the Archbold-Brady Company, Syracuse, N. Y.

SKYLIGHTS

Special attention was paid to the distribution and design of the skylights in the roof. The location of the skylights, with reference to the fire walls, is shown in one of the accompanying drawings. It will be seen that instead of providing a few long skylights running parallel to the tracks, the lights are divided into small units extending transversely across the bays. It is believed that this arrangement will throw more light between the cars where it is needed than would be the case if longitudinal lights were used. The skylights throughout are of the Anti-Pluvius type made by the G. Drouvé Company, Bridgeport, Conn. As this construction has been extensively used for skylights in a number of large buildings in other cities, it may be of interest to describe it briefly. Continuous clips are first placed on the upper and lower curbs to which are riveted angle brackets to give the proper spacing for the skylight supporting bars. The supporting bars are of a special channel section and are bolted to the angle brackets on the upper and lower curbs. Stirrups are fastened in the supporting bars at intervals of from 16 in. to 20 in., and into these stirrups are screwed brass studs having a shoulder at the upper end. Over the stirrups a flat strip of iron is placed and on top of this is a strip of cow-hair felt confined in a sheet metal guide. The edges of the wire-glass plates rest on this strip of felt and are covered by another strip of cow-hair felt, over which is placed a top cap of sheet copper or other metal. Spiral springs are placed over the studs which project above this top cap, and on the shoulder of the studs is placed an inverted channel or U-bar known as a bridge. Nuts secure the bridge securely in place on the studs and slightly compress the springs, which give a firm elastic pressure on the metal cap to hold the glass in place. This type of skylight construction can be put together or taken apart with a wrench or screw-driver. It is claimed that it is perfectly water tight and has an exceptionally long life. The shops have a floor area of approximately 66,000 sq. ft., and there are 11,000 sq. ft. of skylight in the roof. This gives practically 1 ft. of skylight to each 6 ft. of floor space. The balance of the contracts are in the hands of local contractors.

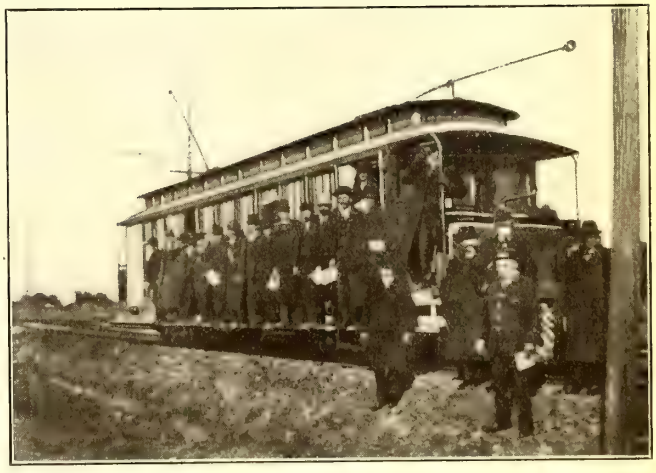
This paper is indebted to C. Loomis Allen, vice-president and general manager of the Oneida Railway, and to W. J. Harvie, chief engineer, for the information from which this article was prepared. Mr. Allen had general supervision of the preparation of the plans and Mr. Harvie was responsible for the details of the design and had general charge of construction of the building.

ANNUAL TRACK INSPECTION OF THE FORT WAYNE & WABASH VALLEY TRACTION COMPANY

Last February the Ft. Wayne & Wabash Valley Traction Company announced to its track foremen a plan for awarding cash prizes to the foremen having in charge the sections of track with the best line and surface and also prizes for general improvement in the condition of the track in their charge. The bulletin outlining the plan, which was issued under date of Feb. 27, 1909, follows:

To TRACK FOREMEN:

Beginning March 1, 1909, records of work of section men and improvements made on their respective sections will be kept for the purpose of awarding during the month of October the following prizes, to be awarded upon the basis of track inspection rules attached hereto:



Fort Wayne & Wabash Valley Track Inspection—Inspection Car and Party

First prize for best line and surface	$50.00
Second prize for best line and surface	40.00
Third prize for best line and surface	25.00
First prize for improvement in track during six months	50.00
Second prize for improvement in track during six months	25.00

TRACK INSPECTION RULES

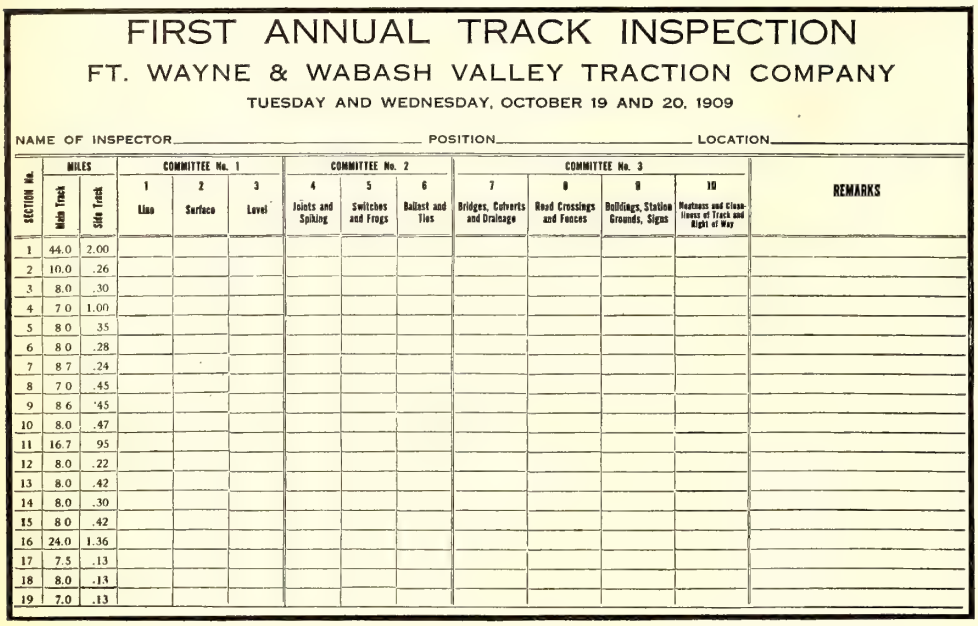
The annual inspection shall be held during the month of October, in which the general officers of the company, road-

master and all track foremen will be requested to take part. These members of the track inspection party will be divided into committees to mark the different track sections, according to their judgment, on the following points:

Committee No. 1—Line, surface, level.

Committee No. 2—Joints and spiking, switches and frogs, ballast and ties.

Committee No. 3—Bridges, culverts and drainage; road crossings and fences; buildings, station grounds and signs; general neatness and cleanliness of track and right-of-way.



FIRST ANNUAL TRACK INSPECTION

FT. WAYNE & WABASH VALLEY TRACTION COMPANY

TUESDAY AND WEDNESDAY, OCTOBER 19 AND 20, 1909

NAME OF INSPECTOR_____ POSITION_____ LOCATION_____

SECTION No.	MILES		COMMITTEE No. 1			COMMITTEE No. 2			COMMITTEE No. 3				REMARKS
	Main Track	Side Track	1 Line	2 Surface	3 Level	4 Joints and Spiking	5 Switches and Frogs	6 Ballast and Ties	7 Bridges, Culverts and Drainage	8 Road Crossings and Fences	9 Buildings, Station Grounds, Signs	10 Neatness and Cleanliness of Track and Right of Way	
1	44.0	2.00											
2	10.0	.26											
3	8.0	.30											
4	7.0	1.00											
5	8.0	.35											
6	8.0	.28											
7	8.7	.24											
8	7.0	.45											
9	8.6	.45											
10	8.0	.47											
11	16.7	.95											
12	8.0	.22											
13	8.0	.42											
14	8.0	.30											
15	8.0	.42											
16	24.0	1.36											
17	7.5	.13											
18	8.0	.13											
19	7.0	.13											

Fort Wayne & Wabash Valley Track Inspection—Card Used to Record Markings

DEFINITIONS

Line—True line means straight line on tangent and uniform curvature on curves, as far as the eye can detect. When these requirements are fulfilled the condition must be represented by 10. Continuous and very apparent deviations from the true alignment over the entire length of one mile, which would limit the maximum speed for the safe passage of trains to 25 m.p.h., must be represented by 5. A condition of alignment which would be difficult for a train to pass should be recorded as 0. Conditions intermediate between those described above shall be indicated in the proper ratio representing these conditions.

Surface—True surface means a uniform grade line between changes of grade, and the conditions must be noted as in regard to line.

Level—The inspectors must watch and must note any unusual oscillations of the car due to unlevel track on tangents, want of uniformity of elevation on curves, or unequal gage. If the inspectors can detect no vibration or oscillation of the car due to unlevel track on tangents and want of uniformity of elevation on curves, they will record the condition as 10, and intermediate conditions must be recorded as already noted.

Joints and Spiking—A perfect joint is one that is fully bolted and tight, and should be marked 10. An absolutely imperfect joint is one that is lacking in bolts, or bolts very loose, with joints out of line and generally in very bad condition, and should be marked 0. True spiking consists of four spikes in each tie, the inside spikes being opposite each other, and all spikes driven home.

Switches and Frogs—A perfect switch is one which is carefully lined, particularly on the main track side, and which the car passes over without oscillations or vibrations. The switch rods, switch stands, guard rails and other apparatus must be in perfect condition. A perfect frog is one which is in perfect line, fully bolted, and, if a sliding or wing-rail frog, so oiled that it works freely, and one that is in such line and surface that it will permit a car to pass over without undue oscillation or vibration.

Ballast and Ties—Perfect ballast should be uniform and equally distributed, extending to within about ½ in. of the top of the ties and shaped off so as to give easy drainage, with sufficient shoulder to hold the track in alignment. Ties must be properly spaced and fully spiked. The ends of the ties on one side must be parallel with the rail.

Bridges, Culverts and Drainage—Perfect bridges are those which are in first-class condition as to alignment and surface and bridge ties and guard rails with abutments in good condition and waterway cleaned out for easy passage of water. Perfect culverts are those which are in first-class condition as to openings at each end and waterways cleaned out for the easy passage of water. Ditches must be uniform and free from obstructions, and with sufficient incline to afford proper drainage.

Road Crossings and Fences—Road crossings must be maintained to the level of the rail, allowing sufficient clearance for the flangeways of the wheels, and must be clear and safe for the passage of vehicles and animals. Fences

FORT WAYNE & WABASH VALLEY TRACTION COMPANY. RESULTS OF TRACK INSPECTION, OCTOBER 19 AND 20, 1909

Sec. No.	Foreman	Average of Com. No. 1. Final Insp'n 100% Basis Line, Sur. Level	General Ave. Preliminary Inspection 80% Basis	General Average Final Inspection 80% Basis	Increase	No. Miles	Maintenance Cost of Section	Maintenance Cost Per Mile	Add 20% For Lowest Cost Per Mile and Use This as Basis	Present Ave., Including 20% Basis and 80%	General Av'ge Preliminary Inspection 100% Basis	Improvement
1	J. Foley (*a*)	34.5757	41.6333	60.3272	18.6939	46.00	$3,180.29	$69.14	.....	.....	52.0417	.....
2	G. M. Frye	33.3333	40.6600	53.0433	12.3833	10.26	2,000.40	194.97	15.6291	68.6724	50.8250	17.8474
3	C. Edington	35.1777	39.1333	54.9094	15.7661	8.30	1,887.80	227.45	13.3972	68.3066	48.9167	19.3899
4	A. Warner	34.0277	37.2812	53.7314	16.4502	8.00	1,782.75	222.84	13.6753	67.4067	46.6016	20.8051
5	J. Goguel	39.1666	49.8000	63.3425	13.5425	8.35	1606.70	192.42	15.8362	79.1787	62.2500	16.9287
6	J. Lewis	33.6111	42.5625	54.1388	11.5763	8.28	1,572.20	189.88	16.0480	70.1868	53.2031	16.9837
7	R. Evans (*b*)	33.8888	43.5333	53.6850	10.1517	8.94	1,358.10	151.91	20.0592	73.7442	54.4167	19.3275
8	L. Kindlesparger	36.8055	45.7187	56.6318	10.9131	7.45	1,440.56	193.36	15.7592	72.3910	57.1484	15.2426
9	C. Kindlesparger (*c*)	30.2777	38.2187	49.8714	11.6527	9.05	3,502.92	387.06	7.8727	57.7441	47.7734	9.9707
10	J. Elliot	33.9999	42.7333	51.7646	9.0313	8.47	1,651.05	194.92	15.6331	67.3977	53.4167	13.9810
11	J. Slagle (*d*)	32.4999	40.1333	51.7709	11.6376	17.65	3,270.53	185.30	16.4447	68.2156	50.1667	18.0489
12	E. Breeding	36.5277	46.9333	58.3146	11.3813	8.22	1,296.65	157.74	19.3179	77.6325	58.6667	19.9658
13	D. Welch	41.1111	47.5666	60.4374	12.8708	8.42	1,295.05	153.81	19.8115	80.2489	59.4583	20.7906
14	Wm. Smith	36.3333	46.7142	57.9926	11.2784	8.30	1,278.60	154.05	19.7806	77.7732	58.3928	19.3804
15	J. Akers (*e*)	37.9166	45.9062	60.1388	14.2326	8.42	1,282.85	152.36	20.0000	80.1388	57.3828	22.7560
16	D. Nelan (*f*)	35.8333	45.3571	51.7856	6.4285	25.36	2,272.60	89.61	.....	.....	56.6964	.....
17	O. S. Heminger	38.9999	45.3666	59.3758	14.0092	7.63	1,254.95	164.48	18.5262	77.9020	56.7083	21.1937
18	U. G. Russell	30.5555	40.8000	50.7985	9.9985	8.13	1,261.40	155.15	19.6403	70.4388	51.0000	19.4388
19	C Crowl	34.4999	43.6666	53.2944	9.6278	7.13	1,357.86	190.45	16.0000	69.2944	54.5833	14.7111

(*a*) Ft. Wayne City Lines. (*b*) Includes Wabash City Lines. (*c*) Includes Peru City Lines. (*d*) Includes Logansport City Lines. (*e*) Lowest Maintenance per mile, Country Section. (*f*) LaFayette City Lines.

must be in repair so as keep out cattle, and cross fences and cattle guards must be complete and clear of all grass and weeds, with wing fences whitewashed.

Buildings, Station Grounds and Signs—The general appearance of buildings, station grounds and signs in regard to the condition and neatness and cleanliness around them shall be taken into consideration.

General Neatness and Cleanliness of Track and Right-of-Way—Grass, bushes and weeds should be kept cut close to the ground within the limits of the right-of-way and should not be allowed to grow closer than 4 ft. 6 in. from the rail. Stumps and logs should be cleared from within the limits of the right-of-way. Cross-ties and iron should be piled neatly at prescribed points. Other general conditions of neatness and cleanliness are to be considered.

A mark of 10 shall indicate perfection, and a mark of 0 shall indicate unsafe or worst possible condition, intermediate marks being used to indicate intermediate conditions. The above marks so given are to be computed and averaged and used in part only in the determination of the prizes.

In addition to marks given as above the final determination of prizes shall rest with a committee composed of the general manager, roadmaster and auditor, and full and due amount of credit will be given the following points:

First—Conditions which foremen have to contend with, that is, if track is old, alignment crooked and with light rail, or if track is new, alignment straight and with heavy rail.

Second—Expense allowed each foreman per mile of track.

A preliminary inspection of the condition of all track was made on March 1 and the final inspection was made on



Fort Wayne & Wabash Valley Track Inspection—A Good Piece of Track

Oct. 19 and 20, 1909. All of the track foremen, 19 in number, were ordered to report at the interurban station in Ft. Wayne at 12:45 p. m., Oct. 19. They were given blank cards on which to mark the records of the track sections inspected as they were passed over. One of these cards is reproduced. Besides the track foremen the party included: C. D. Emmons, general manager; H. E. Vordermark, auditor; J. J. Brennan, roadmaster; F. I. Hardy, superintendent of transportation, and J. W. Tompkins, interurban superintendent. A double-truck Narragansett type open car was used on the trip. A view of this car and the inspection party is shown in one of the engravings. The car left Fort Wayne at 1 p. m. on Tuesday, running to Bluffton, Ind., and returning to Fort Wayne; thence to Robison Park, on the outskirts of Fort Wayne, and returned late in the afternoon and ran over all of the city track in Fort Wayne.

On Wednesday, Oct. 20, the car left Fort Wayne at 6:30 a. m. and ran through to Logansport, Ind., over the main line. The city track in Wabash and Peru was also inspected before luncheon. In the afternoon the party inspected the city track in Logansport, and then ran through to Lafayette, where the line to Battle Ground and the city track in Lafayette were inspected.

The track foremen were divided into the following committees:

Committee No. 1, line, surface and level, J. Goguel, C. Edington, William Smith, J. Elliot, C. Crowl and O. S. Heminger.

Committee No. 2, joints and spiking, switches and frogs, ballast and ties, G. M. Frye, S. R. Evans, A. Warner, L. Kindlesparger, J. Lewis, Edward Breeding.

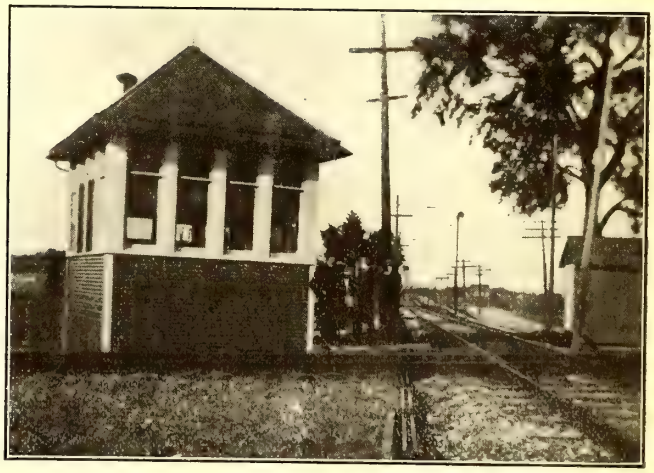
Committee No. 3, bridges, culverts and drainage, road crossings and fences, buildings, station grounds and signs, and general neatness and cleanliness of track and right-of-way, J. Foley, D. Welch, U. G. Russell, C. Kindlesparger, J. Akers, James Slagle, J. O'Brien.

The averages of the markings of each member of these committees are shown for each track section in the accompanying table. In awarding these prizes, not only were the results of the marks given on the inspection trip taken into consideration, but due credit was given for the original condition of each section and the amount of money which had been expended during the past six months for regular and extraordinary maintenance.

The awards made by this committee were as follows:

First prize of $50 for best line and surface, to D. Welch, foreman of section No. 13, located at Rockfield.

Second prize of $40 for best line and surface, to J. Goguel, foreman of section No. 5, located at Andrews.



Fort Wayne & Wabash Valley Track Inspection—Interlocking Cabin at Bluffton, Ind.

Third prize of $25 for best line and surface, to O. Heminger, foreman of section No. 17, located at Yoder.

First prize of $50 for improvement in track during last six months, to J. Akers, foreman of section No. 15, located at Buck Creek.

Second prize of $25 for best improvement in track during the past six months, to A. Warner, foreman of section No. 4, located at Huntington.

The committee in its report made honorable mention of the following foremen who showed an improvement of 19 points or over:

E. Breeding, section No. 12, located at Clymers; U. G. Russell, section No. 18, located at Ossian; C. Edington, section No. 3, located at Roanoke; William Smith, section No. 14, located at Delphi; R. Evans, section No. 7, located at Wabash.

The company has announced its purpose to hold these track inspections annually and to continue the awarding of prizes.

THE STREET RAILWAY SYSTEM OF BOMBAY, INDIA

An electric street railway system built for a sub-tropical oriental city like Bombay, India, presents many novel problems in finance and engineering which in order to make the undertaking a success must be solved by the adoption of practices wholly different from those which have become more or less standard in the cosmopolitan centers of Europe or America. In a country where most of the inhabitants have a daily income of less than 25 cents it is obviously impracticable to think of charging five-cent fares. On the other hand this cheapness of labor makes it economical to have construction work done by hand in the most primitive way instead of by the use of machinery. Special varieties of wood for use in car and track construction are needed to withstand the ravages of the abundant plant and animal parasites which flourish in the warm moist climate of India. Even the overhead line must be modified for unique reasons, such as making allowances for clearance to permit the passage of the high transportable shrines used by the natives in their religious pageants.

The total population of Bombay is about 1,000,000 inhabitants, but in making the preliminary estimates for the street railway system it was assumed that in general the only source of traffic would be from the middle classes. The maximum ordinary fare for a ride up to seven miles was fixed at 1½ annas (2 cents) and the average fare per passenger does not exceed 1 anna (1 1/3 cents). First-class cars on which 50 per cent higher fares were charged were also provided for Europeans and natives of the upper classes when the lines were first opened, but even in caste-ridden India the democracy of the trolley car has prevailed. The difference in the comfort of the accommodations did not justify the higher first-class fare, so that these cars were taken off and a single class has now become the rule. The street railway system is now carrying annually about 1,500,000 passengers per mile of route.

Horse cars were operated in Bombay as early as 1874,



Bombay Tramways—Completed Track Ready for Paving

but it was not until 1906 that permission was finally secured from the authorities to convert the system to electric operation and to build several important extensions. The contract for construction of the track and overhead lines was taken by J. G. White & Company, Ltd., of London, England, and for the power equipment and rolling stock by the Brush Electrical Engineering Company, Loughborough,

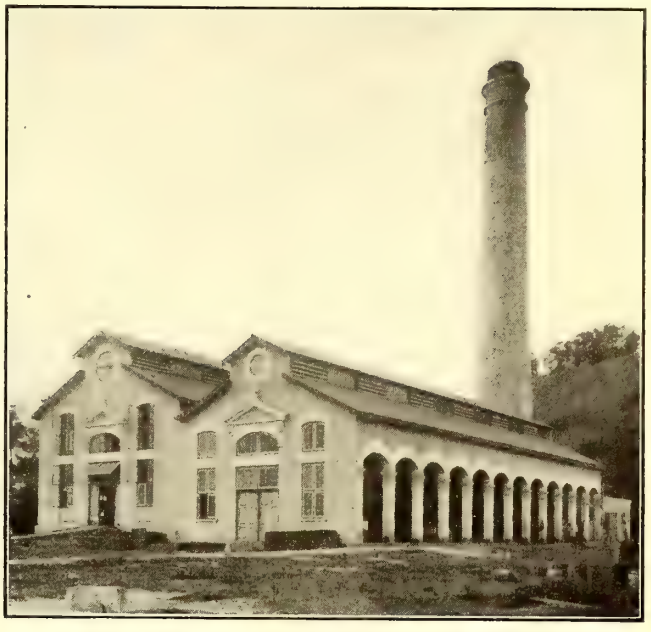


Bombay Tramways—Bori Bunder Junction in Front of the Victoria Terminal Station

England. The work of converting the lines to electric operation was completed in May, 1908. The total length of the several routes is 21¾ miles, almost all of which is double-track except in a few narrow streets. As shown in the cross-section of the standard track construction the rails are of grooved section weighing either 90 lb. or 96 lb. per yard. They are connected by continuous rail joints except on curves. The joints are double bonded with concealed No. 0000 flexible, pin-type bonds 12 in. long. The same bonds are used for cross bonding every 120 ft. between both rails and between the two lines of track. The ties are of principally Indian teakwood 7 ft. 6 in. long by 6 in. x 4 in. spaced 2 ft. 6 in. center to center.



Bombay Tramways—Single Track Bracket Pole Construction in a Narrow Street



Bombay Tramways—Exterior View of Railway and Lighting System Power House

In laying the tracks a foundation consisting of a 6-in. layer of rubble stone was first deposited in the trench and well compacted by rolling. The ties were laid on this foundation with an intervening layer of sharp stone screenings which was thoroughly tamped under the ties with beater picks. The space between the ties was thus filled with coarse rubble stone and the entire width of the track was brought up to a level with the top of the rail with macadam paving. Most of the ballasting was done by female laborers who carried the broken stone in small head baskets. It will be seen in one of the accompanying engravings that even the roller used in laying the macadam paving was pulled by hand. While the roadbed described appears to be very light for city track so far it has been found ample to meet the conditions in Bombay. There are comparatively few vehicles on the streets other than private carriages and slow-moving ox-carts. The special work used in Bombay was furnished by Edgar Allen & Company, Sheffield, England. The switches are of cast steel with manganese steel tongues, and the crossings are of iron-bound construction with manganese steel insert hard centers.

Span construction is commonly employed for the overhead lines. A few bracket poles have been used for the single-track lines in narrow streets and ornamental steel double bracket center poles have been used on a few of the wide streets. No. 00 grooved trolley wire is used throughout and it is carried at a height of from 21 ft. to 21 ft. 9



Bombay Tramways—A Complicated Special Work Layout in Front of Crawford Market

in. above the rails. This unusually high clearance for lines which operate only single-deck cars was adopted to avoid fouling by the large high shrines which are carried through the streets by the natives in their religious processions. Triple insulation was adopted throughout to avoid trouble during the three months' season of monsoons, when the rain storms are very severe, aggregating a precipitation of 78 in. At other periods during the year the humidity is also very high. The trolley wire is supported by mechanical cars attached to insulator bolts having steel pins. The span wires have Brooklyn strain insulators at each end and these are attached by galvanized steel wire slings to earthenware reel insulator feeders on the pole strap bolts. Section breaks are provided at least every half mile and at these points the feeder cables are brought down inside the poles on which the sectionalizing switches are mounted in water-proof boxes. The feeder pillars were especially designed to meet the weather conditions prevailing during the wet season. No uninsulated part of the switch gear is placed less than 2 ft. above the ground. The railway company has a complete telephone system paralleling all of its lines and this has been found very valuable in calling out the tower and emergency wagons.

The 5500-volt transmission cables connecting the substations are of Callender's paper insulated, lead-covered wire-armored type and are laid underground in tile conduit, the cables being completely surrounded in the conduit with bitumen pitch. The low-tension feeders are insulated with fiber tape. They are sheathed in vulcanized bitumen and are laid in tile conduit. The negative track return feeders are also laid in a similar manner.

The power station at Wari Bunder, which supplies the railway and lighting system of Bombay at the present time, has a total capacity of about 5000 kw. The largest units are two 1000-kw turbo-generators and one 1000-kw reciprocating engine set all generating 5500-volt three-phase alternating current at 50 cycles. This plant was originally built for lighting service and is located in a swampy region which has no good facilities for securing fuel or water. It is soon to be succeeded by a platform at Kussara Basin on the harbor of Bombay. The initial installation in this plant, which will be completed in 1910, will consist of two 2000-kw turbo-generator sets to which will be added later the two turbo-generators now operating in the Wari Bunder plant.



Bombay Tramways—Rolling Ballast with Hand Roller

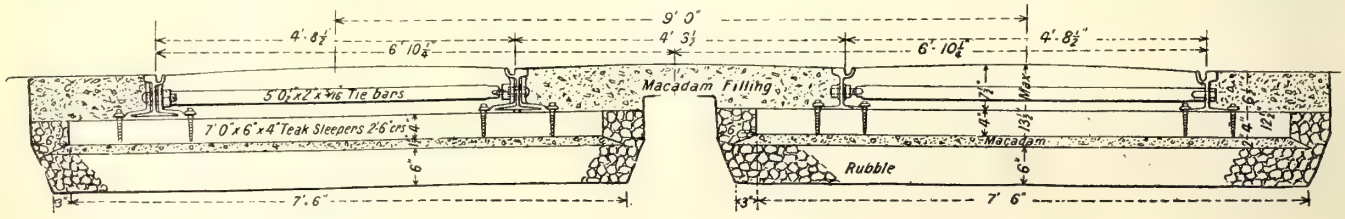


Bombay Tramways—Drilling Bond Holes

The Esplanade substation contains one 250-kw and four 500-kw converting units. Each unit consists of a 5500-volt, three-phase synchronous motor with a 250-volt d.c. generator connected to each end of the shaft. These generators are used as shunt machines in series across the two outer circuits of the 460-volt three-wire lighting system while for the railway supply they are provided with series windings for compounding. This substation also contains a 50-kw starting set and three 50-kw negative boosters for the return circuits.

The present rolling stock includes 100 double-truck and 62 single-truck cars, all of the single-deck type. Half of the cars were built by the Brush company and the rest in the railway company's shops in Bombay. The larger cars are carried on maximum traction trucks fitted with Griffin steel-tired wheels 31¾-in. diameter and 4-in. axles.

The motors and controllers were furnished by the Brush company. Peacock brakes and Hudson & Bowring life guards are installed on all cars. In addition to destination signs lettered in English, the company uses plate color combinations in the day and different colored lamps at night for the benefit of the unlettered natives. The cars are stored in depots at Coloba, Taredo and Parel, which house



Bombay Tramways—Cross Section of Standard Track Construction

The principal dimensions of both types of cars follow:

	Double Truck	Single Truck
Length overall	40 ft.	27 ft. 11 in.
Length inside body	30 ft. 10 in.	17 ft. ¾ in.
Width overall	7 ft. 9 in.	7 ft. 9 in.
Height inside	6 ft. 7 in.	6 ft. 9 in.
Seating capacity	52	32
Approximate weight unloaded	10 tons	7 tons.

The cars are stored in depots at Coloba, Taredo and Parel, which house 107, 45 and 31 cars, respectively. The Coloba depot has 15 tracks, all built with pits except two, which are used for car building.

During 1907 the revenue from the tramway service was £706,354, and from lighting £21,586, making a total of £127,920; the expenses were £87,040. In 1908 the tramway revenue had grown to £130,142 and that from lighting to £47,714, making a total of £177,856; the expenses were



Bombay Tramway—Tower Wagon and Car House

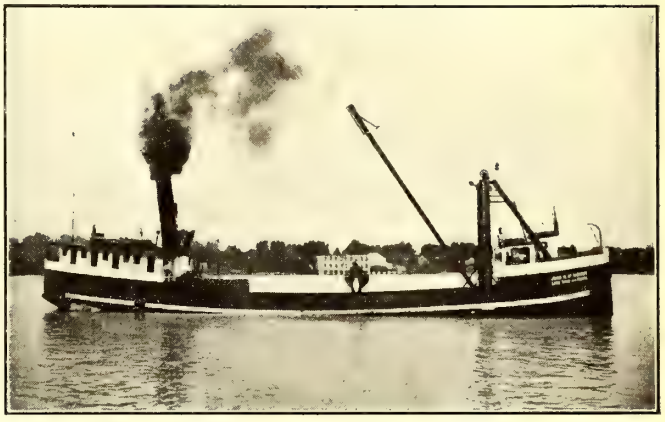
£110,786. It is estimated that for 1909, the first complete year of electric traction, the tramway revenue will be £142,000 and the lighting revenue $64,000, making a total gross income of £206,000 derived from an investment of approximately £122,000.

A scheme is now on foot in London, England, to build an underground line from the Crystal Palace Parade, in the suburb of Upper Norwood, to the Elephant and Castle and Victoria station. The two city terminals mentioned would be reached by branching the main line at Camberwell. The line is to be 6¾ miles long, the fare 3½d. or 4d. and the running time 20 minutes. Connections are planned with the City & South London tube and the District Railway.

At the meeting of the American Institute of Electrical Engineers to be held in New York on Friday evening, Nov. 12, 1909, at 8 o'clock, a paper entitled "The Electric System of the Great Northern Railway Company at Cascade Tunnel" will be presented by Dr. Cary T. Hutchinson.

ROADBED AND TRACK REPAIRS IN DETROIT

The soil upon which the city of Detroit rests is a sandy clay, which upon being wetted and churned becomes almost a quicksand. In some localities, particularly where the traffic is light, a sufficiently solid track foundation can be made with crushed stone, but in a few years the track gradually sinks until in some cases it is from 2 in. to 6 in. below the



Detroit United Railway—Gravel Dredge

adjacent pavement. On the main thoroughfares, therefore, it is necessary to reinforce the regular foundation with a broad concrete mat of such thickness that the sub-structure will withstand the continued hammering of the heavy city cars and the still heavier suburban coaches which run over the lines. The roadway maintenance of the Detroit United Railway is in the charge of the superintendent of tracks, John Kerwin, who has devised the several interesting methods of repair and rebuilding described in the following paragraphs and shown in the accompanying engravings. Among the principal features are a concrete mixer and an improved method of applying cast-weld joints which are finished by a newly devised rail grinder.

CONCRETE MIXING AND INSTALLATION

The concrete base for the roadbed is made of gravel and cement, the gravel being screened to the proper sizes



Detroit United Railway—Locomotive Crane Screening Gravel

as it comes from the boat. This gravel is dredged at Lake Huron and is delivered at the company's dock at the River Rouge, in the suburbs of Detroit. It is unloaded on the dock by a locomotive crane and thence reloaded by the same crane from the dock to the dump cars as needed. The sup-

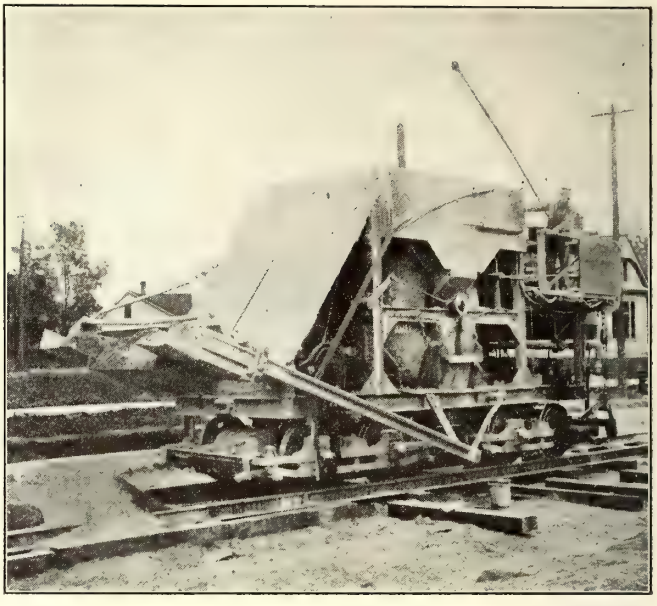
ply of gravel at the dock usually amounts to about 15,000 cu. yd. The dump cars carrying gravel are drawn to the place of use by an electric motor car, where the gravel is unloaded between the rails, the track previously having been excavated, the ties adjusted and the rails surfaced and aligned. Then a car loaded with cement in bags is run over the gravel pile and the cement is emptied on the gravel according to certain predetermined proportions. The con-



Detroit United Railway—Distributing Cement

crete mixer then comes forward, dips up a shovelful of the gravel and cement mixture, raises it over the machine and deposits it in the 5-cu. yd. hopper at the top. From this hopper a charge of 2 cu. yd. is delivered to the mixing drum and thoroughly mixed. Following this the machine, which during the mixing process has been run back to the point of delivery, drops the prepared batch of concrete wholly between the rails, part on one side, part on the other, or entirely on one side if desired. The concrete when delivered between the tracks is leveled off to the right height by dropping a leveling board in the rear of the machine and running forward slowly. The trimming and final leveling is done by the track crew of three or four men who follow up the mixer. The concrete is not handled by manual labor at any stage, except in emptying the cement bags and in the slight trimming following the deposit by the mixer. The process from the arrival of the gravel car to the final leveling in the track is all paid for by the cubic yard of placed concrete. The gang consists of eight men, two of whom handle the mixing machine or car.

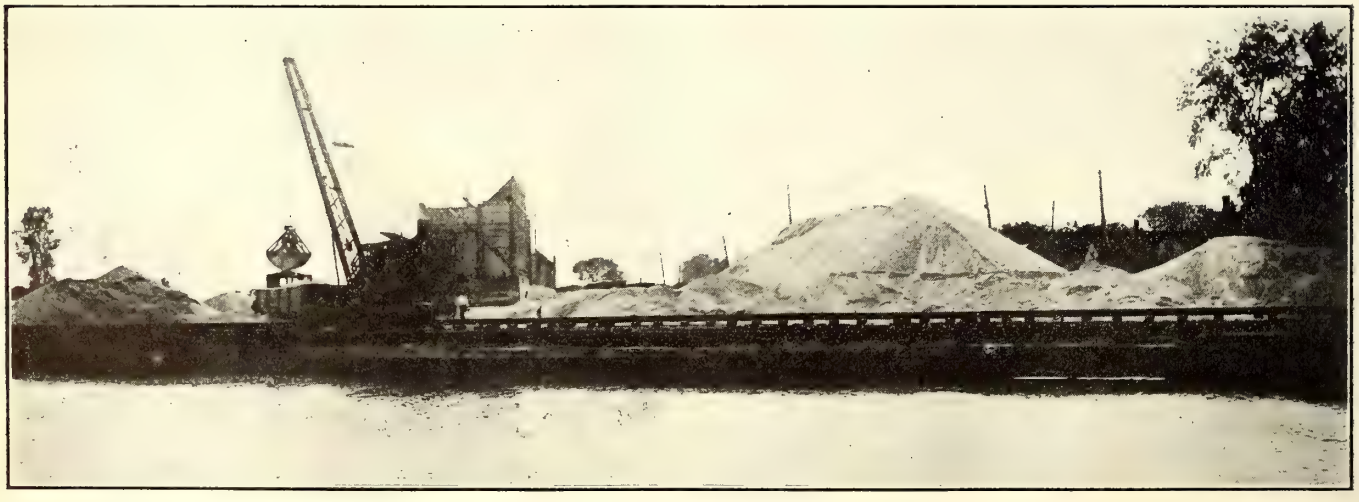
The locomotive crane previously mentioned is operated by steam and was built by the Industrial Works of Bay City, Mich. It weighs 70 tons and has two booms, one with an extreme radius of 12 ft., at which a load of 25



Detroit United Railway—Concrete Mixer Hoisting Charge

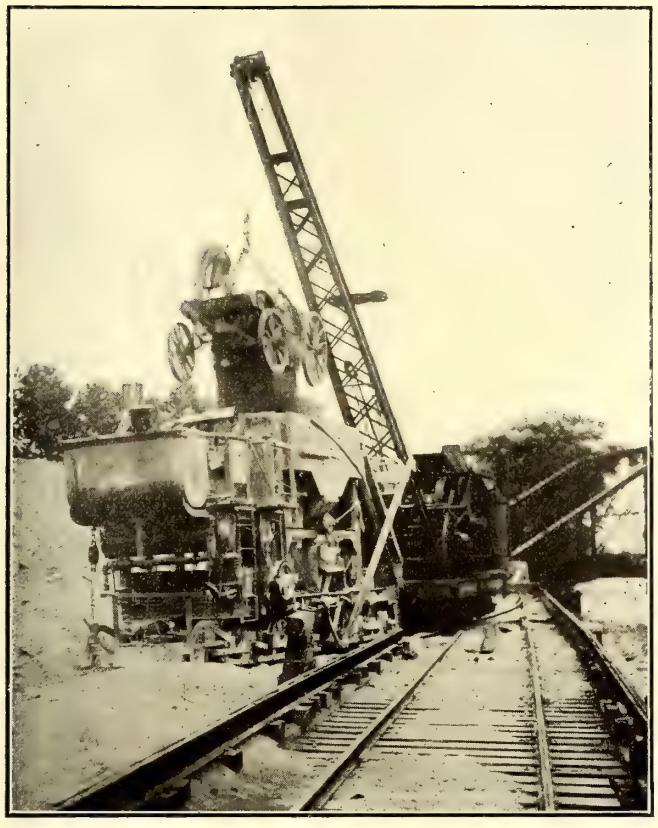
tons can be raised, and another having a 30-ft. radius, at which a weight of 5 tons can be lifted. This crane will propel itself and four loaded cars on a level track, and will haul two loaded cars up a 2 per cent grade.

The concrete mixer consists of a ridged platform of steel I-beams covered with a floor of ⅜-in. steel plate and resting upon two ordinary Peckham trucks, which are equipped with four 30-hp motors. The mixing drum, of the hollow rotating type, is mounted on rollers on this platform and is rotated by a motor geared to it and resting on the same platform. The shovel for raising the aggregate to place in the hopper is raised and lowered by another motor geared to a windlass drum, both resting on the same platform. The hopper is suspended on a steel frame over the mixing drum and delivers the aggregate to this drum in batches of 2 yd. as desired, and can fill the drum from either side of the bin. The mixing drum is similar to those used in Smith mixers, and is 6 ft. 6 in. in diameter by 4 ft. inside measurements. A tank holding water enough for six batches is carried in the rear of the control platform. The shovel for



Detroit United Railway—Gravel Dock

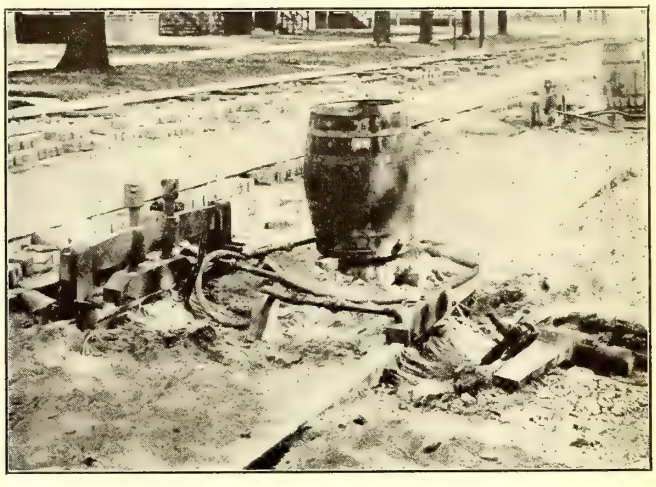
loading the hopper is carried by two long channel bar arms on either side of the machine, one end of each bar being attached to the shovel and the other end being pivoted to a cast iron arm suspended from the side of the platform. The



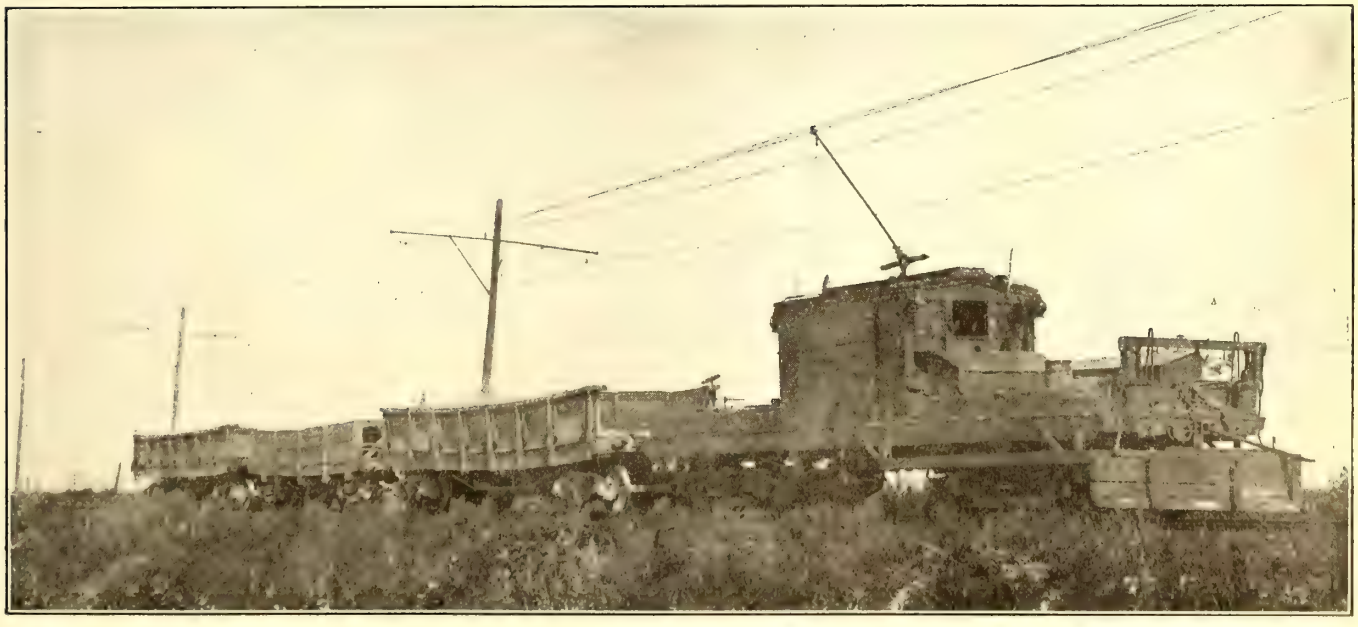
Detroit United Railway—Locomotive Crane Charging Concrete Mixer from Dump Wagon

whole is low enough to get a good push into the gravel pile and the arms are long enough to swing the shovel clear of everything and to bring it to a vertical position over the bin, where its bottom is tripped and the contents drop into the hopper. In working it is customary to load the drum with a batch of 2 yd. first, then close the slides in the bottom of the hopper and load it to its capacity.

The mixer is handled by two men, who stand on a platform high in the rear of the machine, where all the apparatus is located for the control of the drum and shovel and the progress back and forth of the car. Six other men handle all material from the car and finish leveling on the track. The capacity of the mixer is about 180 cu. yd. in 10 hours, or counting in the time of transfer from line to line, repairs, etc., about 300 cu. yd. in 24 hours. The entire cost of the plant for concreting, including the mixer, crane, 27 dump cars, 2 motor cars, gravel dock and miscellaneous tools, is approximately $57,000. It is estimated that 40,000 cu. yd. of concrete will be laid during the season of 1909. The saving per yard on the lowest price that the company is now paying a contractor for laying concrete is $1.25. Hence for 40,000 cu. yd. there will be a total saving of $50,000, or enough to pay for almost the entire plant in one season. This estimate includes interest and depreciation allowances.



Detroit United Railway—Method of Cooling Cast-Welded Joints

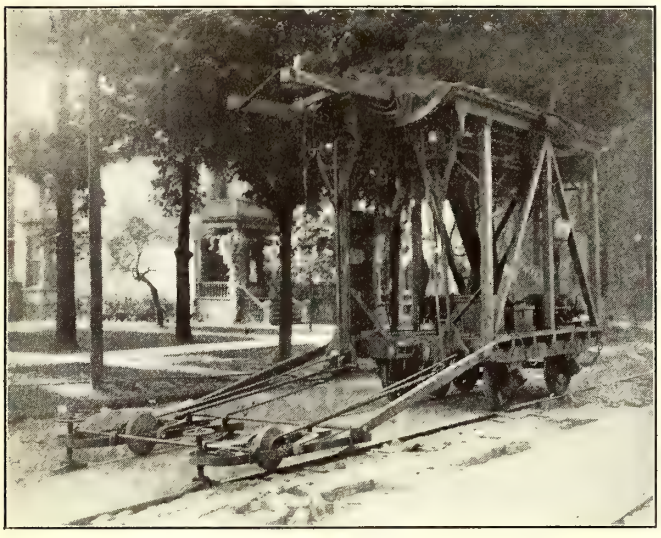


Detroit United Railway—Work Train Hauling Gravel

CAST-WELDED JOINT PRACTICE AND GRINDING

On adopting cast-welded joints some trouble was experienced from a depression located at the immediate point of junction of the rails. This trouble was traced to the

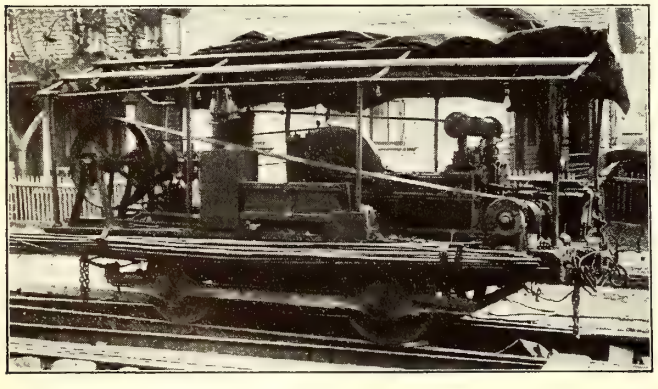
method of holding the rails during the pouring of the hot metal. A bar about 5 ft. long, having end clamps which hook underneath the rail, and a large screw at the center bearing down on the joint, apparently lifted the metal just



Detroit United Railway—Rail Joint Grinder

at the edge of the casting when it was hot. This caused a slight depression at the joint, which grew worse as cars ran over the track. Mr. Kerwin has overcome this trouble by using a hollow casting about 30 in. long, which is shaped to the rail-head on its bottom. The casting is recessed to receive two screws which are used with the clamping bar to keep it pressed in place. A barrel of water is placed near the clamp and connected to one end of the hollow casting by a hose, while a ¼-in. rubber tube is connected to the pet-cock at the other end to guide the water away. The water is turned on when the hot metal is poured into the joint molds to keep the rail-head cool and leave it unchanged as to temper or hardness. Afterward the joint is trued up by the grinder to a perfect surface.

The grinder developed for this purpose is another of Mr. Kerwin's machines. It consists of a strong wooden platform mounted on two axles of a standard truck, which is drawn over the road by one of the motor work cars. One axle is equipped with standard gearing, which is connected to the motors through a planetary gear of the automobile type and suitable countershafts for reducing the speed. This planetary is operated by a lever which, when pushed

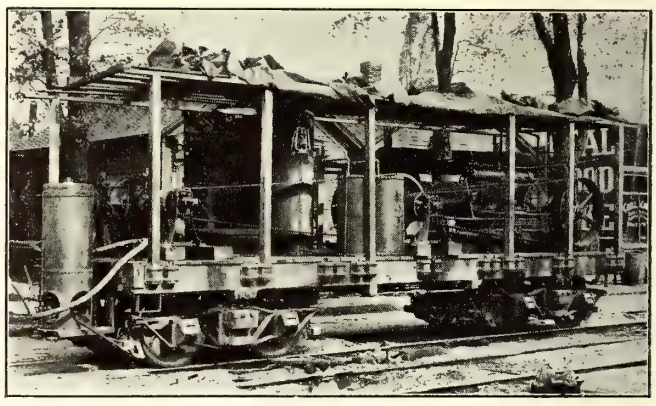


Detroit United Railway—Compressor Car for Track Drills

forward gives a slow forward movement to the whole car, and when pushed backward reverses the motion and starts the car slowly in the opposite direction. A countershaft overhead is driven by a 30-hp motor and furnishes power not only to operate the forward and back motion of the car, but also to drive the two emery wheels, which are belted to a countershaft overhead in the front of the car frame. The two emery wheels, one for each track, are suspended over the rails by jointed arms, and the belts used are beveled and run on grooved pulleys.

The emery grinding wheels are mounted on angle iron frames directly over each rail. The frames are coupled together by two shafts mounted above and at right angles with the track. Each frame is equipped with a shoe at each end, the one nearest the car being pivoted by means of a bolt through the frame to the shoe and designed to slide on the rail. The forward shoes on the outer end of each frame are pivoted in the bottom end of a jaw, the stem of this jaw passing up through a sleeve which is threaded on its outside, to a socket on the frame itself. This screw is equipped with a hand wheel on top by which the operator adjusts the grinding wheels, raising and lowering them at will; this, together with the forward and back action of the car, levels off joints to perfection. This machine is also used in cleaning off corrugations when they occur and in grinding out old joints that have become recessed.

The open hearth rail seems to take the cast-weld joint better than does the Bessemer rail. Of course, the whole surface of the rails, except the bottom, is sand blasted before pouring. Joints of this kind sawed out in 1-in. sec-



Detroit United Railway—Sand-Blast Compressor Car

tions show a perfect junction between the cast iron and the steel of the rail.

OTHER SPECIAL EQUIPMENT

The Detroit United Railway uses in track repair and construction work two air compressor outfits mounted on flat car bodies, both of which are illustrated. The single-truck car is used for supplying compressed air for four Boyer pneumatic drills. The drills are useful in drilling holes for bolts, tie rods and bond terminals when putting in new special work. As many as 300 holes have been drilled on the street in placing one complicated layout. This car is light enough to permit being removed from the rails when it is necessary to keep it in one place for several days, and in this way it can be used without interfering with the traffic on any tracks. The air compressor is belt driven from a railway motor mounted on the platform of the car at one end. The motor shaft carries at its outer end a small emery wheel for grinding track drills. The large compressor car is used for sand blasting rail joints preparatory to welding, and is mounted on a standard flat car body with double trucks. One of the air compressors formerly used in connection with the storage air brake system supply of the company has been mounted over one truck and the driving motor, control apparatus and storage

tanks are mounted at the other end of the car. This car has a much larger reservoir capacity than the small car. Current for operating the compressor motors on both cars is supplied from the trolley wire by a pole and hook. Neither car is fitted with propulsion motors.



Detroit United Railway—Concrete Breaker

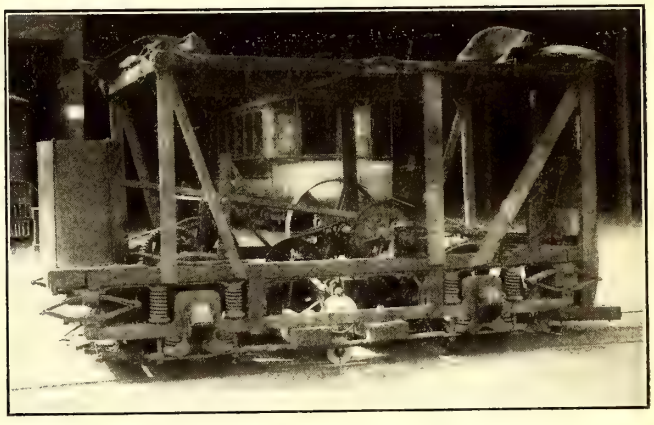
In rebuilding track, it is frequently necessary to break up large masses of concrete. To do this with drills and sledges is a slow process and the Detroit United Railway uses an improvised breaker resembling a pile driver, which



Detroit United Railway—Crane Car

is also illustrated. The shears and the hoisting winch are mounted on a revolving turn-table so that the drop weight can be swung in a complete circle around the body of the car. The weight is hoisted by a motor-driven winch and a disconnecting clutch is used to drop it. The drop weighs 1400 lb. and carries a sharpened wedge 18 in. long on its under side. About four blows are required to penetrate a bed of solid concrete 18 in. thick. This machine will do the work of 75 men with sledges and chisels.

Handling rails and pieces of special work on the ground requires a large force of men. A crane car such as the one illustrated is very useful for this work. This car is mounted on a single truck and carries an operator's cab on the top of which is mounted the trolley pole. The hoisting drum is motor driven and the boom of the crane can be revolved through an arc of about 200 deg. The radius of the boom can be varied by lengthening or shortening the chain from the point of the boom to the top of the mast. This crane car is used in unloading rail, moving the rails into position and doing any moderately heavy lifting required in the construction of track or in loading cars in the material yards.



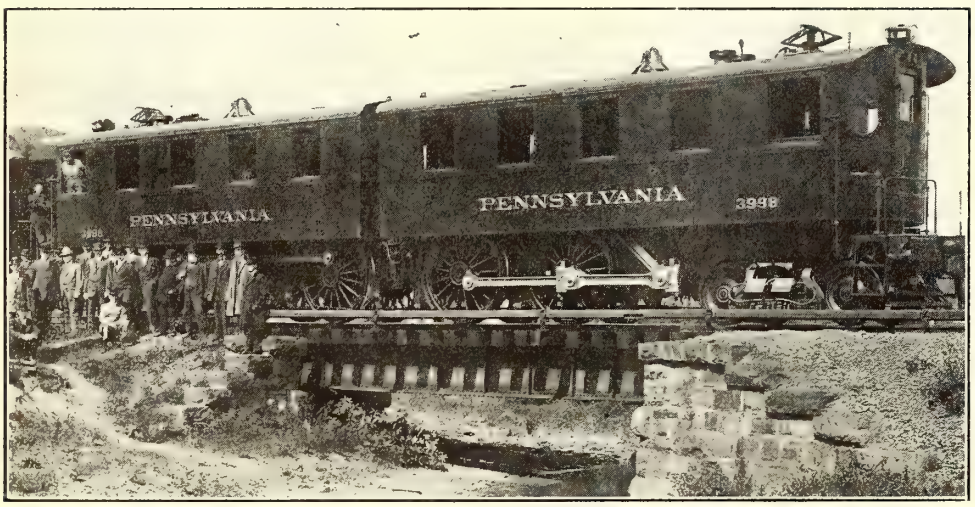
Detroit United Railway—Saw for Cutting Grooved Rail

Some of the older track of the Detroit United Railway was laid with girder rail having a very narrow groove. The flanges of wheels under interurban cars operating over this track completely filled the grooves, and if the wheels were not accurately pressed to exact gage on the axles severe strains were set up, which resulted in many broken axles. After trying unsuccessfully to chip off the lip of this grooved rail, the car shown in one of the engravings was devised. It consists of an old Brill single-truck on which are mounted the driving motor and the cold saw. The saw is mounted on an arbor approximately over the gage line of one rail. It is driven through a chain of gears by a shaft and universal joint which allows for variations in the depth of the cut. The driving shaft is in turn driven through double reduction sprocket wheels and chains by a railway type motor mounted low down on the frame of the car. This motor is operated by a current from the trolley and the speed is regulated by a water rheostat, the plates of which are immersed in a barrel of water carried at one end of the car. Longitudinal movement of the car at the rate of about 60 ft. per hour is effected by a dog and ratchet arrangement driven from the flexible jack shaft to which the saw is geared. An eccentric is mounted on this shaft and a reach rod on this eccentric gives a reciprocating motion to the end of a pivoted arm carrying a dog which engages with the driving ratchet wheel. The ratchet wheel is connected through double reduction spur gears to the forward axle. The saw is flooded with lubricant by a hose leading from a tank mounted on the end sill of the car frame as shown in the engraving. The saw cuts about ¼ in. deep and the lip is then broken off with a sledge.

PENNSYLVANIA ELECTRIC LOCOMOTIVES FOR THE NEW YORK TERMINAL SERVICE

The first of the initial order for 24 articulated electric locomotives which are to be used for handling the Pennsylvania Railroad trains into the New York station and through to the yards on Long Island has been delivered and is in operation on the electrified tracks of the Long Island Railroad. This locomotive incorporates many novel features in electric locomotive design, and is the result of several years of co-operative development between the Pennsylvania Railroad Company and the Westinghouse Electric & Manufacturing Company. The Pennsylvania Railroad was represented in this work by a locomotive committee composed of the chairman, George Gibbs, chief engineer of electric traction; A. W. Gibbs, general superintendent of motive power; D. F. Crawford, general superintendent of motive power, Pennsylvania Lines West, and A. S. Vogt, mechanical engineer.

The new locomotive is distinctively a high-powered machine built for high-speed operation. In wheel arrangement, weight distribution, trucks and general character of the running gear it is the practical equivalent of two American type locomotives coupled permanently back to back. The motors are mounted upon the frame and side-connected through jack shafts to driving wheels by a system of cranks and parallel connecting rods, similar to steam practice. The connecting rods are all rotating links between rotating elements, and are thus perfectly counterbalanced for all speeds. The employment of this transmission permits the mounting of the motors upon the frame, secures their spring support, and, in common with the rest of the locomotive, the center of gravity at 79 in. above the rail, or approximately the same height above the rails found desirable in high-speed steam locomotives.



Pennsylvania Electric Locomotive—Side View

The same freedom of motion in the wheels and axles that is characteristic of the present steam locomotive designs is also secured. In these locomotives the variable pressure of the unbalanced piston of the steam locomotive is replaced by the constant torque and constant rotating effort of the driving motors, and the pull upon the draw-bar is therefore constant and uniform. It might to the casual observer appear that by this arrangement of driving a return has been made to steam locomotive practice as regards counterbalancing difficulties, but it will be seen upon examination that nothing of the kind is true. There are no questions of unbalanced reciprocating weights involved; all weights are revolving ones and directly counterbalanced, so that as far as pounding upon the track is concerned, the effect is precisely the same as though the whole were driven without any pins or rods.

The starting requirements of this locomotive are unusually severe, as it will be called upon to start a train of 550 tons trailing load upon the tunnel grades under the river, which are approximately 2 per cent. The guaranteed tractive effort of 60,000 lb. is amply within the capacity of the electrical equipment. The normal speed with load upon a level track is 60 m.p.h., but the locomotive is capable of speed much in excess of this. During some of the trial runs it made 72 m.p.h. The total weight of the locomotive is 332,100 lb., of which 208,000 lb. are carried by the drivers. The weights per driving axle are 52,000 lb. each and per pony axle 31,000 lb. each.

At maximum capacity this locomotive develops 4000 hp. for sustained heavy output. The motors are designed for forced ventilation, but the initial service will not require this provision. It will be seen that the locomotive is an articulated machine. Each half carries its own motor and has four driving wheels 68 in. in diameter and one four-wheel swing bolster swivel truck with 36-in. wheels. Each section has its own cab of sheet steel extending the length of the frame, communication between the two cabs being provided through a standard Pullman vestibule. The rigid wheelbase of each half is 7 ft. 2 in., and the total wheelbase of each half is 23 ft. 1 in., that of the whole locomotive being 55 ft. 11 in. The total length of the locomotive inside of the knuckles is 64 ft. 11 in. The running gear and mechanical parts of this locomotive were built by the Pennsylvania Railroad at the Juniata shops at Altoona. The air-brake equipment was built by the Westinghouse Air Brake Company, and the electrical equipment was built and the apparatus assembled by the Westinghouse Electric & Manufacturing Company at the East Pittsburgh works.

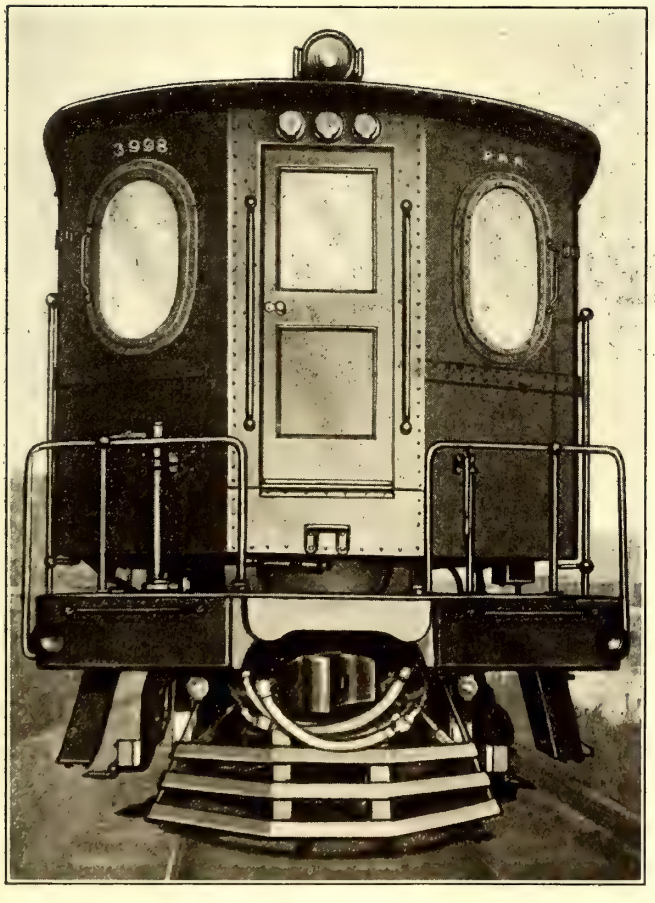
FRAMES

The locomotive frames are of cast steel of large cross-section and massive construction. In their design an unusually large factor of safety has been employed. The side frames are of sufficient strength to allow the engine to be raised by jacks applied at fixed points provided in the construction with all pedestal binders removed. The upper surfaces of the side frames are especially broad and furnish bases for the feet of the motor frames, which fit over the top members of the side frames with heavy flanges. There are five heavy cross-ties from side frame to side frame, consisting of bumper, articulation and jackshaft girders, body bolster and drive wheel cross-tie. Additional transverse strength is given by the steel motor frame which is bolted to the side frames as elsewhere described. The bumper and articulation girders are so proportioned that a bump equivalent to a static load of 500,000 lb. (150,000 lb. applied on center line of draft cylinder and 350,000 lb. applied on center line of platform buffer) will produce no stress exceeding

12,000 lb. per square inch in the frames. The jackshaft girder is of inverted U-section and arranged to give rigid support to the jackshaft bearing brasses. It also carries upon facings the driver brake cylinder and the brake lever fulcrums are integral with the girder. The cross-tie between the driving wheels is of diagonal design, especially fitted for stiffening the bottom members, and also providing a base for the front driver brake hanger pin. This tie fits between the upper and lower members of the side frames and assists in rigidly supporting the heel of the motor frame. The articulation girder is unusually rigid diagonally in the horizontal plane, and is designed to accommodate the articulation gear details. The body bolster carries the swivel truck center pin and is of ample strength to withstand all braking strains.

WHEELS, AXLES AND SHAFTS

The driving wheels are 68 in. in diameter with tires 3 in. thick, have cast-steel centers and rolled-steel tires, and are fitted with retaining rings. The truck wheels are of rolled steel 36 in. in diameter. The driving-wheel centers are fitted with quartered crankpins and counterbalances; these latter are offset from direct opposition to the cranks to correct the transverse unbalance that would otherwise exist. The axles, jackshafts and motor shafts are of special carbon steel, oil-tempered and annealed. They are of large diameter, finished all over, and each has an axial hole throughout.

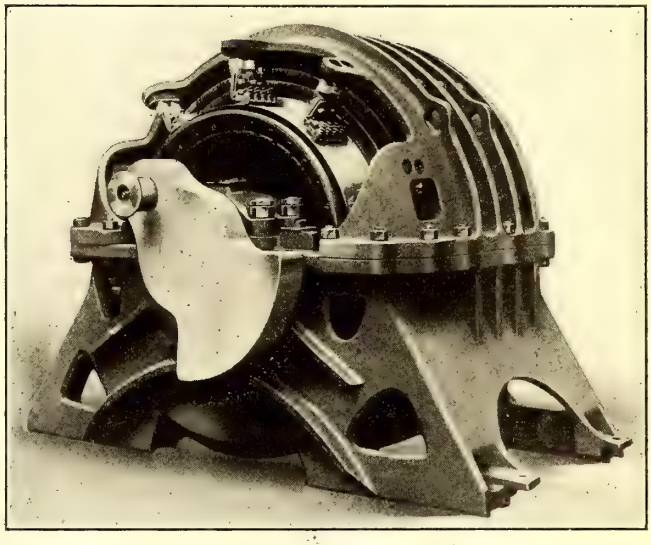


Pennsylvania Electric Locomotive—End View

CRANKS AND CONNECTING RODS

The motor shaft cranks are forged with integral counterbalances, accurately located in quartering positions and press-fitted and keyed to the shaft. The jackshaft cranks are forged integrally with the shaft in quartering position. Their counterbalances are keyed in position. As with the driving wheels, the counterbalances of motor shafts and jackshafts are offset from direct opposition to the cranks in order to complete the balance. All the crankpins are of special carbon steel, oil-tempered and annealed, bored axially and press-fitted to their respective cranks and wheels.

The connecting rods are also of special carbon steel, oil-tempered and annealed. Inasmuch as under the action of the brake shoes the wear of the axle and the take-up of the wedges in the pedestal tend to decrease the distance between the axle and the jackshaft, the main rod is adjustable at each end, so fitted that all take-up shortens the rod and furnishes compensation. The type of adjustable head is that employed on the Pennsylvania Railroad Class E-3 locomotives. All other rods are fitted with solid bushed ends.



Pennsylvania Electric Locomotive—One of Two 2000-Hp Direct-Current Interpole Motors

DRAFT GEAR AND ARTICULATION

The bumper ends of the locomotive are fitted with Westinghouse friction draft gear, standard M.C.B. couplers and platform buffers of Pennsylvania Railroad standard type. The articulation ends are fitted with permanent couplings of long twin draw-bars and Westinghouse friction draft gears so designed that the leading half serves as a leading truck and the other half as a trailer in whichever direction the locomotive may be moving. The coupling gear is designed to oppose any possible "nosing" tendency or buckling action of the halves.

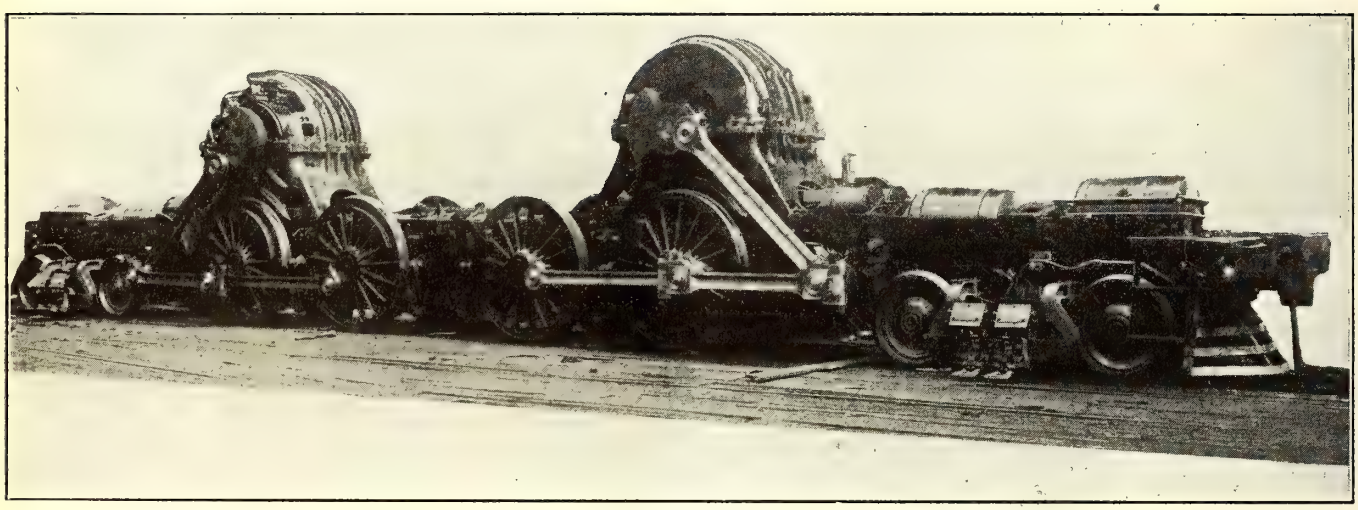
The main journals are similar to those of the Pennsylvania Railroad Class E-3 engine. The jackshaft and motor bearings are all fitted for oil and waste lubrication. The spring rigging is of suitable strength, composed of equalizing beams and semi-elliptic springs, links and hangers of the usual type are provided. All materials of the locomotive running gear were furnished under Pennsylvania Railroad standard specifications with the exception that the axles, shafts, rods and crankpins are of special carbon steel, oil-tempered and annealed, and were subject to special inspection.

CABS

The cab of each half is an independent structure complete in itself. It is so constructed that it may be lifted bodily from the running gear with the floor and all auxiliary apparatus and set upon any convenient flat surface or trestle support without damage. This leaves the motor and running gear accessible for any desired overhauling and permits attention to be given at the same time

to the machinery in the cab. The cabs are identical in construction and fittings and are interchangeable. The location of the cabs in assembling is determined by dowels fitting in corresponding holes in the running gear. They are held in place by a number of bolts sufficient for security, but the locomotives would have to go beyond their centers of stability before the cabs would leave their seats. The cabs are amply lighted by electric lamps. The bulkheads and doors are so arranged that the motor and air compressor compartments, containing nearly all of the auxiliary apparatus, may remain lighted at all times with no intrusion of light in the controller compartment to affect the vision of the driving engineer. Provision is to be made for heating the cabs by steam furnished from electric flash boilers within the cabs.

Steps and hand rails are provided for safe and convenient access to all parts of the locomotive. Each cab is fitted with an appropriate bell for hand operation, a chime whistle, sand box and sanders, and also with a roof collector of pantograph type for power supply over third-rail gaps in the yards. The sanders and overhead collectors are operated by foot push buttons located near the master controller within easy reach of the driving engineer.



Pennsylvania Electric Locomotive—Motors and Running Gear

Each cab carries on the roof, at the end, an electric headlight having for its illuminating element a 50-cp stereopticon lamp operated from the main current, with suitable resistances, on 240 volts. These headlights are not intended to be of high candle-power, or to have a searchlight quality, although they might readily have been made so, as the electric current is obviously at hand. It was considered of great importance to avoid the blinding effect on the motorman of a powerful light as signals are provided with color indication only in the tunnels and terminal yard.

AIR BRAKES

Each locomotive half is supplied with complete Westinghouse air brake equipment actuated by a motor-driven air compressor and 600-volt motor for both automatic and direct braking of locomotive and train. The compressor also furnishes air for the electro-pneumatic switches, and its displacement is 65 cu. ft. of free air per minute. The entire system is especially designed for these locomotives and the foundation brake rigging is suitably proportioned for the weights and arranged for delivery of 85 per cent braking power at 50 lb. cylinder pressure.

ELECTRIC EQUIPMENT

The motive power of this type of locomotive is delivered from two interpole motors on direct current at 600 volts. The design of these motors was governed by the necessity of commutating the heavy drafts of power required to accelerate long trains on the tunnel grades. For this purpose the design not only affords great electrical stability, but renders it possible to use the economical, flexible and efficient field control. Each motor will develop 2000 hp on a current of 2900 amp at 600 volts. The weight of each motor complete without the crank is 42,000 lb. The motor frames are cast-steel shells divided horizontally and bolted rigidly together. The motor is of open construction, affording easy access to all parts. It is especially provided with powerful self-ventilation. If the full power of the locomotive is to be used more frequently than contemplated, ventilation by air blast can be used to increase the output greatly.

Semicircular openings in the lower half of the frame provide seats in which the bearing housings are rigidly bolted. The lower half of the frame is provided with four feet for mounting and bolting on the side frames of the running gear and these feet have machined flanges fitting over the top members on the side frames and stiffening the structure against transverse movement on the part of the motors. In addition to being securely bolted, the feet of the frame are firmly wedged in place.

The motors of these locomotives have 10 main poles and 10 interpoles, with heavy strap field windings. The main field is split in two halves, both being used together in slow speed operation. One of these sections is shunted in control. The armature core is built of soft steel punchings assembled with the commutator. The commutator bars are of hard drawn copper clamped by cast steel rings over mica insulation.

For the relief of the driving mechanism from excessive strains in the event of short-circuit in the powerful motors, an adjustable friction clutch of novel design and tested efficiency in action is provided between the armature spider and the motor shaft.

OTHER ELECTRICAL EQUIPMENT

The control of the locomotive motors is of the shunted field type, and by the utilization of the unit switch system the motors may be grouped in "series" or in "multiple" at will. Electro-pneumatic switches, actuated by air from the brake compressor and operated by magnets controlled from the master controller, are provided to regulate the field strength of the motors by shunting and by cutting out a portion of the field winding, in addition to the "series

parallel" grouping. This gives increased economy of operation and additional running points, greatly improving the facility and economy of operation.

The bridging system is used for passing from "series" to "multiple" connections. The motor fields are arranged to be reversed for changing the direction of motion and reversing is accomplished by unit switches.

The master controller is simple in operation and the cab is so arranged that the entire controlling mechanism of the locomotive and train is within reach of the driving engineer. When two or more locomotives are coupled together all may be operated simultaneously from any one of the master controllers. All switches are operated from the master controller entirely at the will of the motorman or engine driver. While it is not intended that the half units will be operated independently, the cabs are identically equipped and the windings, connections and control are such that in the event of the disabling of one motor the train may be operated under reduced power by the second motor, the same resistances being employed as for the two

The resistances are of the three-point cast grid type. The grids have such capacity that when one motor is cut out of service the locomotive will operate with the remaining motor. Under such circumstances the locomotive will exert a tractive effort of 25,000 lb. with the train accelerating at a rate of 0.1 m.p.h.p.s. until the resistance grids are cut out.

Suitable receptacles and jumpers are provided to establish the necessary low voltage control circuits between the locomotive half units and between the adjacent locomotives. A duplicate set of small storage batteries is supplied in each half unit for operation of the control circuits; and relays with suitable resistances are provided for shunting part of the current of the compressor motor through the batteries for automatic charging. An exceptionally quick-acting circuit-breaker is supplied on each half unit and connected between the junction of the third rail shoe and overhead collector cables and the switch groups. The main switch is on the line side of the circuit-breaker.

Each half unit is supplied with two pairs of collector shoes, suitably connected and fused. One pair of these shoes is mounted in a hardwood beam on each side of the swiveling four-wheeled truck.

GAS-ELECTRIC MOTOR CARS FOR THE SOUTHERN RAILWAY

The General Electric Company has sold to the Southern Railway Company two of its latest type of gas-electric motor cars. These cars will be equipped with standard commutating pole railway motors of 100 hp each. Two of these motors are located on the forward truck, giving a motor capacity of 200 hp to each car. The current is supplied from a 600-volt generator, which is direct-coupled to an eight-cylinder gas-engine in the forward compartment. A controller similar to that used on an ordinary trolley car is located convenient to the operator, and through this the current passes from the generator to the motors. Combined straight and automatic air brakes will be provided for the usual valves and accessories. The car bodies will be of steel, about 55 ft. long, with a seating capacity of 52 passengers. Both rear and center entrances are provided, thus furnishing a convenient means of dividing the two classes of passengers as required in the South. The order for these cars was placed after a thorough test of this type between Manassas and Strasburg last summer.

HOMEWARD JOURNEY OF THE PACIFIC COAST TRAIN PARTY

The special train of the Massachusetts Street Railway Association carrying the party of Eastern delegates who have been making a tour of the street railway systems of the Pacific Coast left Los Angeles over the Southern Pacific Railroad for El Paso, Tex., on Tuesday, Oct. 26. After leaving Los Angeles the party sent a telegram to Mr. Littell, chairman of the local reception committee, which read as follows:

Our visit of two days in Los Angeles will ever be memorable in the minds of every member of our party. The boundless hospitality of which we were the recipients can never be forgotten, nor can your magnificent electric railways, which we had the pleasure of inspecting under your guidance. You may well be proud of the beautiful homes and electric railways of your city, and of the enterprise of the citizens of Los Angeles. The good fellowship and royal hospitality of its electric railway officials will ever be remembered.

The accompanying group view was taken in front of the Hotel Maryland, Pasadena, Cal., Oct. 25, and shows the members of the Pacific Coast party and the reception committee of the Los Angeles railway companies. This committee was composed of the following gentlemen:

H. M. Littell, assistant to general manager, Pacific Electric Railway, chairman.

C. H. Burnett, manager, Los Angeles & Redondo Railway, secretary.

H. E. Huntington, president, Pacific Electric and Los Angeles railways.

L. T. Garnsey, president, Los Angeles & Redondo Railway.

E. P. Clark, president, Los Angeles-Pacific Company.

M. H. Sherman, vice-president, Los Angeles-Pacific Company.

J. McMillan, general manager, Pacific Electric Railway.

W. E. Dunn, general counsel, Pacific Electric Railway.

Howard E. Huntington, general manager, Los Angeles Railway.

R. P. Sherman, general manager, Los Angeles-Pacific Company.

Thomas McCaffery, general superintendent, Pacific Electric Railway.

A. D. McDonald, auditor, Pacific Electric Railway.

Col. G. E. Pillsbury, chief engineer, Pacific Electric Railway.

D. A. Munger, general agent, passenger department, Pacific Electric Railway.

W. F. Towne, general agent, freight department, Pacific Electric Railway.

A. E. Roome, superintendent telegraph and signals, Pacific Electric Railway.

J. Strang, master mechanic, Pacific Electric Railway.

S. H. Anderson, electrical engineer, Pacific Electric Railway.

J. J. Akin, superintendent, Los Angeles Railway.

E. L. Stephens, master mechanic, Los Angeles Railway.

J. L. Clark, superintendent of electrical repairs, Los Angeles Railway.

C. A. Henderson, auditor, Los Angeles Railway.

G. J. Kuhrts, electrical engineer, Los Angeles Railway.

L. O. Lieber, electrical engineer, Los Angeles Railway.

W. C. White, superintendent, Los Angeles-Pacific Company.

D. W. Pontius, traffic manager, Los Angeles-Pacific Company.

C. M. Warnecke, electrical engineer, Los Angeles-Pacific Company.

W. T. Maddex, superintendent and general freight and passenger agent, Los Angeles & Redondo Railway.

E. C. Thomas, general agent, passenger department, Los Angeles & Redondo Railway.

W. F. Goble, superintendent mechanical department, Los Angeles & Redondo Railway.

The party was accompanied from Los Angeles to El

Paso by C. D. Kellogg, Jr., manager, El Paso Electric Railway Company, and upon the arrival of the train at El Paso, about 2 p. m., on Oct. 27, the tourists were met by a number of other officials of the local street railway company, including H. S. Potter, general superintendent; C. L. Forsyth and A. C. Woehler. Special trolley cars and automobiles took the members of the party to the Country Club, where a luncheon was served and a concert provided by the military band from Ft. Bliss. The party was then taken across the Rio Grande River in special cars to the city of Juarez, Mex., in which the El Paso Electric Railway Company also operates the street railway service. After some time spent in viewing the foreign sights in this historical Mexican town, the party returned to El Paso and enjoyed a banquet at the St. Regis Hotel, provided by the local railway officials. Several informal speeches were made by representatives of the company and by some of the visitors. The train left for San Antonio about midnight.

San Antonio, Tex., was reached about 4 o'clock in the afternoon of Oct. 28. The visitors were met at the station by W. B. Tuttle, general manager; T. C. Brown, superintendent of transportation; J. J. King, general superintendent; W. H. Thompson, Jr., assistant general manager, and T. J. Owen, of the San Antonio Traction Company. Special cars were waiting to take the members of the party to see the Alamo, an ancient Spanish mission and the scene of one of the famous battles in the war of Texan independence against Mexico. An opportunity was afforded later in the afternoon to inspect the irrigation works in connection with a large plantation in the suburbs of the city, and the trip concluded with a ride through the beautiful residential sections of San Antonio. A Mexican dinner was served in the evening at one of the famous Mexican restaurants in the city.

The party went directly from San Antonio to Galveston, which was reached about 8:30 a. m., Friday. They were met by H. S. Cooper, manager, Galveston Electric Company, and several of his associates and were taken to two ocean-going tugs. A trip was then taken about the harbor of Galveston, which with the exception of New York, is said to be the largest shipping point for foreign exports and imports in the United States. After landing, the party entered automobiles and carriages and were driven to the famous Sea-Wall Boulevard and had an opportunity of seeing the sea-wall erected by the city and County of Galveston to prevent inundation of the city by the sea. After a shore luncheon at one of the restaurants on the Boulevard the train was taken at 1.30 p. m. for Houston.

The special train reached Houston from Galveston about 4 p. m. on Friday. The tourists were accompanied on the trip from Galveston by David Daly, general manager of the Houston Electric Company, and by a number of his associates. At the Houston railroad station automobiles were in waiting to take the party on a tour around the city. Several of the principal residential streets were traversed. A trip was then made to a large cotton bale compressing plant, owned by the Cleveland Compressing Company. Afterward the Country Club was visited. The party returned to the Southern Pacific Railroad station at 6.45 p. m. and boarded the train for New Orleans, which was the next stopping place.

The party arrived at New Orleans early on the morning of Saturday, Oct. 30, and was met at the Southern Pacific Railroad station by E. C. Foster, vice-president, New Orleans Railway & Light Company. Mr. Foster had joined the party at Denver, but had been obliged to return to New Orleans directly from Seattle. Special electric cars carried the tourists to Bégué's restaurant, in the French quarter of the city, where a breakfast was served according to the French style. A visit was then made to the New Orleans Country Club in company with Mr. Foster and Hugh McCloskey, president, New Orleans Railway & Light Company. Afterward, the party returned to the city, and from the vantage point of the upper decks of a large river steamer witnessed the arrival in New Orleans by boat of President Taft and the party of delegates to the waterways convention, governors of several States, congressmen and others. Three large men-of-war were anchored opposite the landing, and saluted the President as he arrived. The effect of the sight was heightened by the elaborate decorations of the city and the crowds along the shore. It was a spectacle never to be forgotten. After leaving the river front the party again boarded their special cars and were conveyed to an attractive summer resort on Lake Pontchartrain, where an elaborate luncheon was served. The luncheon was followed by informal speeches by a number of those present. Mr. Foster presided and Mr. Peirce, of Boston, acted as toastmaster. After the return to the city the party divided, but most of them assembled later in the



Group View of Members of Pacific Coast Train Party and Representatives of Los Angeles Electric Railways, Taken at Hotel Maryland, Pasadena, Cal., Oct. 24

evening to witness the presentation of "Les Huguenots" at the French Opera House, the performance being also attended by President Taft. The train left New Orleans at midnight for Memphis over the Yazoo & Mississippi Valley Railroad.

The tourists reached Memphis, Tenn., about 4 p. m., Oct. 31, and were taken by a special car provided by the Memphis Street Railway Company to Overton Park, where the city has recently installed an extensive zoological collection. B. H. Betts, of the transportation department of the Memphis Street Railway Company, accompanied the party. After a short visit at the park, the tourists returned to the station in time to start for Louisville at 7 p. m.

Louisville, Ky., was reached about 9 a. m., Nov. 1, and the party was met at the station by Thos. H. Minary, assistant to the president; R. R. Smith, traffic manager, and Jacob Fishback, superintendent of transportation, Louisville Railway Company.

The tourists rode first to the large distillery of the Sunnybrook Distillery Company, where they were taken through the buildings. This is among the largest distilleries in the world, and the visitors were shown all of the various processes of the manufacture of whisky. They then rode to the Louisville factory, No. 27, of the National Tobacco Works branch of the American Tobacco Company, where they were escorted through the building by officials of the company. The stay of the party in Louisville was brief, as the special train was scheduled to leave at noon for Cincinnati, so that after these two visits the tourists returned to the railroad station. They left for Cincinnati on schedule time.

Cincinnati was reached about 4:30 p. m. on Nov. 1, and the party was met at the Union Station by Walter A. Draper, secretary, and Thomas Fitzgerald, assistant general manager, of the Cincinnati Traction Company and the Ohio Traction Company. Two handsome interurban cars of the latter company were waiting and took the tourists around the city and to Eden Park, but as it was raining no stop was made at the latter place. After a ride of about two hours, during which the visitors had an opportunity of seeing many of the interesting features of the city and of the Cincinnati traction system, the party returned to the train. Cleveland had originally been scheduled as the next stopping point, but owing to the desire of many of the party to spend as much time as possible at Niagara Falls, the train continued directly to Buffalo, which was reached about 10 a. m., Nov. 2. At Buffalo the party divided, many going to the Falls, others remaining in the city.

At 7 p. m. the train left for Boston, where it arrived at 9 a. m., Nov. 3. Before parting, the party passed resolutions extending its sincere thanks to F. A. McCormick, passenger agent, Boston & Maine Railroad, through whom the railroad arrangements for the trip had been made, and who accompanied the party.

SUMMARY OF THE TRIP

The tour of the Massachusetts Street Railway Association, which has just ended so successfully, was begun Sept. 30 and lasted five weeks. The idea originated with Charles S. Clark, secretary of the association, and was conducted under the direction of Mr. Clark, H. E. Reynolds, assistant general manager, Boston & Northern Street Railway, and H. L. Wilson, treasurer, Boston Elevated Railway. The special train in which the tour was made was composed of eight cars, consisting of a full baggage car, a café car, a dining car, a standard Pullman sleeping car, three compartment sleeping cars and a combination compartment and observation car. Most of the tourists were from Massachusetts, but a number of other States were represented among those who made the circuit from Cleveland and return. The delegates who left from and returned to Boston traveled nearly 10,000 miles. Twenty-two States and territories were crossed. In addition to the trip in the United States, the party spent three days in Canada, and at El Paso crossed into Mexico. Stops were made at 20 cities for a long enough time to allow the party to inspect the local electric railway system.

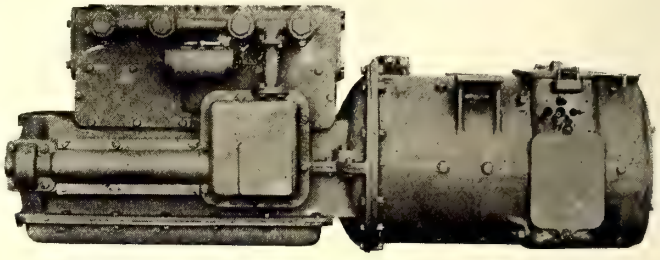
The following is a list of those who participated in either the entire trip or part of it. All of those who started from any part of Massachusetts or from New York and returned with the party are indicated in the list as having made the complete tour, although the train actually left from and returned to Boston.

Arnold, John A., president, Taunton & Pawtucket Street Railway (complete tour).
Arnold, Mrs. John A. (complete tour).
Bacon, Wm. H., Bacon & Co., Boston, Mass. (complete tour).
Bright, Edgar, inspector of expenditures, Boston Elevated Railway, Boston, Mass. (complete tour).
Birtwell, A. W., assistant treasurer Tacoma Railway & Power Company, Tacoma, Wash. (Denver to Seattle only).
Blake, Henry W., editor, Electric Railway Journal, New York City (complete tour).
Bliss, A. W., Brookline, Mass. (complete tour).
Bliss, Mrs. A. W. (complete tour).
Burns, John, Duxbury, Mass. (complete tour).
Burns, Mrs. John (complete tour).
Campbell, A. D., Seattle Electric Company, Seattle, Wash. (Denver to Seattle only).
Carr, Geo. R., vice-president and general manager Dearborn Drug & Chemical Works, Chicago (Denver to San Francisco only).
Clark, Chas. S., secretary, Massachusetts Street Railway Association (complete tour).
Clark, Mrs. Chas. S. (complete tour).
Clark, Miss Arabella (complete tour).
Clark, Miss Mary F. (complete tour).
Clark, Miss Anna M. (complete tour).
Clark, Joseph F. (complete tour).
Coates, F. R., Stone & Webster Engineering Corporation, Boston (Boston to San Francisco only).
Corey, W., Standard Motor Truck Company, New York City (Denver to Seattle only).
Coghlin, Gerald R., B. J. Coghlin & Company, Montreal, P. Q. (Complete tour).
Colburn, Clifton, treasurer, Nahant & Lynn Street Railway, Lynn, Mass. (complete tour).
Dana, Edward, inspector of service, Boston Elevated Railway, Boston (complete tour).
Dana, Mrs. Edward (complete tour).
DeHaseth, C. A., roadmaster, Seattle Electric Company, Seattle, Wash. (Denver to Seattle only).
Dohn, A. F., Tacoma Railway & Power Company, Tacoma, Wash. (Denver to Seattle only).
Davol, B. D., president, Mechanics Mills, Fall River, Mass. (complete tour).
Davol, Mrs. B. D. (complete tour).
Dozier, G. E., superintendent, Nahant & Lynn Street Railway, Lynn, Mass. (complete tour).
Drake, L. J., Jr., Galena Signal Oil Company, Indianapolis, Ind. (Denver to Louisville, Ky.).
Drake, Mrs. L. J., Jr. (Denver to Louisville, Ky.).
Edwards, Chas. R., manager, Badger Fire Extinguisher Company, Boston (complete tour).
Edwards, Mrs. Chas. R. (complete tour).
Fallon, Nugent, Boston Elevated Railway, Boston, Mass. (complete tour).
Farron, H. H., Adams Manufacturing Company, Pittsburgh, Pa. (Cleveland, Ohio, returning to Buffalo).
Foster, E. C., vice-president, New Orleans Railway & Light Company, New Orleans, La. (Denver to Seattle only).
Foster, Mrs. E. C. (Denver to San Antonio, Tex., only).
Fletcher, J. F., Armstrong Dining & News Company, Boston, Mass. (complete tour).
Fletcher, Mrs. J. F. (complete tour).
Goodrich, E. S., Hartford, Conn. (complete tour).
Green, H. B., Pennsylvania Steel Company, Los Angeles, Cal. (San Francisco to Los Angeles, only).
Green, Mrs. H. B. (San Francisco to Los Angeles only).
Johnson, F. H., Boston, Mass. (complete tour).
Johnson, Mrs. F. H. (complete tour).
Hall, Mr., Stone & Webster Engineering Corporation, Houston, Tex. (San Antonio to Houston only).
Kellogg, C. W., Jr., El Paso Electric Railway, El Paso, Tex. (Los Angeles to Houston only).
Kempster, A. L., superintendent, Seattle Electric Company, Seattle, Wash. (Denver to Seattle only).
Laffin, R. T., Stone & Webster Engineering Corporation, Seattle, Wash. (Denver to Seattle only).
Lindsay, S. R., Seattle Electric Company, Seattle, Wash. (Denver to Seattle only).
McCabe, J. F., purchasing agent, Worcester Consolidated Street Railway, Springfield Street Railway and Berkshire Street Railway, Springfield, Mass. (complete tour).
McCormick, F. A., agent, Boston & Maine Railroad, Boston, Mass. (complete tour).
McCormick, Mrs. F. A. (complete tour).
McCarter, Thos. N., president, Public Service Corporation, Newark, N. J. (Denver to Laggan, Alta.).
McCarter, Mrs. Thos. N. (Denver to Buffalo, N. Y.).
McDonald, A. L., Brockton, Mass. (complete tour).
McDonald, Mrs. A. L. (complete tour).
McKay, A. H., traffic manager, Puget Sound Electric Railway (Denver to Seattle only).

Meixwell, J. C., superintendent of transportation, Northern Electric Railway, Scranton, Pa. (from Utica, N. Y., and return).
Milk, Mrs. E. L., Hoosick Falls, N. Y. (from Hoosic Falls and return).
Morse, George, Taunton, Mass. (complete tour).
Nash, George, Brown Brothers & Company, Boston (complete tour).
Nash, Mrs. George (complete tour).
Nash, Miss (complete tour).
Odell, E. H., claim agent, Tacoma Railway & Power Company and Puget Sound Electric Railway, Tacoma, Wash. (Denver to Seattle only).
Odell, Mrs. E. H. (Denver to Seattle only).
Page, H. C., general manager, Worcester Consolidated Street Railway, Worcester, Mass. (complete tour).
Page, Mrs. H. C. (complete tour).
Peirce, Chas. C., manager railway department, General Electric Company, Boston (complete tour).
Peirce, Mrs. Chas. C. (complete tour).
Pierce, Harold W., Stone & Webster Engineering Corporation, Houston, Tex. (San Antonio, Tex., to Houston only).
Potter, E. E., manager Seattle Electric Company, Seattle, Wash. (Seattle to Boston only).
Reynolds, H. E., assistant general manager, Boston & Northern Street Railway, Boston (complete tour).
Reynolds, Mrs. H. E. (complete tour).
Rosengarten, J. C., Philadelphia, Pa. (complete tour).
Rollins, J. R., Jr., president, Holbrook, Cabot & Rollins Corporation, Boston (complete tour).
Rollins, Mrs. J. W. (complete tour).
Rollins, Wingate (complete tour).
Ruppe, S., Seattle Electric Company, Seatle, Wash. (Denver to Seatle only).
Spillane, Maurice, attorney, Boston Elevated Railway, Boston (complete tour).
Spillane, Mrs. Maurice (complete tour).
Shaw, James F., president, American Street & Interurban Railway Association, Boston, Mass. (complete tour).
Smith, Mrs. Alice Johnson (complete tour).
Swenson, B. V., secretary-treasurer, American Street & Interurban Railway Association, New York City (complete tour).
Schluss, K. C., Seattle Electric Company, Seattle, Wash. (Denver to Seattle only).
Thayer, Chas. I., Brookline, Mass. (complete tour).
Thayer, Mrs. Chas. I. (complete tour).
Thornley, A. J., superintendent, Narragansett Machine Company, Providence, R. I. (complete tour).
Thornley, Mrs. A. J. (complete tour).
Wilson, H. L., treasurer, Boston Elevated Railway, Boston, Mass. (complete tour).
Wilson, Mrs. H. L. (complete tour).
Winsor, Paul, chief engineer of motive power and rolling stock, Boston Elevated Railway, Boston, Mass., and past president, American Street & Interurban Railway Engineering Association (complete tour).
Wellington, E. I., Rindge, N. H. (complete tour).
Wellington, Mrs. E. I. (complete tour).
Wilde, E. S., treasurer, Union Street Railway, New Bedford, Mass. (Denver to Boston).
Winter, H. M., General Electric Company, Seattle, Wash. (Denver to Seattle only).
Wells, James R., Springfield, Mass. (complete tour).
Wells, Mrs. James R. (complete tour).

GASOLINE-ELECTRIC CAR FOR THE THIRD AVENUE RAILROAD, NEW YORK

The Third Avenue Railroad Company, at the suggestion of F. W. Whitridge, receiver, has begun experimental operation of a gasoline-electric car to determine the possibilities of this type of vehicle for the lines which it now operates by horse traction. The car, which was built by the General Electric Company, was received on Oct. 25 and is now in service on the 125th Street cross-town line where it is being operated on the same schedule as the electric cars which are running on this route. The 125th Street line is 2.1 miles long, and in this distance from 15 to 21 stops are made in each direction. The round-trip running time is 30 to 33 minutes and the headway is 2½ minutes, with no allowance for lay-overs. The gasoline-electric car, therefore, must have as good accelerating qualities as the electric cars to maintain its place in the schedule. The new car is being operated for 15 hours every day. The company believed that by putting the gasoline-electric unit in regular passenger service on a division with heavy traffic, it would discover any weakness in the design much sooner than if the experimental runs were made on the lightly patronized routes for which self-propelled vehicles may ultimately be used. The specifications under which this car was purchased state that it should be capable of running on a 5 per cent grade and when on level track maintain a schedule speed of 8 m.p.h. with 10 stops per mile. These conditions have been met easily; in fact, shortly after the car was received it was run successfully on Amsterdam Avenue up an 8 per cent grade about 1000 ft. long.



Gasoline Engine and Generator Unit

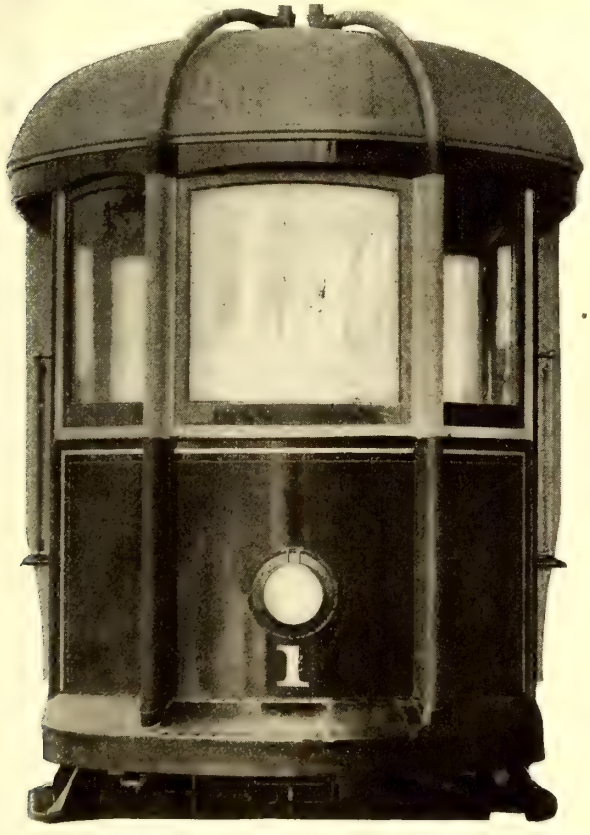
As shown in the accompanying illustrations, the car is of the single-truck type with drop sash and vestibules. The platforms are about 4½ ft. long and are furnished with Pitt folding gates. The outlines of the body are rather unusual owing to the absence of the monitor roof. The top is shaped like a flat dome and carries eight hood-suction ventilators, which will prevent snow or rain finding its way into the interior of the car. The water-cooling radiators are carried on top of the roof near the center of the car. The exhaust pipes are brought up to the roof at one end of the car, as shown in the accompanying head-on view. The interior of the car is handsomely finished in mahogany and is illuminated by tungsten lamps which are set in two rows of six each over the aisle. The semi-convertible windows are furnished with Pantasote curtains. Sufficient gasoline for 150 miles operation is carried in tanks under the longitudinal rattan seating.



Third Avenue Railroad Gasoline-Electric Car

The body, which was built by the Wason Manufacturing Company, Springfield, Mass., is 28 ft. long over all, 19 ft. long over the body end frames, 8 ft. wide and 12 ft. high from top of the rail to the roof. It seats 26 to 28 passengers, and as the total weight of body, truck and apparatus is 24,000 lb., the respective weights per passenger are 923 lb. and 857 lb. These weights compare very favorably with the average electric double-truck car. It will be noted that no space is given up for the power equipment in the body of the car as the machinery is carried on the truck and the control equipment at both ends takes up no more room than the ordinary electric drum controller and brake handle.

The truck is of 7 ft. 6 in. wheelbase and was specially designed by the American Locomotive Company for gasoline-electric drive. As shown in one of the accompanying illustrations, the side frames are made of steel plates. The truck is provided with coil springs and also with half-elliptic springs at the ends. The gas engine, which is mounted on the truck, is of the four-cylinder, four-cycle type, direct-connected to a generator and exciter. The electric energy developed by this unit is transmitted to two railway motors mounted on the axles. The car is operated from either end by a P-15 controller in the same manner as with a standard K type controller. In fact, the trial car is being run by a motorman who had no special training for this work. The controllers on each platform connect the motors progressively in series and in parallel and



End View of Third Avenue Railroad Gasoline-Electric Car, Showing Exhaust Pipes to Roof

regulate the voltage supplied by the generator as required by the speed of the car. In this way all mechanical connections between the gas engine and the driving axles are eliminated. The gas engine is provided with an automatic centrifugal throttle governor and runs at constant speed, regardless of the speed of the car, so that it operates at all times at high efficiency. The operator has no auxiliary levers for controlling either the gas engine or the car. A Bosch low-tension magneto supplies the ignition system, which is of the "make and break" magnet plug type. The engine is started by a crank direct from the magneto. The exciter used in connection with the generator supplies the current for the main generator field and also for lighting the car.

The water-cooling radiators, placed on the roof, are connected to the water jackets of the cylinders by pipes enclosed within the center posts of the car. The circulation is designed on the semi-syphon principle. Connections are also provided so that in cold weather the cooling water passes through heater pipes under the seats. This inexpensive heating is proving very effective and satisfactory as it avoids unequal distribution. It may be worth adding that the arrangement for taking care of the exhaust through the roof connection keeps the unpleasant odor of gasoline from entering the car. The mounting of the machinery on the truck not only saves space but prevents serious vibration of the car body. When the car is running the machinery cannot be heard, and when the car is standing still the noise is no greater than that made by a motor-driven air compressor in a car fitted with air brakes.

EXPERIENCES ON THE SEEBACH-WETTINGEN RAILWAY

During 1907 the Swiss government permitted the Seebach-Wettingen section of its standard gage lines to be electrified for single-phase operation at 15,000 volts. The contractors were the Oerlikon Company, which furnished two locomotives and overhead construction of its Huber side-contact type, while the Siemens-Schuckert Company furnished one locomotive and a section of double catenary construction. The line has now been in service since Dec. 1, 1907, and, according to a report made by an Oerlikon representative, has given the following results:

Not one accident or interruption which could be charged to the high tension has occurred on the line since its installation. Neither the weather nor the smoke from locomotives at stations has injured the insulation in any way. The average line loss over 20 km (12.4 miles) of trolley is less than 1-hp. It is interesting to note that of the various pole spacings tried for the multiple catenary, that of 100 m (328 ft.) has given better satisfaction than the 50 m (164 ft.) spacing more commonly employed. This longer spacing consists of five sections on a 600 m (1968 ft.) curve. The poles, which carry a single bracket, are A-frames composed of two channels. The messenger insulator is carried directly on the bracket. The change in span at one end is made directly from 48 m (157 ft.) at one end and goes over to a compromise span of 76 m (249 ft.) at the other end. The wires thus suspended consist of the following: Fig. 8, trolley of 100 sq. mm section carried at intervals of about 3 m (16 ft.) from the 6 mm (.23 in.) diameter steel auxiliary wire, which in turn is suspended at intervals of 6 m (19.5 ft.) by 5 mm (.19 in.) diameter hangers from a messenger cable of 35 sq. mm section.

The two Oerlikon locomotives each haul trains of 290 metric tons at 60 km an hour (37.2 m.p.h.). On the 1 per cent grades these machines develop a draw-bar pull of 4500 kg (9900 lb.) at 40 km an hour (24.8 m.p.h.). The required motor capacity is 660 hp per locomotive. It has been found that the average power consumption is 27 to 29 watt-hours per ton-km (43.2 to 46.4 watt-hours per ton-mile), as against a theoretical consumption of 23 watt-hours per km. The average quotient of the watt-hours divided by the volt-ampere-hours gave a 70 per cent power factor when 120 kw were taken from the line.

Despite two years' service, neither the commutators nor brushes have given the least trouble from sparking or undue wear. The commutators required no turning or lubrication of any kind. The motor bearings, gearing and connections to the driving wheels have also been found satisfactory. Both the motors and transformers are constructed for natural ventilation. These motors were built originally for 200-hp capacity, but each has frequently developed 330-hp in service. The electric control is two-fold—one by means of a large drum controller and the other by a.c. contacts. Both control systems have proved practicable.

NEW REINFORCED CONCRETE CAR HOUSE IN HARRISBURG, PA.

The Central Pennsylvania Traction Company, Harrisburg, Pa., has just completed an addition to its car house on North Cameron Street by the construction of a building 75 ft. wide by 360 ft. long, which doubles the car storage capacity of this depot. The new building is of reinforced concrete, and is identical in general dimensions and plan with the car house built in 1904, which was fully described in the Street Railway Journal for Sept. 2, 1905. An entirely different method of construction from that followed in erecting the original buildings was adopted for the new house. The plant built in 1904, which included a repair shop and storerooms, in addition to the car storage, was constructed in the usual manner, by erecting wooden forms and casting the concrete in place. The house built this year was constructed of separately molded members cast on the ground and erected by means of a traveling stiff-leg derrick. One bay in the new house is equipped with washing facilities and inspection pits, identical in every respect with the original house. The other bay, however, is intended for storage purposes only, and has no pits. The tracks are laid in a concrete floor, which was used as a casting yard for the columns, beams, wall and roof slabs, which were used in forming the building above the foundations.

The derrick used in erection was mounted on three trucks running on the tracks of the adjoining bay. It had a 60-ft. boom and was equipped with a two-drum Lidgerwood hoist, from which the engine was detached and power furnished by a street-car motor through a gear bolted to the flywheel of the driving shaft of the hoist. The motor was equipped with a controller and resistance boxes, and was operated by one of the company's regular motormen. This method of construction, although it involved the purchase of a derrick especially for the purpose, proved economical. The actual saving over the method used in the first construction amounted to over $2.185 per cubic yard of concrete handled.

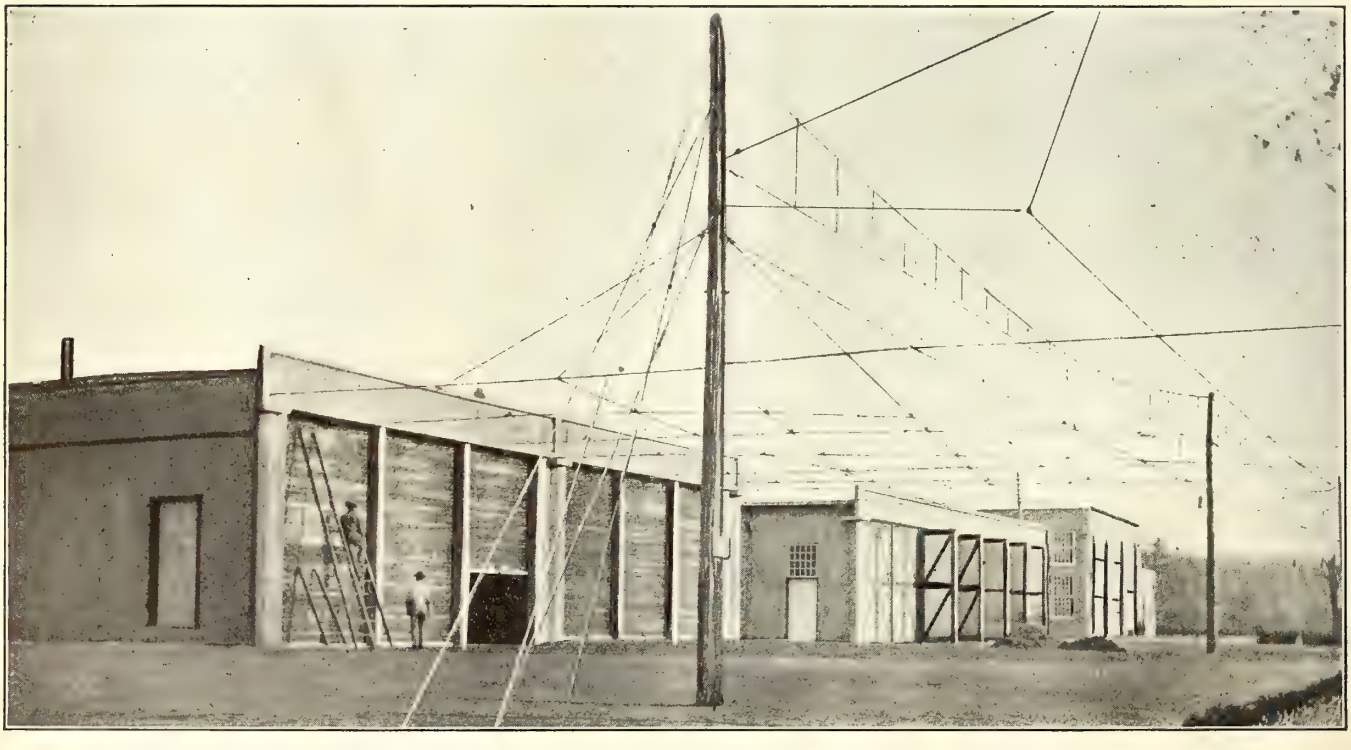
Aside from this, the only change made in the details of the original building was in the adoption of rolling steel



Interior of One Bay of Harrisburg Car House



Roof of Harrisburg Car House

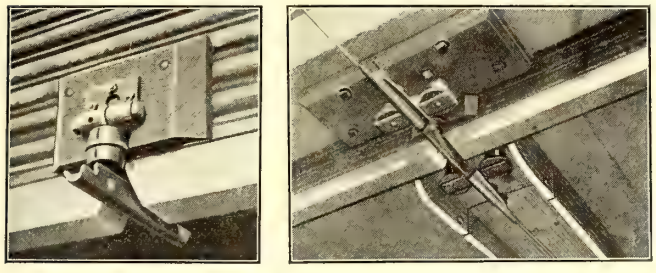


General View of Shop and Car Houses of Central Pennsylvania Traction Company, Harrisburg, Pa.

shutter doors in place of wooden leaf doors, which latter were found rather difficult to handle in windy weather, but which were otherwise entirely satisfactory. The cost of the steel doors was about twice that of the folding doors.

The main difficulty with a rolling steel door for car house purposes is the connection for the trolley wire. This was overcome in a very ingenious and novel manner by a device designed by the company's electrician, Frank Gerhart. It is shown in two of the accompanying engravings.

The new house was built with its first wall 37 ft. distant



Trolley Wire Connection for Steel Rolling Doors

from the wall of the original house, and the columns were provided with brackets, so that it will be possible in the future to add one more bay by simply roofing over the space between the two bays.

The original buildings, as well as the recent addition, were built by day labor from the plans of Mason D. Pratt, Mem. Am. Soc. C. E., Harrisburg, Pa., and under his direct supervision.

SOCIAL AND CO-OPERATIVE ORGANIZATION OF EMPLOYEES OF THE BERLIN STREET RAILWAYS

Organizations of electric railway employees for mutual helpfulness are not new in this country, but in most cases their activities are confined to the payment of sick and death benefits, and in some cases the headquarters of the organization are used for a permanent reading room. The societies formed by street railway men abroad are much more comprehensive. The greatest Continental organization of this kind is the Verein of the Grosse Berliner Strassenbahn, Berlin, Germany. Its objects are numerous, as will appear from the following paragraphs. In addition, the company has a sick benefit organization, which is entirely separate.

One purpose of the Verein is to provide death benefits. The latter amount to $80 if the deceased person held membership for less than three years, and to $87.50 if the membership period exceeded three years. Through a donation of $25,000 made by the directors of the railway company an average of $25 a year is distributed to the widows and orphans of deceased members.

One month after joining the society a member is entitled to free legal service in all civil and criminal cases arising in connection with his duties or in personal civil matters, such as taxes, etc. The organization also assists gratuitously members who are in great financial need. Money up to $18.50 may be borrowed without interest for repayment in monthly installments of $1.25. Such loans are often made to enable members to buy fuel at the most favorable season. The vacation department sends members or their children to vacation colonies for periods of four weeks, if it is apparent that they are in need of recreation.

Members can obtain instruction in all matters pertaining to their work by visiting the information bureau at the headquarters of the society during certain days of the week. In addition, lectures on railway subjects are given on an average of once a week at each division headquarters. The social features are made prominent by an employees' singing club and band, which performs at all concerts and theatrical affairs. The admission prices are low, to promote sociability to the utmost extent.

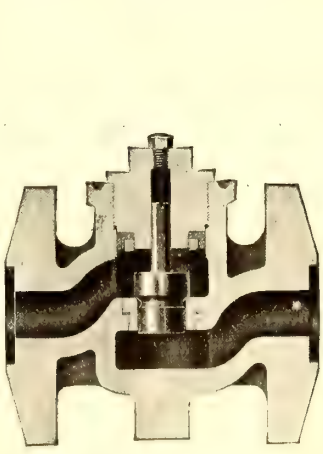
Co-operative purchasing is practised on a large scale. Fuel, in particular, is bought at the lowest possible prices, besides which the society has made arrangements with many merchants and amusement enterprises for discounts from the customary rates. Another important activity of the society is the publication and free distribution of a fortnightly house organ. This contains all the official regulations and personal news of the railway company and of the various societies as well as items of technical interest.

The dues for all of these advantages are only 15 cents a month, to which 9 cents per member is added by the Grosse Berliner Strassenbahn. Those who do not join the organization until after two years' employment must pay on joining 50 per cent additional for every month exceeding two years. The usual entrance fee is 12½ cents, which need not be paid if the application for membership is made within six months after employment. Those who leave the society after one year's membership receive part of what they paid in.

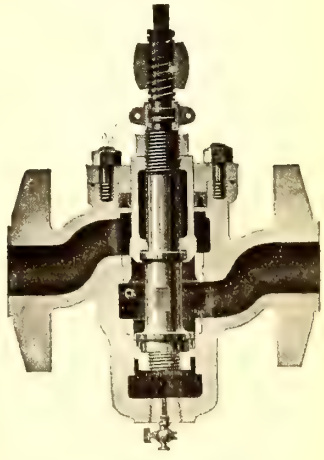
HYDRAULIC VALVES FOR TURBINE LUBRICATING SYSTEM

The New York Edison Company recently has installed the special types of Watson-Stillman hydraulic stop and check valves shown in the accompanying cuts. The installation comprises over 100 of these valves in 2-in., 2½-in. and 4-in. sizes for the forced feed lubricating system which serves the step bearings of the Curtis turbines.

The lubricating system is under a pressure of 1500 lb. per square inch and is provided with accumulators to deliver pressure in case of temporary failure or stopping of the pumps. All joints in the lines are welded to prevent fail-



Section of Check Valve



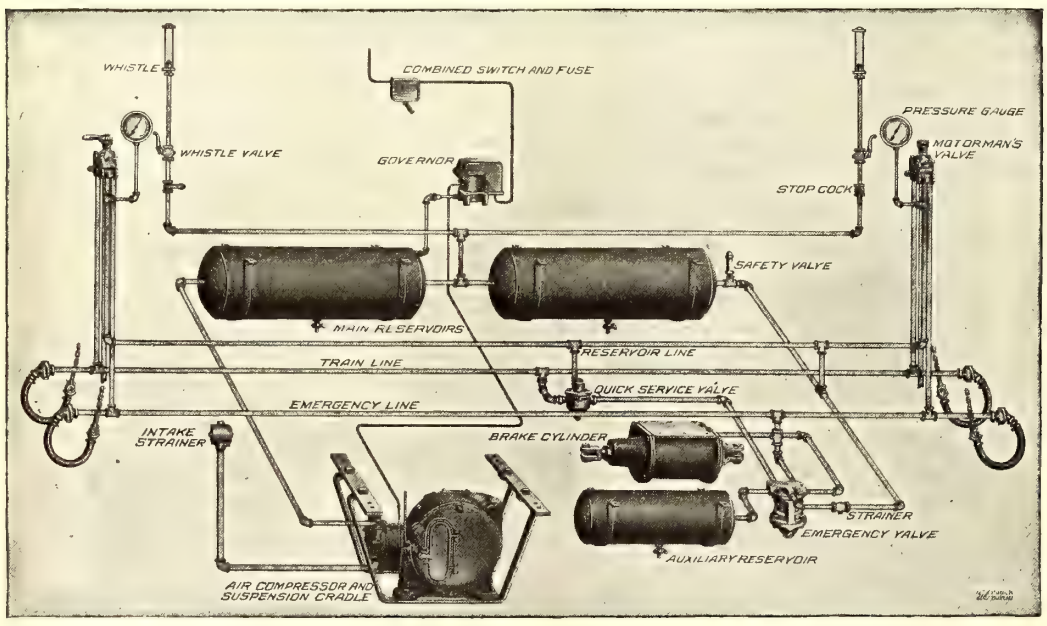
Section of Stop Valve

ure, and all parts are three or four times as heavy as ordinarily. The bodies of the valves shown above are made of steel and are also extra heavy, but strength was not the main question in discarding other valves for this service. It was found that ordinary rubber, hemp or leather packings would not stand up with oil and the heavy pressure, as they were subject to blowouts. These troubles were overcome in the stop valve in two ways; first, by using a special packing which would not soften, but would retain its elasticity;

and second, by a construction which would permit the system to be used even though a packing weakened. The improvement in the latter instance consists in the addition of the small pressure-tight chamber under the end of the valve stem. When running under ordinary conditions the small pet cock at the bottom is left open to act as a tell-tale if a packing starts to leak. Should the packing leak, the pet cock is closed and the valve used until such time as a repair may be conveniently made. Both the stop and the check valves have seats of a special metal which is spun into place. The check-valve stem is slotted, so that by removing the screw on top of the valve a screw driver may be used to regrind the valve seat.

QUICK-SERVICE VALVE FOR EMERGENCY STRAIGHT AIR BRAKE SYSTEM

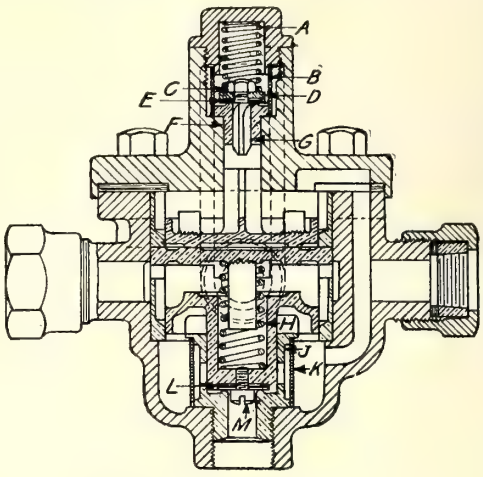
The General Electric Company has incorporated a number of important improvements in its emergency straight-air brake system in order to obtain quicker brake application and release, with a resulting increase of safety and improvement in operating schedules. These advantages are obtained principally by means of a quick-service valve, which increases the rate at which air is admitted into the brake cylinder on application and exhausts the air more rapidly from the brake cylinder on release. With the improved brake equipment, when cars are operated singly, the brakes are applied and released as positively as with the ordinary straight-air brake system. By the addition of the quick-service valve, the motorman can apply and release the brakes in the minimum of time, so that fast schedules can be maintained with frequent stops. The equipment is designed to control trains consisting of a motor car and several trail cars or two or more motor cars equipped with multiple-unit control.



Emergency Straight Air Brake Equipment, with Quick-Service Valve for Motor Cars

The brake equipment for a motor car is shown diagrammatically in the illustration.

The quick-service valve is located in the branch pipe from the train line to the emergency valve. Another connection leads from this valve to the main reservoir. In the trail car equipment this last connection is made to the emergency line. Two pistons are located in the body of the quick service valve, so arranged that they can move in one direction only. When air is admitted to the train line from the motorman's valve to apply the brakes, the upper piston raises a lift valve off its seat and admits air from the main reservoir to the brake cylinder. The movement of this piston also uncovers leakage grooves which allow the air in the chamber between the pistons to flow into the chamber above the upper piston and thence to the brake cylinder.



Section of Quick-Service Valve

When the motorman's valve handle is moved from the service position to the lap position in order to graduate the application of the brakes, the upper piston in the quick service valve returns to the normal position and the supply of air admitted to the train line by the latter valve is shut off. That is, when an application of the brake is made, the volume of air from the train line is increased by air admitted directly from the main reservoir by the quick service valve.

When a release of the brakes is made the air on top of the lower piston is exhausted to atmosphere through the motorman's valve. This piston is then moved upward. Air from the brake cylinder therefore flows to atmosphere through a valve located on the lower side of the piston. Part of the air from the brake cylinder also flows through the leakage grooves which are uncovered when the piston is moved and escapes to atmosphere through the train line and motorman's valve.

When the motorman's valve handle is moved from the release to the lap position in order to graduate the release of the brakes, the piston in the quick service valve returns to its normal position shutting off the flow of air through the quick service valve to atmosphere. Hence the function of the quick service valve is to accelerate the application and release of the brakes and in trains of several cars a very material reduction is obtained in the time taken in making stops and in releasing the brakes.

LONDON LETTER

(*From Our Regular Correspondent.*)

The Town Council of Bournemouth has decided against the operation of cars on Sunday, as the members of the Council consider it would be against the best interests of Bournemouth, especially as the town contains a large number of residents seeking redress from physical ills who desire quiet. It was remarked at the meeting at which the subject was considered that cars are operated on Sunday on all other systems of municipal tramways in England but one. A limited service on Sunday had been proposed in Bournemouth and a tramway expert recently advised that the operation of cars on Sunday would result in a profit of from £4,000 to £5,000 annually.

Although the electrified South London line of the London, Brighton & South Coast Railway has received the approval of the Board of Trade, the Postoffice Telegraph Department has protested that the telegraph and telephone lines along the railway have been rendered unfit for use by the single-phase transmission systems of the railway. The general opening of the system to the public has therefore been postponed, although a certain number of trains are now running. It is hoped that the objections of the postoffice may be overcome at an early date. A similar complaint has been made by the postoffice against the Midland Railway with regard to the Morecambe and Heysham single-phase line. Action in this case has been postponed pending the substitution by the Midland Company of a specially designed telephone circuit. As the postoffice has rights in perpetuity over the railway systems of England, that branch of the Government service will always have to be reckoned with in installations of this kind.

In these days of decreases in tramway earnings throughout practically the whole of Great Britain, it is a pleasure to be able to record the very gratifying report of the financial results of the Bradford Tramways for the past half year. The gross receipts for this period increased £4,100, while the expenditures decreased £1,800 making the net profit £5,900. The car mileage is just about the same as the previous six months, but the average receipts per car mile are now 11.23d., a distinct increase. The report mentions that the sale of through sixpenny tickets to Leeds on the special cars provided for that purpose has increased from 4,750 to 55,208. This speaks well for the special cars adapted to run on both systems, which are of different gages.

The Leeds Tramway Committee persists in its effort to introduce trackless trams in Leeds, and has instructed the town clerk to take steps to promote a bill in Parliament for the construction of the system from the City Square to Farnley, with an extension to Drighlington if the line between City Square and Farnley is a success.

While on the subject of trackless trolleys, it might be mentioned that during the annual conference of the Municipal Tramways Association, about a month ago, an opportunity was afforded the members by the Railless Electric Traction Company to inspect two cars equipped with the Schiemann system, which were being experimentally operated at the depot of the Metropolitan Electric Tramways at Hendon. A number of improvements have been made in this system to comply with British conditions. The experimental line commended itself to the delegates who visited Hendon, and if Parliamentary powers can be procured it is likely that several trackless trolley lines will be introduced in England in the course of the next year or two.

On the District Railway between Mansion House and South Kensington stations, as many as 36 trains an hour are now operated, a service which could only have been made possible by the introduction of the most accurate automatic signaling and other improvements. The suburbs of London are, therefore, growing steadily in popularity, as journeys to the center of London which formerly were prohibitive on account of the amount of time consumed in making them can now be made readily. In the days of steam railways only 20 trains an hour were operated, and Albert Stanley, an American, general manager of the system, is certainly to be congratulated on the results which he has attained since taking charge of the London lines. The District Railway is the oldest railway in London and the greatest improvements have been made on it; but the results of Mr. Stanley's methods are also evident on the Piccadilly, the Bakerloo and the Hampstead tubes, three modern systems opened within the last three or four years. Express trains are now being operated on these lines and the service has been increased. In the Bakerloo tube a train will very soon be available every 1½ minutes. Specially long trains are being provided for theater service and later trains are being introduced.

With reference to the annual conference of the Municipal Tramway Association, of which mention was made in the last letter, at the business meeting which followed the conference, C. J. Spencer, Bradford, was elected president to succeed A. C. Fell, and J. C. Dalrymple, Glasgow, was elected vice-president. Bradford was selected as the meeting place of the association next year.

More experiments are being made with the idea of preventing the indiscriminate throwing away of tramway tickets, hundreds of thousands of which are dropped in the streets of the cities of Great Britain yearly. Most of the cars in Glasgow are equipped with a box in which passengers are requested to drop their tickets. The Bournemouth Tramways committee is providing boxes for a similar purpose, and passengers are requested to co-operate with the committee in an effort to stop the nuisance. The Manchester Corporation Tramways is also experimenting on one of its routes with similar boxes, as in a large city like Manchester it is considered that the throwing away of tickets at the tramway termini is actually a source of danger, as children frequently collect the tickets and have been injured in their anxiety to obtain the slips.

A report submitted to the London County Council by the highways committee states that the tramways system at the end of the period under review extended over a total length of 127⅝ street miles, being 85⅝ miles of electric lines and 42 miles of horse line. The capital expenditure on the undertaking up to March 31, 1909, amounted to £9,483,561 18s. 1d., of which £1,069,971 2s. 2d. represents expenditure during the year 1908-9. The debt outstanding on March 31, 1909, was £8,043,139 0s. 6d. The total receipts during the year from electric traction were £1,572,-251 8s. 7d., and the operating expenses £896,286, a surplus of £675,965 4s.; and the corresponding figures of horse traction were £275,199 1s. 7d. and £305,402 0s. 2d., leaving a deficiency of £30,202 18s. 7d. After charges had been deducted there remained a net balance of £1,077,670. There were 344,705,937 passengers carried on electric cars and 68,207,004 on horse cars, a total of 412,913,841. The number of car-miles run was 31,962,784 miles by electric traction and 7,156,688 by horse traction, a total of 39,119,472 miles. The average fare per passenger was 1.05d.

The work of extending the London County Council Tramways continues. A new section between Queens Road, Battersea and Clapham Junction has been opened recently, and a further portion of the newly electrified system has also been placed in operation between Bloomsbury and Stamford Hill, the cars hitherto having gone only as far as Hackney Station. The section between Cambridge Heath and Aldgate is nearing completion, so that direct communication between Aldgate and Stamford Hill will soon be possible.

A dispute arose regarding the fares on the new trams across Blackfriars Bridge, an extra halfpenny being charged in most cases for crossing the bridge. It has now been decided that this increase of fare shall be cancelled, and all stages, other than halfpenny ones, which hitherto terminated at the south side of Blackfriars Bridge, will be extended across the bridge. Similarly, all fares which hitherto extended only to the south side of Westminster Bridge will now be extended to Westminster.

The London County Council has notified the Lambeth Borough Council that it proposes to apply to Parliament for permission to construct a tramway from Herne Hill to Brixton Hill, which, when completed, will connect the tramways of Brixton with those on the Herne Hill and Norwood route.

A point affecting tramway authorities throughout England has just been decided between the London County Council Tramways Department and the Post Office. By consent it was referred to a Board of Trade arbitrator to decide whether the cost of providing heat coils, fuses, etc., for the protection of telephone and telegraph wires near overhead tramway cables should be borne by the Post Office or by the tramway authority concerned. The arbitrator, whose award has just been issued, rules that the tramway authority should pay.

The depreciation allowances of the Glasgow Corporation Tramways for the last year are in addition to a sum for the sinking fund, which the corporation of necessity has to set aside. In addition the corporation has a special reserve fund, now standing at £70,-631. The allowances for depreciation and renewals for the year 1908-9 were—£500 per mile of single track, equal to about 9 per cent, for the permanent way; 4.28 per cent on the electrical equipment of the lines; 6.91 per cent on power station and substation plant; 7.5 per cent on cars and their electrical equipment, workshop tools and sundry plant, and on office furniture and miscellaneous equipment; and 11.24 on rolling stock other than the passenger cars.

A. C. S.

News of Electric Railways

Mayor Johnson Defeated in Cleveland

Tom L. Johnson, for four terms Mayor of Cleveland, was defeated at the city election in Cleveland on Nov. 2 by Herman C. Baehr, Republican county recorder, who is the first Republican to be elected to that office in 10 years. Mr. Baehr has pledged himself to a settlement of the street railway question on the basis of a 6 per cent return on the stock of the Cleveland Railway, all earnings over that to go to the reduction of fare and the improvement of service. The City Council will be Republican. The acceptance by the voters of the proposed 75-year franchise for a subway system was indicated by the early returns. Mr. Johnson's defeat for Mayor is his fifth in a year at popular elections. He was defeated in the franchise referendum on Oct. 22, 1908, following his six months' control of the street car system; then in his campaign for the election of county officers; next in a referendum on the issue of bonds; again on the Schmidt street railway referendum; now he meets his own defeat for return to the Mayor's office. Incomplete returns indicated that the Democrats, who have long enjoyed control of the City Council, have elected only seven Councilmen out of 32.

Judge R. W. Tayler spent his time last week hearing testimony on the Cleveland valuation. In addition to Cleveland people, Bion J. Arnold, director of appraisals for the New York Public Service Commission, First District, and Frank R. Ford, of Ford, Bacon & Davis, were introduced to testify regarding valuation questions involved in the settlement. Mr. Arnold and Mr. Ford testified at the request of the officials of the Cleveland Railway.

Mr. Arnold, in testifying on Oct. 27, discussed the overhead charges allowed in the valuation of the Chicago street railways, with which A. B. duPont and others were connected. When asked regarding his experience with the valuation of the Coney Island & Brooklyn Railroad, Mr. Arnold introduced a copy of the Electric Railway Journal which contained a report of the hearing at which his testimony was presented. This was admitted and Judge Tayler announced that he would take the report as an expression of principles and information in interpreting the facts produced in this hearing. A copy of the Electric Railway Journal was made part of the record. Mr. Arnold said that the article contained an expression of his views but that the Public Service Commission would take action subsequently and he could not tell whether or not his ideas would be supported.

After giving his experience as an engineer and in the construction of electric railways Mr. Arnold was questioned on the general subject of overhead charges. He said that such charges must be added in every case but that the percentages would vary with different conditions and different properties. To arrive at an intelligent and definite conclusion on this subject in connection with the Cleveland situation would require special investigation. That was true also of other systems because of the varying features found. Many unexpected developments arose during the construction of a street railway system and the cost was almost always greater than the original estimate. It was a rule with engineers to make an allowance for such developments and they scarcely ever failed to need it. Mr. Arnold mentioned in detail the various contingencies for which provision should be made and referred to other expenses for which there ought to be an additional allowance.

On Oct. 28 an agreement was reached to the effect that the property of the old Forest City Railway shall be reappraised upon the basis used in the valuation of the Cleveland Electric Railway. President Andrews made the request. He said that there was a large overhead charge in the Forest City valuation which should be applied to the property of the Cleveland Electric Railway. He said he thought the Cleveland Railway property should be valued higher, rather than that the Forest City property should be valued lower. The same engineers who valued the Cleveland Electric property, with the addition of E. W. Bemis and H. J. Davies, will do this work.

Mayor Johnson stated that some things had been allowed the Forest City company for the sake of peace in the settlement and that ordinarily they would not be granted. The schedules of valuation of the Forest City property show a strip of paving charged at over $6,000, or the price when new. It is said that this pavement was laid 31 years ago and that when the Cleveland Electric Railway valuation was made as of Jan. 1, 1908, it was placed at scrap value, $192. Mr. Andrews has been endeavoring to find who made these valuations, but so far has been unsuccessful.

Henry J. Davies, secretary of the Cleveland Railway, was on the stand for some time in the forenoon. His testimony related mainly to overhead charges. As some of the reports needed were not ready, there was no afternoon session.

On Oct. 29 the subject of cars and motors was taken up again. A. B. duPont gave it as his opinion that economy and service demanded large cars in place of some of the small cars now in use. He said that the small cars should be sold as second-hand cars and that this would reduce the Goff-Johnson valuation of the cars, $480,700. Mr. duPont thought that fewer cars might be operated and the schedules lengthened if the large type was used. Mayor Johnson announced that he would contend that three types of old motors should be scrapped and that another type should be discarded. F. R. Phillips, master mechanic, presented a table showing the average cost of maintaining motors of various types.

Previous to the election the Chamber of Commerce of Cleveland decided to oppose the franchise to the Cleveland Underground Rapid Transit Company for these reasons: "1. Because its confirmation at this time will complicate the already complicated surface street railway situation. 2. Because there is no assurance, nor even probability that the subway lines will be built. 3. Because the free territory provisions of the ordinance are inadequate. 4. Because the forfeiture provisions do not sufficiently safeguard the city's control of the important terminals under the Public Square. 5. Because the provisions with reference to the operation of interurban cars are incorrect in principle, in that they define the exact bargain to be made between the interurban company and the subway company to the advantage of the subway company, but not necessarily to the public advantage."

Final Hearing on Boston & Eastern Electric Railroad

The Massachusetts Railroad Commission and the Boston Transit Commission gave a hearing on Oct. 26, 1909, for the presentation of concluding arguments in relation to the proposed Boston & Eastern Electric Railroad, the plans of which have been printed in preceding issues of the Electric Railway Journal. The joint board is to report upon the terms, if any, under which the road may build a tunnel under Boston Harbor to the Legislature of 1910 early in January. Frederick C. Dumaine, of the Boston Railroad Holding Company, was the first speaker. He protested against the granting of the right to build the road, stating that the company he represented has secured a majority of the stock of the Boston & Maine Railroad and intends to see that every point served by the road is provided with adequate facilities. For the New York Central & Hudson River Railroad Woodward Hudson argued that the proposed line would interfere with plans of his company for the development of the water front at East Boston, objected to the building of the tunnel by a private corporation and criticised the route as somewhat uncertain in the bill which has been drawn up for the approval of the Legislature.

William H. Coolidge, counsel for the Boston & Maine Railroad, stated that the Boston & Eastern Electric Railroad is not designed to develop new territory and that the Boston & Maine Railroad is better prepared to handle traffic than in 1907, when it was claimed that the existing facilities were inadequate. Since the laws in Massachusetts relative to the issuance of securities for needed railroad improvements have been modified, the Boston & Maine Railroad has expended about $6,000,000 for equipment and $11,000,000 for other improvements. The railroad laws of Massachusetts provide that the Railroad Commission shall advise the railroad whenever in its judgment betterments are necessary, stating in writing what kind of improvements it deems necessary, and Mr. Coolidge said that no such advice has been given the Boston & Maine Railroad. He commented on the absence of local subscriptions to the project, and closed with the argument that the needs of the territory can be handled by the present facilities, developed as may be necessary to meet expansion in the district served.

Bentley W. Warren, counsel for the Boston & Northern Street Railway, called attention to the report of the Metropolitan Improvement Commission of 1909, which stated that, following the electrification and the consequent improvement of the suburban traffic facilities around Boston, the effective commutation radius will be increased to 25 or 30 miles. This will increase the rate of growth of suburban traffic beyond that which may be looked for strictly from the normal increase in the population. It is

also probable that as the rapid transit system of the Boston Elevated Railway is extended many of the working class in the immediate suburbs of the city who now enter Boston via the steam lines will use the projected elevated or subway lines. He cited another portion of the report which stated that the lines and branches at present serving the suburban districts are considered adequate and emphasized the point that the proposed road should utilize the existing rapid transit system or the proposed suburban distributing system recommended by the Improvement Commission. Quoting from the report of the Metropolitan Improvement Commission, Mr. Warren said:

"All future passenger lines within the terminal district which may be authorized by the Commonwealth should enter one or the other of the city distributing systems, as these systems may be improved and extended; namely, the rapid transit system or the suburban system. The best public service would not result by the operation of future lines to independent terminals within the city. One double-track tunnel under the harbor would serve as an entrance for both the Revere Beach road and the projected Boston & Eastern Electric Railroad into the proposed suburban distributing system of the city proper. It would seem an unwise expenditure to provide separate tunnels—a course which would result in an unwarranted duplication of items of great expense. Before the plans of the projected road receive final approval the joint project of entering the two lines should receive a thorough and exhaustive study. As the electrification of the present lines becomes urgent, in order to meet increased traffic requirements, as well as to render possible the operation of subsurface facilities in the city, this change in motive power will be gradually realized. Coincident with the prosecution of work entailed in this change of motive power, physical revisions and improvements of the existing railroad properties in the way of four tracking, grade crossing elimination, additional stations, etc., will be carried on. In the ordinary course of events under conservative management these improvements will be carried on only as warranted by the traffic, not necessarily as it exists, but in anticipation of a more or less rapid growth. The construction of any new lines parallel to existing roads and serving the same territory, unless warranted by traffic requirements, will defer the date when improvements upon existing lines may be justified."

Mr. Warren said that the Boston & Eastern Electric Railroad hopes to tap the business of companies operating in the territory in which it proposes to build, and that the route of the proposed line does not touch the undeveloped part of Lynn. The new road will cut into the business of the Boston & Maine Railroad at Lynn, Salem and Beverly and into the Boston, Revere Beach & Lynn Railroad, and will cut off the business of the Boston & Northern Street Railway at Chelsea and cripple existing agencies. In conclusion Mr. Warren said that if the road is to be built it should be a part of the subway system of Boston in its entrance into the city. All the investigations and surveys should be made by the Boston Transit Commission at the expense of the Boston & Eastern, and the tunnel should be built by the Transit Commission at the company's expense, becoming the property of the city at once and being rented to the road for 40 years. No part of the road should be begun until the money for the tunnel is in the hands of the Transit Commission.

Frederick E. Snow, counsel for the Boston Elevated Railway, made a brief statement to the effect that the management of that company desires to have the Boston & Eastern Electric Railroad use the Boston Elevated Railway terminal at Sullivan Square or other terminal facilities that may be established in connection with the elevated lines.

Moorfield Storey, counsel for the Boston & Eastern Electric Railroad, then presented the closing argument. He said that the promoters of the road come before the commission with a new plan to serve the public, and hope to make money by it. The question of public convenience and necessity has already been decided in the road's favor by the Railroad Commission and is not now the issue. The present point is the relation of the proposed road to the existing and future facilities of the territory. The Legislature in 1906 recognized the necessity for a new type of railroad, electrically operated, and the Railroad Commission said that public convenience and necessity call for enterprise in this field, suggesting a tunnel under the harbor as a desirable connecting link and disapproving the plan of entering the city through the present terminals. A distinct entrance is needed, with a foot passage connecting with the existing rapid transit system.

Mr. Storey contended that the project will not interfere with any existing service or plans for its development, and that the question of overcoming the objections of the New York Central & Hudson River Railroad in East Boston is merely one of engineering. He said that for 20 years the present companies have had opportunities to improve conditions in the territory, and that the apprehension which they feel is the result of a realization that the present facilities are inadequate. He did not favor bringing the road into Sullivan Square after the commission's previous discussion of the situation there. Mr. Storey said that the Boston & Northern Street Railway earns $7 per capita over its entire system, and that in the most thickly settled portion an estimate of $7 per capita for the Boston & Eastern Electric Railroad is by no means excessive. The Boston & Maine Railroad and the New York, New Haven & Hartford Railroad are committed to expend $30,000,000 in improvements within the next few years, and there is little chance of their affording the needed facilities through the Boston Railroad Holding Company at present, even if it were possible to operate all kinds of traffic on limited tracks. He said that the Boston & Eastern Electric Railroad would not interfere with the earnings of the East Boston tunnel, as the East Boston tunnel is showing a surplus each year, the total surplus for 1908 being $10,124. The streets will not be needlessly disturbed, as feared by counsel for the city of Boston at the previous hearing. The main question is the method by which the project can be put into effect. The hearing was then closed and the matter taken under advisement.

Transit Affairs in New York

The Public Service Commission has adopted a resolution by a vote of three to two, modifying the Broadway-Lexington Avenue subway plan, so as to include a branch up the White Plains Road, from its junction with Westchester Avenue and the West Farms Road to where the new line will join route 18, previously laid out, running from West Farms Road up White Plains Road to East 241st Street, near the city line. This change will give the Broadway-Lexington Avenue system three branches in the Bronx, instead of two. The new line will be five miles long and add about $4,000,000 to the estimated cost of $60,000,000 for the Broadway-Lexington Avenue line. In addition, there is $7,000,000 cost for the Canal Street crosstown section.

The Court of Appeals of New York has rendered a decision sustaining the Appellate Division of the Supreme Court in its finding that the Public Service Commission of the First District of New York exceeded its powers when it undertook to revise the terms of the franchise granted to the South Shore Traction Company over the Queensboro Bridge. The South Shore Traction Company secured a franchise from the City of New York, its line running from Sayville to Belmont Park, and later applied for permission to cross the Queensboro Bridge. The Public Service Commission agreed that public convenience and necessity required the proposed extension and granted the application; and the Board of Estimate and Apportionment concurred in the grant and prescribed the payments of money to be made to the city by the company in return for the privilege. The commission then refused to agree to these terms and contended that this refusal operated to hold up the franchise. The Appellate Division of the Supreme Court upheld the Board of Estimate and the company. The Court of Appeals sustains the lower court, ruling that in the Board of Estimate alone is vested the power of fixing the terms on which franchises shall be granted and that the authority of the Public Service Commission is limited to passing on the need and the utility of new transit lines or the extension of existing ones.

The Hudson & Manhattan Railroad has obtained from Justice Bischoff of the Supreme Court a writ of certiorari returnable on Nov. 15, 1909, to review the assessment of the current year, amounting to $1,700,000. The company claims that the present assessment is too high, for the reason that the State Board of Taxation has assessed the company's special franchise at $8,000,000.

The Monoroad Construction Company, of which Bion L. Burrows is president, has begun work on the monorail road that is to connect Bartow Station, on the Harlem River branch of the New York, New Haven & Hartford Railroad, with City Island.

The Board of Estimate and Apportionment of New York, by unanimous vote on Oct. 29, 1909, authorized the bond issues necessary to begin work on the Fourth Avenue subway, which is to extend from the entrance to the Manhattan Bridge in Brooklyn to Forty-third Street and Fourth Avenue, Brooklyn. While the entire subway project involves the expenditure of $15,886,381 for construction work, the Public Service Commission, which approved the contracts for the first six sections on June 5, 1908, has asked for only $2,850,000 at present, as the engineers of the commission believed that not more than that amount could be expended in one year. The Court of Appeals, however, held that the entire amount became a city liability as soon

as the contract was confirmed by the Board of Estimate. The resolution passed called for the sale of corporate stocks to the amount of $2,850,000 needed to go ahead with the work. For convenience in construction the line was divided in six sections, and the total of the lowest estimates for each of these sections was $14,886,764. J. P. Graham was the lowest bidder for the construction of the first section of the line, extending from the Manhattan Bridge to Willoughby Street, his estimate being $1,020,477.

On Oct. 30, 1909, the Public Service Commission received a certified copy of the resolution adopted by the Board of Estimate, authorizing the money needed for the construction of the Fourth Avenue line in Brooklyn, and at once summoned the successful bidders to the offices of the commission to execute the contracts. Unless they do so within 10 days the certified checks will be forfeited. In addition each contractor must put up a bond of $150,000 on each section of the work that he has undertaken, and must begin work within 60 days.

Meeting of Central Electric Railway Association

The regular meeting of the Central Electric Railway Association will be held at the Claypool Hotel, Indianapolis, Ind., on Nov. 18, 1909. In view of the fact that this is the last meeting of 1909 and the first one after the Denver Convention, the officers of the association request that every member who can possibly do so be present. It is suggested to members who live at a distance that the trip be made in special interurban cars, which will tend to increase the interest and make the trip one of value by personal observation. The program of the meeting follows:

Morning Session, Nov. 18, 1909

10:00 a. m.—Business session and reports of special committees.

10:00 a. m.—"A Centralized Testing Organization, Its Function in the Management of Electric Railways," by J. G. Callan, Arthur D. Little, Inc., Boston, Mass.

11:15 a. m.—"Publicity," by A. D. B. Van Zandt, publicity agent of the Detroit (Mich.) United Railways.

12:00 m.—Adjournment for lunch.

Afternoon Session

Reports from the Denver Convention

1:30 p. m.—"The Claim Adjusters' Association," by Ellis C. Carpenter, claim adjuster of the Indiana Union Traction Company, Anderson, Ind.

2:00 p. m.—"The Transportation and Traffic Association," by J. B. Crawford, superintendent of the Winona Interurban Railway, Warsaw, Ind.

2:30 p. m.—For the good of the order.

Resolution Fixing Terms of Temporary Operating Permit Passed in Detroit

A draft of an ordinance providing for the renting of the streets of Detroit, Mich., on which franchises of the Detroit United Railway are said to expire on Nov. 14, as mentioned on page 952 of the Electric Railway Journal of Oct. 30, 1909, to that company for $300 a day pending for granting of new franchises was introduced in the Common Council on Oct. 26, and was passed by that body on Oct. 27 without comment. That portion of the resolution setting forth the terms of rental follows:

"Resolved, That consent, permission and authority is hereby granted to the Detroit United Railway to continue from day to day after Nov. 14, 1909, to operate its cars upon the streets and portions of streets above set forth under the same terms and conditions, except as to percentages on gross receipts, now prevailing in the city of Detroit whether due to contract agreement or not upon the payment weekly by the Detroit United Railway to the city treasurer of the sum of $300 for each day that the streets and portions of streets above set forth are used by said company in the operation of its railway or railways; and be it further

"Resolved, That this resolution is subject to revocation at any time at the will of the Common Council or of the people of the City of Detroit."

J. C. Hutchins, president of the Detroit United Railway, is reported to have expressed the following opinion regarding the proposal:

"The proposition is entirely new. So far as I know, there is nothing exactly like it in the street car world. There are companies that pay certain rentals, a license for each car, for instance, and there are different means of paying taxes. I cannot say off-hand whether the proposal would seem agreeable to us or not, or whether we would feel ourselves properly protected and safeguarded under it. I shall have to look it all over and consult others about it. The exact form of the resolution and its precise bearing on all the other factors in the Detroit situation would have to be studied."

Association Meetings

Alabama Light & Traction Association—Birmingham, Ala., Nov. 15 and 16.

National Association of Railway Commissioners—Washington, D. C., Nov. 16.

Central Electric Railway Association—Indianapolis, Ind., Nov. 18.

Central Electric Accounting Conference—Dayton, Ohio, Dec. 11.

Pennsylvania Street Railway Association—Harrisburg, early in December.

Street Railway Association of the State of New York—Rochester, N. Y.; date not selected.

Ohio Supreme Court Decision Favorable in Dayton Franchise Case.—The Supreme Court of Ohio has decided that the franchise granted the Oakwood Street Railway, Dayton, Ohio, under a special act of the Legislature is valid.

New Canadian Line Opened.—The Montreal & Southern Counties Railway placed its line between Youville Street, Montreal, and St. Lambert in operation on Oct. 31, 1909. It is proposed to continue the road to Longueuil, Chambly, La Prairie and St. Johns, which is 15 miles from Montreal.

Meeting of New York Railroad Club.—A meeting of the New York Railroad Club will be held at the building of the United Engineering Societies, 29 West Thirty-ninth Street, New York, N. Y., on Nov. 19, 1909, at 8 p. m. H. McL. Harding, vice-president of the International Lecture Institute, will present a paper entitled "The Handling of Freight at Terminals," illustrated with lantern slides.

Conference Regarding Betterment of Property of Chicago Consolidated Traction Company.—Charles G. Dawes, president of the Central Trust Company of Illinois, has requested Mayor Busse to arrange a meeting with the reorganization committee of the Chicago Consolidated Traction Company for the purpose of considering the betterments to be made to the property of the company. The matter has been referred to the committee on local transportation. The reorganization plan of the Chicago Consolidated Traction Company has been tentatively accepted.

License Ordinance Affecting Motormen in Omaha.—The City Council of Omaha has passed over the veto of the Mayor an ordinance requiring that hereafter every motorman submit proof that he has had 14 days' training in Omaha under a motorman with three years' experience in the city, and secure a license at a fee of $1. Two ordinances which provide for a reduction of fare on street railways operated in Omaha from 5 cents to 6 tickets for 25 cents with special provisions for reduced rates to children and students in the public schools, have been referred to the committee of the whole.

Report to Washington Commission on Denver Convention.—H. C. Eddy, executive officer and secretary of the District Electric Railway Commission of Washington, D. C., who attended the convention of the American Street & Interurban Railway Association at Denver, has reported to the commission the detailed happenings of the convention and observations made in cities which he visited en route to Denver. In his report Mr. Eddy discussed the subjects of fenders, headlights and seats, and complimented the Denver City Tramway on the physical condition of its system, referring particularly to such practices in operation and equipment as are distinctive either of the Denver system or others in the West.

Balloon Anchor Causes Trouble.—In one of the daily issues of the Electric Railway Journal during the convention in Denver it was mentioned that the high-tension line of the Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., had been damaged by the trailing anchor rope of a balloon which started from Indianapolis on a pleasure trip before entering the recent competition in St. Louis. The high-tension line was broken by one contact and was hit by the trailing rope at two other places, causing trouble in the power house and on the line. A. A. Anderson, general manager of the company, says that the anchor was one of the most peculiar sources of trouble with which he has had to deal in an experience covering more than 30 years in street and electric railway work.

Inspection of Ohio Electric Railway.—Members of the Railroad Commission of Ohio and officers of the Ohio Electric Railway, Cincinnati, Ohio, spent the early part of the week commencing Oct. 25, 1909, in a tour of the lines operated by that company. Special attention was given the roadbed, tracks, stations and terminals. The party started

from Cincinnati on Oct. 25 and reached Toledo late on Oct. 26, after a side trip over the Fort Wayne division from Lima. The return to Lima was made on the evening of Oct. 26 and the next day the Columbus-Springfield division was inspected. The commission was represented by J. C. Sullivan, O. P. Gothlin and O. H. Hughes, members; O. F. McJunkin, Dayton, deputy inspector, and John Hussey, Columbus, inspector. The company was represented by the following officers: W. Kesley Schoepf, president; J. B. Foraker, Jr., vice-president; B. J. Jones, Springfield, district manager; H. G. Gilpin, Lima, superintendent, and J. W. Edson, Van Wert, tax agent. Several business men from Cincinnati and other points were also members of the party.

Meeting of New England Street Railway Club.—The first fall meeting of the New England Street Railway Club was held at the American House, Boston, on Oct. 28, 1909, with W. D. Wright, president, in the chair. The speaker of the evening was Howard MacSherry, general counsel of the Public Service Corporation of New Jersey. His subject was "Our Cities." Mr. MacSherry congratulated the club membership upon the spirit with which the commissions and courts of Massachusetts consider public utility matters, and emphasized the important work of the modern corporation in civilized affairs. He reviewed the sources of corporate criticism along the lines of his address at the recent Bluff Point convention of the New York State Street Railway Association, touching the unfair criticisms of the press, labor organizations, the traveling public, executive officials of the State and persons of abnormal characteristics. Concluding, he emphasized the values of true Americanism and the necessity for a more thoughtful appreciation of the privileges conferred by citizenship.

Boston, Lowell & Lawrence Railroad Hearings Continued.—Reference to the continuation of hearings by the Massachusetts Railroad Commission on the petition of the Boston, Lowell & Lawrence Electric Railroad for a certificate of exigency was made in the ELECTRIC RAILWAY JOURNAL of Oct. 30, 1909, page 949. Following the testimony of James C. Boyd, of Westinghouse, Church, Kerr & Company, on Oct. 12, J. W. Farley, counsel for the railroad, submitted an estimate by George G. Clapp, Boston, Mass., of the valuation and damages of land buildings to be taken on each of the proposed routes. The assessed valuation of the property to be taken on the preferred route via Winchester, including the Lawrence branch, was $455,424, the estimated value $774,731, and the damages $179,910. For the route via Lexington, including the Lawrence branch, the assessed valuation was $442,510, the estimated valuation $774,414, and the damages $99,235. The estimate is from 70 per cent to 75 per cent above the assessed valuation, without any allowance for salvage. Counsel for the opposition suggested that the estimated damages should be subdivided according to townships, in order to give the local people a chance to judge whether the figures were high or low; counsel for the Boston, Lowell & Lawrence Electric Railroad objected to the subdivision on the ground that it would seriously prejudice the cost of property taken in specific neighborhoods, and was sustained by Chairman Hall. The subsequent hearings of the week were devoted to the taking of testimony of witnesses living along the route of the proposed road.

Officers of the Colorado Light, Power & Railway Association.—At the meeting of the Colorado Light, Power & Railway Association held in Denver on Oct. 7, 8 and 9, the following officers were elected: President, W. T. Wallace, Colorado Light & Power Company, Cannon City; vice-president, H. L. Corbett, United Hydro Electric Company, Georgetown; secretary and treasurer, J. C. Lawler, Colorado Springs Electric Company, Colorado Springs; executive committee, additional members, George B. Tripp, Colorado Springs Electric Company; J. F. Dostal, Denver Gas & Electric Company; advisory committee, W. J. Barker, Denver Gas & Electric Company; J. F. Vail, Pueblo & Suburban Traction & Lighting Company; John A. Beeler, Denver City Tramway; L. M. Cargo, Westinghouse Electric & Manufacturing Company, Denver, Col.; John A. Clay, Animas Power & Water Company, Silverton, Col.; finance committee, W. G. Matthews, Denver City Tramway, J. C. Davidson, Hendrie & Bolthoff Manufacturing & Supply Company, Denver, Col.; F. C. Caratarphen, Caratarphen Electric Company, Denver, Col.; membership committee, J. J. Cooper, Mountain Electric Company, Denver, Col.; George Wooley, General Electric Company, Denver, Col.; C. K. Durbin, United States Traction & Lighting Company, Denver, Col.; committee on insurance, George B. Tripp, Colorado Springs Electric Company, J. F. Vail, Pueblo & Suburban Traction & Lighting Company, C. K. Durbin, United States Traction & Lighting Company, Denver, Col.; committee on meters, F. P. Cummings, Denver Gas & Electric Company, W. N. Clark, Pueblo Suburban Traction & Lighting Company, H. J. Buell, Northern Colorado Power Company, Denver, Col.

Financial and Corporate

New York Stock and Money Markets

November 1, 1909.

The enforced liquidation in evidence when the rates for money advanced so suddenly a few weeks ago has disappeared, and the recovery reflects the prosperous condition of trade. Interborough-Metropolitan during the last week has been more extensively traded in than at any time since it was listed. Both the common and preferred were strong and made substantial advances. There have been rumors of reorganization plans for the Metropolitan system upon terms more favorable to the shareholders than had been anticipated.

The money market has been easier and the bankers have been more liberal to borrowers. Rates have declined and the whole situation is more favorable to the buying side. Rates to-day were: Call, 3¾ to 5 per cent; 90 days, 4¾ per cent.

Other Markets

Trading in Subway stock upon the Chicago Exchange has been very much less active during the past week and the heavy pressure to sell has been eliminated. The price, however, is still around 7¼. Other tractions are dull.

In the Boston market, Massachusetts Electric issues, both preferred and common, have been active and each has advanced about 2 points. There has also been some trading in Boston Elevated and in Suburban preferred.

In Philadelphia, Rapid Transit has again been quite active, the sales for the short week amounting to about 35,000 shares. The price has been practically unchanged. Union Traction has been in the market at the old figures.

In Baltimore, the bonds of the United Railways continue to sell at former prices.

At the auction of securities in New York last week the following were sold: $1,000 Brooklyn City & Newtown Railroad 5 per cent bond, 99¼; $9,000 Coney Island & Brooklyn Railroad 4 per cent bonds, 80½; $3,000 Brooklyn Rapid Transit 5 per cent bonds, 105⅜.

Quotations of various traction securities as compared with last week follow:

	Oct. 26.	Nov. 2.
American Railways Company	a45½	a45½
Aurora, Elkin & Chicago Railroad (common)	a15	*15
Aurora, Elkin & Chicago Railroad (preferred)	a65	*95
Boston Elevated Railway	130	130
Boston & Suburban Electric Companies	*18¼	*18¼
Boston & Suburban Electric Companies (preferred)	*75	77⅜
Boston & Worcester Electric Companies (common)	a12	a12
Boston & Worcester Electric Companies (preferred)	a54	a53
Brooklyn Rapid Transit Company	74½	75⅞
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	85	85
Capital Traction Company, Washington	*139	a139
Chicago City Railway	a180	a190
Chicago & Oak Park Elevated Railroad (common)	*2	*2
Chicago & Oak Park Elevated Railroad (preferred)	*10	*10
Chicago Railways, ptcptg, ctf 1	a105	a106
Chicago Railways, ptcptg, ctf. 2	a36	a36
Chicago Railways, ptcptg, ctf. 3	a24	a24
Chicago Railways, ptcptg, ctf. 4s	a10	a10
Cleveland Railways	*84	*84
Consolidated Traction of New Jersey	a76½	a76½
Consolidated Traction of N. J., 5 per cent bonds	a106	a106
Detroit United Railway	a67	a70
General Electric Company	161	164
Georgia Railway & Electric Company (common)	a99½	a99½
Georgia Railway & Electric Company (preferred)	a88	a87
Interborough-Metropolitan Company (common)	18	19½
Interborough-Metropolitan Company (preferred)	49¼	50
Interborough-Metropolitan Company (4½s)	82½	83⅜
Kansas City Railway & Light Company (common)	a40	40
Kansas City Railway & Light Company (preferred)	a82	*a82
Manhattan Railway	140½	141
Massachusetts Electric Companies (common)	16¾	a18
Massachusetts Electric Companies (preferred)	80	a83
Metropolitan West Side, Chicago (common)	a17	a17
Metropolitan West Side, Chicago (preferred)	a51	a54
Metropolitan Street Railway	a24	*a24
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	77½	79
Northwestern Elevated Railroad (common)	a20	a20
Northwestern Elevated Railroad (preferred)	a70	a68
Philadelphia Company, Pittsburg (common)	a48½	a49
Philadelphia Company, Pittsburg (preferred)	a45	a44⅛
Philadelphia Rapid Transit Company	a25½	a26½
Philadelphia Traction Company	a90	a89½
Public Service Corporation, 5 per cent col. notes	a100⅛	*100⅛
Public Service Corporation, ctfs.	a97	*97
Seattle Electric Company (common)	114⅛	115¼
Seattle Electric Company (preferred)	104	103
South Side Elevated Railroad (Chicago)	a52	a52
Toledo Railways & Light Company	8	*8
Third Avenue Railroad, New York	19⅜	20
Twin City Rapid Transit, Minneapolis (common)	107½	108
Union Traction Company, Philadelphia	a52	52½
United Rys. & Electric Company, Baltimore	a13¼	13¼
United Rys. Inv. Co. (common)	40	42
United Rys. Inv. Co. (preferred)	68¼	73¼
Washington Ry. & Electric Company (common)	*47	*47
Washington Ry. & Elec. Company (preferred)	*94	a94
West End Street Railway, Boston (common)	93	92½
West End Street Railway, Boston (preferred)	103½	103
Westinghouse Electric & Manufacturing Company	*86	86½
Westinghouse Elec. & Mfg. Company (1st pref.)	a140	a140

a Asked. *Last Sale.

Annual Report of Montreal Street Railway

Gross earnings of the Montreal Street Railway for the year ended Sept. 30, 1909, aggregated $3,874,839, an increase of $197,406, or 5.37 per cent over the preceding year. Operating expenses increased 4.48 per cent and the gain in net earnings was 6.63 per cent. To the net earnings there was added $55,607 interest from the Montreal Park & Island Railway, making the total income $1,675,426. From this amount there was deducted $445,749, comprising the city percentage on earnings, interest and the rental of leased lines. The net income available for distribution was $1,229,677, from which a dividend of 10 per cent was paid, leaving a surplus of $253,344. There was then appropriated $175,000 for contingent account and $25,000 for the fire insurance fund, leaving a surplus of $53,344.

The following table gives some of the results during the last 12 years:

	1909.	1908.	1898.
Gross Earnings	$3,874,838.51	$3,677,432.45	$1,471,939.65
Operating Expenses	$2,255,019.20	$2,158,394.09	$764,884.35
Expenses % of Earnings	58.20	58.69	52.15
Net Earnings	$1,619,819.31	$1,519,038.36	$707,055.30
Passengers Carried	95,376,373	90,746,032	35,353,036
Car Earnings per passenger	3.96c.	3.96c.	4.15c.
Transfers	32,285,208	30,343,113	10,508,603
Total passengers carried	127,661,581	121,089,145	45,861,639
Car Earnings per pass. total carried	2.96c.	2.97c.	3.20c.

L. J. Forget, the president, states in his remarks to shareholders:

"The gross earnings continue to show satisfactory increases. The per cent of expenses to gross earnings is 58.20, against 58.69 per cent for the previous year.

"The increased payment to the City of Montreal for the percentage on earnings was $17,772, an increase of 7.33 per cent over the previous year.

"Your directors appropriated during the year from the surplus earnings of the company, the sum of $175,000 for renewals to the company's property. This amount added to the balance of $29,353 carried forward from previous years, made a total credit to the account of $204,353. Against this amount there has been charged during the year $173,816.

"Your directors appropriated the sum of $25,000 from the surplus earnings of the company as a credit to the fire insurance fund. The interest on the investments for the year amounted to $21,732. The amount now at the credit of this fund is $470,109.

"The premium on the last issue of new stock paid up during the year, amounting to $142,684, has been credited to the general surplus account of the company. The amount of $59,027, representing the taxes on poles, rails, wires and machinery due the City of Montreal, in accordance with the recent judgment up to 1907, has been debited to this account. The amount due for the last two years has been charged against operation.

"The company has expended during the year on construction account, $121,866, on equipment account, $43,837 and on real estate and buildings, $23,745, a total of $189,448.

"Owing to the increase of the system the present shops at Hochelaga are inadequate to take care of the repairs and construction work of the company, and as there is no further property adjoining that can be had, your directors have purchased 75 acres of land in the North East end of the city, on which it is proposed to erect the new shops. The purchase of this land will secure for many years to come ample room for all extensions that may have to be made from time to time.

"The company was again obliged to refuse payment of a portion of the city's accounts for snow removal, owing to the wasteful manner in which the work was carried out. The snow fall according to the McGill records was nearly 2 ft. less than the previous year, but notwithstanding this the city claims to have expended the sum of $208,436, an increase over the previous year of $5,901, and an increase over two years ago of $77,799, with 20.2 in. less snow fall. The increase in street mileage during this latter period was one mile, which at the average cost would only amount to $4,222.

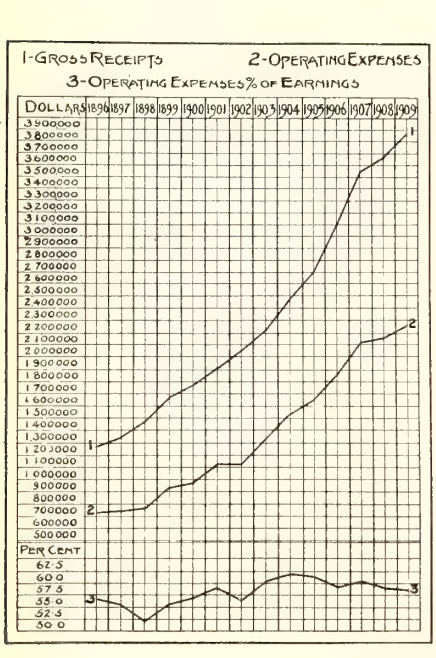
"The company has paid to the City of Montreal the usual property taxes and percentage on earnings, amounting to $286,086, on account of snow removal $83,158 and taxes on poles, rails, wires and machinery for the year $16,941, a total of $386,185, being an increase of $45,653 over the previous year.

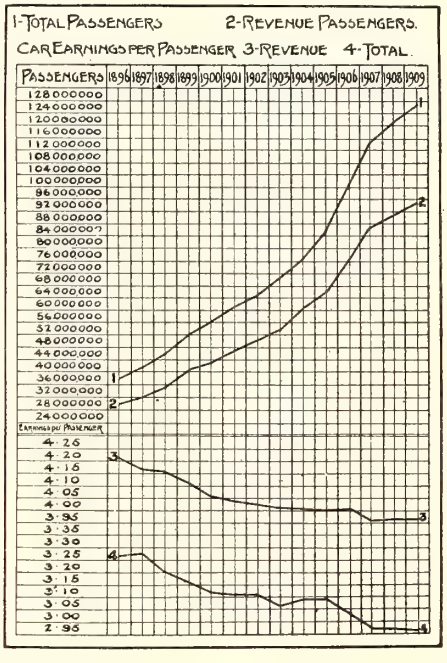
"The earnings of the Montreal Park & Island Railway Company have been somewhat disappointing during the year, owing chiefly to the effect of last year's depression in business in the various factories, etc., situated on this company's lines. The gross earnings remained about the same as the previous year, and did not show the usual increase.

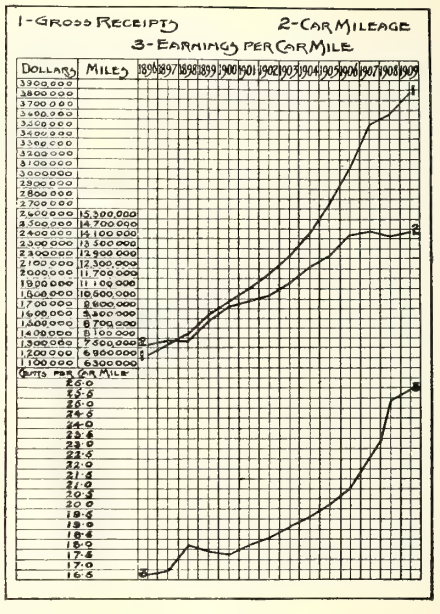
"The operating expenses were higher owing to a larger amount being spent on the maintenance of the property of the company, and to the new extensions that have been constructed and operated during the past year. It was not expected by your directors that these extensions would prove immediately profitable, but owing to the growth of the suburbs, and the building up they have and will induce, it is only a matter of a short period when they will show good earning capacity for the company.

"The gross earnings show a gross increase of $2,859, the operating expenses an increase of $16,947, the net results being $57,058, against $71,146 for the previous year.

"The gross earnings of the Montreal Terminal Railway Company increased $11,261, the operating expenses increased $308, and the net surplus for the year was $5,477, against a deficit in the previous year of $5,162."







Diagrams Showing Operations of Montreal Street Railway

Receivers Appointed for Washington, Baltimore & Annapolis Electric Railway

The Washington, Baltimore & Annapolis Electric Railway was placed in the hands of George T. Bishop, Cleveland, Ohio, president of the company, and George Weems Williams, Baltimore, Md., counsel for the company, as

receivers by Judge Morris of the United States Circuit Court at Baltimore on Oct. 28. They will operate the property under the direction of the court without interruption to the service, and for the present, at least, with the same operating force. The application for the receivership was made by George A. Craig, Toledo, Ohio, a stockholder and creditor of the company, through his attorneys. Mr. Bishop has issued the following statement in explanation of the appointment of the receivers:

"The receivership for the Washington, Baltimore & Annapolis Electric Railway was decided by the officers of the company to be necessary for the protection of the security holders, upon it becoming apparent that all of the reconstruction changes, made necessary by the adoption of the direct-current power system and the acquirement of new cars suitable for use in Washington, would not be completed so as to enable the company to operate its cars in Washington by Nov. 15, as had been expected and relied upon by the company in making plans to care for its obligations. It now seems probable that all of said changes cannot be completed before Feb. 15, 1910, owing to delays which the officers of the company and the several contractors doing the work were unable to foresee. A considerable portion of the cost of such changes necessarily has been paid by the company from its current earnings, necessitating a delay in the payment of pressing accounts, which would otherwise have been made from the earnings.

"It has been believed up to this time, and in our opinion such belief has been justified, that the decreased operating expenses and increased earnings which will result from the changes would have furnished sufficient funds to provide for the company's urgent and unusual requirements. Accounts which the company is unable to pay are pressing, and under the plan decided upon these can be taken care of from earnings, which would not be sufficient to pay the May 1, 1909, interest on first and second mortgage bonds, now in default, and the interest on the same bonds, due Nov. 1, 1909, a total of $200,000.

"Under the receivership, which should not be of long duration, all the reconstruction work can be continued, and the cost thereof which has not already been paid can be provided for. A plan for the funding of the accrued and accruing interest and other indebtedness will soon be submitted to the security holders, but it is the belief of the officers of the company that no drastic action will be necessary. It should be borne in mind by the security holders that the company has no questions of expiring franchises to bother it; its rights are secured; its property is intact and in first-class physical condition, and within a short time it will begin operating cars from the business center of Baltimore to the business center of Washington.

"Without giving a detailed statement of the company's obligations, the cause of the present condition can be summed up by stating that the amount of the company's present liabilities, for which it has not been able to issue securities, is made up entirely of the amount which it has been required to put into its construction account, and the deficit caused by the large percentage of operating expenses under the alternating-current system."

Report of New Haven Subsidiary Properties

The annual report of the New York, New Haven & Hartford Railroad for the year ended June 30, 1909, contains statements showing the results of operation of the Rhode Island Company and the Connecticut Company, as follows:

Year ending June 30, 1909:	Connecticut Co.	Rhode Island Co.
Earnings:		
Passenger	$6,416,338	$3,876,746
Mail	9,408	3,313
Express	224,294	*169,580
Chartered cars	28,428	11,998
Sale of power	39,778	56,076
Park earnings	62,116	.....
Advertising	29,687	16,847
Miscellaneous, including gas, light and water	1,178,782	†26,225
Total earnings	$7,988,831	$4,160,785
Operating expenses:		
Maintenance of way and structures	$ 572,107	$ 198,113
Maintenance of equipment	450,556	265,071
Operation of power plants	753,010	368,120
Operation of cars	1,624,209	1,008,566
General expenses	568,376	474,984
Miscellaneous expenses	337,345	.....
Total operating expenses	$4,305,603	$2,313,954
Net earnings	$3,683,228	$1,846,831
Income from other sources	.....	32,172
Total income	.....	$1,879,003
Taxes, rentals, etc	38,913	1,409,797
Net income	$3,644,315	$469,207

* Stated as "freight and express."
† Stated as "miscellaneous."

The Connecticut Company used for operating expenses 53.8 per cent of its gross revenue, while the proportion required by the Rhode Island Company was 55.5 per cent.

Charles S. Mellen, president of the New York, New Haven & Hartford road, in his statement to shareholders makes the following reference to matters affecting the electrically operated properties.

"Work is now in progress at Glenbrook, Conn., on the erection of approximately one mile of 4 and 6-track catenary construction, beginning at the easterly terminus of the present overhead construction, a short distance east of Stamford. Contract has been awarded for two electric freight locomotives. This work is for experimental purposes to determine future standards in connection with a proposed extension of our electric service.

"The litigation in which the New York, Westchester & Boston Railroad was involved, has been terminated and full authority given for the prosecution of the work of construction, in accordance with plans satisfactory to your company.

"By a decree of the Supreme Judicial Court of the Commonwealth of Massachusetts of May, 1908, in the suit of the attorney general against the New York, New Haven & Hartford Railroad, your company was enjoined from holding directly or indirectly the stock of any Massachusetts street railway after July 1, 1909.

"In consequence of this decree it became necessary to sell the stocks and indebtedness of the Worcester & Webster Street Railway Company and of the Webster & Dudley Street Railway Company, which came into the treasury of your company through the merger with the Consolidated Railway Company of May 31, 1907, thus closing out the last financial interest of your company in Massachusetts street railways.

"The only interest not eliminated is the endorsement upon the shares of the Springfield Railway Companies and the New England Investment & Security Company. These endorsements under decrees of the courts thus far rendered, we must apparently continue until the liquidation of the trusts they represent, but the earnings of the properties owned by both trusts seem to be ample to enable them to meet all obligations without calling upon your company to make any payments under the terms of its guaranty.

"The obligation may therefore be considered more a nominal than a material one.

"By reason of the substitution of electric motive power for steam within the limits of the city of New York, required by law, and the need for larger facilities at the Grand Central terminal involving the expenditure of a large amount of money, it was deemed advisable to join with the New York Central & Hudson River Railroad in a new agreement for the use and occupancy of the terminal. This agreement is now in effect, and, while it entails an additional expense to your company for its use of the terminal, it is recognized as a natural sequence to legal requirements and the changed conditions."

Auburn & Turner Railroad, Turner, Mass.—The property of the Auburn & Turner Railroad was sold under foreclosure on Oct. 29, 1909, at Auburn to R. G. Fessenden, president of the American Trust Company, Boston, Mass., representing the bondholders, for $60,000.

Central Park, North & East River Railroad, New York, N. Y.—Lewis B. Franklin has been elected a director of the Central Park, North & East River Railroad to succeed John W. Castles, deceased.

Columbus, New Albany & Johnstown Traction Company, Columbus, Ohio.—It is reported that A. L. Richmond, Jr., Pittsburgh, Pa., has secured control of the Columbus, New Albany & Johnstown Traction Company through the purchase of the stock of the company held by George B. Cox, Cincinnati, Ohio. The Dominion Construction Company, of which Mr. Richmond is president, has qualified to do business in Ohio, and it is believed that the line will be extended from its present terminus at Gahanna to Johnstown at an early date.

Des Moines (Ia.) City Railway.—W. B. McKinley, president of the Illinois Traction System, Champaign, Ill., and his associates are reported to have obtained from N. W. Harris & Company, New York; G. B. Hippee, president of the Des Moines City Railway and general manager of the Interurban Railway; H. H. Polk, vice-president of the Des Moines City Railway and president of the Interurban Railway, and others an option on a majority of the stock of these companies, the option to be exercised only if Mr. McKinley secures a favorable franchise extension from the city of Des Moines. As an inducement for the Council to grant a new franchise Mr. McKinley has offered to make certain improvements in Des Moines and to extend the interurban lines.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—W. T. Durbin, chairman of the board of trustees, representing the bondholders of the Indianapolis & Cincinnati Traction Company, expects soon to present to the court for approval a plan for the reorganization of the company which has been sanctioned by the board of trustees and by Charles L. Henry, receiver of the company. Mr. Durbin is said to have expressed the opinion that the reorganization of the company can be effected by April 1, 1910.

Metropolitan Street Railway, New York, N. Y.—The petition of the Metropolitan Securities Company, New York, for a writ of certiorari in the case of that company against William W. Ladd, receiver of the New York City Railway, was presented to the Supreme Court of the United States at Washington on Nov. 1. The case involves a judgment for about $5,000,000 for damages alleged to have been suffered by the New York City Railway on account of a breach of certain agreements in connection with the lease of the railway to that company by the Metropolitan Street Railway. The case was decided in the New York Federal courts in favor of the New York City Railway, and the Metropolitan Securities Company asks the Supreme Court to review the entire records. Petitions for writs were also presented in behalf of the Guaranty Trust Company in the case of that company against the Metropolitan Street Railway and the Morton Trust Company against the Guaranty Trust Company, involving the foreclosure of the Metropolitan Street Railway's mortgage of 1897 for $12,500,000 to secure its bonds.

Missouri & Kansas Interurban Railway, Kansas City, Mo.—J. A. Edson has been discharged as receiver of the Missouri & Kansas Interurban Railway by Judge J. C. Pollock of the Federal Court of Kansas at Kansas City, Mo. During Mr. Edson's incumbency as receiver the motive power of the line was changed from gasoline to electricity and other improvements were made to the property which brought the expenses for rehabilitation up to $107,000.

New York, New Haven & Hartford Railroad, New Haven, Conn.—At the special meeting of the stockholders of the New York, New Haven & Hartford Railroad on Oct. 27, 1909, it was voted to issue 500,000 shares of new stock at $125 per share, which will yield about $62,500,000. The stock is to be paid for in four instalments, at intervals of six months. It had been expected that the capital stock would not be increased by more than $40,000,000 at this time, but it has been explained that the larger amount is necessary to meet the floating debt of the road and pay for the improvements that have been planned. All the retiring directors were reelected and John L. Billard was elected to succeed the late Frank W. Cheney.

Northwestern Elevated Railroad, Chicago, Ill.—The report of the Northwestern Elevated Railroad for the year ended June 30, 1909, shows earnings as follows: Gross receipts for 1909, $2,540,883 as compared with $2,463,188 for 1908; operating expenses for 1909, $995,819 as compared with $965,117 for 1908; net earnings for 1909, $1,545,064 as compared with $1,498,071 for 1908; total charges for 1909, $1,189,280 as compared with $1,147,183 for 1908; surplus for 1909, $355,776 as compared with $350,883 for 1908. The ratio of operating expenses to earnings (excluding loop net earnings) was 49.82 for 1909 as compared with 50.22 for 1908; the ratio of operating expenses, loop account and taxes to earnings (excluding loop net earnings) was 68.24 for 1909 as compared with 66.64 for 1908.

Ohio Valley Traction Company, Cincinnati, Ohio.—The directors of the Ohio Valley Traction Company have declared an initial dividend of 1 per cent on the $7,500,000 of common stock of the company, payable, together with the regular quarterly dividend of 1¼ per cent on $8,500,000 of preferred stock, on Nov. 1, 1909, to holders of record of Oct. 25, 1909.

Pensacola (Fla.) Electric Company.—The Pensacola Electric Company, which deferred the dividends due June and December, 1908, and June, 1909, on $300,000 of 6 per cent cumulative preferred stock, has resumed the semi-annual dividend of 3 per cent, payable Dec. 1, 1909, and has also declared a dividend of 3 per cent per share on account of accumulations.

Port Jervis (N. Y.) Traction Company.—The Port Jervis Traction Company has applied to the Public Service Commission of the Second District of New York for permission to issue a mortgage for $50,000 and bonds to the same amount and also $28,812.50 in common stock.

Third Avenue Railroad, New York, N. Y.—Judge Lacombe, in the United States Circuit Court, has granted a postponement of the sale of the Third Avenue Railroad until Jan. 11, 1910, as the Public Service Commission of the First District of New York has not yet approved the reorganization plan of the bondholders' committee.

Traffic and Transportation

Tacoma Companies Increase Fares

The Puget Sound Electric Railway and the Tacoma Railway & Power Company, Tacoma, Wash., of which Stone & Webster, Boston, Mass., are general managers, put into effect on Oct. 17, 1909, a number of changes in the rates of fare on their suburban and interurban lines. Patrons of the companies were notified of the changes by the following notice:

"On Oct. 17 all regular rates on the Puget Sound Electric Railway will be increased to practically 2 cents per mile. Round trip tickets at reduced rates, which have been in force heretofore, will be abandoned, except between Tacoma and Seattle, and in lieu thereof a commutation book will be sold with a 30 per cent reduction from the new regular rates. This book will contain tickets covering 50 rides, good for 30 days, to be used only by the purchaser of the book; said commutation books will be sold only at the company's ticket offices, in Seattle and Tacoma. While the regular rates are increased for passengers who ride infrequently, this commutation book will permit passengers riding daily to do so at a 30 per cent reduction over the regular rates; or, in other words, practically obtain the same rates that now exist, and in many cases they will be found lower than the present tariffs. The through rate of $1 for the round trip which has been in force heretofore between Seattle and Tacoma will be changed to $1.25.

"On all suburban lines of the Tacoma Railway & Power Company, round trip tickets, which have been in force, will be abandoned and the regular rate of 15 cents will be charged between Tacoma, Spanaway, American Lake and Steilacoom. The rate between Tacoma and Puyallup via the old line will be 5 cents within the city limits of Tacoma; 5 cents within the city limits of Puyallup, and 10 cents between the city limits of Tacoma and Puyallup, divided into two 5-cent zones of equal distance; total fare, Tacoma to Puyallup, 20 cents; rate from Tacoma to Puyallup via new line, 20 cents. Transfers will be issued to all lines of the Tacoma Railway & Power Company within the city limits, as heretofore."

Subsequently Jacob Furth, president of the Puget Sound Electric Railway, offered the following explanation of the reasons which prompted the company to make the changes:

"The Tacoma Railway & Power Company was purchased and the Puget Sound Electric Railway opened for traffic in 1902. With a desire to give the public the benefit of low rates under the belief that the population of the valley would increase to a point where traffic would be profitable, the lowest rates on any interurban railway at that time were put into effect and have been in force for the past seven years. During this period a large number of interurban railways have been built throughout the country (and in Washington), and in each case where low fares have been introduced they have in time been increased, from the fact that they were found unprofitable.

"Throughout Indiana and Ohio rates have been increased on the majority of interurban and suburban railways, and recently the Spokane & Inland Empire Railway, operating out of Spokane and receiving 2.4 cents per mile per passenger, found such rates would not pay a reasonable return upon the investment, and has increased its rates to 3 cents per mile. On city and suburban lines in Massachusetts, where the rates were 5 cents, they have been increased to 6 cents in several instances by order of the Railroad Commission, with a view of placing the roads on a paying basis.

"Hence, experience has convinced the railway investors that rates less than from 2 cents to 3 cents per mile on high-speed interurban lines will not pay, and there is nothing left for the company to do but increase the rates to prevent inevitable failure (which would do the country more harm than good).

"During the last seven years there has been a continual outlay for broad gaging the Tacoma Railway & Power Company's system, reconstructing the tracks with heavier rails, ballasting, etc. Miles of pavement have been constructed at an enormous cost, wherein the benefit to the company is exceedingly small and will not be realized until the paved districts are more thickly populated. The interurban line has been partly double tracked, the entire roadbed ballasted, and the company intends to give better and safer service between Seattle and Tacoma by completing the work of double tracking the line as soon as funds can be raised to proceed with the improvement. Modern cars have been introduced on all lines for the comfort of the passengers.

"During this period the cost of all materials and labor used in the operation and construction of the roads has

been increased and in many instances doubled. State, county and city taxes have almost doubled, and in the face of all this the companies have heretofore not increased the rates introduced, but have even decreased them on the suburban lines of the Tacoma Railway & Power Company by giving transfers from the suburban to all city lines.

"With expenses continually increasing on every side, although the most rigid economy has been practised in the management of the companies, a point has been reached where an increase in suburban fares has become necessary to enable the company properly to perform its duty as a public carrier. The managers hope the public will, through this explanation, understand the situation and realize that the increase in rates is a necessity. The percentage of increase is much less than the increased percentage of expenses and much less than the increase every member of the public is paying for necessities furnished by private producers in every line."

Omaha Employees Rewarded for Difficult Service

The employees of the Omaha & Council Bluffs Street Railway, Omaha, Neb., who remained faithful to the company during the recent strike, have been rewarded by the company with extra compensation for the 15 days that the operation of cars was made difficult by deflections from the ranks of the men. A considerable number of the men operated cars every day for the 15 days and received the sum of $150 extra compensation. Others who operated cars some of these days and held themselves in readiness for service also received extra compensation. The communication announcing the determination of the company to reward those who served it faithfully was addressed to the conductors and motormen under date of Oct. 4 and was signed by R. A. Leussler, assistant general manager, and L. C. Nash, superintendent of transportation. It follows:

"The board of directors, at a meeting this day, has decided upon the following extra compensation for conductors and motormen who remained in the service of the company during the recent strike, or who returned to work on or before Oct. 2.

"All conductors and motormen in the employ of the company on Sept. 17, 1909, who reported for work and held themselves in readiness to operate cars between Sept. 18 and Oct. 2, 1909, both dates inclusive, will receive the sum of $5 per day for each day on which they so reported, and all conductors and motormen in the employ of the company on Sept. 17, 1909, who actually operated cars between Sept. 18 and Oct. 2, 1909, both dates inclusive, will receive the additional sum of $5 per day for each day on which they so operated cars. This extra compensation will be paid on Nov. 1, 1909.

"Conductors and motormen having regular runs and operating cars, or reporting for their runs, will be credited with the schedule time for such runs, and conductors and motormen on the extra list will be credited with the schedule time of all runs which they took during the above dates.

"Men who were breaking in on Sept. 17, 1909, will be considered as having been in the employ of the company on said date.

"Conductors and motormen who failed to report on Sept. 18, 1909, or later, and who have since returned to work will receive the same rate of wages each was receiving on Sept. 17, 1909."

Ten Accident Pointers

The bureau for the prevention of accidents of the Philadelphia (Pa.) Rapid Transit Company has reprinted in Bulletin No. 70, dated Oct. 25, 1909, 10 pointers on accidents selected from the written discussion by Francis J. Ryan of the Syracuse (N. Y.) Rapid Transit Company of the topical subject "What Are the Best Means of Preventing Collisions of Cars, as Well as with Vehicles and Pedestrians" considered at Denver by the American Street & Interurban Claim Agents' Association.

The pointers which the Philadelphia Rapid Transit Company has selected to call to the attention of its employees follow:

"1. Have the motorman understand the importance of knowing that his brake, gong, sand and car are in proper condition before starting on his day's work.

"2. Have him understand that imperfection of equipment will act as no excuse for a collision if such trouble might have been known by him (in the exercise of proper care) before the collision occurred.

"3. Have him understand that the man who takes chances is a dangerous motorman.

"4. Have him understand that the keeping of his car on time is of secondary importance when he can prevent a collision.

"5. Have him understand that the time to change lights, signs, side rails, etc., is when the car is standing.

"6. Have him realize the necessity and importance of keeping his car a sufficient distance from the car ahead.

"7. Have him make sure that all points, switches, signal lights, and orders are fully understood before proceeding with his car.

"8. Have him understand the importance of having his car under perfect control when he is about to cross lines running at right angles.

"9. Have him understand the reasons why he should have his car under perfect control when passing standing cars.

"10. Have him understand his duty at railroad crossings."

Fare Complaint in Pennsylvania.—The Railroad Commission of Pennsylvania will consider at an early date the complaint of the authorities of Collegeville against the Schuylkill Valley Traction Company, Norristown, Pa., that the fare of 15 cents charged between Collegeville and Norristown is excessive.

Denver & Interurban Railroad Resumes Service.—The Denver & Interurban Railroad, which as stated on page 635 of the ELECTRIC RAILWAY JOURNAL of Oct. 2, 1909, discontinued the service on the line between Denver and Boulder owing to the necessity of replacing the viaduct out of Denver to the north with a new steel structure, resumed service on this line on Oct. 28, 1909, work on the viaduct having been completed.

Pay-as-You-Enter Cars on Broadway, New York.—About 90 pay-as-you-enter cars, constructed under license from the Pay-As-You-Enter Car Corporation, New York, N. Y., were placed in service on the Broadway and Amsterdam Avenue line of the Metropolitan Street Railway, New York, N. Y., on Oct. 31, 1909. Cars of this type will gradually be substituted for the ordinary closed cars on both the Broadway and Amsterdam Avenue and the Broadway and Columbus Avenue lines of the company, and it is expected that by Dec. 1, 1909, the equipment of both of these lines will be composed entirely of pay-as-you-enter cars.

Handling State Fair Traffic Over Illinois Traction System.—Officials of the Illinois Traction System are pleased with the showing made in handling the crowds that visited the State fair at Springfield recently, 125,000 people having been carried in and out of Springfield during the week. This is about 30,000 more than were transported in 1908. Every effort possible was made by the advertising department, under the direction of J. H. Ryan, to interest the public in the fair. The newspapers were used freely and posters and other advertising matter were distributed. The centennial at St. Louis, which occurred at the same time that the fair was held, complicated matters, but the increase in traffic on the southern division was also handled expeditiously.

Precautions to Prevent Accidents Between Freight Trains on Spurs and Interurban Cars.—Under date of Nov. 1, 1909, the Railroad Commission of Indiana addressed the following communication to all steam railroads operating in Indiana: "The commission has ascertained that it has been the practice on the part of steam railroads having industrial tracks intersecting the railways of interurban lines, not to stop their freight trains or freight cars before crossing such interurban lines. This practice the commission considers dangerous. It is therefore, recommended and ordered, that, from and after Dec. 1, 1909, all steam railroads operating in Indiana shall bring their freight trains and freight cars to a full stop before passing over an interurban line, provided such freight trains or freight cars are being operated over an industrial switch or spur which crosses the track of such interurban railway. All of which is ordered and directed by the commission."

Letter from Pennsylvania Commission Calling Attention to Front Platform Rule.—The Railroad Commission of Pennsylvania has addressed a communication to a number of street railways in that State relative to their compliance with the regulation of the commission forbidding the companies to carry passengers on the front platforms of closed cars and limiting the carriage of passengers on the front platforms of open cars to those who can be accommodated on the benches thereon provided. The commission states that it intends to insist upon the observance of this regulation, which was made after conferences with representatives of the railways at which it was agreed that such regulation was desirable and could be enforced. With regard to the contention now that the rule can not be enforced at periods of heavy travel, the commission states that it has recently observed rigid adherence to the rule in Pittsburgh in rush hours, and had been informed that the regulation was effective even during the heavy travel incident to the recent championship baseball series in Pittsburgh.

Personal Mention

Mr. Henry B. Seaman, chief engineer of the Public Service Commission of the First District of New York, has been appointed by Mayor Brooks of Boston to act in a consulting capacity in connection with the Cambridge subway.

Mr. Harry S. Calvert, secretary of the Pennsylvania State Railroad Commission, was on Oct. 27 appointed one of the receivers of the Land Trust Company and the Mercantile Trust Company, Pittsburgh, Pa., by Judge Kunkel of the Dapuhin County Court. Mr. Calvert, who was appointed secretary of the State Railroad Commission when that body was organized, will resign from that office.

Mr. Louis C. Fritch has resigned as consulting engineer of the Illinois Central Railroad, Chicago, Ill., to become chief engineer of the Chicago Great Western Railroad. During the last year Mr. Fritch has had in charge the preliminary studies which the engineering department of the Illinois Central Railroad has made with a view to ascertaining the conditions governing the electrification of that company's suburban trunk line service. Mr. Fritch entered railway work in 1884, and has been connected with steam railroads in the Central States ever since that time. A short biographical sketch of Mr. Fritch was published on page 309 of the Electric Railway Journal for Feb. 13, 1909.

Mr. J. L. Greatsinger has been elected president of the Elmira, Corning & Waverly Railroad, Elmira, N. Y. Mr. Greatsinger began his railway career in 1869 with the Erie Railroad. Since that time he has been connected with the Utica, Ithaca & Elmira Railroad; Ithaca, Auburn & Western Railroad; Cazenovia, Canastota & De Ruyter Railroad; Canal Railroad; the Chicago & Indiana Coal Railroad; the Chicago & Eastern Illinois Railroad, and the Duluth & Iron Range Railroad. He was in turn master mechanic, general superintendent, general manager and president of the Duluth & Iron Range Railroad. Mr. Greatsinger was president of the Brooklyn (N. Y.) Rapid Transit Company from March, 1901, to February, 1903, and since that time has been identified with real estate development in Brooklyn and railway work in Central New York State.

Mr. J. J. Riley, whose appointment as general inspector of the surface lines of the Brooklyn (N. Y.) Rapid Transit Company was announced in the Electric Railway Journal of Oct. 30, 1909, was born in Oswego, N. Y., in 1873, and was educated in the public schools of Montreal, Quebec. He began his railroad career in the traffic department of the Grand Trunk Railroad. He next became connected with the foreign freight department of the Erie Railroad and later entered the employ of the Lehigh Valley Railroad. Mr. Riley's practical experience in railroad equipment was obtained as superintendent of the works of the Peckham Car Wheel Company, Kingston, N. Y. Mr. Riley entered the employ of the Brooklyn Rapid Transit Company as special inspector to the general superintendent and was subsequently made assistant trainmaster of the Southern Division of its elevated lines. He was next transferred from the elevated to the surface lines of the company and made district superintendent of the Southern Division. In the recent reorganization of the staff of the surface lines the office of district superintendent was abolished, but Mr. Riley's abilities were recognized by his appointment as general inspector of surface lines, a newly created position. In his new office Mr. Riley will have direct charge of the heavy volumes of traffic through lower Fulton Street and across both the Brooklyn and the Williamsburgh bridges. The entire staff of inspectors of the company will report direct to him.

Richard McCulloch, vice-president and assistant general manager of the United Railways, St. Louis, Mo., in an illustrated lecture on the development of the street railways before the St. Louis Chapter of the American Institute of Banking at the Missouri Athletic Club on the evening of Oct. 26, 1909, said that travel in subways is noisy and uncomfortable and that elevated railways greatly decrease the value of a street for the building of residences. He praised the surface car of the pay-as-you-enter type now operated on the lines of the United Railways and contrasted pictures of that type of car with pictures showing the evolution of cars from the old English stage coach. Mr. McCulloch also spoke about the social benefits of the city electric railway and the interurban lines. In concluding his remarks he referred to the substitution of electricity for steam as motive power on the lines of the New York Central & Hudson River Railroad; the New York, New Haven & Hartford Railroad and the Pennsylvania Railroad out of New York and to the probable use of electricity as motive power by the Pennsylvania Railroad on its lines between Philadelphia and New York.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Interurban Railway, Helena, Ark.**—Incorporated to build an electric railway in Helena. Capital stock, $10,000. Incorporators: E. C. Hornor, John S. Hornor and C. H. Purvis.

Vallejo & Northern Railroad, Vallejo, Cal.—Incorporated with a capital stock of $25,000,000, to build an electric railway from Vallejo to Sacramento. The route will be the same as that planned by the Vallejo & Northern Railway, with the exception that the charter calls for a straight line between the two points. The old company's route called for a branch near Elmira to Woodland via Winters. There will be four branches on the new line, one connecting Susan and Fairfield, another leaving the main line at Cement and running to Woodland via Vacaville and Winters, and a third running between Woodland and Davis. A steamship line between Vallejo and San Francisco is also projected. Directors: T. C. Gregory, William Pierce, John W. Mauman, Ernest D. Holly, Suisun and Winfield R. Madden, Oakland. [E. R. J., Oct. 23, '09.]

***Gooding, Soldier & Boise Interurban Railway, Boise, Idaho.**—Incorporated to build a railway, steam or electric, to extend between Boise and Gooding, a distance of 34 miles, to connect with the Idaho Southern Railroad in the Twin Falls country. Preparations are being made for grading and construction of a portion of the proposed railway as far as Soldier. Capital stock, $1,000,000. Incorporators: Attorney Sullivan, Boise and other capitalists of Camas Prairie, Soldier and Gooding.

St. Louis-Kansas City Electric Company, St. Louis, Mo.—Incorporated to build an electric railway 295 miles long through the counties of St. Louis, St. Charles, Lincoln, Warren, Montgomery, Calloway, Boone, Howard, Saline, Lafayette and Jackson to Kansas City, with a branch from Glasgow through Chariton and Brookfield in Linn County. Headquarters, New Bank of Commerce Building, St. Louis. Capital stock, $5,000,000. Incorporators: W. D. Nevin, Denver, Col.; W. H. Chase, B. F. Gray, Edgar R. Talton, St. Louis; Daniel F. Miller and Charles A. Loomis, Kansas City. [E. R. J., Aug. 21, '09.]

***Tennessee Traction Company, Memphis, Tenn.**—Incorporated to build an interurban electric railway from Memphis to Nashville. Capital stock, $50,000.

FRANCHISES

***Jonesboro, Ark.**—Preston Hatcher, of the Home Telephone Company, on behalf of a number of capitalists has applied to the City Council for a franchise to build a street railway in Jonesboro with interurban connection to Nettleton, 3 miles distant.

Los Angeles, Cal.—A franchise for the extension of the street railway tracks on West Adams Street, from the present terminus, has been granted to W. M. Bowen by the Board of Supervisors. The successful bid was $100.

Oakland, Cal.—The City Council has granted a 50-year franchise to the Oakland Traction Company to extend its electric railway along Grand Avenue. The company paid the city the sum of $500 for the franchise.

Delphi, Ind.—The Commissioners of Carroll County have ordered an election to be held Nov. 9 to vote on the proposition of Monroe Township voting a subsidy of $20,000 in aid of the construction of the Delphi, Flora & Burlington Traction Company's line. E. W. Bowers, president. [E. R. J., Oct. 30, '09.]

Logansport, Ind.—The Indiana Northwestern Traction Company, Monticello, has filed a petition with Commissioners of Cass County, asking for a franchise to build and operate an electric railroad through the county. The Town Board has granted a 75-year franchise to the company to build its proposed electric railway over Main and Marion Streets, Monticello. W. F. Brucker, Monticello, president. [E. R. J., Oct. 23, '09.]

Des Moines, Ia.—William B. McKinley, president of the Illinois Traction System, Champaign, Ill., and his associates who have secured an option on the property of the Des Moines City Railway and the Inter-Urban Railway have agreed to make the following improvements to the lines in Des Moines in return for a 25-year extension of the franchise grants to the companies in that city: To remove all present unused tracks, rebuild at once 10 miles of line with 129-lb. girder rail on paved streets and 80-lb. T-rail on unpaved streets, install 50 new cars, build 50 miles of the

new line within the city, cast or electrically weld all joints on new track, construct a new power house to cost $250,000, place all feed and transmission wires under ground in the fire district and use iron poles wherever there is permanent construction and paved streets. The questions of fare, the division of gross receipts and the right of the city to purchase the property in the future are points that have not yet been agreed to.

Granville, Ia.—The Sioux City & Spirit Lake Railway, Sioux City, has been granted a franchise to build its proposed electric railway through the streets and roads of Granville Township. [E. R. J., Jan. 16, '09.]

Marshalltown, Ia.—The City Council has fixed Nov. 29, as the date of the special election at which the people will be called upon to vote gas, electric light, and street railway franchises, asked in the names of H. W. Darling, and Louis H. Schroeder, Chicago. [E. R. J., Sept. 11, '09.]

***Kansas City, Kan.**—George Hall, Milwaukee, Wis., has submitted a franchise to the Wyandotte County Commissioners asking for a 35-year grant to operate an electric railway over 4½ miles of the county road. It is proposed to start the new line on Greystone Avenue in Rosedale, at the point of intersection of the Kansas and Missouri State lines, and then to proceed west on the ridge about half way between Argentine and Rosedale to the junction of the county road, about 2 miles west of Argentine.

New Orleans, La.—An ordinance has been passed by the City Council directing the comptroller to sell at public auction at the City Hall on Nov. 11, 1909, to the highest bidder, a 47-year franchise to construct a street railway from Lafayette Avenue and Villere Street to Franklin Avenue and St. James Avenue.

***Virginia, Minn.**—V. M. Pindle, Duluth, representing W. M. Pindle, Duluth, and W. D. Chapman, Chicago, Ill., has applied to the City Council for a franchise to build an electric railway in Virginia. The company intends to construct an electric railway from Virginia to Eveleth and Gilbert and later to Hibbing.

Patchogue, N. Y.—The Suffolk Traction Company has forfeited $60,000 bonds because of non-compliance with the conditions of its franchise to have completed and in operation within two years the cross-island railway from Patchogue to Port Jefferson. The company will endeavor to secure an extension to its franchise.

Chattanooga, Tenn.—The City Council has granted an electric street railway franchise to the Mountain Railway. D. J. Duncan is interested. [E. R. J., July 3, '09.]

***Mabton, Wash.**—J. A. Humphrey and associates have applied to the City Council for a 50-year franchise to construct a street railway in Mabton.

Monroe, Wash.—The Everett & Cherry Valley Traction Company, Everett, which proposes to build an electric railway between Snohomish and Fall City, has been granted a franchise in Monroe. J. T. McChesney, president. [E. R. J., Aug. 21, '09.]

TRACK AND ROADWAY

Capitol Traction Company, Washington, D. C.—This company has opened two extensions of its railway. One is the line from Seventh Street to the Navy Yard, via Florida Avenue and Eighth Street East, and the other is the extension of the Fourteenth Street line from the Union Station Plaza to Eighth Street East.

Birmingham & Edgewood Electric Railway, Birmingham, A.—This company has awarded a contract to Dunn & Lallande for the construction of 3¼ miles of track. An order has also been placed with the Tennessee Coal & Iron Railroad Company for 400 tons of steel open-hearth rails. Stephen Smith, president. [E. R. J., Sept. 18, '09.]

Chicago, Ill.—George W. Jackson, Inc., which was announced on page 413 of the ELECTRIC RAILWAY JOURNAL, Sept. 11, 1909, as being prepared to submit a proposal for the construction of an underground railway system in Chicago, has offered to submit to the City Council a draft of an ordinance under which it would be willing to build the lines it has in contemplation.

Murphysboro & Southern Railway, Murphysboro, Ill.—It is announced that this company, which is building an electric railway connecting Murphysboro and Carbondale, has awarded the contract for grading to Leonard Griffin, Murphysboro.

Gary & Southern Traction Company, Crown Point, Ind.—F. M. Clark, 615 Rookery, Chicago, Ill., secretary and treasurer, writes that this 12-mile electric railway from Gary to Crown Point is under construction and grading is nearly completed, although the company is not fully financed. Power will be furnished by the Chicago, Lake Shore & South Bend Railway. Officers: H. W. Seaman, president; Warren Bicknell, vice-president, and I. W. Troxel, chief engineer. [E. R. J., April 10, '09.]

Atlantic Northern & Southern Railway, Atlantic, Ia.—This company is in the market for material for the construction of 58 miles of railroad. The material will be purchased by the engineering firm of Rattenborg, Ross & Judd, Atlantic.

Centerville Light & Traction Company, Centerville, Ia.—This company has begun the work of laying rails on its proposed electric railway from Centerville to Mystic, 7 miles. The company is using the 70-lb. rails for construction.

Saginaw & Flint Railway, Saginaw, Mich.—It is unofficially announced that this company plans to lengthen its Frankenmuth spur to Cass City, taking in both Caro and Vassar.

Wahpeton-Breckenridge Street Railway, Breckenridge, Minn.—F. L. Strum, general manager and purchasing agent, advises that this company expects to commence construction about May 1, 1910, on its electric railway from Breckenridge to Wahpeton, N. D. For the present only 1 mile of track will be built. The company intends to operate two cars. The power will be furnished by the Otter Tail Power Company, Fergus Falls, Minn. The shops will be located at Breckenridge, and the amusement park at Island Park. Officers: A. J. Divet, president, and Henry Connolly, vice-president, Wahpeton, and D. J. Jones, secretary, and J. H. Ehlert, treasurer, Breckinridge. [E. R. J., Oct. 9, '09.]

Kansas City, Independence & Southeastern Electric Railway, Independence, Mo.—It is stated that this company has revived its plan of building an electric railway from Independence to Blue Springs and thence southeast to Holden and Warsaw. It began last year but has lain dormant several months. A preliminary survey has been made from Independence to Warsaw by E. M. Stayton. A proposition is said to have been made to J. Allen Prewitt, one of the promoters, by a financing company to build the railway provided that the business men of Independence will furnish $50,000. [E. R. J., Feb. 20, '09.]

Missouri & Cameron Railway, Kansas City, Mo.—The Jackson County Circuit Court on Oct. 23, dissolved the temporary injunction obtained in Kansas City two months ago by the Interstate Railway Company, restraining the Missouri River & Cameron Railway from prosecuting its work on the interurban right-of-way between St. Joseph and Kansas City. Both companies propose to construct a double-track electric interurban railway between St. Joseph and Kansas City, and their rights-of-way parallel the greater part of the distance. [E. R. J., Jan. 30, '09.]

Gallatin Valley Electric Railway, Bozeman, Mont.—It is reported that the first section of this electric railway, from Bozeman to Ferris, Hot Springs and Salesville, a distance of 18 miles, has been completed. The company intends to handle both freight and passengers, and has installed sidings at every crossroad for the convenience of farmers. It will connect with the Northern Pacific Railroad at Bozeman and with the Chicago, Milwaukee & Puget Sound Railway at Salesville. H. S. Buel, Bozeman, president. [E. R. J., May 8, '09.]

Missoula (Mont.) Street Railway.—This company advises that its electric railway, which is to be a 10-mile urban system, is under construction, and that the material for the first 10 miles has been ordered. Officers: W. A. Clark, 49 Wall Street, New York, N. Y., president; A. H. Wethey, Butte, vice-president; J. M. Bickford, secretary, and S. R. Inch, general manager and treasurer, Missoula. [E. R. J., Sept. 18, '09.]

Texas, New Mexico & Pacific Railroad, Las Cruces, N. Mex.—This company advises that construction work on this proposed electric railway from Las Cruces to Sunny Slope, 3 miles, will commence in about two months. The power station and repair shops will be located at Sunny Slope. Officers: Jas. T. Smith, president and treasurer; A. J. Papen, vice-president, and F. A. Jones, secretary. [E. R. J., Oct. 16, '09.]

Albany Southern Railroad, Albany, N. Y.—This company has awarded the contract for grading in connection with the double tracking of its railway from Rensselaer to Electric Park, a distance of 14 miles, to the Ennore & Hamilton Construction Company. J. C. White & Company, New York, will have charge of the new work.

Yates County Electric Railway, Dundee, N. Y.—E. L. Bailey, owner of this railway and also the Dundee Electric Lighting Plant, writes that this railway will be constructed next spring. It will extend from Dundee through Starkey to Starkey Point, Seneca Lake, 4 miles distant, to connect with the steamers for Geneva and Watkins Glen. The company intends to operate two cars. The shops will be located at Dundee and the amusement park, which is

partially controlled by the company at Starkey Point. The company intends to purchase short ties, 50-lb. rails and all overhead material including hard-drawn wire, feeder cable and bonds. Officers: C. D. Rapalee, chief engineer; Jeptha Gibson, engineer power station, and L. J. Bullock, master mechanic. [E. R. J., Oct. 23, '09.]

Elizabethtown Terminal Railroad, Elizabethtown, N. Y.—This company has applied to the Public Service Commission of the Second District for authority for a certificate of convenience and necessity to construct a railroad from Westport, where it will connect with the Delaware & Hudson Railroad, to Elizabethtown, a distance of 8 miles. Combination passenger motor cars operated by gasoline will be used. The company was incorporated last month and is capitalized at $80,000. The commission will hear the application on Nov. 16. [E. R. J., Oct. 23, '09]

New York & Queens County Railway, Long Island City, N. Y.—The Public Service Commission of the First District has adopted an order requiring the New York & Queens County Railway to double track its line between Flushing and College Point, and also in Flushing. Between Flushing and Jamaica it is required to lengthen the turnouts or switches, so as to maintain a headway of five minutes during the rush hours.

New York, Westchester & Boston Railway, New York, N. Y.—It is announced that this company has awarded contracts to the Ferguson Construction Company and to Henry Steers for the construction of a branch line from Mount Vernon to White Plains, a distance of 10 miles.

***Alliance, Ohio.**—It is announced that an electric railway is to be built between Alliance and Ravenna and that grading will be started this fall. The new railway, which will be 20 miles long, will parallel the Cleveland & Pittsburgh Railroad, giving a direct connection from Alliance to Cleveland. C. R. Morley, of the Stark Electric Company, and Henry M. Everett, of the Lake Shore Electric Company, and the Northern Ohio Traction Company are said to be interested.

Western Ohio Railway, Lima, Ohio.—It is stated that this company will extend its line from Minster to Loramie, a distance of 3 miles, and the work will be started in the early spring.

Lawton & Fort Sill Electric Railway, Oklahoma City, Okla.—D. L. Sleeper, vice-president, writes that this company, which was recently incorporated, will commence construction on its electric railway within 60 days. The railway will connect Lawton, Medicine Park and Fort Sill, a distance of 15 miles. The company intends to operate about four cars. The power station will be located at Medicine Park. Officers: Simon Smith, president, and W. H. Pattie, secretary. [E. R. J., Oct. 30, '09.]

Oklahoma (Okla.) Railway.—W. A. Haller, general manager, advises that this company expects to build about 25 miles of new city and suburban track within the next six months. Contracts for this work will probably be placed within four weeks.

Oklahoma Union Traction Company, Tulsa, Okla.—G. C. Stebbins, secretary, advises that this company has 2½ miles of its electric railway from Tulsa to Orcutt Lake under construction and that the company is in the market for good relaying rails and other material. The railway will extend from Tulsa, via Red Fork to Sapulpa, a distance of 15 miles. Capital stock, $100,000. Officers: A. A. Small, president; E. F. Tucker, vice-president; S. A. Orcutt, treasurer, and L. Cox, superintendent. [E. R. J., Sept. 18, '09.]

Oregon Electric Railway, Portland, Ore.—This company is to begin construction on an extension of the Willamette Valley system at an early date, as the sale of $2,000,000 of bonds, which is to be used for the extension, was ratified at a meeting of the stockholders of the company on Oct. 15.

Rapid Transit Subway Company, Pittsburgh, Pa.—This company has been authorized to extend its lines in Pittsburgh a distance of about 900 ft. from Fifth Avenue and Grant Boulevard, under Grant Boulevard to Forbes Street, and to a point in Schenley Park about 200 ft. south of Frobes Street.

Waynesburg & Blacksville Street Railway, Waynesburg, Pa.—This company, which was chartered Oct. 14, to build a 14-mile railway extending from the Pennsylvania-West Virginia State line to Waynesburg, Pa., has been granted authority by the Governor to build almost 50 miles of extensions as follows: Eastward from the State line from a point near the mouth of Roberts Run to a point on Dunkard Creek, in Wayne Township, Pa., a distance of 2 miles; from the same starting point in a westward direction, following Dunkard Creek to a point near the mouth of Tom's Run, Wayne Township, a distance of 3 miles; from a point at the mouth of Smith Creek at Waynesburg, through that town to the following towns, Ten-Mile, Lone Pine, Eighty-Four, Wylandville, Gambles, Linden, Hills, Marshalsea, Bridgeville and Mount Lebanon, traversing Washington and Allegheny Counties, a distance of 44.2 miles; total distance covered by above extensions, 49.2 miles, all over private rights-of-way. Samuel Eakin, Wadestown, W. Va., president. [E. R. J., Oct. 23, '09.]

Ogden (Utah) Rapid Transit Company.—It is reported that this company has commenced construction on its extension in Logan, from the Logan depot to the Agricultural College, a distance of 3 miles. David Eccles, president.

Rutland Railway, Light & Power Company, Rutland, Vt.—It is announced that this company has decided to extend its electric railway from Castleton to Poultney, a distance of 6 miles. Ultimately this branch is to be extended to Granville, N. Y.

Richmond & Henrico Railway, Richmond, Va.—This company contracted with the Blake Construction Company, New York, N. Y., for the laying of the tracks and the construction of the viaduct between College to Twenty-first and Marshall Streets. The Blake Construction Company will sublet its contract to Winston & Company, and W. O. Burton, Richmond. It is specified that the work shall begin immediately and be completed by July 1st next year. W. S. Forbes, president. [E. R. J., Oct. 2, '09.]

***Independent Seattle-Tacoma Electric Railway, Seattle, Wash.**—This company has been organized for the purpose of constructing an electric railway between Seattle and Tacoma. The following temporary officers have been chosen: F. R. Burch, president; E. N. Chase, New York, N. Y., vice-president; I. P. Calhoun, Kent, secretary; R. R. Spencer, Seattle, treasurer.

SHOPS AND BUILDINGS

Lake Shore Electric Railway, Cleveland, Ohio.—This company has arranged to move its car shops from Norwalk to Sandusky, where the operating office has been located for some time and where there is also a power house and large car sheds. The shops will be located in a portion of the car house.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company is preparing plans for improvements to its car house at Hazelton. A new sand house will be erected which will have a capacity of three carloads of sand. A new paint shop will also be erected in the near future and the yards and tracks are to be extended from the west end of the car house a distance of about 300 ft. At least 10 tracks will be extended approximately that distance.

Peoria Railway Terminal Company, Peoria, Ill.—This company's car house, together with six cars, was destroyed by fire a few days ago. The loss is estimated at $60,000.

Municipal Street Railway, Yazoo City, Miss.—This company expects within four weeks to build a small addition to its car house, 80 ft. x 12 ft.

POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway, New Westminster, B. C.—T. R. Nickson & Company have secured the contract for the erection of the substations along this company's extension from New Westminster to Chilliwack.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—This company wishes to correspond with manufacturers of coal-handling machinery. It is intention of the company to install a system at its power plant.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—G. W. Wattles, president of this company, is said to have announced that plans are being prepared for the erection of a new power station in Omaha, which with complete equipment, it is estimated, will cost $1,000,000. The new plant will be located at the foot of Jones Street, opposite the present power station.

Buffalo & Williamsville Electric Railway, Williamsville, N. Y.—This company is in the market for a 200-kw converter and three 100-kw transformers.

Oklahoma (Okla.) Railway.—This company expects to contract during the next month for stokers and coal-handling apparatus for boilers having 1600 hp.

Hull (Que.) Electric Company.—The power station of this company located on Lake Deschenes was partially destroyed by fire on Oct. 19. Arrangements for a temporary supply of power were made with the Ottawa Electric Company.

Quebec Railway, Light & Power Company, Quebec, Que.—This company has purchased a 500-kw motor generator set from the Canadian General Electric Company. The company expects to place contracts this year for the erection of a substation at St. Anne de Beaupré, Que.

Manufactures & Supplies

ROLLING STOCK

Spokane & Inland Empire Railroad, Spokane, Wash., is reported to be planning to purchase several parlor cars.

Chicago & Joliet Electric Railway, Joliet, Ill., is in the market for two double-truck cars and two single-truck cars.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa., is considering the purchase of three double-truck cars.

Cincinnati (Ohio) Traction Company recently ordered 50 city cars from the Cincinnati Car Company for pay-as-you-enter service.

Erie Railroad, New York, N. Y., will soon be in the market for six motor cars for use on its electric division between Rochester and Avon, N. Y.

Quebec Railway, Light & Power Company, Quebec, Que., has purchased a single-truck snow sweeper from the McGuire-Cummings Manufacturing Company, Chicago.

North Jersey Rapid Transit Company, Paterson, N. J., will purchase 10 interurban cars within the next two weeks. Address Willis Fertig, Paterson, N. J.

New York State Railways, Rochester, N. Y., has placed an order for two snow sweepers with the McGuire-Cummings Manufacturing Company, Chicago.

Municipal Street Railway, Yazoo City, Miss., has purchased one single-truck Brill semi-convertible car for Dec. 1 delivery from the American Car Company.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has ordered 5500 Schoen steel wheels from the Carnegie Steel Company for replacement.

Omaha & Council Bluffs Street Railway, Omaha, Neb., is completing 15 cars in its shops which will be duplicates of the pay-as-you-enter cars ordered from the American Car Company.

Peoria (Ill.) Railway Terminal Company suffered a loss by fire recently of its car house. Six cars were destroyed. The company expects to be in the market for five new cars within the next two weeks for replacement.

Hammond, Whiting & East Chicago Electric Railway, Chicago, Ill., is asking prices on two 47-ft. 2½-in. semi-convertible cars, fully equipped. The order for these cars will be placed through A. L. Drum & Company, Chicago.

Saunders Motor Car Company, Lancaster, Pa., is having one car body built by The J. G. Brill Company. The rear truck will also be furnished by The J. G. Brill Company. The front truck is being constructed by the company, with gasoline motor equipment.

Dayton, Springfield & Xenia Southern Railway, Dayton, Ohio, has placed an order with the Jewett Car Company, Newark, Ohio, for six semi-convertible cars of the following dimensions: Length of body, 20 ft.; over vestibules, 29 ft.; over all, 30 ft.; seating capacity, 32. The cars are to be finished in mahogany.

Port Arthur (Tex.) Traction Company has just ordered 12 standard Barber cars from the Barber Car Company, York, Pa. Six of these cars are for immediate delivery, to be equipped with GE-219, 50-hp motors. Mention that this company would purchase cars was made in the Electric Railway Journal of April 3, 1909.

Columbus, Marion & Bucyrus Railroad, Marion, Ohio, which was reported in the Electric Railway Journal of Oct. 30, 1909, as planning to purchase two interurban cars, has specified that these cars shall be 50 ft. in length, of the three-compartment type and mounted on Curtis trucks. The company is also in the market for a 45-ft. utility car.

TRADE NOTES

Forsyth Brothers Company, Chicago, Ill., announces the removal of its sales department to the home office, 213 to 231 Institute Place, Chicago, Ill., and requests that all communications to the company be forwarded to that address.

Lyon Metallic Manufacturing Company, Aurora, Ill., has opened an office at room 1369 Hudson Terminal Building, New York, N. Y., in charge of B. L. Waters, secretary and treasurer of the company. Mr. Waters will handle the steel factory equipments.

Planet Company, Chicago, Ill., has recently secured patents on a sanitary soap shaker for use on Pullman and private cars. The shaker is of a very compact and artistic design, and is intended for use in lavatories where hot and cold water are supplied.

C. H. Hughes & Company, 115 Broadway, New York, N. Y., announce that they have moved from 120 Broadway, New York, N. Y., where they have been located for the last five years to the U. S. Realty Building, 115 Broadway, New York, N. Y., and will continue as engineers for electric railway and lighting companies.

New England Engineering Company, New Haven, Conn., announces that it has established an office at New Haven, Conn., for the conduct of a general engineering and contracting business. This department is under the management of L. L. Gaillard, formerly electrical superintendent, Interborough Rapid Transit Company, New York, and recently electrical engineer of the Connecticut Company, New Haven, Conn. A corps of engineers and experts will be maintained for the execution of contracts for the design and construction of steam-electric and hydro-electric power plants and substations for railway, light and power purposes; design and construction of electric transmission and trolley lines; examinations of the physical and financial condition of electric properties, and preparation of reports.

Allis-Chalmers Company, Milwaukee, Wis., announces that the Connecticut Company, New Haven, Conn., has ordered 30 type A-A-6 air-brake equipments to be used on new double-truck cars and that the Chicago (Ill.) City Railway has ordered 50 type A-A-6 air-brake equipments which are being delivered to The J. G. Brill Company, Philadelphia, Pa., for use on additional pay-as-you-enter cars for the Chicago City Railway. This order by the Chicago City Railway is the first made on a contract recently entered into whereby the Allis-Chalmers Company is to furnish all air-brake equipment used by the Chicago City Railway for a period of years. A similar contract for the same term of years as that between the Chicago City Railway and the Allis-Chalmers Company has been entered into by the International Railway, Buffalo, N. Y., and the Allis-Chalmers Company.

ADVERTISING LITERATURE

Coin Counting Machine Company, Chicago, Ill., has published a small folder describing the meritorious features of the J. M. Johnson automatic registering fare box for prepayment type cars.

Vulcan Steam Shovel Company, Toledo, Ohio, is distributing an illustrated catalog of steam and electric locomotive cranes and combined cranes and shovels. Complete specifications of each type of machine are given.

Gulick-Henderson Company, Pittsburgh, Pa., has published a 14-page booklet in which some of the advantages of its engineering inspection department are pointed out. It also contains a price list for the analysis, essaying and physical testing of various materials, and directions for submitting the different samples for testing. Two pages of the publication are devoted to remarks on foundry melting systems. The Gulick-Henderson Company has also printed a catalog in which are presented a number of views of its laboratories and test rooms in Chicago and Pittsburgh, also a dozen micro-photographs of axle steel under various heat treatments.

J. G. Brill Company, Philadelphia, Pa., in *Brill's Magazine* for Oct. 15, 1909, continues the series of articles describing in a general way the standard type of cars in many of the largest cities of the world. The installment in the current issue is Number 10 and in it the subject of city service in Denver is considered. Other interesting features of the publication this month are a description of the semi-steel, semi-convertible cars for the Blue Hill Street Railway, the passenger cars for light-package service on the Cairo Railway & Light System, the exhibit of The Brill Company at Denver and the Brill standard journal box for M. B. C. journals and biographical sketches and portraits of the winners of the Brill thesis prizes which were offered in 1908 to the senior students of the technical schools of the United States for essays on the subject of "Design of Electric Car for City Service."

Pay-as-You-Enter-Car Corporation, New York, N. Y., has issued a publication illustrated with types of pay-as-you enter cars adopted for use in different cities throughout the United States, and presenting floor plans of typical pay-as-you-enter-cars showing that the system is unlimited in its adaptability to platform and seating arrangements. A feature of the publication is a list of 32 companies now operating pay-as-you-enter cars which totals 4605, including nine companies operating more than 100 pay-as-you-enter cars, the Chicago Railways leading with a total of 1,278, followed by the Chicago City Railway with 830, the Public Service Railway of New Jersey, with 457, the Third Avenue Railroad with 450, the Montreal Street Railway with 400, the New York City Railway with 305, the United Railways of St. Louis with 210, the International Railway with 150 and the Milwaukee Electric Railway & Light Company with 100 in the order named.

TABLE OF MONTHLY EARNINGS

Notice:—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. similar statistics in regard to roads not reporting are solicited by the editors. *Including Taxes. †Deficit. ‡Increase due to special attraction in St. Joseph. *d* Includes Ferry earnings up to April 1, 1909.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Sept. '09	202,156	102,990	99,166	42,928	56,239
	1 " " '08	172,675	91,650	81,025	43,412	37,613
	9 " " '09	1,634,172	887,730	746,442	393,342	353,100
	9 " " '08	1,420,552	822,042	598,511	394,743	203,768
BELLINGHAM, WASH. Whatcom Co. Ry. & Lt. Co.	1m., Aug. '09	36,841	19,175	17,667	8,064	9,603
	1 " " '08	29,417	17,268	12,149	7,976	4,173
	12 " " '09	390,818	222,204	168,614	101,903	66,711
	12 " " '08	359,739	205,266	154,472	93,877	60,596
BIRMINGHAM, ALA. Birmingham Ry., Lt. & Power Co.	1m., Sept. '09	188,364	105,753	82,611	.....	.....
	1 " " '08	177,388	107,566	69,822	.....	.....
	9 " " '09	1,646,825	917,679	729,146	.....	.....
	9 " " '08	1,581,763	928,148	653,615	.....	.....
CHARLESTON, S. C. Charleston Con. Ry., Gas & Elec. Co.	1m., Sept. '09	60,008	42,003	18,005	13,917	4,088
	1 " " '08	58,125	40,269	17,856	13,817	4,039
	7 " " '09	451,425	285,295	166.130	97,417	68,714
	7 " " '08	445,096	285,971	159,125	96,542	62,584
CHICAGO, ILL. Aurora, Elgin & Chicago Railroad.	1m., Aug. '09	163,698	76,448	87,250	29,351	57,899
	1 " " '08	153,895	71,175	82,720	27,624	55,095
	2 " " '09	331,312	154,343	176,969	58,250	118,719
	2 " " '08	302,643	143,383	159,260	55,402	103,857
Chicago Railways.	1m., Aug. '09	1,088,209	650,633	437,576	.....	.....
	1 " " '08	980,166	650,128	330,038	.....	.....
	8 " " '09	8,068 552	5,260,726	2,807,826	.....	.....
CLEVELAND, O. Cleveland, Painesville & Eastern R. R.	1m. Sept. '09	31,361	*16,278	15,083	8,784	6,299
	1 " " '08	27,971	*18,742	9,229	8,132	1,097
	9 " " '09	242,206	*120,580	121,626	75.605	46,021
	9 " " '08	225,229	*126,576	98,653	72,394	26,259
Lake Shore El. Ry.	1m., Sept. '09	108,207	*49,842	58,365	34,804	23,560
	1 " " '08	104,073	*49,649	54,424	34,013	20,411
	9 " " '09	835,062	*439,691	395,370	309,093	86,277
	9 " " '08	787,210	*439,498	347,712	287,720	59,992
DALLAS, TEX. Dallas Electric Corporation.	1m., Aug. '09	112,802	72,271	40,532	28,648	11,883
	1 " " '08	94 739	63,553	31,186	28,329	2,857
	12 " " '09	1,265,739	791,835	473,901	341,711	132,189
	12 " " '08	1,144,892	770,061	374,831	353,844	20,986
DETROIT, MICH. Detroit United Railway.	1m., Aug. '09	813,794	507,003	306,791	*162,999	143,792
	1 " " '08	696,446	*443,939	252,507	134,859	117,648
	8 " " '09	5,308,056	3,224,682	2,083,374	*1,251,383	831,991
	8 " " '08	4,696,394	*2,972,116	1,724,278	1,083,811	640,467
EAST ST. LOUIS, ILL. East St. Louis & Suburban Co.	1m., Sept. '09	176,402	87,324	89,078	49,345	39,733
	1 " " '08	170,028	87,161	82,867	48,216	34,651
	9 " " '09	1,481,078	818,006	663,072	445,111	217,961
	9 " " '08	1,487,855	781,239	706,616	436,645	269,971
EL PASO, TEX. El Paso Elec. Co.	1m., Aug. '09	46,447	28,546	17,901	8,259	9,642
	1 " " '08	41,399	30,889	10,510	7,076	3,434
	12 " " '09	567,906	369,541	198,364	93,326	105,038
	12 " " '08	531,943	372,864	159,079	81,639	77,440
FAIRMONT, W. VA. Fairmont & Clarksburg Tr. Co.	1m., Sept. '09	47,695	15,094	32,601	12,655	19,946
	1 " " '08	41,934	12,470	29,464	12,344	17,121
	9 " " '09	346,441	119 312	227,129	111,148	115,981
	9 " " '08	309,142	107,963	201,179	104,262	96,917
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., Aug. '09	133,412	74,255	59,157	.....	.....
	1 " " '08	125,586	66,420	59,167	.....	.....
	8 " " '09	905,614	537,475	368,139	.....	.....
	8 " " '08	856,257	492,496	363,762	.....	.....
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Aug. '09	109,422	57,893	51,529	17,190	34,339
	1 " " '08	92,503	53,530	38,973	17,434	21,539
	12 " " '09	1,203,508	667,601	535,907	197,997	337,910
	12 " " '08	1,058,200	617,009	441,191	183,122	258,070
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Aug. '09	111,295	62,976	48,319	21,679	26,640
	1 " " '08	101,708	55,101	46,607	20,527	26,080
	12 " " '09	1,181,351	682,277	499,074	254,495	244,579
	12 " " '08	1,065,863	626,700	439,163	240,614	198,549
GRAND RAPIDS, MICH. Grand Rapids Railway.	1m., Sept.' 09	97,626	43,200	54,426	18,958	35,468
	1 " " '08	89,899	40,618	49,281	18,806	30,475
	9 " " '09	776,022	362,961	413,061	170,770	242,291
	9 " " '08	708,569	356,985	351,584	165,296	185,288
HARRISBURG, PA. Central Penn. Trac. Co.	1m., Sept. '09	62,979	44,045	18,934	.....	.....
	1 " " '08	60,868	46,578	14,290	.....	.....
	9 " " '09	564,747	418,639	146,108	.....	.....
	9 " " '08	533,118	422,599	110,519	.....	.....
HOUGHTON, MICH. Houghton County Tr. Co.	1m., Aug. '09	32,925	15,588	17,337	6,216	11,122
	1 " " '08	25,952	12,772	13,180	4,603	8,577
	12 " " '09	305,706	165,775	139,931	69.556	70,375
	12 " " '08	257,651	148,644	109,007	56,877	52,130
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., Aug. '09	38,782	21,293	17,490	9,520	7,970
	1 " " '08	36,271	19,142	17,129	9,231	7,898
	12 " " '09	460,587	262,356	198,231	111,370	86,861
	12 " " '08	413,226	251.142	162,084	106,806	55,278
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Sept. '09	375,426	178,407	197,019	111,552	85,467
	1 " " '08	339,132	160,078	179,054	100,810	78,244
	9 " " '09	3,154,103	1,537,172	1,616,930	952,841	664,089
	9 " " '08	2,909,950	1,486,615	1,423,335	893,670	529,665
Milwaukee Lt., Ht. & Trac. Co.	1m., Sept. '09	144,942	37,699	107,244	69,152	38,091
	1 " " '08	139,169	34,665	104,504	62,802	41,701
	9 " " '09	1,112,207	291,925	820,283	580,850	239,432
	9 " " '08	1,068,064	280,458	787,606	538,296	249,310
MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., Aug. '09	641,062	262,472	378,583	140,251	238,332
	1 " " '08	592,702	281,708	310,995	128,667	182,328
	8 " " '09	4,531.223	2,162,532	2,368,690	1,108,259	1,260,431
	8 " " '08	4,181,925	2,095,436	2,086,489	1,006,456	1,080,034
NASHVILLE, TENN. Nashville Railway & Light Co.	1m., Sept. '09	154,540	71,624	82,916	.....	.....
	1 " " '08	151,055	68,821	82,234	.....	.....
	9 " " '09	1,257,641	625,354	632,287	.....	.....
	9 " " '08	1,159,583	596,474	563,109	.....	.....
NORFOLK, VA. Norfolk & Portsmouth Trac. Co.	1m., Sept. '09	158.234	88,373	69,861	63,058	6,803
	1 " " '08	*d*162,938	94,834	68,104	67,187	917
	9 " " '09	1,436,199	833,363	602,836	583,273	19,563
	9 " " '08	*d*1,395,234	835,271	559,963	592,583	†32.620
PADUCAH, KY. Paducah Traction & Light Co.	1m., Aug. '09	19,930	11,281	8,649	6,618	2,031
	1 " " '08	19,852	11,695	8,157	6,851	1,306
	12 " " '09	222,988	130,335	92,653	81,929	10,725
	12 " " '08	233,839	140,191	93,648	83,708	9,940
PENSACOLA, FLA. Pensacola Electric Co.	1m., Aug. '09	22,205	12,515	9,691	4,371	5,319
	1 " " '08	19,562	13.142	6,421	4,488	1.933
	12 " " '09	235,626	136,388	99,237	51,881	47,356
	12 " " '08	213,875	152,483	61,392	51,130	10,263
PHILADELPHIA, PA. American Rys. Co.	1m., Sept. '09	255,598	.....	.....	.....	.....
	1 " " '08	240,752	.....	.....	.....	.....
	3 " " '09	827,636	.....	.....	.....	.....
	3 " " '08	785,043	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., Aug. '09	17,912	11,195	6,717	1,661	5,056
	1 " " '08	16,515	9,275	7,240	2,213	5,027
	12 " " '09	129,734	88,254	41,480	22,963	18,517
	12 " " '08	119,733	91,775	27,959	27,491	468
PORTLAND, ORE. Portland Ry., Lt. & Pwr. Co.	1m., Sept. '09	420,778	193,437	227,341	128,924	98,417
	1 " " '08	373,288	173,342	199,946	114,207	85,739
	9 " " '09	3,547,647	1,651,228	1,896,419	1,111,334	785,085
	9 " " '08	3,222,103	1,597,121	1,624,982	1,038,434	586,548
ST. JOSEPH, MO. St. Joseph Ry., Lt., Heat & Pwr. Co.	1m., Sept. '09	88,266	40,809	47,477	22,058	25,419
	1 " " '08	‡94,971	39,905	55,086	20,368	34,718
	9 " " '09	722,808	374,530	348,278	192,080	156,198
	9 " " '08	672,232	342,778	329,454	184,542	144,912
ST. LOUIS, MO. United Railways Co. of St. Louis.	1m., Sept. '09	929,329	*589,357	339,972	232,132	107,840
	1 " " '08	887,344	*554,164	333,180	234,380	98,800
	9 " " '09	8,226,385	*5,217,704	3,008,681	2,101,632	907,049
	9 " " '08	7,860,625	*5,073.068	2,787,557	2,097,332	690,225
SAN FRANCISCO, CAL. United Railroads of San Francisco.	1m., Aug. '09	642,120	363,951	278,169	.....	.....
	1 " " '08	587,733	356,028	231,705	.....	.....
	8 " " '09	4,832,778	2,805,509	2,027,269	.....	.....
	8 " " '08	4,497,944	2,923,604	1,574,340	.....	.....
SAVANNAH, GA. Savannah Elec. Co.	1m. Aug. '09	53,931	36,385	17,547	17,435	112
	1 " " '08	51,544	30,858	20,686	17,502	3,184
	12 " " '09	610,720	387,043	223,677	209,247	14,430
	12 " " '08	596,288	401,540	194,748	205.297	†10,549
SEATTLE, WASH. Seattle Elec. Co.	1m., Aug. '09	610,816	312.119	298,697	108,588	190,109
	1 " " '08	382,742	219,660	163,082	94,834	68,248
	12 " " '09	5,409,933	3,142,929	2,267,003	1,207,198	1,059,805
	12 " " '08	4,398,998	2,606,723	1,792,275	1,043,877	748,399
SYDNEY, N. S. Cape Breton Elec. Co.	1m., Aug. '09	22,005	11,504	10,501	5,071	5,430
	1 " " '08	22,958	11,886	11,472	4,969	6,103
	8 " " '09	148,388	94,396	53,992	41,092	12,900
	8 " " '08	159,838	94,247	65,591	40,169	25,422
TACOMA, WASH. Puget Sound Elec. Railway.	1m., Aug. '09	194,383	113,867	80,516	48,800	31,716
	1 " " '08	158,595	95,845	62,750	42,928	19,822
	12 " " '09	1,785,615	1,190,781	594,834	548.091	46,743
	12 " " '08	1,625,058	1,018,993	606,065	507,747	98,319
TAMPA, FLA. Tampa Elec. Co.	1m., Aug. '09	48,468	28,804	19,665	4,594	15,070
	1 " " '08	45,474	29,723	15,751	5,138	10,613
	12 " " '09	579,095	351,939	227,156	55,862	171,294
	12 " " '08	542,907	371,063	171,844	24,631	147,213
TOLEDO, O. Toledo Rys. & Lt. Co.	1m., Aug. '09	236,119	127,863	108,256	75,642	32,614
	1 " " '08	212,454	113,870	98,584	71,879	26,705
	8 " " '09	1,765,538	1,012,270	753,268	576,718	176,550
	8 " " '08	1,644,941	907,924	737,017	563,767	173,250
TORONTO, ONT. Toronto Railway Co.	1m., Sept. '09	379,981	180,835	199,146	.....	.....
	1 " " '08	354,095	160,942	193,153	.....	.....
	9 " " '09	2,857,291	1,449,636	1,407,655	.....	.....
	9 " " '08	2,629,222	1,396,744	1,232,478	.....	.....

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The Cleveland Election

Whether or not the defeat of Mayor Tom L. Johnson has an important bearing on the present negotiations for settlement of the Cleveland traction situation, it accentuates the public dissatisfaction with the course which he followed respecting the street railway property. Mayor Johnson started out, in his experiment with the Cleveland lines, under conditions that were almost entirely of his own selection; his failure to give the public adequate service at the rates of fare that had been promised was a complete failure not only of administration, but also of the fanciful ideas on which the campaign against the street railway had been founded. That Mayor Johnson has been able to continue for so long a time a steady onslaught upon the property of the Cleveland company is one of the extraordinary developments of American politics, based on the easy acceptance by the public of attacks on corporate operation and enterprise. The public tires, however, of continued agitation, and repeated demonstration of the fact that settlement appeared doubtful while Mayor Johnson remained in office undoubtedly produced the change in sentiment that led to the election of a new Mayor.

Moving Platforms

The serious consideration by the Public Service Commission of New York, First District, of the plan to install a moving platform in a subway under Broadway, between Fourteenth Street and Forty-second Street, calls renewed attention to this system of transportation. Although recognized as the most efficient means of transporting passengers, it has been employed only at expositions, such as that at Chicago in 1893 and at Paris in 1900, and possibly for this reason has often been considered somewhat in the light of a freak. Nevertheless, as shown by the report of Mr. Seaman, engineer for the commission, a moving platform of the type proposed for New York has not only a capacity very much in excess of that of the combined rush hour service of the local and express trains of the present subway, but for distances of 4 miles gives more rapid service than the present local service on the subway, and even the local and express service combined. The two principal objections from a transportation standpoint which have been raised against the moving platform are (1) that it requires a certain amount of agility to pass from the slow-speed platforms to the high-speed platform, and that this is not possessed by everybody, and (2) that the carrying capacity of the moving platform is constant, so that the same service must be run at non-rush hours as at rush-hour periods. There are also some objections from an engineering standpoint, and perhaps the principal one, based on the experience at Chicago and Paris, is noise. For these reasons there has been considerable reluctance to install the system in any place other than at a fair ground or similar locality, where the patrons need not ride unless they wish to do so. In many respects the proposed location in New York is especially well suited for a moving platform, if, as we believe, it is a transportation agent which is worthy of serious consideration. The route comprises a very large part of the retail shop, hotel and theater dis-

tricts on Broadway, and traffic should be fairly constant throughout a considerable part of the day. Again, there are other means of transportation, such as the surface cars, for feeble persons and others who do not wish to use the moving platforms and to transport passengers in hours of light traffic if the platform is not run 24 hours a day. It is doubtless true that for some time, at any event, a considerable number of guards would have to be provided to assist people in boarding and leaving the moving platform, but the experience with escalators in the subway stations and in department stores indicates that the public will soon become versed in using transportation means of this kind, and the number of guards required for this purpose could soon be reduced. Certainly the installation of a moving platform in New York under the circumstances suggested would form a very interesting contribution to the art of urban transportation.

Courtesy and Accident Liability

The reasonableness of a rule promulgated by a street railway company that "persons riding on the platforms do so at their own risk," was affirmed by the Supreme Judicial Court of Massachusetts in a recent case involving circumstances which are common in the operation of cars in very congested districts. (Tompkins vs. Boston Elevated Railway Company.)

The plaintiff boarded a surface car which was so crowded with passengers that he could not stand or sit inside. He knew the rule of the company, which was prominently printed on the car. Yet he assumed the incidental risks of his position. Before reaching his destination he temporarily alighted from the car in order to permit some ladies who were inside to leave the car. In trying to board the car again the plaintiff was injured by its sudden start.

It was argued in the plaintiff's behalf that when he left the car, even though temporarily, his status as a passenger ceased and that he was injured in attempting to re-establish his relation as a passenger by boarding the car a second time. The court was not impressed with this novel contention, and held that even if this claim proved to be law, then the relationship had not been re-established, for from the evidence it was not shown that the plaintiff gave any notice of his intention to again board the car, that those in charge of the car knew of any such intention, or that he was again accepted as a passenger.

The court expressed the following opinion:

The plaintiff did not cease to be a passenger by leaving the car momentarily for this cause. He could not have been required to pay another fare. The necessity or courtesy which prompted his action did not terminate his status as a passenger. It is notorious that this is one of the common incidents of travel during the rush hours. The acceptance of passengers on cars already so crowded created an implication on the part of the defendant railway company that, although some passengers might be obliged for an instant to slip to the street for the accommodation of their fellows, the contract for carriage should not thereby be terminated. The plaintiff by taking his position on the front platform of such a car also impliedly contracted with reference to the same obligation resting on him. But he contracted subject to the rule of the defendant company that he took all risks from riding on the front platform. The defendant was, in any event apart from the rule, responsible for no other risks than those arising from its own failure, or that of its agents, to exercise the highest degree of care as to passengers consistent with the reasonable conduct of its business.

The court held that a verdict for the defendant should have been directed by the trial judge, instead of leaving the question of liability for the jury to determine. This decision, we believe, is the first of its kind, and is one which the courts of other States will doubtless follow.

The Design of Car Repair Shops

The design of the car repair shops of the Oneida Railway Company at Syracuse, N. Y., described in our last issue, will undoubtedly attract a great deal of attention from those responsible for the maintenance of the rolling stock on electric railway properties. The conditions at Syracuse, so far as concerned the location of the shops, area available, etc., fortunately gave very wide latitude in the design so that the engineers in charge had a very free hand in working out their ideas of what a model car repair shop should be. The structure possesses additional interest from the fact that W. J. Harvie, who was largely responsible for the design, was one of the committee which presented the paper on the "Model Car Repair Shop" at the 1908 annual convention of the New York State Street Railway Association. In this report several of the main features of the Syracuse shops were suggested, but in other respects the design has been greatly modified, particularly by the introduction of two transfer tables, one at each end of the building, instead of entrance tracks. The reasons for the adoption of these transfer tables were mentioned briefly last week and are discussed below. There are other features of the shop, however, which are also worthy of comment.

Following the latest ideas on shop design, all tracks are carried through from the front to the rear of the building and extend across its shorter dimension, so that the number of cars to be moved to permit the exit of any car in the shops is a minimum. This plan also simplifies the work of adding extensions to the building.

Probably the most striking feature of the shops is the almost complete segregation of the different departments by walls with very few entrances. In fact there are practically no direct means of intercommunication between the different departments except on the outside of the building. Such a plan is, of course, very desirable from a fire prevention standpoint, but this was not the only reason for its adoption. It was employed largely on the theory that each department was complete in itself and that better work could be done if the attention of those at work was not distracted by visits of employees from other departments. Thus an examination of the plan of the shops will show that a painter, to get to the carpenter shop, must walk across the building through a narrow passage way to the rear unless he goes outside of the building, which under ordinary conditions he will not be permitted to do. Similarly the carpenter shop and the machine shop are widely separated for intercommunication, although actually contiguous, and the same is true of the other departments. The theory of this plan is that the foremen of the various shops are the only ones who ought to go back and forth in the general course of the day's work and that the other em-

ployees have no business to move around from one department to another unless for some special and specific reason and in this case the foreman should know what is being done.

In the general arrangement of the departments there is also followed a logical order. The storeroom is in the center, where it can supply all of the departments of the shop, and is connected with them by a track located in the basement of the building. The paint shop is at one extreme end of the building, the carpenter shop is next, and these two departments are kept away as far as possible from the general repair shop, truck shop and machine shop, which are at the other end of the building. It is possible that the blacksmith shop could with advantage have been placed nearer machine and carpenter shops, but it did not seem possible to accomplish this result and still keep the storeroom in the center. It is believed that the system of continuous overhead carrier trolleys will prevent any serious difficulty in moving material between the departments. The course of the work through the shops is also such as ordinarily to require a minimum of shifting and delay. In the regular routine the cars would first go to one of the two inspection tracks in the general repair shop, then to the next two tracks for general repairs. In the meantime the car bodies would be put on dummy trucks and shifted to a definite track in the carpenter shop for stripping and trimming, and finally to the paint shop.

One other feature of special interest in the general design should be mentioned. This is the small space given over to storage tracks. The layout at Syracuse was influenced to a great extent by the fact that the shops adjoin one of the main car houses of the company, but it was also considered desirable to define clearly between the transportation and the mechanical departments the responsibility for holding cars in storage. Some storage at the shop is necessary and it has been provided on stub tracks, but as these tracks are limited in capacity there will be no tendency to store good cars on them or to delay the work of repairs. In other words, all of the cars in the car house are, at least presumably, available for transportation service, and those at the shop are under repair or awaiting immediate attention. This arrangement should result in reducing the time often lost by cars waiting in the car house for repairs or overhauling and in the repair shop, and thus should more closely define the relative responsibilities of the two departments.

Transfer Tables or Track Entrances

The use in the Syracuse shops of transfer tables instead of entrance tracks is worthy of further comment than was possible to publish in the description of the shops which appeared in last week's issue. In that number some of the advantages which seemed to be possessed by transfer tables were mentioned, but the idea is so radical as to attract immediate attention in the published plan of the shops. Under all ordinary conditions, with a 14-track shop, such as that of Syracuse, either transfer tables or entrance tracks are adequate to handle all of the cars which have to be taken to and from the shop, so that an analysis of the respective merits of the two plans can be reduced to that of their relative cost and of their operation under extraordinary conditions, such as during and after a heavy snow storm and at the time of a fire. Considering the question of snow first, it might be assumed at first thought that a transfer table would be more apt to become clogged by snow and ice during the winter than tracks. Testimony on the efficiency of open transfer tables was taken, however, from points as far north as Minneapolis and seemed to show that there was no more danger on this score and no more liability of blockade than when tracks are used. But as a precaution the pits in which the transfer tables move were made 2 ft. deeper than the rails upon which the tables run.

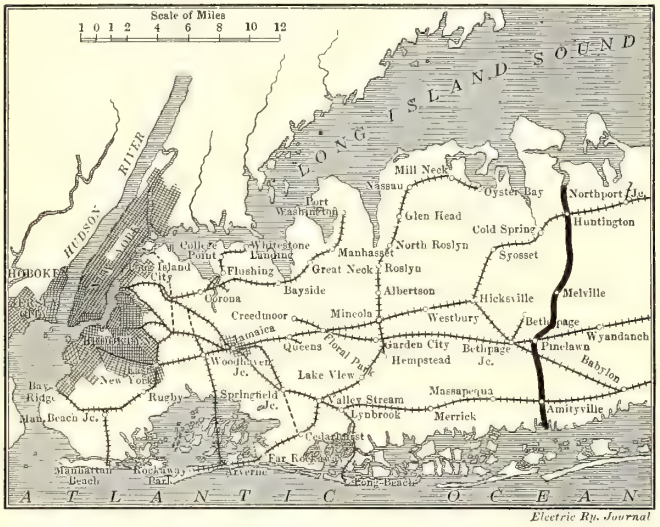
In case of fire, it is probably true that a transfer table is not so expeditious in removing cars from a building as a series of entrance tracks, as it can carry only one car at a time. But when a car house or shop is divided into bays of only three or four tracks each, separated from each other by a considerable distance as in this case, the number of tracks from which the cars have to be cleared is practically reduced to those in each bay. With entrance tracks the cars at first can be taken out of the building more rapidly, but when they reach the main track they must be handled one at a time, and information collected in regard to several recent fires seems to indicate that after a few cars have been started out of the shop under emergency conditions a trolley wheel often gets off the overhead wire, a car becomes derailed or in some other way the entrance tracks become blocked. Moreover, many of the cars in a repair shop are on dummy trucks, and could not be removed with power in any event. It is also a fact that the fire regulations at many electric railway shops now require that the entire available force, after the fire department has been summoned, should give its attention to fighting the flames rather than removing more cars. These arguments among others lead the engineers of the Oneida Railway Company to believe that two transfer tables, under the conditions described, are at least as efficient as separate tracks.

The final point is that of expense of installation and maintenance. Here the arguments are greatly in favor of transfer tables. As stated last week, the cost of the two transfer tables at the new Syracuse shops, installed complete with pits and foundations, was approximately 50 per cent less than the expense of corresponding ladder tracks and the cost of their maintenance is also estimated at far less than that required by the alternate plan, for the wear-and-tear on line and special work on the curves leading into a shop is always great. A single instance of a pole jumping the wire on an entrance curve might very easily cause damage to the overhead structure equal to, or greater than, the estimated cost of maintaining a transfer table for a year. The expense for power required to operate the table also was believed to be no greater than the extra expense involved in pulling cars around entrance curves.

It must be borne in mind that all of these arguments would not necessarily hold in the case of a car house installation, but it is interesting to find that in the case of the Syracuse repair shop, the various factors of efficiency and economy seemed to be all in favor of the double transfer table scheme.

THE FIRST CROSS-ISLAND ELECTRIC LINE ON LONG ISLAND

The Long Island Railroad has recently completed, under the name of the Huntington Railroad, an electric line 18.53 miles long between Huntington Harbor on the north shore and Amityville on the south shore of Long Island. The towns named are respectively 34.6 miles and 31.5 miles east of the Brooklyn terminal of the Long Island Railroad and hence are practically just outside of the New York suburban zone. As shown on the accompanying map, the new electric railway affords the only direct connection between the three west-to-east divisions of the Long

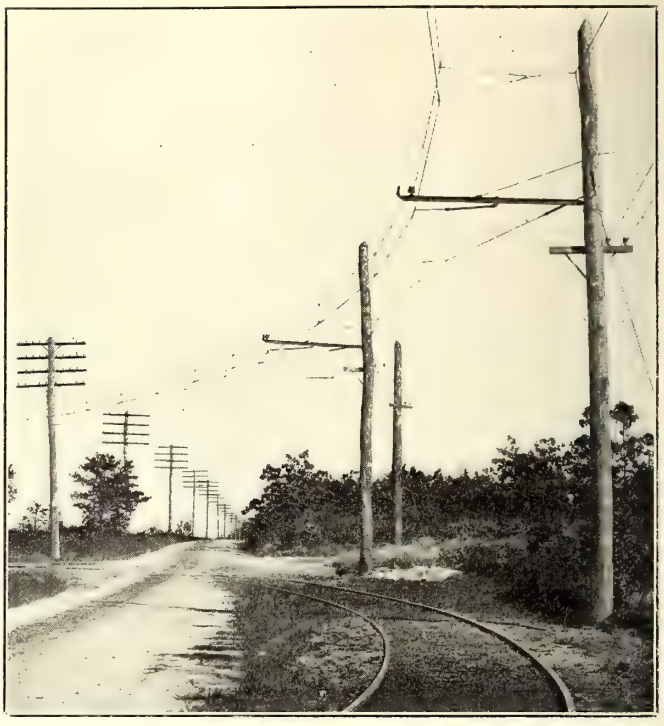


Electric Ry. Journal

Huntington Railroad—Map Showing Cross-Island Electric Railway and Steam Railroad Connections

Island Railroad. It thus eliminates the long detour via Hicksville or Jamaica which was formerly necessary in making an all-rail journey between the north and south sides of the island or from either to the main line. The line was opened to the public from end to end on Aug. 25, 1909, and has not only proved a convenient feeder for the through steam divisions, but has also developed excellent local traffic. The total fare on this road from Huntington to Amityville is 30 cents; the five-cent fare zones average 3 miles in length.

The nucleus of the Huntington Railroad was a 2½-mile horse railway built in 1890 between Huntington village and the railroad station. Such a line was needed because, owing to the deep indentations on the north shore coast line, the steam railroad route is in general located more than



Huntington Railroad—Curve Construction in the Open Country

a mile inland from the towns on the shore after which the stations are named. In 1896 the horse line was purchased by the Long Island Railroad and the property was electrified for 500-volt d. c. operation and extended three-quarters of a mile north to the harbor of Huntington. Work on the cross-island extension to Amityville via the main line station at Farmingdale was started in 1907, but was discontinued on account of hard times until the spring of 1909. The construction was finished Aug. 15, 1909, and the road opened for service 10 days later as previously



Huntington Railroad—View Along the New State Highway Opposite the Birthplace of the Poet Walt Whitman

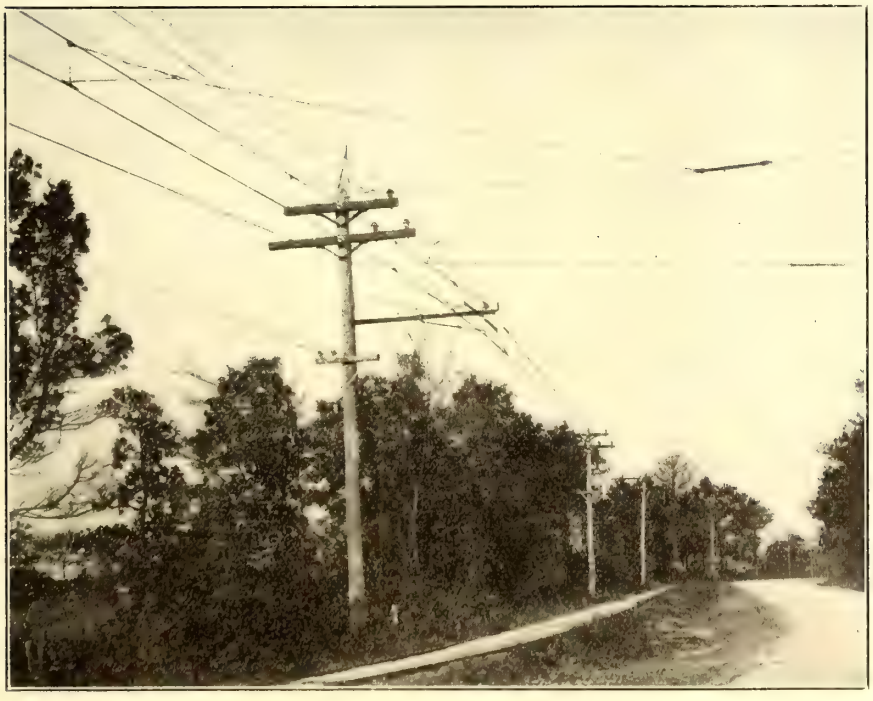
mentioned. All of the new part of the line has catenary overhead construction and it is planned to change over the old portion between Huntington station and Huntington harbor during the spring of 1910.

ROUTE, BRIDGES AND BUILDINGS

The route of the Huntington Railroad after leaving Huntington follows the State highway through Melville and Farmingdale to Amityville except for a 2-mile cut-off on private right-of-way just south of Melville. The opening of the line has greatly stimulated travel for marketing and social purposes, while last summer's experience showed that the bathing beaches at each end were good drawing cards. The road is single track throughout, with short freight and passenger spurs from the highway to the Huntington station and one spur to the Farmingdale station. To avoid grade crossings with the three intersecting lines of steam tracks, undercrossings were built at Huntington and Farmingdale and a viaduct at Amityville. There are 11 sidings at present, but provision has been made for two more. At Huntington the electric cars pass under a new bridge, carrying the tracks of the North Shore steam division. A part of this bridge is shown in one of the accompanying views. It is of the half-through plate girder type, 68 ft. 5¾ in. long, and spans a 56-ft. roadway, the trolley track being located at one side near the abutment. It is carried on concrete abutments and has an 8-in. reinforced concrete jack-arch floor supported on 20-in., 70-lb. I-beams spaced 3 ft. apart. The girders of the Huntington bridge are 8 ft. deep. The Farmingdale bridge, carrying the main line division of the Long Island Railroad, crosses the 40-ft. wide Broad Hollow road with a clearance of 14 ft. and is of the open-floor deck plate girder type with a span of about 42½ ft. The Amityville viaduct, which is shown in one of the accompanying cuts, crosses over the Montauk division of the Long Island Railroad. This viaduct is made up of I-beam spans about 30 ft. long and one plate girder span 58 ft. long, the latter giving a 21-ft. clearance over the present two-track and future four-track line at this location. The overhead trolley is carried from light steel bridges which are riveted to brackets on top of the bents supporting the floor.



Huntington Railroad—Curve Construction in the Village of Farmingdale



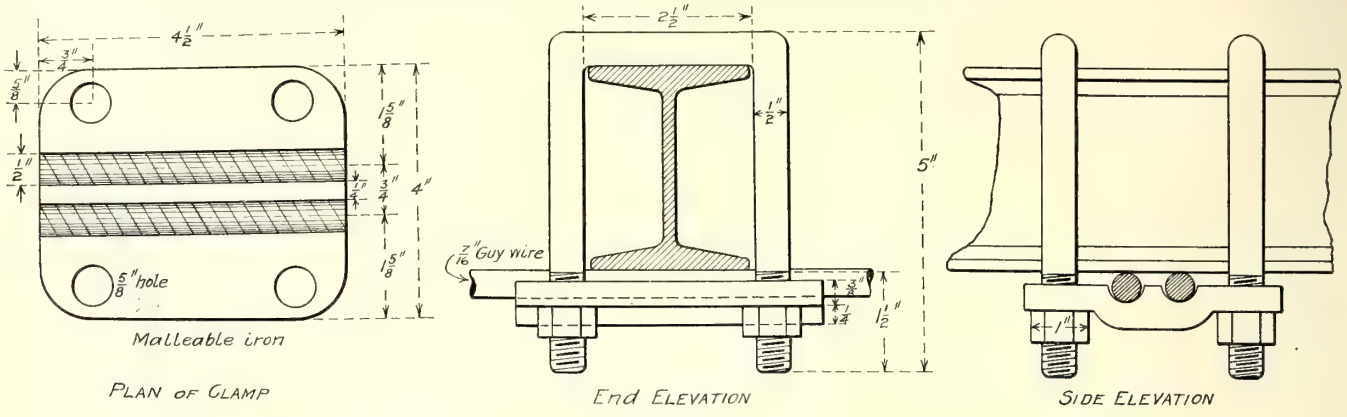
Huntington Railroad—Typical Anchorage with Connections to Opposite Poles

In building the new line it was determined to replace the old steam station at Huntington with a new structure accessible to both steam and electric passengers. As is evident from the accompanying view, the new station is a very handsome building. It is made of stuccoed brick with a shingled gambrel roof. The shelters on each side are made up of stuccoed columns, and as they have triangular roofs, the wings present the classic outlines of Greek temples. The station has been given a most attractive appearance by planting flowers and grass along the approaches. The station building is two stories high, 28 ft. wide and 82 ft. long, divided as shown in the accompanying plans. The lower floor contains the ticket office and the substation feeding the north end of the line, while the upper floor has been finished for living quarters for the station agent. The improvements at Huntington, including the station, bridge and approaches, cost about $100,000.

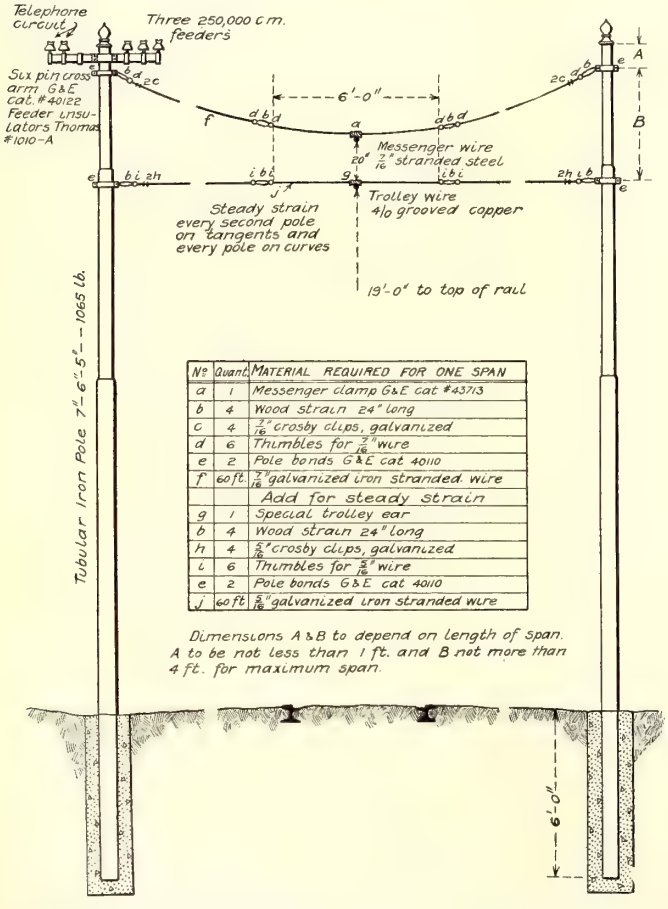
TRACK

The old tracks of the Huntington Railroad were laid with 56-lb. T-rail bonded with No. 00 concealed ribbon

bonds 12½ in. long. In all of the new work 70-lb. T-rail was used except in Farmingdale and Amityville where 73-lb. girder rail is laid in straight track and 140-lb. sections at curves and through special work. The new rails are bonded with No. 00 cable bonds, 12 in. long. In general the rails are laid on white oak or yellow pine ties spaced 2 ft. apart center to center, but where the line passes over the macadamized street in Amityville the company installed yellow pine ties creosoted by the Barber Asphalt Company's Rueping process. The treated pine ties cost $1.02 each against 85 cents for the untreated oak or pine ties.



Huntington Railroad—Anchor Clamp Used for Bracket Construction

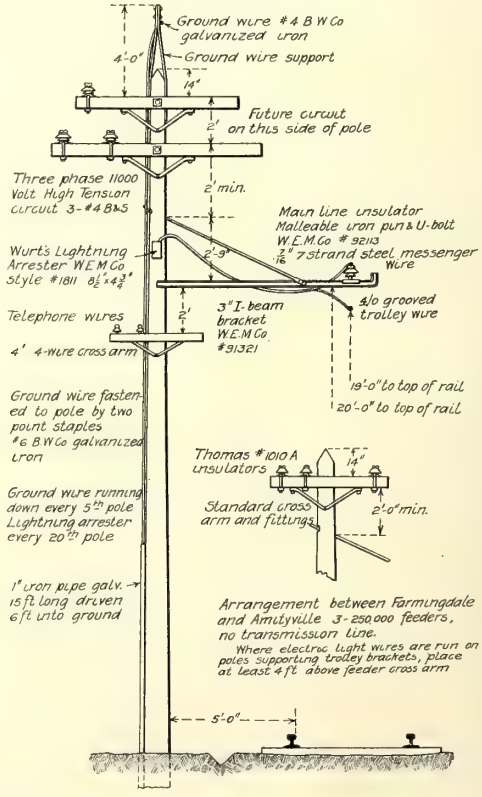


Huntington Railroad—Span Construction with Steel Poles in Towns

TRANSMISSION, FEEDERS AND SUBSTATIONS

Power for the operation of this line is transmitted from the power station supplying the electrified lines of the Long Island Railroad Company in Long Island City at 11,000 volts, three-phase, 25 cycles to substations at Farmingdale and Huntington. The transmission circuits follow the main line of the Long Island Railroad as far as Farmingdale where they are diverted to the poles of the trolley line. The high-tension wires are of No. 4 copper and are carried on Thomas 6½-in. insulators. Protection from lightning is afforded by a No. 4 steel wire which is grounded at every fifth pole. The telephone wires, which are carried on the same poles, are transposed at every fifth pole.

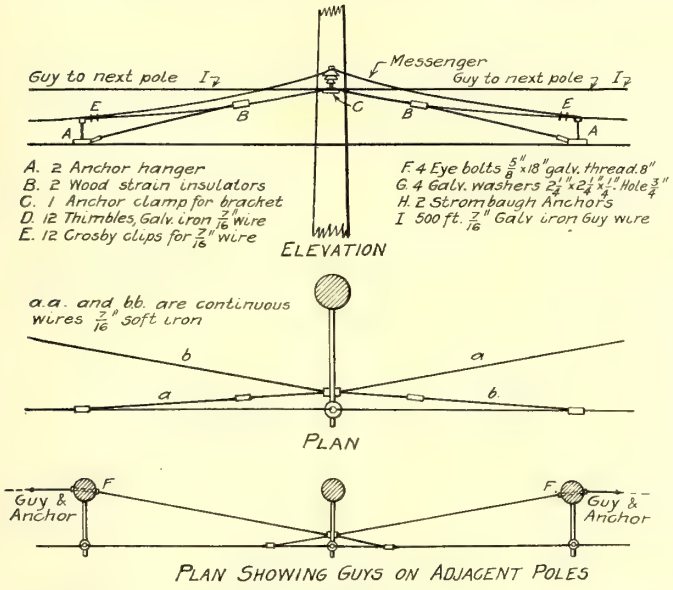
The feeder system comprises three 250,000 circ. mil cables between Farmingdale and Amityville; nothing except the trolley and messenger wire for the 9.5 miles between Farmingdale and Huntington, and a No. 0000 feeder from the Huntington substation to the harbor. The feeder and trolley are protected by a Wurts lightning arrester mounted on every twentieth pole or 2000 ft. apart. The trolley is of No. 0000 copper and the messenger wire of 7/16 in. steel throughout.



Huntington Railroad—Bracket Construction at a Feed-in Point

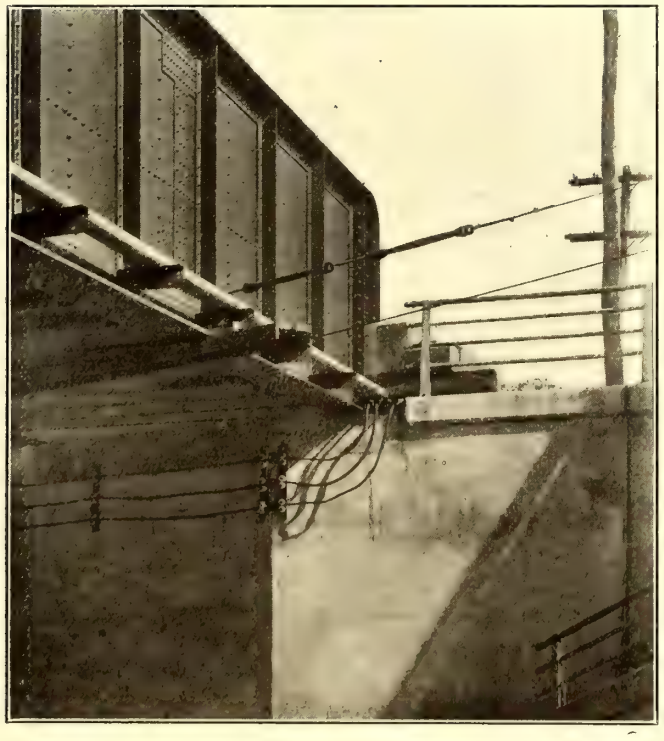
The Huntington substation is housed in a room of the passenger station with the exception of the lightning protection equipment. The latter, which is of the Westing-

house electrolytic type, illustrated, is installed in a small brick structure about 500 ft. distant. The high-tension cables are brought from this house over the adjacent bridge in galvanized iron pipes and continued underground to the substation in fiber ducts set in concrete. The feeders from the substation are also carried underground



Huntington Railroad—Anchorage Scheme with Bracket Construction

in fiber ducts. This method avoids the use of unsightly overhead wires which would spoil the appearance of the station and also confines any disturbances from lightning



Huntington Railroad—View of Huntington Bridge, Showing Pipe for High-Tension Lines, Temporary Feeder Connections and Double Trolley Insulation

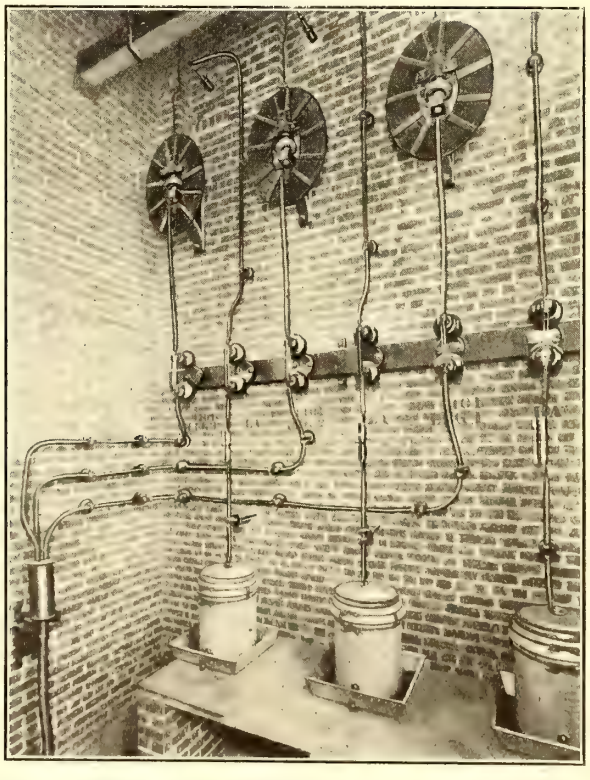
discharges to a place some distance from the passenger station. The Huntington substation equipment includes two 125-kw General Electric rotaries and three 100-kw oil-cooled transformers.

At Farmingdale a two-story extension has been built to the old steam railroad station to house a 250-kw Westinghouse rotary converter and three 60-kw transformers. Provision has also been made here for installing a duplicate of the present equipment.

CATENARY LINE CONSTRUCTION

Although there is no likelihood that the Huntington Railroad will be operated by alternating current in the near future, the overhead line has been built according to the Westinghouse three-point catenary system and is suitable for 3300-volt, single-phase service at any time. The decision to use the catenary for d.c. operation was made largely for the reason that this line is so far from the other electric railways operated by the Long Island Railroad that it was essential to adopt a construction requiring the least possible maintenance. The catenary system therefore received favorable consideration and especially so in view of the company's experience on the Glen Cove (Long Island) line. The latter road is a 5-mile catenary line installed in 1905 on which very little has been expended as yet for the maintenance of the overhead work. Aside from the advantages of lower maintenance and possible change to high-tension current in the future, the adoption of the catenary permitted a pole spacing of 150 ft. instead of 100 ft. and avoided installing a feeder cable on part of the route.

In general the catenary is carried from 3-in. I-beam brackets attached to the same poles which carry the high-tension and other wires. In Farmingdale and Amityville, however, span construction is used with three-piece tubular iron poles weighing 1065 lb. each and set in concrete to a



Huntington Railroad—Interior of Isolated Lightning Arrester House at Huntington Showing Electrolytic Arresters

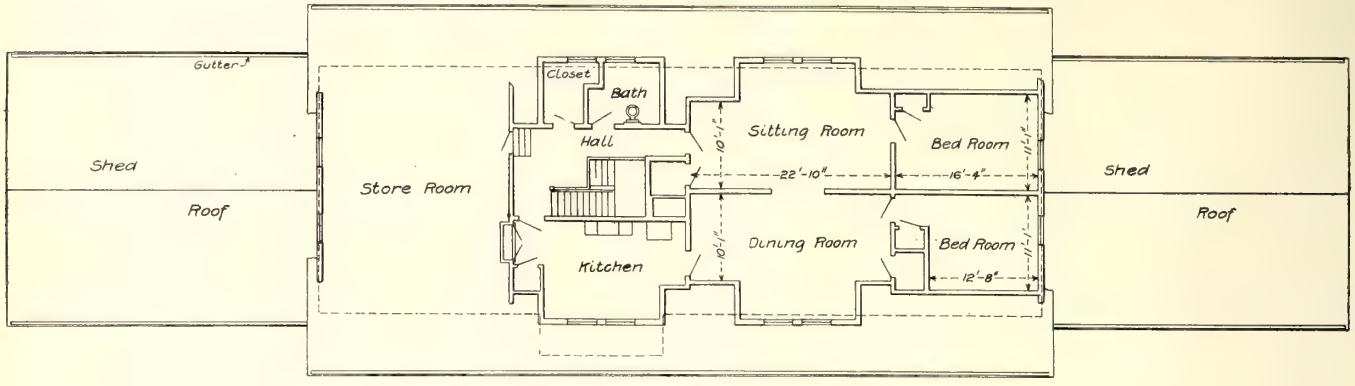
depth of 6 ft. In both cases the messenger wire is carried 20 ft. and the trolley wire 19 ft. above the rails. Hickory steady strains are used at all poles on curves and at every other pole on tangents.

One of the accompanying drawings shows the method

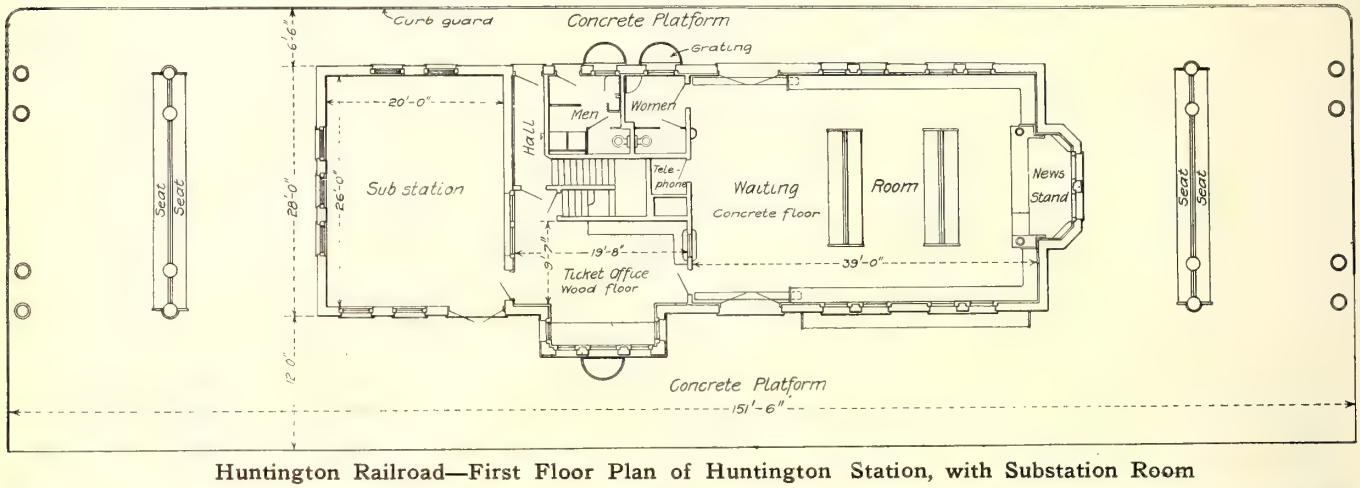
employed to anchor the line about every 2000 ft. on tangent sections and another shows the malleable iron anchor clamp which was devised for this purpose by the Long Island Railroad Company's engineers.

ROLLING STOCK, PASSENGER AND FREIGHT SERVICE

During the past summer the cross-island traffic of the Huntington Railroad was carried in six convertible, vestibuled cars either 46 ft. 6 in. or 46 ft. 9 in. overall. These cars seat from 54 to 60 passengers each, the six cars having a total seating capacity of 344 passengers. They carry two-motor equipments of General Electric 57 or Westinghouse No. 112 designs. The cars were withdrawn from service on the Ocean Electric Railway, an allied company which operates a line from Far Rockaway, Long Island. The motor equipments are rather light compared with ordinary cross-country lines, but they appear to be entirely satisfactory for the moderate speed requirements on the Huntington-Amityville line. With these cars 16 through trips were made every day during the past summer. The schedule time between Huntington and Amityville was 1 hour and 16 minutes.



Huntington Railroad—Plan of Second Floor of Huntington Station



Huntington Railroad—First Floor Plan of Huntington Station, with Substation Room



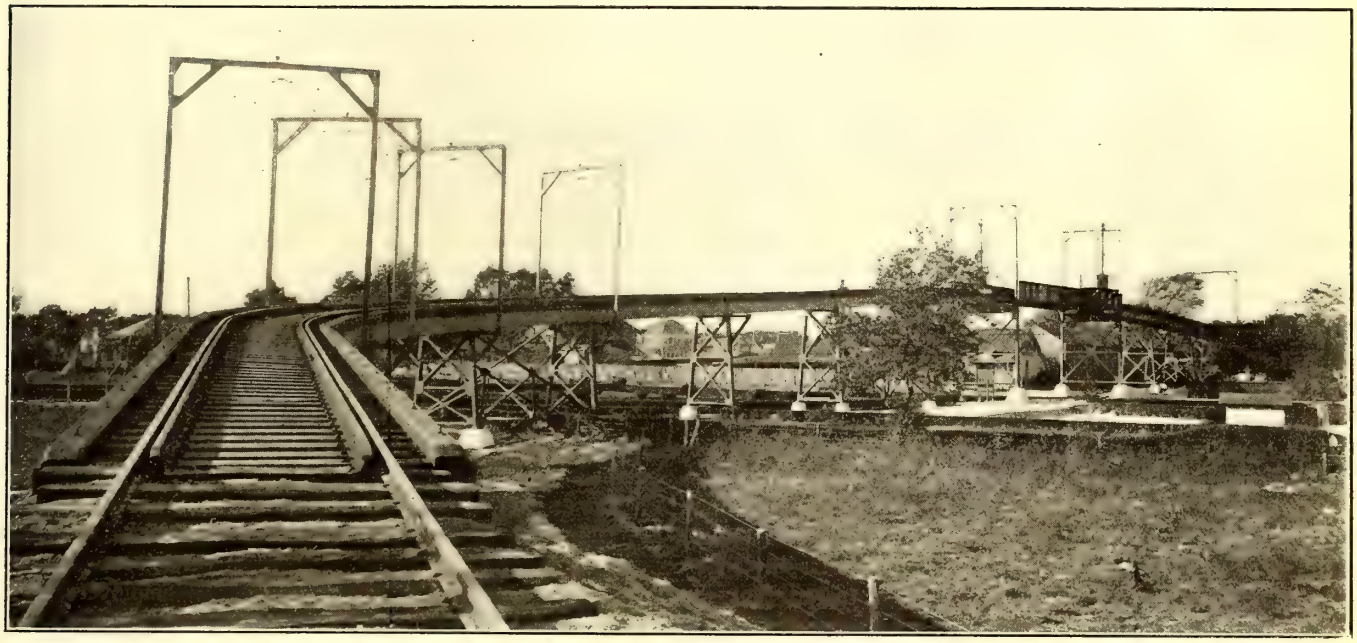
Huntington Railroad—Combined Steam and Electric Passenger Station, Including a Substation Room, at Huntington

Aside from the cross-island service, local cars are

operated in Amityville on train orders and a good local service is given between Huntington station and the harbor. For the latter service there were used last summer seven cars of open, closed and convertible types ranging in length from 23 ft. 3 in. (10-bench trailer) to 36 ft. 3 in. and seating a total of 284 passengers. All but one of the Huntington cars are equipped with two GE-1000 motors.

All cars are dispatched by telephone and all orders are recorded in triplicate, one copy for each of the crew and one remaining in a locked box for the dispatcher, according to the system of the Autographic Register Company, New York. The through cars carry portable telephones and jack boxes are installed at all sidings and elsewhere along the line at intervals of 2000 ft.

The company conducts a small freight and baggage transfer business between the station and town of Huntington. The charge for handling freight is 2 cents per 100 lb., with a minimum of 5 cents. There is no extra charge for the express baggage transfer as the charge of 50 cents per 100 lb. includes transfer to the village of Huntington from Brooklyn or lower New York. This freight and baggage transfer service is performed with one 23-ft. motor baggage car carrying two General Electric-1000 motors, a trailer baggage car and a trailer flat car.



Huntington Railroad—Viaduct Over the Long Island Railroad Tracks at Amityville

A JAPAN-BRITISH EXPOSITION IN LONDON

From May to October, 1910, there is to be held under the auspices of the Japanese government and prominent English interests an exposition of Japanese and British arts and manufactures at the "White City," Shepherd's Bush, London. The exposition will include a machinery building with an electrical engineering section. The Japanese exhibit will include examples of means of communication of different periods, particularly of engines and cars. This will be the first great display of Japanese products in Europe, and will probably create more interest than the Franco-British exposition. The exposition grounds cover 160 acres, and are within 15 minutes of the heart of London. It is announced that diplomas and medals will be granted to successful exhibitors. Applications for space should be addressed to the secretary, Japan-British Exposition, 1910, Great White City, Shepherd's Bush, London.

REPORT ON VISITS OF PHILADELPHIA COMMITTEE

The report of the joint special committee of the Select and Common Councils of Philadelphia, appointed to investigate various features of the street railway systems in other cities of the United States and the statistical reports secured in each city visited, have been published in pamphlet form.

When the Philadelphia Rapid Transit Company issued an order in May, 1908, relating to the issue of free transfers, various ordinances and rules were introduced in Councils and were referred to the committee on street passenger railways, which, in turn, referred them to a subcommittee. After a public hearing, it was voted jointly by the Select and Common Councils to authorize the appointment of a joint special committee of three members from each chamber to co-operate and act in conjunction with the sub-committee on street railways to investigate the various questions involved.

In its report to the general committee the sub-committee relates its experiences at Pittsburgh, Cincinnati, Milwaukee, Detroit, Cleveland, Buffalo, Boston, Brooklyn and New York. The committee states that it "met with the greatest courtesy and frankness in each city, and wishes to take this occasion to thank the officers of the various companies who thus offered every avenue of information and rendered every assistance in their power to aid your committee in its labors."

The report to the general committee is treated under six headings, covering (1) rate of fare, (2) length of routes, (3) transfer privileges, (4) abuse of transfers, (5) new construction in five years, (6) taxes. In addition to these matters, various other points were brought up by the committee.

The report states that "in nearly every case the managers of the street railway properties have advocated the speeding of the schedules. Mr. Beggs, of Milwaukee, thought that a schedule of 9 m.p.h., including stops, was about right for the center of the city, and pointed out that it took 12½ per cent less equipment to do the same work at the rate of 9 m.p.h. as at the rate of 8. On the other hand, Mr. Brooks, of the Detroit system, when asked whether a higher rate of speed was not economical for

the company, in that it reduced the number of cars and employees required, answered that speed cost money in the wear and tear of track and rolling stock, damages, etc."

Taking up in detail the visits to the various cities, the report describes first the visits to Pittsburgh, Cincinnati and Milwaukee. The Pittsburgh Railways Company stated that from its experience "special work costs twice as much as straight track for installation," and "the cost per foot run of track per annum for installation, renewal and maintenance is for special work about 3.77 times what it is for straight track." The Cincinnati Traction Company stated that from its experience the cost of installing and keeping up special work was about two and one-half as much as for track. The answers to the written questions given by the Milwaukee Electric Railway & Light Company related to the city system in Milwaukee only. These answers stated that there was abuse of the transfer system in Milwaukee to a very general extent. "The company felt that it had surrounded the issue and receipt of transfers with all the safeguards practicable, consistent with the conditions under which the company is operated. If the transfers are correctly issued by the conductors and properly used by the passengers under the conditions, there would be no abuse of the use of free transfers on this system." This company stated that the life of special work ran from approximately 33 1/3 per cent to 50 per cent of the life of straight track.

In his formal answer to the written questions of the committee, F. W. Brooks, general manager of the Detroit United Railway, referred as follows to the system of transfers in force on the lines of that company: "The lines in the city of Detroit comprise three separate systems. It is required that a transfer shall be issued upon the payment of a 5-cent fare from a line of one system to an intersecting line of the same system. It is not required that a transfer shall be given from a line of one system to a line of another system. The company, desiring to promote the general good of the city, voluntarily issues a transfer upon the payment of a 5-cent fare from a line of one system to a line of another system. It is in this way issuing many millions of transfers voluntarily. It is feared that the growing abuse of transfer privileges may necessitate withdrawing, to a large extent, the transfer privileges now granted to the public." In answer to other questions on the subject, Mr. Brooks said: "The company has reason to believe that on account of the abuse of the transfer privilege it is deprived of several million fares annually to which it is rightfully entitled." This company estimated that the cost of maintaining special work was about six times as much as for straight track.

The interview with the committee in Cleveland was held with A. B. duPont, at that time president of the Municipal Traction Company, which was operating then the lines of the Cleveland Railway Company. During this interview Mr. duPont expressed his opinion that the franchise under which the company was operating was worth $25,000,000.

In visiting Buffalo the committee saw H. J. Pierce, then president of the International Railway. Mr. Pierce spoke of the hope for the future in the pay-as-you-enter car. Mr. Pierce stated in his written answer to the questions submitted that the cost of installing and keeping up special work was about five times as great as for straight track.

In its visit to Boston the committee interviewed C. S. Sergeant, vice-president of the Boston Elevated Railway. In relation to the subject of transfer abuse, the Boston Elevated Railway said in its written answer to the questions submitted by the committee that general abuse existed where transfer tickets were obtained unlawfully by persons who mingled with the crowds at transfer points, by the exchange of tickets and the use of tickets issued to others and by conductors' frauds. To stop the abuse, the company had put nearly all transfers into conductors' hands for issue. It gave what inspection it could and prosecuted offenders, but abuse was a serious loss.

In its visit to Brooklyn, the committee interviewed Edwin W. Winter and J. F. Calderwood, president and vice-president, respectively, of the Brooklyn Rapid Transit Company. Mr. Winter said that the growth of the transfer evil was caused in part by legislation and in part by the mistaken idea on the part of companies that the more people they moved the more money they would have. The cost of electrical apparatus and of operation, however, had been beyond what was anticipated. C. D. Meneely, secretary and treasurer of the Brooklyn Rapid Transit Company, showed the committee a map illustrating the possible abuse of the transfer privilege.

In visiting New York the committee called on T. P. Shonts, president of the Interborough Rapid Transit Company. In discussing the abuse of transfers in his written statement, Mr. Shonts said: "The result of compulsory transfers is most unsatisfactory. Added to the misuse by the public, the practical impossibility of a close accounting of the issue and receipt of transfers presents more or less opportunity for dishonest conductors to rob the company through direct sale and trading. Many years' experience with transfers on a large system confirms the statement that the use of transfers to any extent is a constant menace and source of loss, and from this point of view of the railroad companies, wholly undesirable and unsatisfactory." In answer to the question as to a remedy, Mr. Shonts suggested the discontinuance of the issue of transfers, or, if that was impracticable, that a charge be made and the number limited.

The answer of the Philadelphia Rapid Transit Company, to which the same questions were submitted, said in relation to the transfer abuse: "There is very great abuse by the public generally and by certain of our employees. The exact extent it is impossible to tell, but it is a matter of public scandal, and unquestionably has cost the company a great deal of money."

REPORT ON NEW SOUTH WALES GOVERNMENT TRAMWAYS

The report of T. R. Johnson, chief commissioner for railways and tramways of New South Wales, covering the year ended June 30, 1909, shows gross earnings for tramways of £1,097,565, as compared with £1,011,994 in the preceding year. The working expenses were £875,560, as compared with £809,065. The net earnings in the last year were £222,005, as compared with £202,929 in the preceding year. Deductions on account of interest on the capital invested were £142,831 last year, as compared with £134,504 in the preceding year, leaving balances of £79,174 and £68,425 for the respective years.

In describing the rolling stock the report says in part:

"Since the introduction of electric working, the capital of the old steam stock has been written down by £229,572, and that sum has been charged to working expenses to meet the cost of 101 steam motors, 158 steam cars, 39 cable trailers, 33 grip cars, 5 steam trail cars, 13 electric motor cars and 4 motor omnibuses written off the books."

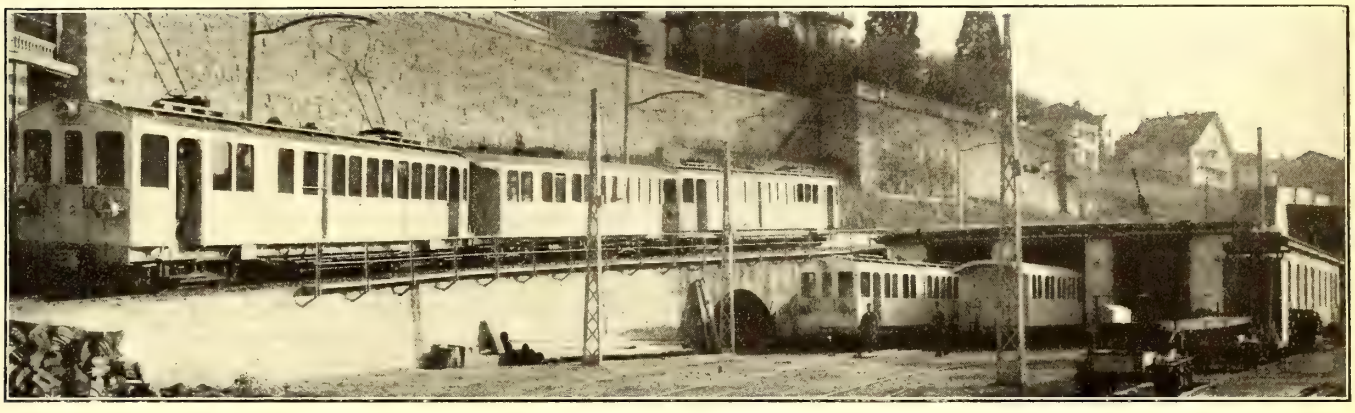
THE MONTREUX-BERNOIS RAILWAY

Of the many electric railways which make the beauties of the Swiss Alps so accessible to the tourist there is none which offers a more interesting trip than the Montreux-Bernois Railway, between Montreux and Zweisimmen in the Bernese tableland. The entire line is 62.1 km (38.5 miles) long, and cost 13,050,000 francs ($2,610,000). This comparatively high cost was due to the large number of tunnels and special construction required.

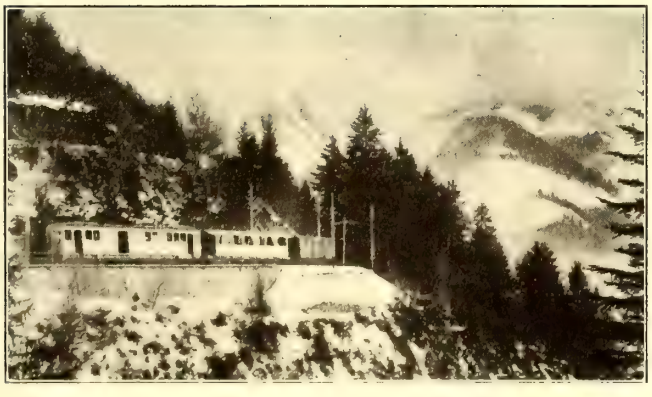
The first section of the railway was built in 1901, and was designed for steam operation, but changes were made later to make it conform to the construction of the rest of the road. The maximum grade on this section is 6.7 per cent and the minimum radius of curvature 40 m (131 ft.). The gage is 1 m (39.37 in.). The rails weigh about 49 lb. per yard and are laid on steel ties spaced 91 cm (35 in.) apart on tangents and 83.5 cm (32 in.) apart on curves. The track is heavily ballasted with broken stone.

The overhead line is carried from curved steel brackets attached to wooden poles, except in the yard at Montreux, where steel lattice poles are in use. Two staggered trolley wires are employed. Both are of hard drawn copper 8 mm in diameter (102,400 circ. mil) or 9 mm in diameter (129,600 circ. mil), and are carried at various heights above the rails, varying from 6 m (18.5 ft.) to 4 m (12.3 ft.) in tunnels. Under the last condition the pressure on the wire from the aluminum bow collectors is over 11 lb. The rails are bonded with Harold P. Brown's plastic alloy and cross-bonded with copper every 200 m (657 ft.), which is also the distance between the feeder taps. The feeder system is of such capacity that under normal running conditions the drop in the line will not exceed 20 per cent.

The power supply is purchased from hydroelectric companies and transmitted to converter stations at 8000 volts, 50 cycles, three-phase. Each station is supplied with 8000-volt induction motors, which are direct-connected to 750-1000 volt, shunt-wound d.c. generators. A converter set usually consists of a 250-hp motor and a 170-kw generator. The d.c. machines are mounted on insulators. It is rather instructive to learn why a d.c. system with series motors should have been chosen for this mountain railway. Three-phase equipment was seriously considered, but was not adopted because a two-speed motor appeared impracticable to carry out the schedule on a line with so many diverse grades. The d.c. motors could be relied upon to make up lost time and to be less sensitive to a drop in voltage. Again, the subject of line repairs was particularly important, since a d.c. wire could be repaired while alive, and in any event with less trouble than a three-phase line. The most important reason for direct current, however, was the possibility of using storage batteries. Batteries have been placed in all converter plants and have made it possible to purchase current at the most favorable figures.



Montreux-Bernois Railway—Storage Yard and Car House at Montreux



Montreux-Bernois Railway—Motor, Trailer and Freight Car Going Down Valley

The type of car used is shown in the views. It is furnished with vacuum and with electro-magnetic track brakes. Each car has four 65-hp motors wound for 750 volts and operated with a series-parallel controller. Trail cars are used. One of the conditions set forth for the motor design was that the motor speed must not exceed 1100 r.p.m. when the car is running downhill at 40 km an hour (24.8 m.p.h.). Extra large resistances were adopted for better speed regulation on light grades.

All of the electrical equipment and part of the rolling stock was furnished by the Alioth Company, Basel, Switzerland.

TRACK CONSTRUCTION ON MARKET STREET IN SAN FRANCISCO

B. P. Legaré, engineer of maintenance of way and construction of United Railroads of San Francisco, calls attention to the fact that the work of reconstruction on the Market Street line in San Francisco during the early part of this year was carried out directly by the company and not by contract, as stated on page 555 of the issue of this paper for Oct. 2. The paving was done by the city, but the work on the construction of the track was carried out by the engineering department of the United Railroads.

The municipal authorities of Broussa, Turkey, have invited tenders for a concession to build an electric tramway system in that city.

HEARING ON HEATING CARS IN NEW YORK

The hearing before the Public Service Commission of the First District of New York to determine why an order should not be made by the commission specifying that a temperature of not less than 45 deg. Fahr. above zero nor more than 65 deg. above zero should be maintained between Oct. 15 and April 15 in all electric and horse cars operated within the territory under the jurisdiction of the commission, and requiring that a copy of the order and a thermometer be displayed in each car, was continued on Nov. 4. Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company; W. S. Menden, assistant general manager and chief engineer of the Brooklyn Rapid Transit Company; Edward A. Maher, manager of the Third Avenue Railroad and the Union Railway; F. T. Wood, assistant to the general manager, and H. H. Adams, superintendent of rolling stock and shops of the Metropolitan Street Railway; S. W. Huff, president and general manager of the Coney Island & Brooklyn Railroad, and W. O. Wood, president and general manager, and Chas. S. Banghart, master mechanic of the New York & Queens County Railway, were in attendance. The following counsel represented the companies: J. L. Quackenbush, the Interborough-Metropolitan Company and the Metropolitan Street Railway; Herbert J. Bickford, the Third Avenue Railroad; Brainard Tolles, the Second Avenue Railroad; C. L. Addison, the Ocean Electric Railway; A. H. Larkin, the Richmond Light & Railroad Company and the Staten Island-Midland Railroad Company, and L. F. Crumb, the Yonkers Railroad. The hearing was before John E. Eustis, as a member of the commission, with H. H. Whitman as counsel. E. G. Connette, transportation engineer of the commission, also was in attendance.

In opening the hearing Mr. Eustis said that some reasonable regulation for heating the cars was needed, and suggested that the testimony be directed to learning what kind of an order would be least burdensome to the companies and afford the public maximum protection. He referred to the fact that at the previous hearing objection had been general on the part of the representatives of the railroads to the minimum temperature of 45 deg. fixed in the proposed order and requested that the representatives of the companies state their objections to the use of thermometers. He asked how the public was to know whether the order was complied with if the thermometers were not used.

Mr. Hedley of the Interborough Rapid Transit Company was the first witness. He said that thermometers in the cars would be a source of continuous trouble to the companies and the commission. It would be difficult to locate the instruments so as to secure fair average readings, and the readings would vary at least 5 per cent. Longitudinal and side draughts especially would affect the instruments. He was opposed to any arbitrary rule. The heating of the subway and elevated cars was regulated from the general office of the company, the amount of heat being governed by the prevailing weather. At points near the center of the road and at all terminals placards were displayed informing crews of the amount of heat to be carried.

Mr. Hedley said that by means of the company's private telephone system the heat could be changed on all cars in seven minutes. The instructions to guards on the elevated lines were to open the rear doors of the cars first so that a back draught would not be caused when the front door was opened. Even with this precaution the thermometer, no matter where located on the elevated cars, would record a drop of temperature of 20 deg. at stations on account of the inrush of air.

Mr. Hedley also said that with the temperature of the street from zero to freezing he considered that the maximum temperature of the cars should not be more than 50 deg. Mr. Whitman, counsel for the commission, read part of the order of the Railroad Commission of Massachusetts to the street railways operating in that State regulating the heating of street cars. This order fixes the minimum at 40 deg. and the maximum at 60 deg. and imposes a fine of $25 for each trip made by a car insufficiently heated.

Mr. Menden of the Brooklyn Rapid Transit Company, who at the previous hearing had agreed to relate the experience of his company with thermometers, said that about seven years ago his company suffered the loss of several power stations by fire and that because of resultant lack of power it was impossible to heat cars sufficiently at all times. As a result complaint was made to the Railroad Commission and in accordance with an order from the commission thermometers were installed in about 100 cars and were continued in use from January, 1903, until March, 1903. During this time some of the instruments were stolen and many broken. The period was so short and the results so disastrous that no effort had been made to preserve the records.

Mr. Menden said that the ratio of power consumed in the heaters to the amount required to run a car varied greatly with the type of equipment, the degree of temperature desired to be maintained and the number of stops. While he did not care to testify regarding this point without consulting his records he said that with both the high and low resistance coils of the heaters in circuit giving the maximum of heat it would take about half as much current to heat a car as to operate it.

Mr. Maher of the Third Avenue Railroad and the Union Railway said that the first winter when electric heaters were installed in the cars of the Union Railway the regulation of the heat was left in the hands of the conductors, but this proved so unsatisfactory that the heat on cars of both the Union Railway and the Third Avenue Railroad had since been regulated from the car house of the company at Sixty-fifth Street and Third Avenue and the general office at 129th Street and Third Avenue, and was therefore entirely under the control of the office forces at these places. The heaters on cars operated over these lines were turned on one point when the thermometer registered more than 30 deg. and two points when it registered 30 deg. or below. Mr. Maher knew of no better way than that used by his company to regulate the heat. It would certainly be much more difficult to heat the pay-as-you-enter cars, in use on Third Avenue Railroad and the cross-town lines in the city proper, than the ordinary type of car, as both the front and rear doors of the pay-as-you-enter cars were opened simultaneously.

As it had previously been explained that the New York order was based largely on the order of the Massachusetts Commission regulating the heating of cars, Mr. Quackenbush said that the companies he represented would be willing to accept an order similar to the Massachusetts order and Mr. Larkin said that the companies he represented would also abide by such an order. Mr. Eustis of the commission said that personally he felt that the thermo-

meters could be dispensed with, but that he could not venture to say whether the other members of the commission would share this opinion with him. He said the purpose of the commission was to promulgate a reasonable order and that he thought the method followed in Massachusetts of having employees of the commission make occasional readings would suffice to determine whether the companies were wilfully neglecting to comply with the requirements.

F. T. Wood of the Metropolitan Street Railway said that during the period between Oct. 1, 1908, and April 1, 1909, a total of only 29 complaints had been received that could in any way be construed to bear on the heating of the cars of his company and that during this time 182,000,000 passengers had been carried, making the percentage of complaints very small. Among these complaints there were several that were general and very unfair, such as one in which the assertion was made that none of the cars of one of the company's crosstown lines was heated. All complaints to his company that were specific were investigated.

Mr. Wood said that the heating of cars on the Metropolitan Street Railway was regulated from a central point, and that at a temperature of 38 deg. all doors of cars were closed, at 35 deg. the heaters were turned on one point, at 32 deg. two points and at 25 deg. three points. At 4 a. m. in the morning the car house foreman fixed the amount of heat in accordance with this schedule. In the event of a change of temperature starters and inspectors were immediately advised and every few blocks there was an employee vested with authority to regulate the heat in accordance with instructions from the general office. The regulations under which the Metropolitan Street Railway carried its insurance were very strict and made the heating of cars impossible before they were run out of the car houses in the morning for service.

H. H. Adams of the Metropolitan Street Railway said that the cars of that company were equipped with 8, 14 and 16 heaters, the number of heaters to a car being governed by the type of car. Mr. Adams had studied the subject of temperatures recently and presented a tabulation of temperature in New York and Boston, which showed that the mean temperature of Boston for 38 or 39 years was about 5 deg. lower than New York. One table showed the variation month by month of temperatures in New York and Boston for the winter of 1908-1909. This disclosed the fact that for one month the average mean temperature in New York was 10 deg. higher than for Boston.

Mr. Adams experimented with thermometers in cars beginning Oct. 20, and while the period was a most unsatisfactory one climatically, the variation in the readings of thermometers was as much as 8 deg. He explained that there really was very little need to heat cars of the Metropolitan Street Railway before placing them in service for the day as the wet sprinkler system of fire protection was used in most of the car houses of the company and under the regulations of the insurance underwriters structures in which the wet system was used must be kept at a temperature of not less than 40 deg.

Mr. Huff of the Coney Island & Brooklyn Railroad said that heating on his road was governed on the central authority plan. The heat was turned on at 40 deg. and three points were carried at zero and below. According to the insurance regulations governing his company cars out of service must be kept with the power off, but this requirement was interpreted not to extend to cars being prepared for service for the day and heat was turned on in such cars 15 minutes before they were started on their runs.

Mr. Connette of the commission, who recently was general manager of the Worcester (Mass.) Consolidated Street Railway, said that the State police and the inspectors of the Railroad Commission in Massachusetts carried thermometers and were constantly on the lookout for violations of the order of the commission regarding the heating of cars. He had under his charge at Worcester 80 miles of city railway and 200 miles of suburban and interurban lines, and during four years of service with the company had experienced no difficulty in complying with the requirements of the Massachusetts Commission. One of his lines extended from Worcester to Fitchburg, a distance of 26 miles, and cars were operated over it at a speed of 30 m.p.h. Heat was turned on in the interurban cars 30 minutes before they were taken out of the car house.

Mr. Banghart of the New York & Queens County Railway said that about five years ago a road with which he was connected in Pennsylvania had of its own accord experimented with thermometers, but that they were dispensed with as unsatisfactory after a short term of service. The New York & Queens County Railway operated suburban lines largely and had in service about 150 cars. Mr. Banghart did not think it would be possible to meet the 45 deg. requirement between 11 p. m. and 5 a. m. in zero weather. This would be rather serious, as practically all the lines were operated all night.

Some of the cars of the New York & Queens County Railway were equipped with 12 heaters and some with 18 heaters, the capacity being the same in both cases, the 18 heaters giving a better distribution of heat. Some of the heaters were single coil and some double coil. Where 12 heaters were installed the units were 36 in. long and where 18 heaters were installed the units were 17 in. long. Mr. Banghart said that to comply strictly with the terms of the order of the commission as submitted would probably require rebuilding a considerable number of heaters in use on the New York & Queens County Railway.

Mr. Connette was of the opinion that if the heaters in use on the New York & Queens Railway were well maintained and the cars in good repair a minimum temperature of 45 deg. could be maintained at 10 deg. below zero, except under very trying circumstances. It was decided to have Mr. Connette inspect the equipment of the company so as to pass an authoritative opinion on this point.

Mr. Eustis then announced that so far as the other companies were concerned they might consider the matter closed, but that the commission would be glad to receive any additional information from the companies in writing that might occur to the counsel or the managers as not having been brought out at the hearing.

In conclusion Mr. Quackenbush for the companies said that a minimum of 15 or 20 minutes for complying with the requirements of the commission should be inserted in the order so as not to subject the companies to complaints on evidence based on casual readings taken at a time when some outside influence had, perhaps, made it impossible for a company to comply with the order.

At the hearing on Nov. 9 Mr. Connette said that on Nov. 8 he examined the steel cars of the New York & Queens County Railway at its barn at Woodside, Long Island. These cars have seven cross seats on either side and one longitudinal seat on either side at each end with a capacity of four people to each seat. Mr. Connette hung a thermometer in the center of the cars under test on a level with the windows and turned on the heat two notches, but was

unable to obtain a rise in temperature of more than 6 deg. in 30 minutes. Two hours were required to increase the heat 20 deg. He attributed his failure to secure better results to two causes. In the first place he considered the heaters too small for the style of car to which they were applied, and, secondly, the steel cars seemed to conduct and radiate heat much more readily than wood cars. Mr. Connette's study of the subject was not thorough enough for him to warrant an authoritative expression of opinion on the matter of conduction and radiation, and it was decided to adjourn the matter for a week so as to enable him to conduct comparative tests with steel and wood cars, W. O. Wood of the New York & Queens County Railway saying that cars could easily be arranged so as to secure good results although the same number of heaters are not in use on the steel and the wood cars.

TESTS OF POWER CONSUMPTION OF CARS IN CLEVELAND

Some tests of the power consumption of interurban and city cars while within the city of Cleveland and on the track of the Cleveland Railway, have recently been conducted by L. P. Crecelius, superintendent of power of the Cleveland Electric Railway at Cleveland, and F. W. Coen, vice-president and general manager of the Lake Shore Electric Railway Company. The tests were carried out on May 3 and May 4, so that the operating conditions could be as nearly alike as possible. The results given in the two accompanying tables were obtained. Tests were also conducted to determine the amount of power required by the interurban cars while on the city company's tracks, as these tracks do not end in all cases at the city limits. The figures are slightly less than those for the cars while in the city limits, being 2.7854 kw-hours per car-mile and 88.2983 watts per ton-mile.

TABLE I—DATA ON INTERURBAN CARS.

Name of Line.	Car. No.	Motor equip.	Gear ratio.	Total length in ft.	Weight in lb.	Kw-hrs. per car-mile.	Watt-hrs. per ton-mile.
Lake Shore Elec..	148	West 121	14.51	50	73,320	3.211	83.230
Lake Shore Elec..	19	West. 76	24.58	50	62,500	3.035	90.70
C. S. & C.....	128	West. 112	22.67	50	67,140	4.551	106.74
C. S. & C.....	93	West. 56	24.58	50	57,940	2.506	83.90
C. S. & C.....	145	West. 112	22.67	45	61,000	3.691	115.59
N. O. T. & L. Co.	32	G. E. 204	22.55	52	77,320	4.769	117.25
N. O. T. & L. Co.	28	G. E. 57	28.59	45	59,300	2.578	81.00
N. O. T. & L. Co.	21	G. E. 57	26.59	42	50,820	3.612	133.31
E. O. T. Co.....	31	J. 34	21.67	42	42,900	2.901	113.27
E. O. T. Co.....	16	J. 34	21.67	46	53,260	2.480	90.17
E. O. T. Co.....	39	J. 34	25.69	46	54,300	2.152	75.54
C. P. & E.....	104	West. 112	22.67	50	60,800	2.4810	76.00
C. P. & E.....	42	G. E. 57	24.63	42	49,800	2.4346	89.20
Average of all.....						2.8982	91.5207

TABLE II—DATA ON CITY CARS.

Car No.	Motors.	Gear ratio.	Classification.	Weight. lb.	Kw-hrs. per car-mile.	Watt-hrs. per ton-mile.
517...4	West. 49	14.68	34 ft. pay-enter	45,600	3.604	143.12
433...4	G. E. 67	17.67	33 ft. pay-enter	43,460	3.413	143.76
455...4	West. 49	14.68	14 bn. convert.	38,240	2.556	124.46
199...4	West. 101	15.69	29 ft. box	39,840	3.073	143.14
337...	None	.....	28 ft. box, trail	27,700	2.510	63.43
149...4	West. 101	15.69	29 ft. box	39,800	2.825	131.72
728...	None	.....	28 ft. box, trail	27,700	1.870	52.23
509...4	West. 49	14.68	34 ft. pay-enter	46,580	4.656	182.20
54...4	West. 12-A	14.68	14 bn. convert.	38,140	2.911	140.64
121...4	West. 101	15.69	30 ft. box	40,180	2.663	124.55
322...	None	.....	28 ft. box, trail	27,700	2.402	61.67
793...2	West. 101	15.69	28 ft. box	33,280	1.873	94.90
3369...4	G. E. 80	19.67	34 ft. pay-enter	43,300	3.360	130.70
Average of all.....					2.851	126.64

"Fuel Tests with Illinois Coal," by L. P. Breckenridge and Paul Diserens, is issued by the Engineering Experiment Station of the University of Illinois as Circular No. 3. It consists of a compilation of data relating solely to the coals of the State of Illinois, selected from the complete reports of the Government investigations on the fuels of the United States. Copies of the circular may be obtained gratis upon application to W. F. M. Goss, director of the Engineering Experiment Station, University of Illinois, Urbana, Ill.

CRUSADE AGAINST ILLEGAL USE OF TRANSFERS IN NEW YORK

The receivers of the Metropolitan Street Railway Company are making an active effort to reduce the illegal use of transfers on that line. At present there are approximately 4,000,000 passengers a year on the Metropolitan Street Railway system, and of this number about one-third ride on transfers. Although the number of transfers issued in New York has been largely curtailed by the segregation from the Metropolitan Street Railway of the Third Avenue Railroad, Central Park, North & East River Railroad, Second Avenue Railroad and other companies, there is still considerable abuse of the transfer system, a fact which was clearly shown in the testimony of Oren Root, general manager for the receivers, and of other witnesses at the hearings before the Public Service Commission last year.

The existing statutes in regard to transfers and the decisions on their issue make it difficult for the company to

ADRIAN H. JOLINE, DOUGLAS ROBINSON, Receivers
METROPOLITAN STREET RAILWAY COMPANY

TO THE PUBLIC.

ATTENTION IS CALLED TO SECTION 1566, PENAL LAW OF NEW YORK STATE, IN WHICH PROVISION IS MADE THAT NO TRANSFER TICKET SHALL BE ISSUED, SOLD OR GIVEN TO ANY PERSON NOT LAWFULLY ENTITLED TO RECEIVE THE SAME. THE LAW PROVIDES THAT THE PERSON RECEIVING THE TICKET UNDER SUCH CIRCUMSTANCES, AND ALSO THE PERSON WHO ISSUES, GIVES AWAY OR SELLS SUCH TICKET MAY BE IMPRISONED FOR ONE YEAR AND FINED $500.00.

PERSONS VIOLATING THIS LAW MAY BE INDICTED AND CONVICTED FOR A CONSPIRACY, THOUGH THE OBJECT OF SUCH CONSPIRACY HAS NOT BEEN EXECUTED.

ANY PERSON DETECTED IN VIOLATING THE ABOVE STATUTE WILL BE PROSECUTED TO THE FULL EXTENT OF THE LAW.

Receivers, METROPOLITAN STREET RAILWAY COMPANY.

Dated November 7th, 1909.

Warning Notice Against Illegal Use of Transfers

stop all illegal use of transfers and permit, for instance, a passenger to ride eastward and westward again on the crosstown lines for an unlimited number of times after he has paid his initial fare. It does, however, provide a penalty for trafficking in transfers. It is the intention of the company to take advantage, as far as possible, of this law, and in order to secure convictions a corps of detectives has been organized. In addition, notice has just been posted in all the cars of the company, calling attention to the section of the Penal Law of the State prohibiting the issue, sale or gift of a transfer ticket to any person who is not entitled to receive it. A copy of this notice appears above.

The record of passenger trains reported to the New York Public Service Commission, Second District, for September shows that of 62,092 trains, 82 per cent were on time at division terminals. Average delay of each late train, 24.3 minutes; for each train run, 4.2 minutes. Principal causes of delay: Waiting for trains on other divisions, 32.7 per cent; train work at stations, 19.3 per cent; train connections with other railroads, 14 per cent.

FIRST ANNUAL REPORT OF BOARD OF SUPERVISING ENGINEERS, CHICAGO TRACTION

The first annual report of the Board of Supervising Engineers, Chicago Traction, covering the period ended Jan. 31, 1908, has just been published by the board. A preliminary abstract of this report was presented in the ELECTRIC RAILWAY JOURNAL for Oct. 31, 1908, page 1285. The full report contains a most complete history of Chicago traction affairs and a detailed explanation of the work of the board. The Board of Supervising Engineers, Chicago Traction, is as follows: Bion J. Arnold, chairman; George Weston, successor to Charles V. Weston, representing the city of Chicago; Harvey B. Fleming, representing the Chicago City Railway Company; John Z. Murphy, acting for the receivers of the Chicago Union Traction Company, and later representing the Chicago Railways Company. F. K. Parke is secretary and auditor and L. H. Davidson, assistant secretary of the board.

HISTORY OF CHICAGO TRACTION

The first annual report is a book of 462 pages, 6 in. x 9 in. in size, substantially bound. The contents are divided into seven chapters, followed by a chronological and subject index. Twenty-four full-page halftone and wax engravings present illustrations of the construction standards, report and accounting forms used, views of new substations and car houses and types of rolling stock equipments used since the early horse-car days.

The first chapter is a chronological summary of traction events in Chicago since 1837, setting forth in historical narration the development of Chicago's local transportation facilities. In this chapter will be found presented in a clear way the important events of the involved traction strife which led up to the settlement ordinances of Feb. 11, 1907, ordinances which created the traction board and made possible the great street railway rehabilitation work now so well being carried out by the surface railways of Chicago. A chronological summary of the important extensions and improvements in the five elevated railroads of Chicago concludes this historical chapter.

The second chapter is a brief outline of the main provisions of the traction ordinances of Feb. 11, 1907, as they have been interpreted. The general character and main provisions of the ordinances are clearly and concisely set forth in a brief and argument, submitted by special traction counsel, Walter L. Fisher, to the Supreme Court of Illinois, in what is known as the Venner case. The validity of the general provisions of the ordinances, as construed by Mr. Fisher, was sustained, and the board quotes Mr. Fisher very fully in this chapter.

WORK OF THE BOARD

Chapters III and IV include a summary of the work undertaken and accomplished under the jurisdiction of the board for the year ended Jan. 31, 1908, and a summary of the financial exhibit and estimates of the Chicago City Railway Company and the Chicago Railways Company for that year. It is related that in character and duties the board was without precedent or tradition to guide its actions, and there was necessarily much initiative work of a constructive character in organization, methods of procedure, and particularly in the practical application of the provisions of the ordinances to ordinary as well as extraordinary railway operating conditions. During the first year of its existence the board held 95 meetings, and plans and specifications were passed upon and adopted for the entire rehabilitation work for the year under review and for the supervision and inspection thereof. Bids were passed upon and contracts authorized for the necessary construction material, as were contracts for electric power, electric welding of rail joints, paving, etc. The plan was adopted for verifying the accounts of the railway companies covering the value of the properties and the equipment and additions thereto purchased or acquired between June 30, 1906, and Feb. 1, 1907. This plan of verifying the certificates of the work included a field check of the work in place by the chief engineer of the work and an audit of original accounts by the auditor, undertaken independently of each other, and subsequently compared and harmonized.

The report states that standard plans and specifications have been passed upon by the board, covering the multiplicity of details connected with the rebuilding of a modern and complete system of street railways which, when entirely rehabilitated, will have required an expenditure during the first three years of reconstruction of approximately $17,000,000 for the Chicago City Railway Company and $26,000,000 for the Chicago Railways Company. For the period covered by the report the gross earnings of the two railway companies were $18,823,094.31. Operating expenses and taxes were $13,176,166.01, leaving net earnings of $5,646,928.30. The interest on capital investment was $2,802,167.43, leaving a net income of $2,844,760.87. Of this net income the railway companies' proportion was $1,280,142.40 and the city's proportion $1,564,618.47. The report explains that as the ordinances arbitrarily fix upon 70 per cent of the gross earnings for operating expenses and taxes during the three-year period only, and as many operating difficulties are encountered at a time when a complete reconstruction of roadway and plant is being effected, a comparison of the operating results of these companies with other traction properties could not fairly be made.

During the three-year periods, beginning April 15, 1907, for the Chicago City Railway Company and Jan. 28, 1908, for the Chicago Railways Company, all of the construction, reconstruction, equipment, re-equipment, extensions and additions to plant and property provided for or required by the ordinance, according to the ordinance, are to be added to capital at actual cost plus 10 per cent for conducting the work and furnishing the equipment and 5 per cent for procuring funds, including brokerage; except on certain river tunnel work of the Chicago Railways Company, for which no added percentages are allowed. The value of these additions during the year ended Jan. 31, 1908, amounted to $6,235,292 for the Chicago City Railway Company and $1,809,177 for the Chicago Railways Company. The total values of the properties Jan. 31, 1908, were $61,641,193.

STATISTICS

The earlier abstract of this report showed statistical information regarding the expense of carrying passengers and a subdivision of the nickel fare, showing its disposition. The important financial exhibits of the two railway companies have been published earlier. Interesting operating statistics included in Chapter V of the board report are contained in the table on the following page.

Chapter V comprises 110 pages of the report, and is a summary of the work done by the chief engineer of the work during the date of the passage of the ordinances, Feb. 11, 1907, and the date of the organization of the Board of Supervising Engineers, May 7, 1907, and a description of the organization of the board and the work performed during the period covered by the report.

The board is organized as regards the working force

into the following divisions, each in charge of a division engineer specialized in the particular work covered by his division:

Division D, track and roadway, R. F. Kelker, Jr.

Division E, electric power distribution, Edward N. Lake.

Division G and I, buildings and fixtures—power plant equipment, R. A. Sanborn.

Division K, cars and car operation, Wray Thorn.

Drafting room, F. W. Steeg.

Division of accounts, L. R. Acton.

DIVISION OF ELECTRIC POWER DISTRIBUTION

The report discusses the work undertaken and accomplished by each of these divisions during the period under review. The characteristic of roadway and track are first presented, and the reasons given for the use of the three types of track structure. During the period covered by the report a total of 46.186 miles of single track was constructed. The work of the electric power distribution division, as for other divisions, included the preparation of plans and specifications, engineering inspections of construction work, estimates of the work done and checking of the charges to rehabilitation expenditures under this division by the two railway companies. The plans and specifications prepared for underground conduit construction covered: Type A—square-bore multiple duct; type B—round-bore, single duct, installed in cable slots, and type C—square-bore, single duct. Several types of manhole construction have been developed. It was found in the outlying districts, where there were few underground obstructions, that a considerable saving in cost could be effected by the use of concrete. The report includes five engravings exhibiting manhole and duct construction. Specifications have been prepared for wires and cables, and it is noted that on account of the wide margin of safety which was afforded at a small additional cost, the specifications for all rubber insulating cables for 600-volt service were made to call for a 30 per cent rubber compound 5/32 in. thick, with a 1/8-in. protecting sheet of lead; a factory test potential of 12,000 volts a.c. at a frequency of 60 cycles was required.

The report states that in connection with the preparation of the specifications for three-conductor cable, the question of ultimate transmission potentials was considered. A study was made of the underground transmission at the present standard voltages, ranging from 9000 to 22,000. It was noted that the limiting factor in three-phase underground transmission was the size of the duct. Thus the capacity of a 3¼-in. duct is about 4000 kw at any of the standard voltages considered, and of the 3½-in. duct about 5000 kw. This is due to the fact that the increase in insulation thickness and the decrease in conductor diameter for higher potentials are in such relation that a three-conductor cable of a given outside diameter has about the same kilowatt capacity for all of the standard voltages compared.

Considering 13,200 volts as against 9000 volts, for example, it was found, as will be seen by the following table, that the saving in cost by the use of the higher voltage was only about 2 per cent. It was therefore believed that the increase of about 50 per cent in voltage could not be justified.

COMPARATIVE STUDY OF THREE-PHASE CONDUCTORS FOR POWER TRANSMISSION IN STANDARD 3¼-IN. DUCT, BASED UPON A UNIT CABLE CAPACITY OF APPROXIMATELY 4000 KW.

Voltage of transmission	9,000	13,200
Thickness of total insulation in inches	6/32x6/32	8/32x8/32
Nearest size of conductor for 4000 kw	4/0	1/0
Actual kilowatt capacity of conductor	4,288	4,001
Diameter in inches of cable over lead	2.567	2.627
Estimated net price per foot of cable installed	$1.395	$1.275
Range in miles delivering full kilowatt capacity at 10% loss, 100% power factor	5.68	6.52
Estimated net price per 1000 kw per foot installed	$0.325	$0.319
Per cent of price per 1000 kw per foot compared to 9000 volts	100	98.1

A feature of the work of this division consists of the tests of the conductivity of the electrically welded rail joints. These tests are made with apparatus especially designed for this purpose, and copies of reports, showing the results, are sent to the railway companies.

A summary of tests made on lines of the Chicago Railways Company prior to Jan. 30, 1908, showed 62 joints below standard out of 3499 tested. All joints showing a conductivity below the requirements of the ordinance are rejected and replaced by the manufacturer free of cost to the railway company.

THE DIVISION OF BUILDINGS AND FIXTURES

The division of buildings and fixtures was organized in May, 1907. With the acceptance of the ordinances by the traction companies a complete change in the operating car houses of the railway companies became necessary, due to the cable trains being superseded by electrical equipment and the adoption of a standard type of large double-truck car. In order to give the efficient service required of the companies, it became imperative to have the most modern methods of car inspection, housing and cleaning. The question of closed versus open storage of cars, the advantages to be gained by building double-end houses, with the consequent increased facility of movement of cars; the proper pit area and washing facilities; the architectural features; the question of fireproof construction versus mill construction from a fire hazard standpoint; the insurance rates on different types of building; the possible saving by fireproof construction and the installation of sprinkler systems, and the determination as to proper area to be allowed between fire walls, etc., have been carefully studied. The result is the car houses now being built are the embodiment of what is considered the best design for and construction of an operating car house for a large city where the highest standard of efficiency of service is required. In general, it is the intention that all car houses be constructed of sufficient capacity to permit all cars to be stored under cover.

OPERATING STATISTICS FOR YEAR ENDED JAN. 31, 1908.

	Chicago City Railway Co.	Chicago Railways Co.
General:		
Miles of track owned (single)	244.30	326.80
Miles of track operated (single)	217.13	306.446
Gross earnings per mile of single track owned	$33,627.49	$32,459.91
Gross earnings per mile of single track operated	37,835.38	34,615.88
Gross earnings of system	8,215,196.49	10,607,897.82
Paid to employees (wages)*	3,539,667.75	4,471,996.34
Average number of employees	4,032	6,854
Per cent of gross earnings used in operation (including reserve for taxes and damages)	70.00	70.00
Per cent of gross earnings reserved for damages	5.71	8.15
Per cent of gross earnings reserved for taxes	2.92	1.88
Transportation:		
Total passengers carried	268,099,953	350,200,313
Passengers carried for revenue	162,578,888	209,544,311
Passengers carried on transfers, employees and other free passengers	105,521,065	2,525,723
Per cent of transfer passengers to fare passengers	57.19	65.92
Average gross earnings per passenger (cents)	3.06	3.03
Average passenger earnings per passenger (cents)	3.02	2.96
Average expense per passenger, including 5% interest on agreed valuation of property (cents)	2.61	2.57
Average operating expenses per passenger (cents)	2.15	2.12
Average interest charge per passenger, based on agreed valuation of property (mills)	4.61	4.47
Average profit per passenger (mills)	4.58	4.62
City's proportion (55%) of profit per passenger (mills)	2.52	2.54
Company's proportion (45%) of profit per passenger (mills)	2.06	2.08
Power:		
Kilowatt output in hours (all plants)	116,134,558	82,529,728
Total rated kilowatt capacity (all plants)	28,640	18,737
Load factor (all plants), 24 hours	46.29	50.3
Cost per kilowatt-hour (all plants)—(cents)	0.90	1.078
Average kw-hr per car per day of 18 hours	522	268
Energy consumed per car mile (kw-hr)	3.46	2.333

* City Railway: In addition $679,145.36 was paid to 775 employees on construction and rehabilitation work.

* Chicago Railways: In addition $349,676.43 was paid to employees on construction and rehabilitation work.

POWER PLANT AND CARS

The report of the work done by the division of power plant equipment includes illustrated descriptions of large rotary converter substations of the Chicago City Railway and the Chicago Railways companies. Rotary converters of 2000-kw capacity have been chosen for the present and future work. The Van Buren and Jefferson Street substation of the Chicago Railways Company had four units of this capacity.

The report of the division on cars and car operation describes the evolution of the Chicago street car from the earliest four-wheel, one-horse, no-conductor car to the present large, four-motor, pay-as-you-enter equipment. A large number of attractive halftone illustrations and several engravings illustrate this section. A description of the latest type of car includes the following stated advantages of the pay-as-you-enter system:

"Absence of confusion in loading and unloading. * * *

"Reduction of possible number of accidents. * * *

"Orderly and systematic collection of fares.

"Wide and comfortable seats and wide aisles.

"Good ventilation."

THE DIVISION OF ACCOUNTS

The province of the division of accounts, as described in the report, is:

To keep a running check upon the expenditures of the street railway companies coming under the supervision of the Board of Supervising Engineers in so far as they relate to the cost of rehabilitation; to ascertain, with the assistance of reports from the engineering divisions, whether or not such expenditures are reasonable; to determine whether or not such expenditures are proper additions to capital account in accordance with the rulings of the board; to determine whether proper reserves have been created and are maintained in the accounts of the railway companies in accordance with the provisions of the ordinances; to prepare and submit to the Board of Supervising Engineers each month certificates authorizing the railway companies to charge to capital account the amounts shown therein; to keep a set of accounts displaying the value of the properties of the railway companies as fixed in the ordinances, together with the additions thereto authorized by the board; to prepare monthly reports showing the locations and costs of all such additions, for filing with the comptroller of the city of Chicago; to prepare reports for submission to the railway companies showing the distribution of such authorized capital expenditures to the several construction and equipment accounts standardized by the American Street & Interurban Railway Accountants' Association; in general, to institute and maintain a proper checking system in order that the board may be assured that all the provisions of the ordinances as regards additions to capital account are observed; and to keep account of all expenditures made by the board in the carrying out of its duties, which expenditures, in accordance with the terms of the ordinances, are to be added to the capital accounts of the railway companies during the period of rehabilitation, and after that period are to be charged to operating expenses.

In order to carry out the duties as above briefly outlined the division of accounts checks and passes upon the accounting features of all work orders submitted to the board by the railway companies covering such work as they propose to perform and charge to capital account. The work orders are then passed upon by the chief engineer of the work, and finally by the board.

Authority for the work having thus been given, it becomes necessary that the board be furnished with complete data covering construction and reconstruction expenditures. This has been accomplished through an arrangement with the railway companies by which they transmit to the board each day copies of material manifests showing the quantities, values and disposition of all materials issued by their storekeepers; labor reports showing the hours, values and disposition of time as reported by their timekeepers; audited vouchers, audited and approved by their auditors, showing quantities, values and disposition of all material, etc., delivered direct to the various pieces of work and which have not passed through the storerooms of the companies; accounts receivable vouchers covering sales of scrap and other credits to capital account; journal vouchers covering all transactions not otherwise provided for.

The accuracy of these reports is checked in the division of accounts as to quantities, prices, extensions and additions, and, as far as possible, points of delivery.

The expenditures shown thereon are summarized under each work order and each subdivision of each work order on special forms, in order to determine the total expenditures on each piece of work each month. The totals are then checked against the monthly reports submitted by the railway companies to the board covering the amounts which they claim should be added to capital account.

Concurrently with the recording of values under work orders, the quantities and values of all materials used are analyzed under each class of material and under each work order, the engineering division whose duty it is to check such expenditures being shown on the forms used and also the sub-capital account to which the charge is to be made.

The result of such analysis of materials, together with a summary of the hours and value of labor by departments is carried to recapitulation of expenditure forms, on which the total expenditures each month under each work order, subdivided according to the standard classification of accounts, is shown. These recapitulation reports are made in duplicate—one copy being sent to the division engineers to be checked against their estimates, the other being filed in the division of accounts.

Each of the division engineers has as a part of his organization certain inspectors who, in addition to their other duties, render to him on forms daily, semi-monthly and monthly reports of the quantities and kinds of materials used and hours of labor expended on each piece of work in progress. These reports are used by the division engineers as the basis of their monthly estimates, and also as a check upon the expenditures made by the railway companies and reported to them by the division of accounts. Thus, a counter check from two entirely independent sources is secured, viz., from the reports of the railway companies, checked and summarized by the division of accounts, and from the field reports of the division engineers.

Each month the division engineers submit to the auditor the result of their check of expenditures by work-order numbers, showing the expenditure as reported by the railway companies and checked by the division of accounts, also the estimates as prepared by the division engineers and the amounts which they recommend be added to capital account.

From these reports, after they have been approved by the chief engineer of the work and by the auditor, certificates are made and submitted to the board for approval and signature, showing the total authorized expenditures made by the railway companies, the percentages added in accordance with the terms of the ordinances, and the amounts which the companies are authorized to charge to capital account.

The expenditures having thus been checked and certified by the board a summary report showing work-order numbers, locations, costs for current month and total cost from the beginning of the rehabilitation period to date is made, submitted to the chairman of the board for signature and filed with the comptroller of the city of Chicago, copies also being furnished to the railway companies and to each member of the board.

In order to be assured that the accounts of the railway companies will be in harmony with the accounts of the board, a further report is made analyzing the expenditures according to the standard classification of construction and equipment accounts and forwarded to the railway companies. This report is prepared from the analyses made by the division of accounts, is in accord with the accounts as carried upon the books of the board, and is the authority for the final distribution of capital expenditures to like accounts upon the books of the railway companies.

All receipts and expenditures of the board are examined and passed upon monthly by an auditing committee appointed by the board.

DRAUGHTING DEPARTMENT

The draughting department is organized under a chief draughtsman, who receives his instructions direct from the assistant chief engineer, and the four division engineers and their respective assistants. He has general supervision of the work performed in the department, and of the various systems and records required. Reporting directly to the chief draughtsman are a clerk and four squad foremen. Each of these is held respectively responsible to him for the correct and proper execution of the work performed under his immediate supervision. Each squad foreman is assigned to a special class of work, and, as the needs or demands of that particular department require, draughtsmen and tracers are accordingly detailed in order to insure the best and most desirable results.

THE REMAINING CHAPTERS

Chapter VI of the report of the board is the full text of the ordinances of Feb. 11, 1907, authorizing the Chicago City Railway Company and the Chicago Railways Company to construct, operate and maintain street railways in the city of Chicago, followed by a very complete subject index.

Chapter V is a digest of the minutes of the meetings of the traction board for the first fiscal year, ended Jan. 31, 1908.

EXTENSION OF NEW YORK CENTRAL ELECTRIC ZONE TO NORTH WHITE PLAINS

Work is progressing rapidly on the equipment of the Harlem division of the New York Central & Hudson River Railroad for electric operation from the present temporary terminal of the electric zone at Wakefield to North White Plains, which is to be the permanent electric suburban terminal on this division. The details of the electrical equipment now being installed are the same as those of the sections below Wakefield and Yonkers which have been in operation for some time. Two new substations are being built, one at Tuckahoe, which is about 50 per cent completed, and the other at White Plains, which is about 25 per cent completed. These are both plain brick buildings on concrete foundations, and each will contain three 1000-kw Westinghouse rotary converters and three groups of three single-phase, air-cooled General Electric transformers of 375 kw capacity each. Storage batteries will not be installed at either of these substations at present, although ground space has been provided near each building on which a battery house can be erected in the future if it is found desirable to add an equipment of batteries. All of the lightning arresters and switching apparatus are to be furnished by the General Electric Company.

The high-tension transmission line carried on steel poles is being extended north from Wakefield, and both substations will be looped in on it. This branch of the high-tension distribution system extends south from Wakefield to the substation at Botanical Gardens, where it is tied through the switchboard to both the Port Morris and the Yonkers generating stations.

There are six circuit-breaker houses on the extension containing the third-rail sectionalizing switches. The switches in each house are of the remote control type, and will be operated from the nearest substation.

The bonding of the track rails has been completed for the entire distance of 10 miles for both tracks. Underrunning type protected third-rail has been erected for about half the distance. It is expected that complete electric operation from Grand Central Station to North White Plains will be begun soon after Jan. 1, 1910, after which time the temporary steam and electric locomotive terminal at Wakefield will be abandoned and dismantled.

TESTIMONY IN CLEVELAND VALUATION

Testimony was given in Cleveland on Oct. 27 by Frank R. Ford, of Ford, Bacon & Davis, in the hearing before R. W. Tayler, judge of the United States Circuit Court, who is the arbitrator in the negotiation between the Cleveland Railway Company and the city of Cleveland in relation to the renewal of franchises. Mr. Ford was examined by Horace E. Andrews, president of the Cleveland Railway.

Mr. Ford testified that for the last 15 years he had been a member of the firm of Ford, Bacon & Davis, consulting engineers in the building and operation of street railway properties. The firm was engaged at present by the Coney Island & Brooklyn Railroad and the receivers of the Metropolitan Street Railway of New York in valuations of the properties which are being made by the Public Service Commission through its experts and the company through Ford, Bacon & Davis. From 1904 to 1906 the firm was consulting engineer of the Chicago City Railway, and in that connection Mr. Ford worked out a number of expert matters bearing on the settlement with the city.

Mr. Ford had found it was necessary in preparing engineering estimates upon the physical construction in which his firm had been concerned to add a percentage charge or overhead charge for the contingent items of construction and for engineering service, contractor's profit, etc. The company estimates of proposed capital expenditures must provide for the overhead charges relating more particularly to the organization of the company, legal expenses and other expenses which did not pertain directly to construction. Mr. Andrews asked Mr. Ford to state how he would proceed to value a property like that of the Cleveland Railway. In answer, Mr. Ford said he would give the method that was used in the case of the Coney Island & Brooklyn Railroad, in which a valuation was being made for the purpose of determining the rate of fare to Coney Island. The company charged a 5-cent fare on its city lines and 10 cents to Coney Island. A petition filed with the Public Service Commission had asked for a reduction of the Coney Island fare to 5 cents. Since the matter of physical valuation had been agitated Mr. Ford's firm had been employed in the last three or four years in several other places where valuation was involved, notably in Kansas City, Toledo and Baltimore, and had made a special study of the methods of valuation for various purposes followed in this country and abroad. From that study, he believed that in a rate making case, where the question was as to the amount to be charged for the service or commodity, there were four different bases of valuation that should be considered, as follows:

DIFFERENT BASES OF VALUATION

1. Value of the Earning Power. This was the basis upon which most of the European steam railroads had been appropriated by the State. For instance, an average was taken of the net earnings for five or seven years and that was capitalized on the basis of from 4 per cent to 5 per cent. Payment was made for the properties in some cases in bonds of the State.

2. Market Value of the Securities of the Company. This was the basis which Prof. H. C. Adams, in charge of statistics and accounts for the Interstate Commerce Commission, employed in his report for the Census Bureau on the

"Commercial Valuation of Railway Operating Property in the United States."

3. Cash Investment in the Property. This was the equivalent of the cost of reproduction of the property through its period of development. In the case of the Cleveland Railway, it would mean the actual cash put into the property from its beginning as a horse car line, through the cable period and the early electric road and continuing through the various developments of electrical construction and equipment to the present system.

4. Cost of Reproduction New To-day of an Adequate Modern System of Electric Railway. In this method it was assumed that the present system did not exist, and it was desired to reproduce not only the present system but to add the necessary additions, extensions and betterments, to serve the public adequately. This was the basis which a competing company would have to use and upon which it would have to sell its service.

Discussing the fourth method, the cost of reproduction new to-day of an adequate system, Mr. Ford said that it would be proper to allow not only for the reproduction of the physical property but also for the reproduction of all of the labor and expense necessary to secure the right to place the property in the streets. Strictly speaking, the valuation of the physical property would be a valuation simply of the physical material inventoried. That part of the cost of construction which was represented in labor was largely estimated. In the track, there were the rails, ties and ballast, physical articles, some of which could be seen, but the cost of the labor of putting these in place had to be estimated. The costs of getting the rights and the overhead charges or development expenses were largely matters of labor and expenses that also had to be estimated. It was much more difficult to estimate the cost of that labor than labor on the physical construction, because it was not apparent except by close and deep investigation into the subject.

DEVELOPMENT EXPENSES

Mr. Ford presented a list of the development expenses which he suggested to the New York Public Service Commission, First District, as printed in the Electric Railway Journal of June 19, 1909. Judge Tayler said he would like to have the list.

Discussing this list, Mr. Ford said the cost of reproducing a street railway property started in the first place with the cost of promotion. In order to finance any street railway property, allowances had to be made for this cost in one of two ways: It had either to be included in the value of the property as a capital charge or to be represented by a rate of return on the value which would be larger than the current rate of interest. In other words, if a return of say 8 or 10 per cent was allowed, as is permitted by the laws of some States, the promotion cost ought not to be included in the value of the property. Mr. Ford understood that the New York Public Service Commission, Second District, had allowed in the capitalization 5 per cent on the estimated cost in the case of the Rochester, Corning, Elmira Traction Company. He was informed that in that case, the allowance was not sufficient and the property therefore had not yet been financed.

The cost of promotion would include the preliminary technical expenses of survey and location of line and estimates of earnings, and cost of construction and operation together with legal and miscellaneous expenses and the preparation of prospectus. The second item would be the profits of promotion. Then, there would be the cost of organization of the company before the construction period, that is, during the promotion and financing period. This period would include the time spent in obtaining the rights, and the expenses down to the commencement of construction. In the case of large cities, such as New York, Mr. Ford thought this period would occupy probably three years, due to various legal formalities which were required to secure consents of a number of public bodies. This cost of organization of the company before the construction period would include legal expenses, the cost of the company's own organization, its various expenses in connection with the issue of securities, etc. A charter and franchises would have to be obtained in that case under conditions of competition, which, of course, increased the cost. Various expenditures would be entailed in securing consents of property owners and of local authorities.

CHANGES IN THE ART

Included in the costs of development through which all companies had to go, there would be various technical expenses of development such as those resulting from changes in the art and, in the case of New York, experiments with the horse system, the cable system, the storage battery and compressed air, some of which had not existed in Cleveland, and also improvements in the art, such as double truck cars in place of single truck, three or four designs of motors, improvements in the grade and alignment of track, improved type of rail, improved paving, steel poles instead of wooden poles, placing overhead feeder wires underground, fireproof car houses and shops in place of non-fireproof wooden structures, and the various developments in the power houses, such as steam turbines and the use of large units in place of small units and, finally, the alternating current distribution for large areas. There would also be the extra cost of construction due to non-interference with operation, the extra cost due to piecemeal construction, the solidification of roadbed and adaptation of construction and equipment, terms that had been used in some of the State Railroad Commission valuations of steam properties, and in some cases, the development of park and amusement enterprises.

Leaving the construction for a moment, Mr. Ford testified that there had been considerable expense in the development of properties due to various corporate consolidations. Where a large number of small companies competed or occupied separate sections of the city, there was first a suppression of intangible capital due to consolidation. Taking the charter as an instance, there would be 25 charters, each of which had cost a certain amount, and when the properties were consolidated, a large amount of the original cost would be wiped out. A premium was paid in some cases for the securities of smaller properties in order to effect consolidation and the various legal and organization expenses and payments to the State and the city for the consolidated company should be included.

LOSS IN EARLY OPERATION

From the standpoint of the business of the company, there had been considerable loss in the early operation of many lines. Companies had always considered, when they lost on perhaps the first five or 10 years of operation of outlying lines, that they would overcome the deficit by the larger profits of the inner lines and subsequent profits from the new lines. Losses were made by inefficient managements during the early period of the business. Managements of the smaller companies particularly made mistakes which larger and more expert forces probably would not have made.

Taking up the period of financing, Mr. Ford said that in New York City permission for the issue of securities had to be obtained from the State and Public Service Commission and the company had to pay its legal and organization expenses in submitting the project to bankers. It also had to meet the cost of the sale of securities to the bankers, including commissions and discounts and, if a large project was involved, the expense of underwriting syndicates.

CONSTRUCTION PERIOD

That would bring the property to the construction period. During this period, there would be various expenditures which Mr. Ford had divided into several classes. The first class would be the company's overhead charges, such as those involved in its own organization, accounting department, office, store room, and stable expenses, permits of authorities and city inspection, engineering of its organization, consulting engineers and architects, interest, taxes, legal expenses, and wear and tear during construction. Then there would be the contractor's overhead charges, which would cover his organization and office expenses, general superintendence, watching, lights, fire, accident and liability insurance during construction, maintenance and use of tools and finally, the contractor's profit. In addition, Mr. Ford called attention to physical extras, incidentals and contingencies due, first, to incomplete inventories and second, to loss and wastage of material during construction. Next was the cost of material and labor for the present physical construction, which Mr. Ford would figure as an inventory priced on the basis of sub-contracts. Mr. Ford also included the cost of reproduction of the land used for right-of-way and sites for power houses, car houses, shops and terminals. The basis which he had used was (1) its assessed value, (2) an additional sales value, (3) an additional value for railroad purposes, due partly to the contiguity factor, such as a long, narrow right-of-way. The additional value for railroad purposes was also represented by the necessity of discarding part of the real estate purchased. It was very seldom that real estate of the exact size needed could be bought. The question of discarding buildings was also a proper one to consider. A street railway usually had to have a certain amount of its construction of power houses, car houses, shops or office buildings in or near the center of the city where buildings already existed on the land desired. Unimproved real estate could not be bought in such cases and the existing buildings had to be discarded.

Mr. Ford had one case in mind in a large city where a substation building site was the cheapest that could be secured in the most economical location for the distribution of current. The cost of the site was $4,000, of which the value of the building on the site was $2,000. The building had to be discarded but the land remaining represented a valuation of $4,000 on the books. There might be other additional values for railroad purposes such as additional cost of condemnation of real estate, and the monopoly value due to location, such as the necessity of locating the car house on the line of track or of locating a power house near a railroad or water supply. In addition to these factors in estimating the reproduction value of land, Mr. Ford stated that there were certain overhead charges on the real estate which had to be paid, such as the expenses of commissions, brokerage, legal expenditures, cost of search and title insurance.

With the property thus reproduced and ready for operation, it was necessary to have a certain amount of working capital. By that, Mr. Ford meant a supply of cash on hand sufficient at all times for purposes of credit and for extraordinary drains on the cash and also to represent the amount of bills or accounts outstanding. In addition, certain reserve funds and special deposits might be required.

For rate making purposes, Mr. Ford thought that depreciation should not be deducted from the cost of reproduction.

The amount that a street railway should charge for its service was not dependent on whether the physical property of the company was old or new. If a company gave the same kind of ride to its passengers in an equally comfortable car at the same speed, it should obtain the same rate whether the car was new or five or 15 years old. The rate that a cab driver charged was not dependent on whether the horse was four years or 14 years old, and it made no difference to the passenger provided he reached his destination with reasonable promptness. The buyer of water, so long as the water was of good quality and the pressure sufficient, did not care whether the pipe was new or 50 years old. The same statement was true respecting an electric wire carrying current.

Judge Tayler said he was very much interested in the analysis of the whole subject because it showed a large number of items that under varying conditions might affect the cost of creating a finished service. He supposed, however, to use one item as an illustration, that the city would not admit that if a $50,000 building had been destroyed to make room for a car house, the Cleveland company would be entitled now to have that placed in value.

Mr. Andrews said he would not claim that, but he claimed that it might have a bearing when the question of fixing a rate on capital was reached.

Judge Tayler said this case was not a rate making case exactly although in many respects the reasoning would have to be analogous.

Mr. Ford said that the Cleveland case was regarded by the general public of the United States and especially by street railway people as one of the most important rate cases that had ever arisen.

VALUE IN CALCULATING A RETURN

Judge Tayler said that, of course, it was a question of the value on which the owners of the property were entitled to receive a normal rate of interest. In the last analysis it might come to the question of rate of fare, but it was a little more definite than that. The amount of return on the capital would be fixed and the rate of fare would take care of itself in this particular instance. Mr. Ford asked if it was not important that the amount on which the figure was calculated should include all features of the company's property.

Judge Tayler replied that he did not know that the philosophy was different in the two cases. This was not exactly a rate making case. In the New York case, in determining what rates of fare might be charged, there had to be an overhead allowance in order to make sure that the capital received its return. In the Cleveland case, no protection of that character was needed because the capital was assured of its rate of return. The question was what justly and truly ought the capital to be to-day. It was presumably to be based on the value of the property to-day and as most of it had been in use for a longer or shorter period of time, it was necessary to undertake to arrive at the reproduction value of the property as it is found and suited to the purposes. It was rather a difficult question to answer, but it was admitted that there must be an overhead charge as to most, if not all of the items,

whether figured on the whole amount of the value that could be appraised or only on parts of it. There were certain items for which allowance must be made, not fanciful at all in their foundation but due to the actual expenditure of money, and therefore necessary to produce the property. The question was rather as to the amount of money than to the soundness of the principle that there must be some error in human computations, and they must therefore place some blanket figures in the account for those expenses which must have been included in the finished articles.

Mr. Ford said it was necessary as a constructor to allow for contingencies. It seemed to him that the item of contingencies was simply a small one of the overhead charges. Actual labor and expenses could probably be located. Returning to the illustration of the cab horse, Mr. Ford said that the purchaser of the horse would want to know how old it was, but the rider in the carriage did not care so long as the destination was reached on time. The same condition probably was true with the electric wire or the water pipe. The purchaser would not want to pay full value for something that was 50 years old, although if he was buying water or electric current, the pipe or wire would serve just as well, regardless of the age.

Judge Tayler said that there had been depreciation, and that allowance must be made, therefore, in determining the just and true value of the property, in view of the fact that it was, in effect, to be appropriated by the city. The fact of depreciation was involved necessarily in the inquiry, and the value of the property would have to be determined according to the just view that was taken of the extent of the depreciation and its effect upon the present value of the property.

OPPORTUNITY FOR RECONSTRUCTION DESIRABLE

Mr. Ford said that to follow the course of basing the rate on the depreciated value would be to take from the company the opportunity of repairing and renewing the property. If such a rule was followed, a certain rate of fare could be charged on a brand new railroad, but if the property was half worn out a smaller rate of fare would have to be charged, and in the latter case the company would be prevented from reconstructing and keeping up its equipment.

Judge Tayler said he understood the principle, but it was not being applied in that way in this case.

Mr. Andrews asked Mr. Ford whether after examining the Cleveland property and its value he could arrive at a fair percentage for overhead charges.

Mr. Ford answered that he could give only his general experience on certain items. He knew he could not give any figures that would cover the majority of overhead charges without a careful study of the local situation. He could give his general experience on the items of contractor's profit, cost of engineering and allowance for physical contingencies, but to compute figures of the cost of administration during the construction period and the expenses of promotion, financing and development of the property would be a very difficult matter and would take some time to arrive at proper values. His firm had used for contingencies of physical construction, due to incomplete inventories and loss and wastage of materials, from 5 to 15 per cent. For instance, on cars he might use 5 per cent and on certain parts of track construction as high as 15 per cent. These figures had been borne out by his experience in the construction of street railway properties.

He would say that the cost of the company's own engineering organization and of consulting engineers and architects would amount to from 5 to 10 per cent of the cost of the physical property. His experience was that contractors' charges, including their organization expenses and profit for building street railways generally amounted to from 7½ to 15 per cent of the cost of the physical construction, depending upon the size of the undertaking. He would not be prepared to name any figure for other charges without a study of the local situation.

Mr. Andrews said that the endeavor was to determine the value of the property, not the rate of fare to be charged.

Mr. Ford said that the items he had in mind would not apply in determining the value of the property, though allowance should be made for them if provision for the future was intended. He had in mind such elements as the cost of raising the property to an adequate physical standard, the extensions of tracks, and the additional equipment that might be necessary to serve the public properly.

Judge Tayler said he thought that other provision had been made for this feature of the situation.

Mayor Tom L. Johnson cross-examined Mr. Ford as to the percentages mentioned in the testimony. He quoted Mr. Ford's figures as extending from 17½ to 40 per cent, and inquired whether some more definite figures could not be given.

VARIATION IN CHARGES

In response, Mr. Ford stated that the cost would depend upon the character, location and the amount of the construction. The charge might easily run to 40 per cent on a small property where the construction was of a very difficult character and the amount of contingencies might reach higher figures than in another case where there was a large property with fairly easy standard construction.

Mr. Johnson asked what percentage Mr. Ford would fix as a proper charge for contingencies in the case of 240 or 250 miles of street railway track, naming about the mileage of the Cleveland property.

Mr. Ford asked whether the track was assumed to be constructed by piecemeal, as it was actually built.

Mr. Johnson said it was assumed that the construction was undertaken as though there had been no track in the street.

Assuming the construction of all the track at one time, Mr. Ford thought that the contingencies might extend to 10 per cent. He thought the allowance for engineering might be 7½ per cent, and would place the contractor's profit at 10 per cent. These figures were given without knowledge of the local conditions, contracting, labor, local materials or the lines themselves. The 10 per cent allowance for contingencies would cover in this case loss and wastage of material during construction, and the question of incomplete inventories which might, of course, involve changes in type of construction during the progress of the work. Mr. Ford had in mind in specifying the latter item some of the track of the Coney Island & Brooklyn Railroad, where the city required a change in the type of construction during the progress of the work, increasing the cost 10 per cent.

Mr. Johnson asked whether the contingency item would be larger or smaller in calculating the present worth of an existing mile of track than in estimating 1 mile that was projected. Mr. Ford thought he would use the same percentage. The unit price in the case of new construction should be sufficiently high to cover any fluctuation in the cost of material. The cost to reproduce a mile of track, including the history of its cost and the items entering into

it, was as difficult, if not more difficult, to obtain than the theoretical cost for a standard piece of track which was to be built.

Mr. Johnson asked where Mr. Ford would place loss of time and expense due to weather conditions. Mr. Ford thought he would place that in the cost of labor as part of the track construction. It would be a part of the labor item rather than of the contingency item. He would allow a sufficient amount for labor to cover the usual cost of track work of this character, and that would include a reasonable allowance for interferences of that nature.

Mr. Johnson asked Mr. Ford whether he included in the item of contingency anything for fluctuations in costs of labor or material. The witness replied that he would include in his unit costs sufficient allowance for any usual fluctuations.

Mr. Johnson asked whether the estimate would not be reduced to the extent that the unit price went largely into detail and provided for the type of construction found. Mr. Ford thought so, but would like to apply the same answer to the intangible labor or the cost of development. If such costs were to be disregarded, or practically disregarded, there would have to be a large percentage for contingencies in the labor and expense of that part of the cost of construction of the railway. If the cost of producing the rights of the company and the costs of organization and development were not to be itemized, and an effort made to inventory and price them, he thought that a considerably larger percentage would have to be added for contingencies than the percentage which he had discussed.

SUBSEQUENT PROCEEDINGS

Hearings on the street railway question before Judge Tayler were resumed on Nov. 5. W. F. Cook, superintendent of the Municipal Traction Company, testified on the morning of Nov. 5, but the greater part of the time was taken up in discussing the franchise valuation. Mayor Johnson argued that the earnings of the company, in addition to the expenses and 6 per cent on the physical value, form the basis for franchise values. Judge Tayler seemingly favored the idea, but Mayor Johnson added that as the 6 per cent profit would consume the earnings, or the greater part of them, there would be no franchise value. Judge Tayler stated that the Euclid Avenue line would be valued in connection with the others and not separately. In order to ascertain the earning power of this line, men have been placed in East Cleveland to board the cars and ask all passengers their destination, so as to fix the average length of ride taken by residents of the village and the cost of transportation, so far as it affects the business of the Euclid Avenue line.

Judge Tayler has lengthened the hours of the sessions, and has informed both sides that they must make their examinations brief, so that the work will not be delayed unnecessarily.

LIFE OF TRACK

On the morning of Nov. 6 C. H. Clark, engineer of maintenance of way of the Municipal Traction Company, testified that the average life of the track was greater than had been contended by Mr. Andrews and others. Mr. Clark gave the dates when track was laid on various streets, and produced a table showing that the average life was about 20 years. Mr. Clark said that he secured the figures from City Engineer Hoffman. Mayor Johnson tried to show that Mr. Clark had copied the figures, dates and other information from a printed volume of testimony taken when the Goff-Johnson valuation was made. Mr. Clark insisted that he secured the data from Mr. Hoffman. Judge Tayler asserted that it was not fair to him for the city to put Mr. Hoffman on the stand as an expert witness and then try to discredit him. He said that this was the first time he had heard the figures questioned. On the statement by the Mayor that he was trying to show that the witnesses were basing their deductions from assumed dates, Mr. Andrews said that Mr. Hoffman had taken the figures from the records in the office of the Cleveland Electric Railway. Judge Tayler took the table in the absence of better proof, and he read the facts from the records of former hearings, as given by Mr. Hoffman. They were as stated by Mr. Clark.

Considerable testimony was taken to clear up the contention of the city that certain sections of tracks examined showed that the life was much shorter than claimed by the company. Even the number of trips made over these sections had been computed and compared with the less frequent use of other parts of the same line. Comparison was also made with the headway on the entire length of some of the lines which served more sparsely settled sections of the town. Foundations and track bed were also taken into consideration as affecting the wear of some portions of the tracks. The administration was endeavoring to show that the value of the track was lower than shown by the Goff-Johnson valuation.

Warren Bicknell, receiver of the Municipal Traction Company, and Henry J. Davies, secretary of the Cleveland Railway, testified on Nov. 8 that the substitution of long cars for the small ones had not increased the traffic and earning capacity of the system. Both thus disagreed with A. B. duPont. Mr. Bicknell and Mr. Davies agreed, however, that the large cars are preferable, especially from the passengers' point of view.

Judge Tayler questioned Mayor Johnson sharply as to why he agreed to a valuation in the Goff-Johnson settlement which he now states is several million dollars too high. Mr. Johnson said that was a trade, and that allowances had to be made for good-will in the interest of an early settlement. The judge intimated that Mr. Johnson did not take into consideration the fact that he was putting a burden on the community, and said the present valuation would be made differently.

At the instance of the Chamber of Commerce a temporary injunction was secured against the board of elections at Cleveland on Nov. 4 to prevent the counting of several thousand blank ballots cast at the recent election on the subway proposition. Of the actual number of votes, 35,158 were in favor of the proposal and 38,539 against it. The friends of the proposition insist that the blank ballots put into the boxes should be counted as votes. If this were done the proposal would be carried. The Chamber of Commerce contends that the blank ballots should not be considered as votes. A decision by the courts on the question will involve an authoritative expression of opinion on a point in elections that will count for much, as improperly marked or unmarked ballots are usually thrown out.

Various comments are heard on the results of the recent election, when Mayor Johnson was defeated for a fifth term and Herman C. Baehr was chosen to succeed him. Mr. Baehr is a business man, and it is believed that he will want good cars and good service, even if they involve a little higher fare than the present administration has insisted upon.

City Solicitor Newton D. Baker was re-elected by more than 1200 plurality. In addition, seven Johnson councilmen were elected. This places the next Council in relation to

Mr. Baehr about the same as the present body to Mayor Johnson. At first it was hinted that Mr. Baker would not accept the office to which he was elected, preferring to go with the others to private life, but it is thought now that he will hardly take such a step.

On the day following the election traction stock advanced 13 points on the Cleveland Stock Exchange. On Monday, Nov. 1, it sold at 75 and on Wednesday, Nov. 3, at 88. Only about 300 shares changed hands, however.

It is understood that A. B. duPont was slated for the position of street railway commissioner if Mr. Johnson had been re-elected, but it is not likely that Mr. duPont will be appointed to that position by the new administration.

RULES FOR OHIO INTERURBAN LINES

In the Electric Railway Journal of Oct. 23, 1909, page 910, a brief account was printed of the first joint conference of representatives of interurban railway companies in Ohio and the State Railroad Commission to prepare a basic code of operating rules for all interurban roads in the State. On Oct. 28 another conference was held in Columbus, and the railway representatives recommended the adoption, with some modifications, of the new standard code of interurban rules as revised at the Denver convention of the American Street & Interurban Railway Transportation & Traffic Association last month. The commission accepted this recommendation and is to have printed the suggested modifications of the standard rules. Copies of these proposed changes and of the Transportation & Traffic Association's standard code as adopted in Denver are to be sent to all interurban roads in the State which have no book of rules on file with the commission, with instructions that a rule book based on the modified and standard rules as distributed must be prepared and filed with the commission before the expiration of six months from the date of the order.

A NEW FIRM OF ELECTRICAL ENGINEERS

Theodore Stebbins, formerly general manager of the Texas Traction Company, of Dallas, Tex., and Albert B. Herrick, electrical engineer, of New York, have formed a partnership, to be known as Herrick & Stebbins, which will succeed the business of Mr. Herrick. Clarence G. Boyden and John G. Rockwood, who have been assistants to Mr. Herrick, are also members of the partnership, whose headquarters will be in New York. The firm will make a specialty of reporting on and conducting electric railway maintenance work. This will include the autographic record, by apparatus designed by Mr. Herrick, of track and bond data, and also of electrical and magnetic defects in car equipment. Announcement is also made that these engineers are prepared to install a system of complete electrolysis protection. Mr. Stebbins will have the executive management of the partnership.

Comprehensive plans have been presented to the City Council of Cincinnati providing for a subway system to connect the business section with the outlying residential districts. The plans were drawn by City Engineer Sundmaker, and have the approval of the city administration. They involve an expenditure of from $10,000,000 to $15,000,000. The project is entirely one of municipal ownership, although it is proposed that the roads shall be operated under lease.

COMMUNICATION

COASTING REGISTERS ON MANHATTAN ELEVATED

Transit Development Company
Brooklyn, N. Y., Nov. 4, 1909.

To the Editors:

In the issue of Oct. 30 there is an interesting article describing the coasting registers on the Manhattan Elevated. Two speed-time curves are given, which presumably were intended to illustrate the effect of the additional coasting time which has resulted in such large economy. There is no doubt that there is large opportunity for effecting economies by proper attention to the matter of coasting on the part of the motorman without material sacrifices of running time, and any device which will secure attention to this matter is of value. I object, however, to the two speed-time curves, which certainly do not illustrate the point at issue. It is obvious to any one that the average speed of the run with little coasting is necessarily higher than where prolonged coasting is used. The fact that both speed-time curves show the running time to be 66.5 seconds means, necessarily, that they refer to runs of unequal length. By measuring the area of both speed-time curves with a planimeter the area of the one with little coasting was found to be 2.19 sq. in. and that of the one with prolonged coasting 1.97 sq. in. As the scales of both curves are alike, and as printed in the Oct. 30 issue, 1 sq. in. represents a distance of 845 ft., the length of the first run is approximately 1850 ft. and the second run 1663 ft. Why the speed-time curves with little coasting, characterizing ordinary practice, and the prolonged coasting obtained by the use of the coasting registers were not given for the same length of run I do not know. I note that one curve is marked "Average Run" and the other "Typical Run." To assume that this difference in wording was used advisedly is to assume rather unsatisfactory disingenuousness in the writing of the article.

H. G. H. Smith,
Chief of Testing Bureau.

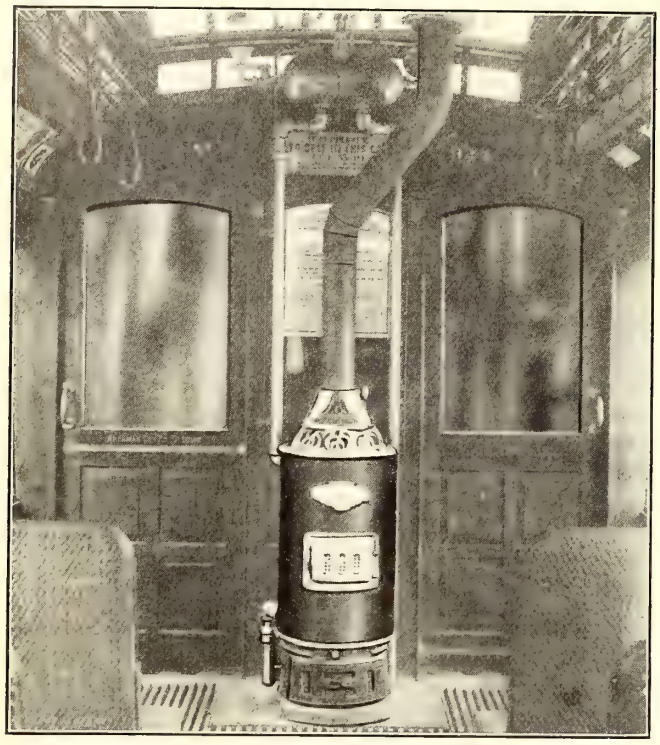
[The speed-time curve showing little coasting was plotted from known data on the equipment of the Manhattan Elevated, and truly represents "average" operating conditions. The curve showing long coasting was plotted principally to show the difference in the general shapes of the current and velocity curves when the coasting period is prolonged. The two curves, of course, are not strictly comparable.—Eds.]

HOT WATER HEATERS FOR P-A-Y-E CARS

The Grand Rapids (Mich.) Railway recently received from the American Car Company, St. Louis, Mo., 12 pay-as-you-enter cars which are equipped with No. 3-C magazine hot-water heaters made by the Peter Smith Heater Company, Detroit, Mich. This is said to be the first installation of hot-water heaters on pay-as-you-enter type cars. As shown in the accompanying engraving, the heater is placed near the bulkhead at one end of the car, between the entrance and exit doors. It occupies a space only 17 in. wide, and as the inlet and outlet pipes are brought out of the heater casing at an angle of 45 deg., the heater can be mounted close up against the bulkhead.

The expansion chamber is mounted under the upper deck, directly above the heater. The heater is connected to the expansion chamber by a 1¼-in. pipe, and from the chamber the feed pipe runs down through the car floor. Under the

floor it crosses over to one side of the car and connects with the heater coil on that side. This coil is made of 2-in. pipe and runs to the opposite end of the car and return. After passing through this coil, the hot water is led across the car, underneath the floor, through a 1¼-in. pipe to the double coil on the other side. The outlet of this coil is



Hot-Water Heater Installed in Pay-As-You-Enter Car

brought up through the floor to the return connection on the heater.

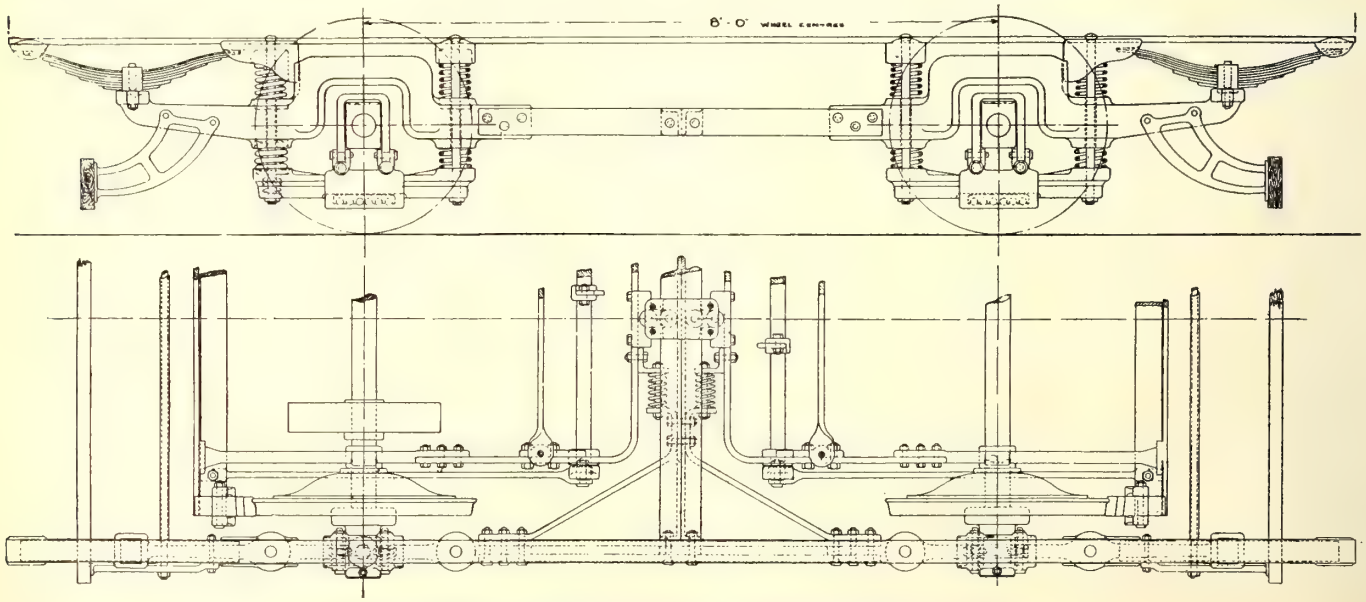
The fuel magazine drops down to within 10 in. of the grate, and as the bottom coils in the fire pot are closely wound, it is said to be impossible for any red hot coals to get between these coils and overheat the inside casing. The inside and outside casings are separated by a 1-in. air space with inlets at the bottom for cold air and outlets at the top for heated air. It is therefore impossible for the outer casing to become hot enough to burn passengers who might come in contact with it or to scorch their clothing.

The heater is connected to the expansion chamber and to the piping under the car floor by ground joint unions. It can be removed for the summer season in 15 minutes' time by disconnecting these unions. The heaters were guaranteed to heat these cars to a temperature of 60 deg. Fahr. in the coldest weather, with an average fuel consumption of not more than 40 lb. of hard coal in 24 hours.

RADIAL PENDULUM TRUCK

The Peckham Truck Company, London, England, has recently put on the market several improved types of single and double trucks for electric cars, which are the inventions of Edgar Peckham, manager of the company. The improvements relate to the method of supporting the truck frames on the journal boxes and to the use of a radiating gear, whereby the wheels and axles of a single truck are permitted to assume a true radial position on sharp curves. The accompanying engravings illustrate an 8-ft. wheel-base single truck embodying both of these features.

The weight of the car body is carried by the top members of the side frames, each of which rest on two pairs of coil springs mounted on the main frames just outside of the pedestals. The overhang of the car body is supported by leaf springs carried on extensions of the main side frames. Over each journal box is a forged yoke or hanger, to which is fastened at the bottom a short bar carrying coil springs at each end. The weight of the main frames rests on these springs. By means of these yokes the wheels and axles have free side play to take up lateral shocks. In trucks built without the radiating feature the links or hangers are attached directly to the horizontal spring-supporting bars by pin connections. A different method is used, however, in the radial truck illustrated. The swing links are connected flexibly to a housing or box surrounding the horizontal spring-supporting bar. This housing is provided with a number of cold-rolled steel rollers, on which the spring bar rests. The spring bar is thus free to move longitudinally with respect to the journal box, and by widening the pedestal jaws sufficiently each pair of wheels and axle can assume a true radial position on a curve without setting up strains in the truck frame. To prevent the housing from binding on the spring bar the seat for the swing links on top of the journal box is made to swivel,



Side Elevation and Half Plan of Pendulum Radial Truck

thus permitting the links to remain in a plane parallel with the supporting bar when the axle assumes an angular position with respect to the truck frame. In the radial truck the motor gears and brake rigging are carried on auxiliary frames supported by bearings on the axles and by movable links from the central cross-tie.

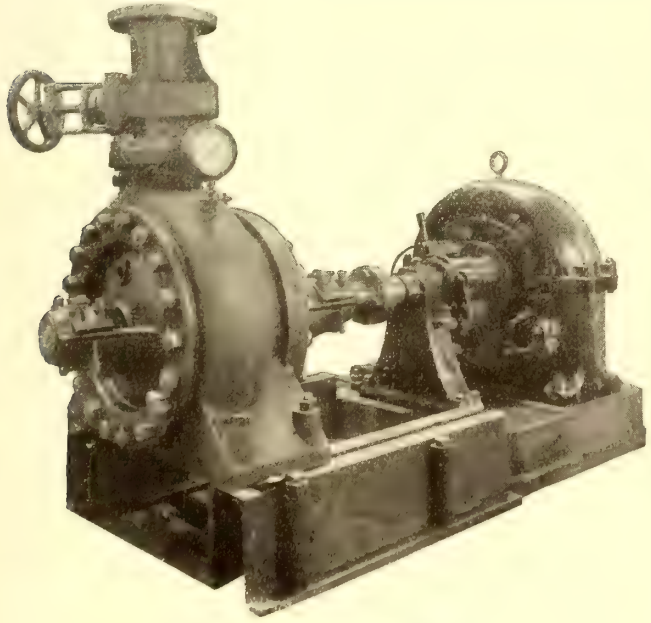
It is claimed that experiments made with this type of radial pendulum truck in England have shown a reduction in tractive effort required to tow a car around curves of less than 150-ft. radius of 25 per cent over that required for the same car equipped with other types of trucks. The riding qualities of this truck under a double-deck car 30 ft. long over all are said to be excellent.

The pendulum suspension of the truck frame adds about 2 ft. 6 in. to the effective spring support spacing, and this feature is applicable to single or double trucks, including maximum traction types. These improvements have been patented in the United States, and, it is understood, will soon be introduced in this country.

MOTOR-DRIVEN TURBO-PUMP

Willans & Robinson, Limited, Rugby, England, are building a new line of turbo-pumps designed for both high and low lifts. The low-lift pumps are suitable for use as circulating pumps for condensing plants, and are designed to pump against heads up to 50 ft. or 60 ft. The high-lift pumps are intended for use in mine pumping and similar applications, and will pump against heads of 2000 ft. or less.

These pumps have no pressure stuffing boxes at the delivery end, as only low-pressure exists in the end chamber behind the last diaphragm. The stuffing box at the suction end is water sealed, and as it must remain tight against



Motor-Driven Turbo-Pump

a pressure of only one-tenth of an atmosphere, it is not necessary to set the packing up hard against the shaft. No end thrust bearings are used, as the end thrust is balanced at all times by a simple patented arrangement which automatically adjusts itself to changes of head or output while the pump is running, and also adjusts for any wear of the impellers.

The bearings are separated by a gap of more than 1 in. from the packing to prevent the entrance of any water, grit or mud. They are arranged for ring oiling and are cast in one piece with the end covers. As these end covers fit accurately with the center casing, it is impossible for the bearings to get out of alignment.

The impellers and guide wheels are made of special bronze, and the inner surfaces are all finished perfectly smooth. Experience has shown that when handling dirty water the wheels thus finished have a much longer life than wheels which have rough surfaces. The central casing is also lined with special bronze to prevent wear or corrosion.

APPRENTICESHIP COURSE AT LEWIS INSTITUTE, CHICAGO, ILL.

At a meeting of the Electric Club of Chicago on Nov. 3, Dean P. B. Woodworth, professor of electrical engineering, Lewis Institute, Chicago, described a new "co-operative course in mechanic arts" which is being conducted by Lewis Institute in conjunction with the managers and superintendents of a number of industrial plants in Chicago. The plan is similar to the co-operative educational and apprentice system recently established at the University of Cincinnati. A year ago the managers of some of the large industrial plants in Chicago were asked to nominate two or more of their apprentices for enrollment in the course, which was started on Jan. 1, 1909. Since the beginning of the year 47 boys have enrolled and 24 are still pursuing their studies.

The boys spend half of their time at school and half in the shops, attending school one week and working in the shops the next week. Two, four or six boys are drawn from each shop and paired off, one boy of each pair working in the shops while the other attends classes. In this way the regular shop routine is not interfered with.

A typical course in the schoolroom is as follows: General instruction in physics laboratory, 8:30 a. m. to 10:30 a. m.; mathematics, 10:30 a. m. to 11:30 a. m.; English, 11:30 a. m. to 12:30 p. m; mechanical drawing, pattern making, foundry practice or machine shop practice, 1:30 p. m. to 5:30 p. m. Many of the apprentices enrolled have had little more than a grammar school education, and some of them left school at the end of the sixth grade course. The instructors in the Institute have noted, however, that the apprentices show much more rapid progress in the laboratories where manual skill is an important factor than the regular students, who have not had any shop practice. At frequent intervals the shop superintendents and the school instructors meet and discuss the progress made by the individual students.

The Lewis Institute imposes a condition on the manufacturers desiring to send apprentices through the co-operative course in mechanic arts, that the boys be paid $14 per calendar month for the work which they do at the shops in alternate weeks. Of this amount $4 is paid to the Institute for tuition. Many of the boys now taking the course receive more than $14 per month.

Bulletin No. 1 of the revenues and expenses of steam roads of the United States, covering the nine months ended March 31, 1909, and prepared by the bureau of statistics and accounts, has been issued by the Interstate Commerce Commission. In an introductory letter, Prof. H. C. Adams states that the publication will be followed by similar bulletins showing the results by months for April, May and June, as well as by a comparative general summary covering the entire years ended June 30, 1909 and 1908.

ELECTRIC RAILWAY LEGAL DECISIONS

LIABILITY FOR NEGLIGENCE

Alabama.—Carriers — Passengers — Injuries — Petition — Negligence.

A count in a petition averred that plaintiff was a passenger, etc., and "was waiting to alight, or engaged in or about alighting therefrom," and "said car was started or jerked, or the speed suddenly increased, and as a proximate consequence plaintiff was thrown," is demurrable, in that its allegations of negligence were insufficient, since it is not every increase in the speed of a car or starting of same, whether with or without a jerk, that amounts to negligence. (Birmingham Ry., Light & Power Co., v. Parker, 47 S. Rep., 138.)

Colorado.—Street Railroads—Municipal Regulations—Validity—Regulations—Negligence—Evidence—Collisions—Actions—Complaint—Appeal and Error—Denial of Motion to Strike Evidence—Prejudicial Error—Operation—Care of Drivers of Vehicles—Care Required—Contributory Negligence—Res Gestæ—Expressions of Pain—Damages—Personal Injuries—Mental Pain and Fright—Instructions—Roving Commission.

Municipal ordinances requiring suitable and seasonable warning to be given of the approach of street cars to crossings are reasonable and proper regulations. A municipal ordinance requiring suitable and seasonable warning to be given of the approach to crossings of street cars, supplemented by other proof, is competent evidence in an action by one injured in a collision with a street car by the negligence of the street railway company, though the ordinance is not pleaded. Where the complaint in an action against a street railway company for injuries in a collision with a street car charged the failure to give any warning of the approach of the car, a municipal ordinance requiring suitable and seasonable warning to be given of the approach of street cars was admissible. Where, in an action against a street railway company for injuries in a collision with a street car, defendant introduced in evidence the complaint, which set forth a copy of an ordinance regulating the operation of street cars, the refusal to grant its motion to strike from the evidence the ordinance introduced by plaintiff without including the evidence introduced by it was not prejudicial. In an action against a street railway company for injuries in a collision with a street car, evidence held to warrant the jury in finding that the company was guilty of actionable negligence. Where the driver of a vehicle along the streets of a city does not know of the existence of street car tracks on a street which he is about to cross, and there is nothing in the physical conditions to impute to him such knowledge, the law does not impose an absolute duty on him to look and listen for an approaching car before attempting to cross, for the driver has a right to rely on the law requiring the giving of timely warnings of the approach of cars. The duty to look and listen for an approaching street car before attempting to cross a street car track depends on the circumstances of each case, and it is not negligence for a person to drive across street railway tracks, but the question of negligence in each case depends on the proximity of the approaching car, its speed, and other circumstances; and, where at the time he started to drive across the track the car was at such a distance that an attempt to cross after having seen it was not contributory negligence, his failure to look for the car will not preclude a recovery. While a street railway company has a preferential right to the use of that portion of the city streets on which its tracks are laid, it has no right to proceed regardless of the probability of encountering at a street crossing vehicles with a right to use the crossing as a common highway, but the motorman, in approaching such crossing, must proceed with such care as, while serving the public in rapid transit, will reduce to the minimum the danger to those equally entitled to the use of the street. In an action against a street railway company for injuries in a collision with a street car, evidence held not to show that the driver of the vehicle was guilty of contributory negligence. Expressions of pain by a person when taken from a wreck occasioned by a street car running into the vehicle in which he was riding, and expressions of pain made immediately thereafter, are admissible as part of the res gestæ. One may recover for mental pain and fright connected with or resulting from a physical injury. An instruction in a personal injury action which limits the recovery to bodily pain and mental suffering which plaintiff had endured or might endure on account of the injuries, or as a direct result of the injuries, properly limited the measure of damages for mental suffering. An instruction in a personal injury action that, where mental suffering occurs in connection with a bodily injury, the law allows a recovery for both, and the amount thereof is left "to the judgment of an enlightened jury to be assessed in such reasonable sum" as may to them seem right, and that the award of damages must be in such sum as in the judgment of the jury the evidence warrants, is not open to the objection that it permits the jury to award damages without reference to the evidence. (Denver City Tramway Co. v. Martin, 98 Pac. Rep., 836.)

Illinois.—Municipal Corporations—Obstructions in Streets—Liability of Person Causing Obstruction—Burden of Proof—Contributory Negligence—Question for Jury—Trial—Instructions—Conformity to Issues.

Placing an obstruction in a street is prima facie unlawful, and the person so placing it has the burden of showing an express license obtained from the city, or that the obstruction is of such character as may be lawfully placed in the street without express permission. Where one places unlawful obstructions in a street without properly guarding the same and injury results to a traveler, he cannot avoid responsibility by showing that it was the duty of a third person to remove such obstruction or to maintain warning lights. In an action for injuries from obstructions placed in a street by defendant, it appeared that plaintiff was a battalion chief of the fire department of the city, and at the time of the injury he was responding to a fire alarm, and was driving at a speed of nine or ten miles an hour along the side of a street railway track, striking an obstruction maintained by defendant at the side of the street. An ordinance of the city provided that no person should drive at a greater speed than six miles per hour. Held, that the question of plaintiff's negligence was for the jury. In an action for injuries caused by an obstruction in a street, an instruction that plaintiff could not recover on the mere ground alone that defendant deposited the obstruction in the street was properly refused, where he did not seek to recover on that ground alone. (Kenyon v. Chicago City Ry. Co., 85 N. E. Rep., 660.)

Indiana.—Carriers—Street Railroads—Alighting Passengers.

As a matter of law the position of a street car passenger, standing on the outer edge of an open car running 12 miles an hour, is perilous, where the car is brought to a sudden stop by a quick, violent, backward motion. (Richmond St. & I. Ry. Co. vs. Beverley—No. 6207—85 N. E. Rep., 721.)

Iowa.—Carriers—Carriage of Passengers—Actions for Injuries—Evidence—Sufficiency—Questions for Jury—Proximate Cause—Negligence—Contributory Negligence—Conduct in Emergency—"Emergency"—Instructions—Appeal and Error—Review—Harmless Error—Pleading.

Evidence, in an action for injury to a street railway passenger, held sufficient to go to the jury on the question of whether he was in the exercise of due care.

Evidence, in an action for injury to a street railway passenger, held sufficient to go to the jury on the question of whether defendant was negligent in starting the car, proximately resulting in the injury.

Where the immediate effect of the negligent starting of a street car was not to throw a passenger, who was attempting to board, to the ground, but instead he maintained his hold on the rail, and ran alongside for some distance in an effort to board, when finally his hold was broken or relinquished, and he fell and was injured, the question whether his fall was the proximate result of the negligent starting of the car, if the facts permitted of a question, was for the jury.

A negligent act, putting another in a position of danger, continues and controls as long as the danger continues, unmodified by any independent, affirmative and voluntary act of the person affected, or by some intervening, controlling circumstance.

Where what is done by a person in the face of an emergency is no more than may be expected from an ordinarily prudent person under like circumstances, due care is not wanting.

Where reasonable minds might differ whether a person in the face of an emergency acted with due care, the question is one for the jury.

Whether a passenger, thrown from his footing in attempting to board a street railway car by the negligent starting thereof, was guilty of contributory negligence in not releasing his hold on the rail and in running alongside and attempting to regain his position and board the car held for the jury, and especially where the starting of the car was slow.

In the sudden and unexpected starting of a street car while a passenger is attempting to board, there is presented an emergency; an "emergency" being a sudden or unexpected happening or occasion calling for immediate action.

An instruction, in an action for injury to a street railway passenger, after advising the jury that plaintiff could not recover if his own negligence contributed to the accident; that the fact that plaintiff did not let go of the car, but kept his hold on the rail, and ran alongside trying to get on after it had started, did not necessarily show that he was guilty of contributory negligence; that if by reason of the starting of the car an emergency arose, then, even though his action was ill judged, if under the facts he acted as a man of ordinary prudence in a like situation, and had used ordinary care in his original attempt to get on the car, he was not guilty of contributory negligence—correctly stated the law, and without confusion.

Where, in a personal injury action, there were other elements of damage alleged than loss of time, to which evidence was addressed, and the verdict was for $5,000, there was no prejudice in the court's failure, in its instructions, to place any limitation on the amount recoverable for loss of time, though the petition alleged damage, on that account, of but $1,000.

Where the trend of the allegations of fact, in a petition for injury to a street railway passenger, was to the effect that he was in the exercise of due care for his own safety, an allegation that the injury was not due to any act of negligence of his was sufficient as a conclusion, or, at least, the pleading was not wholly wanting in an allegation on that subject; and if the street railway company desired more it should have moved therefor. (Burger vs. Omaha & C. B. St. Ry. Co., 117 N. W. Rep., 35.)

Kentucky.—Pleading—Amendment — Trial Amendment — Street Railroads—Death of Children—Instructions—Cars—Operation—Crossings—Crossing Accidents—Discovered Peril.

In an action against a street railway company for killing plaintiff's child, the court held that plaintiff's allegation of defendant's gross negligence in running, operating and managing the car, and in failing to give warning of the approach of the car to the crossing by gong, bell or otherwise, was not sufficient to entitled plaintiff to prove absence of a headlight, whereupon plaintiff tendered a trial amendment charging negligence in not having a headlight on the car. Held, that the court's refusal to allow the amendment was erroneous; defendant having made no application for a continuance by reason thereof.

Plaintiff's intestate, a child of 12, was run into and killed by defendant's street car at or near a crossing. The proof of both parties showed that the child went on the tracks so close to the approaching car that she could not be saved. Defendant's evidence was that she fell on the track and was struck for this reason, while plaintiff's proof showed the car was running too rapidly; that it was very dark, and that there was no warning of the car's approach. Held, that an instruction that, if plaintiff's intestate attempted to cross the tracks so close to the car that the motorman by ordinary care could not stop before injuring intestate, then plaintiff could not recover, was erroneous as requiring a verdict for defendant, though the jury should believe plaintiff's evidence to be true.

A street railroad company is required to moderate the speed of its cars at public crossings, to give notice of their approach by proper signals, to maintain a headlight when dark, and to keep a lookout for persons on the crossing, that they may be warned of approaching danger.

Where a street railroad company operates a car over a crossing without proper warning and at excessive speed, and a person is injured, the company cannot be exonerated from liability on the sole ground that, after his peril was discovered, his injury could not be averted. (Whitman's Adm'r vs. Louisville Ry. Co., 119 S. W. Rep., 165.)

Massachusetts.—Master and Servant—Injuries to Servant—Contributory Negligence—Knowledge of Danger.

Plaintiff, a street railroad motorman, was injured by a derailment of his car, claimed to have been caused by a defective rail joint. Plaintiff at the time was running at usual speed, in violation of a rule requiring motormen to slow up at that point, though he had known for more than a month that there was a sunken joint there which was liable to cause derailment. Held, that plaintiff was negligent, precluding a recovery.—(Lanen v. Haverhill, G. & D. St. Ry. Co.; Same v. Boston & N. St. Ry. Co., 86 N. E. Rep., 776.)

Michigan.—Master and Servant—Injuries to Servant—Railroads—Negligence—Instructions—Concurring Cause—Fellow Servant's Negligence—Expert Testimony—Basis for Opinion—Question for Jury.

The conductor of an electric car was injured in a rear-end collision. The braking apparatus of plaintiff's following car was not in a reasonably safe condition, and defendant failed to discover the defect in its inspection of the car, and plaintiff was not conclusively shown to have had knowledge of the defect. Held, that defendant's rights were protected by an instruction that, if plaintiff had actual or constructive knowledge of the defect, he could not recover, and that he had constructive knowledge, if by reasonable care he could have learned of the defect.

Where injuries to the conductor of an electric car in a rear-end collision were found to have resulted from a defective brake on the following car or other negligence of the railroad company, and there was evidence that such defective brake was a direct contributing cause, defendant was not relieved because a fellow servant failed to obey a safety rule which also contributed to the result.

Two contributing causes of an injury were concurring where both were essential to produce the injury.

Without evidence that a train dispatcher knew that the braking appliances on a following car were defective when he ordered it to follow a preceding car, which had been ordered to proceed after repairs, it was error to permit experts to testify that, in their opinion, the dispatcher's order was improper.

In an action for injuries to a car conductor in a rear-end collision, evidence held insufficient to go to the jury on the question of the negligence of defendant's train dispatcher in sending out the local car in a crippled condition, and in ordering plaintiff's car to follow.—(Welch v. Jackson & B. C. Traction Co., 117 N. W. Rep., 898.)

Missouri. — Carriers—Carriage of Passengers—Actions for Injuries—Instructions—Contributory Negligence—Damages—Conformity to Pleadings and Evidence—Parts Injured.

An answer in an action against a carrier by a passenger to recover for injuries was treated by the trial court and both parties as pleading contributory negligence, and several instructions bearing on that issue were given on request of defendant. Held, that it was not error to instruct that contributory negligence is an affirmative defense to be proven by defendant unless it appears in other evidence, and that, if such defense is not established, the finding should not for that reason be for plaintiff, but it should be that there was no contributory negligence in the case.

In an action by a passenger against a carrier for personal injuries, evidence as to injury to a "thumb" and to a rupture justifies instructions submitting an injury to the "hand" and to the abdomen, although plaintiff treated injury to the thumb and hand as distinct, and similarly treated injuries to the rupture and abdomen, especially where there was affirmative evidence of injury to both thumb and abdomen. (Gerhart vs. Metropolitan St. Ry. Co., 112 S. W. Rep., 10.)

New York.—Street Railroads—Operation—Actions for Injuries—Sufficiency of Evidence—Negligence—Res Ipsa Loquitur—Appeal and Error—Presentation of Objections Below—Necessity—Variance.

Where plaintiff was injured by a bolt which was seen to fall from defendant's elevated railroad structure while its train was passing over it, though there was evidence that the structure was inspected the next day without finding any bolts missing, and that there were no bolts of that kind in the bridge, the rule of res ipsa loquitur applied.

In an action for injuries caused by a bolt falling from an elevated railroad structure, defendant's evidence held insufficient to require a finding that the presumption of negligence arising from the accident was overcome.

Where the complaint was for injuries caused by a bolt falling from an elevated railroad structure because not securely fastened thereto, if defendant wished to rely on a variance in that the evidence showed that it might have fallen from a passing train, it should have urged the objection in its motion to dismiss so as to permit the trial court to pass upon it and give plaintiff an opportunity to amend, and, not having done so, cannot rely thereon on appeal. (Sturza vs. Interborough Rapid Transit Co., 113 N. Y. Sup., 974.)

New York.—Municipal Corporations—Use of Street—Acts Constituting Negligence—Running Automobile—Question for Jury—Contributory Negligence—Injuries from Negligent Use.

It is negligence for a person in charge of an automobile to run it along the street past a street car, that has stopped to allow persons to get off and on, at the rate of six or seven miles an hour.

Whether defendant was running his automobile negligently, where the evidence as to whether he was running fast or slow is conflicting, is for the jury.

A passenger on a street car is not guilty of contributory negligence if he alights from the car after it has stopped to allow passengers to alight; and if he follows other passengers out of the car, and onto the sidewalk, without looking to the right or left to see whether an automobile is approaching, as when a car stops and it is

announced that passengers are to alight, a passenger may assume that it is safe for him to alight in the ordinary manner.

A pedestrian and driver of a vehicle must each be careful in the exercise of his rights upon the streets, and the owner or driver of the vehicle must exercise the greatest care and vigilance not to injure the pedestrian, and the pedestrian is bound to not place himself where an injury will probably result to him. (Brewster vs. Barker, 113 N. Y. Sup., 1026.)

Pennsylvania.—Street Railroads—Injury to Person on Track.

In an action to recover for injuries received by being struck by a street car while lying on the track, evidence held to require binding instructions for defendant. (Moyer vs. United Traction Co., 70 Atl. Rep., 551.)

CHARTERS, ORDINANCES AND FRANCHISES

Connecticut.—Municipal Corporations—Control of Streets—Use for Street Railways—Electric Conductors—Statutory Provisions—Review of Decision of Municipal Authorities—Appeal to Railroad Commissioners—Appeal to Superior Court.

In view of the history of legislation fixing the general rule of policy that municipalities shall be bound to maintain public highways, and invested with the power of protecting the public safety in their use, appearing in its final form in General Statutes 1902, c. 125, secs. 2012-2089, and the legislation as to occupation of highways in aid of public uses, giving municipal authorities control of the placing and maintenance of electric lines and conductors, leading up to General Statutes 1902, sec. 3905, providing that the common council of any city shall have full direction and control over the placing, erection and maintenance of any wires, conductors, etc., of any company engaged in using any electric wire or conductor for any purpose, and may make all orders necessary for the exercise of such power and direction of control, and especially in view of the history of legislation on the subject of railways along the highways, and the control by local authorities, appearing in General Statutes 1902, sec. 3824, providing that the Mayor and Council of each city shall have exclusive control over the placing or locating of tracks, wires, conductors, etc., subject to the right of appeal to the railway commissioners, the placing of electric wires and conductors in a highway by a street railway company, for the purpose of applying electricity as the motive power for the operation of its railway, is subject to the direction of the local municipal authorities, which may direct that such wires and conductors shall be placed underground or overhead as they may deem proper for the safety of the public; and there is no exemption from such municipal control by force of Special Laws 1905, p. 711, sec. 3, amending the charter of the New York, New Haven & Hartford Railroad Company, and authorizing it to establish and maintain conductors over, on, or under any street, highway or public grounds, subject to the general provisions of secs. 3904-3907, inclusive, of the General Statutes of 1902, relating to control by the local authorities, etc., and to transmit electricity thereby in such manner, etc., as said corporation shall find necessary for the best conduct of its business, for the power given the company is subject to all general laws, and especially to the laws mentioned in the amendment; and, in the absence of action by the railroad commissioners, the local authorities may exercise full direction and control given by the statute in respect to placing electric conductors in the highways by a street railway company, subject to the final action of the railroad commissioners.

Under General Statutes 1902, sec. 3832, providing that whenever the Mayor and Common Council of any city shall make any decision, denial, order or direction with respect to any matter relating to street railways, any company affected thereby may appeal to the railroad commissioners from such decision, etc., and sec. 3834, providing that any party to any proceeding relating to street railways, brought before said commissioners, either upon original application or by appeal, may appeal therefrom to the Superior Court, and sec. 3905, providing that the Common Council of any city may make all orders necessary to the exercise of the power of control over the placing of electric conductors, etc., subject to the right of appeal by such company to a judge of the District Court, any action taken by the Common Council of a city, with respect to matters relating to street railways in respect to the placing of electrical conductors, may be retried and determined by the railroad commissioners, and any one injured in his legal rights, by unlawful action of the local authorities in the exercise of specified administrative powers, may apply to the Superior Court or a judge thereof sitting in chambers, through the original process called "appeal" for such appropriate relief as comes within the judicial power vested in the court, and this process will run against the municipal board when the actual injury complained of results from the unlawful action of that board.

Under General Statutes 1902, sec. 3905, authorizing an appeal to a judge of the Superior Court from orders of the Common Council of a city, relating to the placing of conductors of electricity, purely legislative and administrative powers or duties are not transferred to the Superior Court for performance in such matters, and the action of the board charged with their performance is final; and where the Common Council of a city denies an application to erect overhead wires for the conducting of electricity from an electric street railway power plant to a substation, on the ground that it is unsafe, a judge of the Superior Court has no authority to reverse the order, and authorize the erection of such conductor in the manner desired by the company. (Appeal of N. Y., N. H. & H. R. Co., 70 Atl. Rep., 26.)

Michigan.—Street Railways—Acquisition of Rights in Road—Statutory Provisions—Consent of Adjoining Owners—Fraud in Securing Consent of Some Owners—Effect—Eminent Domain—Compensation—Additional Servitude—"Railroad"—"Street Railway"—Titles and Subject Matter—Constitutionality.

Under Comp. Laws, chap. 164, sec. 51, art. 2, as amended by Laws of 1901, p. 370, No. 238, permitting the construction of interurban railroads upon public highways under certain conditions, provided the company obtains the consent of two-thirds of the owners of adjoining property, if the consent of more than the required two-thirds of the adjoining property owners was properly obtained the fact that the consent of two others was obtained by fraud would not affect the validity of the company's right.

There is a well-defined distinction between the definition of the words "railroad" and "street railway." The one is a word of general and extended meaning, applying to all roads incorporated under the general law, and has always been held to impose an additional servitude upon a public way for which abutting owners are entitled to compensation. The other is local in its signification, referring to transportation of a character entirely different from that of a general railroad, and has been held to add no burden as an additional servitude.

Comp. Laws, c. 164, entitled "An act to revise the laws providing for the incorporation of railroad companies and to regulate the running and management, and to fix the duties and liabilities of all railroads and other corporations owning or operating any railroad in this State," was amended by Laws 1901, page 370, No. 238, by adding to Article 2 thereof a new section, to wit, Section 51, which gave to corporations organized to construct and operate street and interurban railroads, operated by other than steam power, authority to construct such roads on streets, highways, etc., on certain terms. Held, that the amendment relating to street railways was not germane to the purposes of the general railroad law as expressed in the title; hence the act of 1901 was unconstitutional, as in violation of Constitution, Article 4, Section 20, providing that no law shall embrace more than one object, which shall be expressed in its title. (Ecorse Township v. Jackson, A. A. & D. Railway et al., 117 N. W. Rep., 89.)

Massachusetts.—Statutes—Construction—Construction with Reference to Other Statutes—Death—Actions for—Statutory Provisions—Street Railway Companies.

St. 1906, p. 506, c. 463, revising and re-enacting the general railroad law, is as to part 1, sec. 63, almost identical with Rev. Laws, c. 111, sec. 267. St. 1907, p. 338, c. 392, amended St. 1906, p. 506, c. 463, pt. 1, sec. 63. St. 1907, p. 324, c. 375, amended Rev. Laws, c. 171, sec. 2. Held that, as the amending statutes are in effect the same as if they had been originally enacted in the Revised Laws, the same rules of construction are applicable as if both were enacted at the same time and as part of the same general statutory scheme. Statutes alleged to be inconsistent in whole or in part must be so construed as to give reasonable effect to all, unless there be some positive repugnancy between them. St. 1907, p. 324, c. 375, giving an action against any person or corporation whose negligence, or the negligence of whose servants, causes the death of a person other than an employee, does not include a street railway company; but damages against it for the death of a passenger can be recovered only under St. 1906, p. 506, c. 463, pt. 1, sec. 63, as amended by St. 1907, p. 338, c. 392, making street railways liable for the death of passengers, and persons other than passengers, not employees, in the exercise of due care. (Brooks v. Fitchburg & L. St. Ry. Co., 86 N. E. Rep., 289.)

News of Electric Railways

Engineer of New York Commission Files Report on Moving Platform Proposal

Henry B. Seaman, chief engineer of the Public Service Commission of New York, filed with the commission on Nov. 5 a report on the proposed moving platform which the Continuous Transit Securities Company has offered to build under Broadway, between Fourteenth Street and Forty-second Street at Times Square. The proposition of the Continuous Transit Securities Company was made in February, 1909, and amended on June 1, 1909, following the passage by the Legislature of the amendments to the rapid transit act permitting subway construction by private capital. On July 1, 1909, William R. Willcox, chairman of the Public Service Commission, sent a letter to the Board of Estimate and Apportionment, calling the attention of that board to the general subject of moving platforms and suggesting the advisability of a committee from the Board of Estimate considering the matter and a committee appointed by that body with Herman A. Metz, controller of the city, as chairman is at work. The report by Mr. Seaman to the commission says in part:

"Owing to the constantly increasing density of population on Manhattan Island, it has long been evident to students of the transportation problem that a contrivance similar to that offered by the Transit Securities Company may eventually be necessary as a means of transportation for the most congested routes of the city.

"The moving platform is made up of short units coupled together, forming an endless chain, which is kept in continuous motion. This platform is provided with seats, and will travel at a speed of 12 m.p.h. Provision is made for the loading and unloading of passengers at will by the introduction of narrow loading platforms moving at differential speeds. Thus, for the continuous train moving at 12 m.p.h. speed there would be three loading platforms moving at 9, 6 and 3 m.p.h., respectively. The passenger steps from a stationary platform to one moving at the 3-mile speed; thence to the 6-mile speed; thence, etc., until reaching the ultimate speed of the continuous train. The transition of speed between platforms, each increasing at 3 m.p.h., may be made without inconvenience.

"The advantages of this arrangement are: 1. A vastly increased capacity, and seats for all passengers. 2. There is no delay incurred by waiting for trains at stations, as the train is always there and constantly moving. 3. Passengers may board or leave the train at any point at will, and instead of placing stations one-third of a mile apart, as on the present subway, they may be placed at every cross street, or, indeed, at any intermediate point, and the construction may take the form of a continuous arcade.

"The disadvantage is the fact that a larger investment is required. This, however, may be offset by the increased earning power from larger patronage, short trips, and from other sources.

"I have had this device most carefully investigated, and submit herewith typical plans indicating its construction and method of operation. The details of the mechanism may be so designed as to be practically noiseless. The designs and estimates indicate that as a means of transportation this method of conveyance will be efficient, safe and reliable, and, with dense traffic, most economical. For purposes of illustration, the Broadway route has been selected.

"In order to compare the time of transit by means of the moving platform with that by means of the present local trains, we may assume that the average passenger starts from a point one-fourth distance between local stations, and travels to a point of destination likewise one-fourth distance between local stations, and is required to wait at the station one-half the interval between trains. For the purposes of calculation the following data may be used:

"Distance between express stations, 2 miles.
"Distance between local stations 1/3 mile.
"Distance between cross streets, 1/20 mile.
"Speed of express trains, including stops, 25 m.p.h.
"Speed of local trains, including stops, 15 m.p.h.
"Speed of platform, 12 m.p.h.
"Speed of pedestrian, 3 m.p.h.
"Interval between trains (average), 3 minutes.

"It will be found that for all distances less than 4 miles the moving platform is a quicker and more convenient mode of conveyance than is the local train service, or even quicker than the local and express service combined; for instance, a passenger may reach Times Square station from any local station south of Fourteenth Street quicker by the moving platform than by the local and express trains of the present subway.

"These results are derived from the assumption that the local train travels at the schedule speed of 15 m.p.h. As a matter of fact, however, it has been found that during the rush hours the local service averages only about 12 m.p.h. If this rush hour service is compared with a platform speed of 12 m.p.h., it is evident that the platform will have the advantage for all distances, because there is no train interval to wait and no distance between stations to walk.

"Since surface cars, in congested districts, do not travel faster than 8 m.p.h., while in rush hours their speed is diminished in some instances as low as 3 m.p.h., it may readily be seen that a platform would have a great advantage in every case.

"In order to compare the capacity of the two systems of travel, the following table has been prepared:

CAPACITY PASSENGERS PER HOUR (IN ONE DIRECTION).

	Mid-day	Rush hour		
	Seated.	Seated.	Standing.	Total.
5 car local train....	5,500	7,500	15,000	22,500
8 car express train.	8,000	12,000	24,000	36,000
Moving platform ..	73,500	73,500	———	73,500

"This table indicates that the moving platform has a capacity far greater than the combined rush-hour service of the local and express trains of the present subway, and furthermore, as already stated, will carry all passengers seated.

"In view of the foregoing, I would respectfully recommend that the proposed routes be laid out as requested by the Continuous Transit Securities Company, and that an early installation of some one route be required."

Philadelphia Transit Talks

Transit Talk No. 25 of the Philadelphia (Pa.) Rapid Transit Company was dated Oct. 12, 1909. It was entitled "An Invitation Renewed." The talk follows:

When we began these talks we asked for suggestions from the public as to subjects about which Philadelphians wanted information.

The responses to this invitation have been disappointing in one way, though helpful in another. They don't assist us in finding out what people in general want to know about the transit company.

Most of the letters deal with details of the service that do not affect the public at large; but in a number of cases we have been able to correct faults called to our attention in this way. All such suggestions are welcome, and each will have careful attention.

Don't hesitate about writing to us, even if you only want to know how to reach some point on our lines.

We are dealers in a merchandise called transportation, and want to satisfy our 500,000,000 customers. The proprietors of a department store are not more anxious to please people than we are.

Write to us with this idea in mind, and don't forget that we want to know what you want to know about the affairs of the company. Address 228 Land Title Building—an office established especially to supply information to the public.

Transit Talk No. 26 was dated Oct. 15, 1909. It was entitled "How to Reach Point Breeze," and contained a map and directions for reaching Point Breeze Park, where an aeroplane flight and automobile races were scheduled to take place on Oct. 16.

Transit Talks No. 27 was dated Oct. 20, 1909. It was entitled "To Prevent Accidents to Children." The talk follows:

In an endeavor to lessen the chances of accidents to children this letter was recently sent to the principal of every public school in Philadelphia:

"We wish to enlist your co-operation in our efforts to prevent injuries to children, resulting from the operation of our cars near your school.

"In spite of every precaution taken by the company, the careful operation of our cars by employees and constant vigilance in the enforcement of safety rules, accidents happen more often than they would if children were carefully instructed by those in authority concerning the dangers of carelessly playing in the streets, crossing streets without looking for cars and stealing rides on cars.

"We believe that a warning and instruction against these practices would tend to diminish the chance of accident, and we earnestly request that you will give such warning to the children under your charge.

"This letter is sent with the approval of Dr. Martin G. Brumbaugh, superintendent of schools. Respectfully, CHARLES O. KRUGER, President and General Manager."

The responses to this appeal have been very gratifying, and we now address it to every parent in Philadelphia. Children cannot have too many of these warnings.

The fact that the company is rarely held responsible for accidents to children proves conclusively that such mishaps occur, ninety-nine times out of a hundred, under circumstances that relieve us of all blame. This fact also shows that we use every care to avoid accidents.

If we could induce passengers and pedestrians to use half as much care as we do, the accident roll would be greatly reduced.

Even now we have but one accident for every 2,289 miles run by our cars, and only one out of every 14,486 passengers is in any way injured. In this computation the most trivial accidents count as much as those of a serious nature.

Transit Talk No. 28 was dated Oct. 26, 1909. It was entitled "About One of Many Safety Rules." The talk follows:

This notice has lately been posted in all of our car barns:

"Recently we have had a number of accidents, the direct cause of which can be attributed to conductors unnecessarily standing inside the car. The requirements of Rule 24, Page 18, in the Book of Rules and Regulations must be complied with hereafter, otherwise infringement of said rule will be sufficient cause for suspension."

The rule referred to in this notice is one of many framed to safeguard passengers. The rule reads:

"The conductor's position when not otherwise engaged in duty, is upon the rear platform, standing erect, attentive to the wants of his passengers, and on the watch for persons desiring to enter or leave the car."

Our platforms are protected from the weather, and there is no reason why conductors should not be almost constantly at their proper stations, on the rear platform.

It will aid us in the stricter enforcement of the rule quoted if passengers will refrain from unnecessary conversation with conductors. That is the reason why we bring this matter to the attention of the public.

Transit Talk No. 29 had for its subject "Poisoning the Wells of Public Opinion." The company referred to the effort made in some quarters to make the company an issue in the recent municipal campaign and reprinted part of the last baccalaureate address by President Hadley, of Yale University, as a reproach to those who had sought to slander the company.

Transit Affairs in New York

The Public Service Commission has given out designs for the elevated parts of the new subway, which have been approved by the Municipal Arts Commission. It was said, however, that this approval was tentative, and that the designs finally adopted would go again before the Arts Commission for consideration. The drawings of the new structures show several departures from the old style of elevated railway construction, among which are a noise deadening scheme and a footpath extending from station to station; also larger stations. The stations will be on the mezzanine plan. The ticket office will be placed on a floor half way between the street and the rail platforms, and there will be as many platform approaches as convenient. This will make access to either side of the station possible without crossing the street, and one ticket office will do for each station. The platforms for express stations will be 480 ft. long, allowing for 10-car trains, and for the local stations 435 ft. long, permitting 8-car trains to be used. On the latter, if only one door of the end car is used 10-car trains may also be used. The design provides that 14 ft. of head room shall be provided underneath the elevated structure, and the base of rail is never to be higher than 25 ft. above the curb line of the street.

The Public Service Commission of the First District of New York has referred to the entire commission as a committee of the whole the letter from the New York Edison Company to the commission in which an offer was made to submit bids for supplying the current necessary to light and operate the new subways in New York. This letter was published in full in the Electric Railway Journal of Oct. 30, 1909, page 951.

The Public Service Commission on Nov. 9 signed the contracts for the Brooklyn subway under Fourth Avenue, from the Manhattan Bridge to Forty-third Street, Bay Ridge. Work will begin just as soon as a few remaining preliminaries can be taken care of. The Fourth Avenue subway, as laid out under the contracts, calls for the expenditure of $15,886,381, of which $14,886,723 is for the construction of railway and the tube itself, and the balance for pipe galleries along its sides. James P. Graham, the successful bidder on Section 1, from the bridge to Willoughby Street, arranged for the assignment of his section to Smith, Scott & Company, a firm of which Mr. Graham is a member. Following is a list of the contracts and the sums they call for:

Section 1—Nassau Street to Willoughby Street, James P. Graham, Bensonhurst, L. I., N. Y. Railroad, $1,020,476; pipe galleries, $101,374.

Section 2—Willoughby Street to Ashland Place, William Bradley, New York, N. Y. Railroad, $3,436,019; pipe galleries, $58,695.

Section 3—Ashland Place to Sackett Street, William Bradley, New York, N. Y. Railroad, $3,392,091; pipe galleries, $208,135.

Section 4—Sackett Street to Tenth Street, E. E. Smith Contracting Company, Philadelphia, Pa. Railroad, $2,283,553; pipe galleries, $206,672.

Section 5—Tenth Street to Twenty-seventh Street, Tide Water Building Company and Thomas B. Bryson, New York, N. Y. Railroad, $1,945,640; pipe galleries, $251,076.

Section 6—Twenty-seventh Street to Forty-third Street, E. E. Smith Contracting Company, Philadelphia, Pa. Railroad, $2,808,982; pipe galleries, $176,665.

In a letter addressed to the Public Service Commission on Nov. 9, the Edison Illuminating Company of Brooklyn expressed its desire to furnish power for lighting or operation of the Brooklyn subway. In its letter to the commission the company said:

"We respectfully ask that in the preparation of specifications providing for the operation of the railway, any contractors who may assume the operation of the whole or any part of the railway be given the privilege of obtaining electric current necessary for the maintenance and operation of the subway from the mains of this company, or any properly equipped electric supply company. We believe that it will be found to the advantage of the city of New York, as well as to the contractors who may operate the Fourth Avenue system, to contract for their electric light and power service, rather than to make the large investment necessary to provide for a special power plant."

New Pennsylvania Road Opened.—The Irwin & Herminie Traction Company has placed in operation its line between Irwin and Herminie, 4 miles distant. The company has an extension under construction reaching the Youghiogheny Valley at West Newton.

Submission of San Francisco Plan to Voters.—A date between Dec. 22, 1909, and Jan. 1, 1910, will be selected for submitting to the voters of San Francisco the resolution of the Council providing for the reconstruction of the Geary Street, Park & Ocean Railroad by the city and the building of an extension in Market Street from Geary Street to the Market Street ferry.

Forest Hills Extension in Boston to Be Opened Shortly.—The Boston (Mass.) Elevated Railway will shortly open its new double-track elevated extension to Forest Hills, thus affording the West Roxbury district high-speed train service from the center of Boston. There will be only one stop between the present end of the elevated system at Dudley Street, Boston, and Forest Hills Square, and the completion of the line will throw open for travel a through route from Sullivan Square to Forest Hills via the Washington Street tunnel, about 7½ miles long.

Quarterly Meeting of New York State Street Railway Association.—A meeting of the executive committee of the Street Railway Association of the State of New York was held in Schenectady on Nov. 5, and it was decided to hold the next quarterly meeting of the association in Albany on Dec. 7 and 8. The meeting will be opened with an informal dinner at 8 p. m. on Dec. 7 and two sessions will be held on Dec. 8. A program of the meeting and an announcement of the place at which the meeting and dinner will be held will be published in an early issue of the Electric Railway Journal.

Kansas City Ordinance Passed.—The ordinance granting the Metropolitan Street Railway, Kansas City, Mo., an extension of its franchise until 1951 under new terms has been passed by both houses of the Council and signed by the Mayor. The ordinance provides for six tickets for 25 cents and 25 tickets for $1 after 1913, the right being reserved to the city to purchase the property of the company any time after 1945. Both branches of the Council have passed, and the Mayor has signed, an ordinance ordering a special election on Dec. 16, 1909, at which the new franchise will be submitted to the voters for approval.

Hearing by Joint Commission on Boston Elevated Structure.—The Massachusetts Railroad Commission and the Boston Transit Commission, sitting jointly, gave a public hearing on Nov. 4, 1909, on the bill of J. F. Cronin and others, referred to it by the Legislature of 1909, asking that the Boston Elevated Railway be required to accept a subway from Castle Street to Dover Street, Boston, under Washington Street, in place of its present elevated structure. After hearing arguments by Mr. Cronin in favor of the bill, the board read a statement from T. A. Babson, corporation counsel, of Boston, criticising the measure as wholly impracticable. Mr. Babson said that if the elevated structure were removed in the section asked, other sections would demand removal; that the Boston Elevated Railway has already paid damages to the abutting property owners; that the courts would require the company to be compensated for the loss of its structure, legally built and owned, if the road should be forced into a tunnel, and that the subway would be a financial failure. F. E. Snow, counsel of the Boston Elevated Railway, questioned the constitutionality of such an act as Mr. Cronin's bill suggests. He said that the contention that the elevated structure constitutes a nuisance is based on the assertion that it obstructs light and air, that it is unsightly, and that its operation by electricity is noisy. Concluding, Mr. Snow stated that the particular type of structure erected and operated in Washington Street was specifically authorized by the Legislature, and that the plans were approved in detail by the Railroad Commission and the Mayor of Boston. The company has paid damages to abutters and acquired property rights in the street which even the Legislature may not constitutionally abrogate. The board will report its recommendations or comments to the next Legislature.

Financial and Corporate

New York Stock and Money Market

November 9, 1909.

The stock market was dull to-day and there was a tendency of prices to sag, in keeping with the trend during the entire week, although on previous days conditions have been a trifle less emphatic. The unsettled condition of the money market, principally abroad, is responsible for the depression. There has continued to be considerable activity in Interborough-Metropolitan, especially the common stock, and on a receding market the prices of these issues has advanced. Other tractions have been rather dull.

Money to-day was quoted: Call, 4½ to 5½ per cent; 90 days, 5 per cent.

Other Markets

Dealings in Philadelphia Rapid Transit stock have been heavy, but there have been as many buyers in evidence as sellers, with the result that the price is at the same figure at the end of the week as at the beginning. Other tractions have been fairly active at unchanged prices.

In the Boston market, Massachusetts Electric common and Boston Suburban preferred have been the leading tractions in the trading. The prices of these stocks have not changed to any extent.

There has been little interest shown in tractions in the Chicago market during the past week. Even Subway shares have been dull, with the price still hovering around 7. Metropolitan Elevated preferred is a trifle lower.

In the Baltimore market, the bonds of the United Railways Company, the only traction issue in which there has been trading, have been selling liberally at about 57¾ for the incomes, 84 for the funding 5s and 85¼ for the 4s.

At the auction of securities in New York last week the following were sold: 150 shares Second Avenue Railroad at 19¼, 4 shares Metropolitan Street Railway at 20⅜, and 4 shares American Light & Traction preferred at 105⅝.

Quotations of various traction securities as compared with last week follow:

	Nov. 2.	Nov. 9.
American Railways Company	a45½	a45¼
Aurora, Elgin & Chicago Railroad (common)	*45	a49¼
Aurora, Elgin & Chicago Railroad (preferred)	*95	a95
Boston Elevated Railway	130	130¾
Boston & Suburban Electric Companies	*18¼	a18½
Boston & Suburban Electric Companies (preferred)	77⅜	77⅛
Boston & Worcester Electric Companies (common)	a12	a12½
Boston & Worcester Electric Companies (preferred)	a53	a52
Brooklyn Rapid Transit Company	75⅞	75½
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	85	84¾
Capital Traction Company, Washington	a139	a136
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*2	*2
Chicago & Oak Park Elevated Railroad (preferred)	*10	*10
Chicago Railways, ptcptg., ctf. 1	a106	a106
Chicago Railways, ptcptg, ctf. 2	a36	a35
Chicago Railways, ptcptg, ctf. 3	a24	a24
Chicago Railways, ptcptg, ctf. 4s	a10	*10
Cleveland Railways	*84	*84
Consolidated Traction of New Jersey	a76½	a76½
Consolidated Traction of N. J., 5 per cent bonds	a106	a106
Detroit United Railway	a70	a67½
General Electric Company	164	162
Georgia Railway & Electric Company (common)	a99½	a100½
Georgia Railway & Electric Company (preferred)	a87	a88½
Interborough-Metropolitan Company (common)	19½	20¼
Interborough-Metropolitan Company (preferred)	50	50¼
Interborough-Metropolitan Company (4½s)	83⅜	83
Kansas City Railway & Light Company (common)	40	a40
Kansas City Railway & Light Company (preferred)	*a82	*82
Manhattan Railway	141	142
Massachusetts Electric Companies (common)	a18	a18½
Massachusetts Electric Companies (preferred)	a83	a83
Metropolitan West Side, Chicago (common)	a17	a17½
Metropolitan West Side, Chicago (preferred)	a54	a52½
Metropolitan Street Railway	*a24	*24⅝
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	79	79⅛
Northwestern Elevated Railroad (common)	a20	a20
Northwestern Elevated Railroad (preferred)	a68	a68
Philadelphia Company, Pittsburg (common)	a49	a49
Philadelphia Company, Pittsburg (preferred)	a44⅞	a43¾
Philadelphia Rapid Transit Company	a26½	a27¾
Philadelphia Traction Company	a89½	*89½
Public Service Corporation, 5 per cent col. notes	*100⅛	*100⅛
Public Service Corporation, ctfs.	*97	a100½
Seattle Electric Company (common)	115¼	116
Seattle Electric Company (preferred)	103	a104½
South Side Elevated Railroad (Chicago)	a52	a53
Toledo Railways & Light Company	*8	*8
Third Avenue Railroad, New York	20	19
Twin City Rapid Transit, Minneapolis (common)	108	109½
Union Traction Company, Philadelphia	52¼	a53¾
United Rys. & Electric Company, Baltimore	13¼	*13¼
United Rys. Inv. Co. (common)	42	42
United Rys. Inv. Co. (preferred)	73¼	*73¼
Washington Ry. & Electric Company (common)	*47	a47
Washington Ry. & Elec. Company (preferred)	a94	a94
West End Street Railway, Boston (common)	92½	92½
West End Street Railway, Boston (preferred)	103	103½
Westinghouse Electric & Manufacturing Company	86½	85½
Westinghouse Elec. & Mfg. Company (1st pref.)	*140	*140

a Asked. * Last Sale.

Annual Report of Northwestern Elevated Railroad

The annual report of the Northwestern Elevated Railroad of Chicago, covering the year ended June 30, 1909, shows a gain of 3.15 per cent in gross earnings, reflecting the failure of the elevated properties of that city to maintain their usual rate of traffic development against the improvement in the surface lines. A statement of the income account, with a comparison, is as follows:

Year ended June 30—	1908	1909	Increase
EARNINGS.			
Passenger earnings	$1,857,754	$1,913,515	$55,762
Other earnings (including Loop net earnings)	605,434	627,368	21,934
Total earnings	$2,463,188	$2,540,883	$77,696
OPERATING EXPENSES.			
Maintenance of way and structure	$40,115	$45,038	$4,924
Maintenance of equipment	130,381	147,045	16,664
Conducting transportation	693,760	699,843	6,083
General expenses	100,861	103,893	3,032
Total operating expenses	$965,117	995,819	$30,703
Net earnings	$1,498,071	$1,545,064	$46,993
CHARGES.			
†Taxes	$226,381	$261,846	$35,465
Bond interest	802,837	848,852	46,015
Other interest	117,965	78,590	*39,375
Total charges	$1,147,183	$1,189,288	$42,105
Surplus	$350,883	$355,776	$4,888
Ratio of operating expenses to earnings (excluding loop net earnings)	50.22	49.82	.....
Ratio of operating expenses, loop account and taxes to earnings (excluding loop net earnings)	66.64	68.24	.....

* Decrease.

† Includes compensation to city on account of loop. Reserve for maintenance has been kept at $250,000.

Total expenditures for maintenance of way and structures and maintenance of equipment in the last year were $192,083, or 10 per cent of the passenger earnings. The cost of conducting transportation was 36.6 per cent of the passenger earnings.

M. B. Starring, president of the company, says in his statement to shareholders:

"The gross earnings for the year were (including Loop and Evanston line net earnings) $2,540,883, an increase of $77,696, or 3.15 per cent.

"The rehabilitation of the lines of the surface railways, and the improvements in their rolling stock and schedules somewhat affected this company's gross earnings, not only upon its own lines but by reason of the effect upon the revenue of the other Loop lessees, correspondingly affecting the revenue from the Loop. The most serious effects have now been felt, and the business of the elevated railways as an entirety is improving.

"The total expenses were $2,185,107, an increase of $72,807, or 3.44 per cent.

"This increase was due: (a) To increase in car-miles from 10,316,296 in 1908 to 12,034,490 in 1909, occasioned by the opening of new lines, although the cost of operation per car-mile decreased 11.55 per cent. The opening of new lines has added materially to the length of the average haul for 5 cents per passenger.

"(b) To an increase in the disbursement for taxes caused by the increase in the tax rate in the towns of South Chicago, North Chicago and Lake View.

"(c) To accident on May 18, one of the most serious accidents in the company's history. The traction expert of the city of Chicago, after a thorough investigation, reported to the Mayor as follows: 'I am forced to conclude that the motorman must have been confused and he failed to apply his brakes in time to avoid the collision.' This accident has already cost the company $10,602, which has been charged to 'general expenses' for the year. How much more this accident will cost is problematical.

"(d) To increased expenditures for maintenance.

"To provide in future for the accident of May 18 and other claims and suits which are pending and which arose from accidents which occurred in this and previous years, $25,000 has been set aside as a 'reserve for damages.'

"The net income was $355,776, an increase of $4,888. The surplus at the close of the year was $2,355,677.

"On May 31 the contract between the company and its employees, in force for the past two years, regarding their wage scale and working conditions, expired, and we are negotiating a new contract. At the close of the fiscal year settlement had not been attained; however, the relations between the men and the management are amicable and

no doubt an arrangement fair to all concerned will finally be agreed upon. Whatever contract is executed will result in an increase in the wage scale.

"The physical condition of the property has been properly and conservatively maintained.

"Of the 20 combination motor cars ordered from the Pullman Company, 19 have been delivered and placed in service. For comfort, beauty and convenience these cars are not excelled, if equaled, by those of any other railroad.

"The Evanston line, which has been in operation for over one year, has greatly enhanced values in real estate. The territory adjacent to it is rapidly filling up with high-class buildings, and when the tracks are elevated from Wilson Avenue to Central Street the line will show a good profit to both companies.

"At present our train schedules are much interfered with by the work of elevating the tracks from Howard Avenue to Church Street, Evanston, and the service is thereby rendered more or less irregular, resulting in loss of patronage, which must of necessity continue until this work is completed, which will probably be in December, 1909.

"The North Water Street terminal was duly completed from a junction with the main line at Wells Street to the terminal station at Clark Street, and opened for business Nov. 17, 1908—nearly two weeks ahead of time required by ordinance. From this station during the evening rush hours as high as 2141 passengers have been carried, thus affording that much more accommodation to our patrons, all of whom can obtain seats on the trains at that station.

"The radii of the curves at Michigan and Wells Streets and Michigan and Franklin Streets were changed so as to make them ride much easier for passengers, permit of trains being operated thereon at higher speed, and secure a longer life of rail, etc., and a corresponding reduction of maintenance charges. This work was completed and the first through train operated thereover May 5, 1909.

"The company has received from the Central Trust Company of New York $334,000 of the first mortgage bonds of the Union Elevated Railroad Company, which are now in this company's treasury. The stocks of the Chicago & Oak Park Elevated Railway Company obtained pursuant to the plan of reorganization dated Nov. 9, 1903, of the Lake Street Elevated Railroad Company, as printed and published at that time, have recently been delivered to this company and are included in the item 'stocks and bonds.' The company's floating debt was reduced by the proceeds of the sale of $3,000,000 bonds heretofore authorized, which have been sold and delivered.

"An initial dividend upon the preferred stock of the company will be paid in October, and it is the expectation of the management that the earnings of the company will warrant a continuance of dividends upon said stock and that the maximum rate provided therefor will be ultimately attained."

The total number of passengers carried in the year was 40,955,795, as compared with 37,419,286 in the previous year. The daily average was 112,207, an increase of 9969 passengers, or 9.75 per cent, over the previous year.

Camden & Trenton Railway, Camden, N. J.—The United States Circuit Court of Appeals at Philadelphia on Nov. 4, 1909, granted to Daniel Killian, a bondholder, permission to appeal from the judgment of foreclosure and sale, also a stay of the sale of the property of the company, which had been set for Nov. 12, 1909.

Chicago (Ill.) Consolidated Traction Company.—Charles G. Dawes returned to Chicago from New York on Nov. 3, after conferences in the East regarding the reorganization of the Chicago Consolidated Traction Company. It has since been announced that more than 90 per cent of the underlying bonds of the company have been deposited in favor of a readjustment, the terms of which have not been made public, and that practically all of the consolidated general mortgage bonds have been pledged. The first meeting of the reorganization committee of the company with the officers of the Chicago Railways for the purpose of arranging a traffic agreement between the companies was held on Nov. 2.

Halifax (N. S.) Tramway Company.—The Halifax Tramway Company has declared a quarterly dividend of 1¾ per cent. The previous quarterly disbursement was 1½ per cent.

Lowell, Acton & Maynard Street Railway, Maynard, Mass.—The Railroad Commission of Massachusetts has authorized the Lowell, Acton & Maynard Street Railway to reduce its capital stock from $45,000 to $35,000.

New York Central & Hudson River Railroad, New York, N. Y.—The New York Central & Hudson River Railroad has applied to the Public Service Commission of the Second District of New York for permission to issue $44,658,800 of new stock, increasing the amount outstanding from $178,632,000 to $223,390,000. With the proceeds it is proposed to redeem $25,000,000 of 3-year 5 per cent notes which mature on Feb. 1, 1910, and to use the balance to defray the expense of improvements which have been made, some that are under way and others in contemplation. Of the total thus to be used for paying for improvements, $6,000,000 will go toward electrifying the Harlem division to North White Plains, four-tracking the Hudson River division between New York and Albany and electrifying the line between Highbridge and Croton and for two-tracking the Rome, Watertown & Ogdensburg and the Pennsylvania divisions.

Pittsburg, McKeesport & Westmoreland Railway, McKeesport, Pa.—The Pittsburg, McKeesport & Westmoreland Railway has been organized to buy certain railways, including the Pittsburg & Westmoreland Railway, of which Manning Stires is receiver. The sale of these properties to the Pittsburg, McKeesport & Westmoreland Railway has been requested by a petition of the receivers of the Pittsburg & Westmoreland Railway to the court. The sale of the property of the Pittsburg & Westmoreland Railway will be held on Nov. 13, 1909.

Southwestern Traction Company, London, Ont.—The property of the Southwestern Traction Company was sold under foreclosure at London on Oct. 20, 1909, to J. E. McDougall and T. H. Purdom, representing a syndicate of London, Toronto and Hamilton capitalists. The purchase price was $445,000 in cash, the purchasers agreeing to assume $80,000 of indebtedness. C. C. Giles, Montreal, offered $450,000 on behalf of the Royal Securities Corporation, representing a majority of the $717,500 of outstanding bonds, including $445,000 owned by the Electrical Securities Trust, Ltd. The London Street Railway, of which H. A. Everett, Cleveland, is president, bid $350,000. The purchasers have applied to the Dominion Parliament for the incorporation of the London & Lake Erie Railway & Transportation Company with a capital of $2,000,000, as the successor to the Southwestern Traction Company, and have asked permission to acquire the Woodstock, Thames Valley & Ingersoll Electric Railway as part of their through system and to construct lines from Brantford through Paris to Woodstock, Ingersoll, London, Strathroy and Glencoe, and from Delaware to Lambeth and from Ayler to St. Thomas. The new company will also run boats to Cleveland, Ohio, from Port Stanley, on Lake Erie. The provisional directors are: W. K. George, Sidney Jones and George B. Woods, Toronto; Dr. Angus MacKay, Ingersoll; F. G. Rumball and John Purdom, London, and Albert E. Thompson, Cleveland.

Spokane & Inland Empire Railroad, Spokane, Wash.—Negotiations are understood to be under way whereby the Northwestern Improvement Company, acting in the interest of the Northern Pacific Railway, is to take over the Spokane & Inland Empire Railroad.

Tarrytown, White Plains & Mamaroneck Railway, White Plains, N. Y.—Richard Sutro, of Sutro Brothers, New York, N. Y., representing the New York, New Haven & Hartford Railroad, purchased the greater part of the Tarrytown, White Plains & Mamaroneck Railway on Nov. 5, for $825,000, under a foreclosure sale brought by the Knickerbocker Trust Company, New York, N. Y. The property of the company was sold in three sections, and the first two were bought by Mr. Sutro. They extend from Mamaroneck to Tarrytown and from White Plains to Scarsdale, a distance of 21½ miles. The other successful bidder was Frederick J. Littlebrook, representing Franklin L. Babcock, secretary of the bondholders' committee of the Third Avenue Railroad, New York, N. Y. He purchased the third section for $110,000. This line extends from Mamaroneck to Larchmont, two miles.

United Railways, St. Louis, Mo.—The voting trust for the $24,913,800 common stock of the United Railways expired by limitation on Nov. 1, 1909. The voting trust was formed five years ago in connection with the reorganization of the St. Louis Transit Company, which was succeeded by the United Railways Company. The voting trustees originally were F. S. Smithers, Anson W. Hard, James Campbell, Murray Carleton, J. C. Van Blarcon, Eugene Delano and James Brown. When the North American Company acquired control of the United Railways through the purchase of a large part of its common stock, the personnel of the voting trust was changed and at the time of its dissolution consisted of F. S. Smithers, chairman; John I. Beggs, vice-chairman; Edwin M. Bulkley, Adolphus Busch, James Campbell, George R. Sheldon and Charles W. Wetmore. Steps will immediately be taken for the issue of stock certificates in exchange for the voting trust certificates.

Traffic and Transportation

Communications of Indiana Commission on High-Tension Lines and Trolley Guards

On Nov. 1, 1909, the Railroad Commission of Indiana addressed the following communication to the steam railroads and the electric railways in Indiana:

"Information has come to the commission that many telegraph and telephone wires crossing interurban and steam railway rights of way are so constructed as to be sources of danger by reason of the possibility of their coming in contact with high-tension wires of the electric line; and that many wires crossing steam railways are too low for safety. This hazard arises (1) either from the wires being originally stretched too low, (2) or from their being fastened to weak or rotten poles, (3) or from their being constructed of inferior material which quickly rusts out and breaks, especially when acted upon by the smoke from locomotives, or (4) because the poles are too far apart, causing the wires to sag.

"The commission proposes to take steps to correct these conditions, so far as possible. You are therefore requested to furnish to the commission at your earliest opportunity, a list of all such dangerous wires which cross your line, where the steam and electric lines run parallel to each other, and where they do not, indicating (1) the station upon your line, nearest to which the objectionable wire is located. (2) The number of the telegraph pole along your line nearest to which such wire is located. (3) The present height of the wire above your rails. (4) Why the wire is considered dangerous. (5) The name and address of the owner of such wire."

On the same date the commission also addressed the following communication to the electric railways in Indiana:

"The Railroad Commission is conducting an inquiry with respect to the installation of trolley guards at crossings of electric and steam lines. To assist it in its investigation, it solicits your answers to the following questions:

"1. Give number of crossings upon your line now protected by trolley guards; and give brief description of guard or guards so used, with name of manufacturer.

"2. Give approximate number of crossings upon your line not so protected.

"3. What is your opinion concerning the practical efficiency of trolley guards?

"4. What kind of guard do you consider the best?

"5. What is the approximate cost of installing a serviceable trolley guard?

"6. Do you propose installing guards upon your line in the near future? If so, to what extent?

"Prompt replies to the above are requested."

The commission has also addressed a communication to all interurban railways on the subject of continuous service by employees which it has concluded as follows:

"While the Attorney-General has decided that the Sixteen-Hour Law of 1907 does not apply to interurban railroads, nevertheless, inasmuch as Congress and the General Assembly of Indiana have enacted humane endurance laws, we think that the wisdom and experience of railroad men and legislators leading to such enactments should cause you not to require or permit employees, especially your trainmen, to work more than a reasonable length of time. Therefore the commission desires to impress upon interurban managers, whether or not the interurban railroads are amenable to the penalties of these Acts, that their trainmen and employees should not be required or allowed to remain on duty longer than 16 consecutive hours, or to go on duty without having had at least eight hours' rest, and the commission recommends that managers take prompt and efficient steps to limit the hours of service on their lines in accordance with the recommendation."

Celebration Traffic in New York

The Public Service Commission of the First District of New York has just made public a summary of the total passengers carried on each of the street railways within its jurisdiction during the Hudson-Fulton celebration in New York, which extended from Sept. 25 to Oct. 2. On page 887 of the ELECTRIC RAILWAY JOURNAL, of Oct. 16, 1909, a similar summary was published, but the figures were obtained direct from the companies solicited, and the summary was confined to the principal companies operating in Manhattan Borough, Bronx Borough and Brooklyn Borough. The compilation of the Public Service Commission, therefore, includes the Second Avenue Railroad, Central Park, North & East River Railroad, the Hudson & Manhattan Railroad operating between New York and New Jersey and the Twenty-eighth & Twenty-ninth Street Crosstown lines in Manhattan Borough; the West Chester Electric Railroad, Yonkers Railroad, New York City Interborough Railway and the Southern Boulevard Company in Bronx Borough; the Long Island Electric Railway, New York & Long Island Traction Company, New York & Queens County Railway and the Queens Borough Bridge Operating Company in Queens Borough, and the Staten Island Midland Railroad and the Richmond Light & Railroad Company in Richmond Borough, none of which was included in the compilation in the ELECTRIC RAILWAY JOURNAL of Oct. 16. Thus the total of passengers carried as given by the Public Service Commission for the five boroughs of the greater city is 47,834,103, as compared with the total of 44,321,821 given in the ELECTRIC RAILWAY JOURNAL of Oct. 23, 1909, page 922, for the principal companies in Manhattan Borough and both companies operating in Brooklyn. The number of passengers carried by the companies arranged by boroughs as made public by the commission follows:

Manhattan.		
Metropolitan Street Railway	10,802,964	
Second Avenue Railroad	417,483	
Central Park, North & East River Railroad	363,312	
Subway (Interborough)	7,515,655	
Elevated (Interborough)	7,608,506	
Hudson & Manhattan Railroad	1,052,915	
Third Avenue Railroad	1,510,796	
Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad	1,119,967	
Dry Dock, East Broadway & Battery Railroad	324,468	
Twenty-eighth & Twenty-ninth Street Cross-town Railroad	9,126	
		30,725,172
Bronx.		
Westchester Electric Railroad	144,920	
Yonkers Railroad	170,913	
New York City-Interborough Railway	152,400	
Southern Boulevard Co.	69,030	
Union Railroad	1,357,030	
		1,894,293
Brooklyn.		
Brooklyn Rapid Transit Company (Elevated)	3,752,748	
Brooklyn Rapid Transit Company (Surface)	9,476,007	
Coney Island & Brooklyn Railroad	805,017	
		14,033,772
Queens.		
Long Island Electric Railway	78,469	
New York & Long Island Traction Company	59,445	
New York & Queens County Railway	570,193	
Municipal Operating Queensboro Bridge	144,034	
		852,141
Richmond.		
Staten Island Midland Railroad	125,926	
Richmond Light & Railroad Company	202,799	
		328,725
Grand total		47,834,103

Notwithstanding the fact that the surface, subway and elevated lines in Greater New York carried 47,834,103 passengers during the celebration, the commission reports that not a death resulted from accident in handling the enormous crowds. During the celebration, there were only 20 accidents resulting in injury to passengers, of which 7 occurred on Sept. 25, 7 on Sept. 28, 5 on Sept. 30, and 1 on Oct. 2. This is lower than the average number of accidents in ordinary traffic and, in the opinion of the commission, shows the attention and care exercised in the provisions made for the safe transportation of the people. In the accidents which occurred, there was nothing to indicate that any one of them was directly connected with the celebration.

Employees of Connecticut Company Rewarded.—The Connecticut Company, New Haven, Conn., recently made its fourth annual distribution of $1,000 among conductors and motormen of its New Haven lines who operated their cars for a year with a clean record. About 200 men participated, the motormen receiving $3.29 each, while the conductors received $5.26 each.

Smoking Cars Discontinued on Chicago & Oak Park Elevated Railroad.—The Chicago & Oak Park Elevated Railroad discontinued the operation of smoking cars on Nov. 1, 1909. The notice of the company to the public, informing them of the change, follows: "On and after Nov. 1, 1909, the Chicago & Oak Park Elevated Railroad will not operate 'smoking cars' on any of its trains. Four-minute service except during 'rush hours' (when the 3-minute service still continues) will go into effect Nov. 1, 1909, from Oak Park and Austin. Running time, Oak Park to Loop, will be cut to 29 minutes, and Austin to Loop to 22 minutes."

Members of Pennsylvania Commission and Representatives of Railways Confer.—A series of important conferences between the members of the Railroad Commission of Pennsylvania and officials and attorneys of steam railways and electric railways regarding various matters affecting the companies was held at the offices of the commission at the State Capitol, in Harrisburg, beginning Nov. 1. Mayor

Magee, of Pittsburgh, reported to the commission concerning the service furnished by the Pittsburgh Railways in compliance with the recommendations of the commission following an inquiry into the transportation problems in Pittsburgh and its suburbs, and officials of the Philadelphia Rapid Transit Company were heard regarding the recommendation of the commission that the company comply with the previous order of the commission forbidding passengers from riding on the front platforms of cars, to which order attention has been directed by the commission, as noted on page 1001 of the Electric Railway Journal, of Nov. 6, 1909.

New Headlight Regulation in Washington.—The Commissioners of the District of Columbia have adopted the following amendment to the police regulations of the district: "No street railway company, motorman, conductor or officer or employees of a street railway company, operating street railway cars in the District of Columbia, shall use upon, or affix thereto, any street railway car any headlight which by reason of its excessive brilliancy is likely to dazzle, blind or otherwise endanger any driver or operator of any vehicle or any pedestrian, using the public streets, avenues or highways of the District of Columbia. Any person or corporation violating the provisions of this section shall upon conviction thereof be fined not less than $5 nor more than $40 for each offense."

Electric Railways at the Boston 1915 Exhibition.—An "uplift" exhibition is being held in Boston in the old Museum of Fine Arts building, with the object of improving living and commercial conditions in the metropolitan district with 1915 as a time limit for definite betterment. Among the exhibits is a display by the Pennsylvania Railroad which consists of a model of the New Jersey, Hudson and Long Island tunnels 33 ft. in length, models of electric locomotive, car, tug and lighter construction, photographs of the Washington terminal, views of the proposed Hell Gate bridge, and illustrations of a variety of steam locomotives, passenger and freight rolling stock. Plans and sections of the company's recent work are also shown. The Boston Elevated Railway shows a large number of photographs of its system and equipment, including views of places on its lines with historic and literary associations, cardboard models of subway and tunnel stations, plans of the surface and elevated lines, maps of the subway system, and a perspective drawing of all the trunk lines of the company. Views of surface and elevated cars are shown by years, and there are also motor-driven folding pictures of points of interest. The Boston & Northern Street Railway and the Old Colony Street Railway are distributing maps and folders of their territory, and exhibit photographs and 300 reflectograph views of points on the systems north and south of Boston. The Boston Transit Commission displays a model of the State station of the Washington Street tunnel, and photographs and blue prints of its subway and tunnel construction since the building of the Tremont Street subway in Boston, about 14 years ago.

Chicago Cars to Stop on Near Side.—At a conference of city and traction officials on Nov. 8, 1909, it was decided that on and after April 1, 1910, all street cars in Chicago shall stop on the near side of street crossings. Between now and April 1 a campaign of education will be conducted so that passengers will not be inconvenienced when the new rule goes into effect. One of the members of the conference said that the scheme of stopping on the far side of crossings, which is observed by many street railways, was a relic handed down from horse-car days. Another reason for stopping on the far side of the crossing has been that passengers boarding or alighting from the rear end of a car in the winter would be obliged to walk through the snow if the car was stopped on the near side of the crossing. With the large pay-as-you-enter cars having exits at the forward end, this objection is lessened, because only those boarding need walk to the rear platform. As the chief of police and his assistants, other representatives of the city and representatives of the Chicago City Railway and the Chicago Railways were unanimous in approving the change, no special ordinance was deemed necessary. The far-corner stop is blamed for a large measure of the street congestion within the crowded commercial district. Traffic regulation by crossing policemen requires that stops be made on the near side in practically every instance, and thus there are two stops where one would suffice. The delay incidental to the time taken by the second stop obstructs other cars and wagons and retards the schedule of the cars. It is stated that the railways plan to put a guard rail along the exit side of the front platforms of the cars, thus maintaining a free passageway between the exit door in the bulkhead of the car and the door in the platform vestibule immediately above the forward exit step. This should make the front door readily available for exit.

Personal Mention

Mr. A. S. Palfray has resigned as treasurer of the Mexico Tramways and the Mexican Light & Power Company, Ltd., Mexico City, Mex.

Mr. J. B. Ingersoll has resigned as electrical engineer of the Spokane & Inland Empire Railroad, Spokane, Wash., to engage in other engineering work.

Mr. A. C. Smith, who has been chief inspector of the Ogden (Utah) Rapid Transit Company, has been appointed assistant superintendent of the company.

Mr. F. E. Guthrie and **Mr. George W. Whysall** are receivers for the Columbus, Marion & Bucyrus Railway, Deleware, Ohio, and Mr. Eli M. West is sole receiver for the Columbus, Delaware & Marion Railway, Columbus, Ohio.

Mr. H. G. Welfare has resigned from the Chicago, Lake Shore & South Bend Railway, South Bend, Ind., to act as assistant engineer on the erection and installation of a new disposal plant which is being constructed for the city of Columbus, Ohio.

Mr. A. D. Miller has been appointed manager and superintendent of the Reno (Nev.) Traction Company. For the last two years Mr. Miller has been assistant engineer of the Reno Power, Light & Water Company and the Truckee River General Electric Company.

Mr. Henry Floy, having concluded the work he was doing for Mr. B. J. Arnold, in connection with the appraisals of the various street railway properties in Greater New York, for the Public Service Commission of the First District, has agreed to co-operate with certain bondholders of the Third Avenue Railroad, New York, N. Y., in valuing the property of that company.

Mr. W. H. Evans has entered the service of The Milwaukee Electric Railway & Light Company, Milwaukee, Wis. For the immediate future his particular work will be to assist in the development and supervise the construction and equipment of the comprehensive new general construction and repair shops which The Milwaukee Electric Railway & Light Company proposes to erect. He began his services in Milwaukee on Nov. 1. Mr. Evans was formerly master mechanic of the International Railway, Buffalo, N. Y., and at one time was master mechanic of the Indianapolis Traction & Terminal Company, Indianapolis, Ind. He entered street railway work with the Twin City Rapid Transit Company, Minneapolis. Subsequently he was connected for a short time with the Chicago City Railway. Mr. Evans is first vice-president of the American Street & Interurban Railway Engineering Association and acted last year as chairman of the committee on standards of that association. Mr. Evans also served for a time as chairman of the standardization committee of the Central Electric Railway Association.

Mr. C. E. A. Carr, managing director of the Quebec (Que.) Gas Company, has been appointed general manager of the Quebec Railway, Light & Power Company, to succeed Mr. E. A. Evans, who will continue with the company as chief engineer. Mr. Carr was formerly manager of the Helena Light & Railway Company, Helena, Mont. He was born in Thornton, Ont., in 1870, and was graduated from the high school at Barrie, Ont., in 1883, and studied at the British-American Commercial School, Toronto, until 1886. He was connected with the office of the city engineer of Toronto from 1888 until 1891 and from 1892 until 1894 was secretary to the general manager of the Toronto Railway, Montreal Street Railway and the Cleveland Electric Railway. From 1895 to 1905 Mr. Carr was secretary, treasurer and general manager of the London (Ont.) Street Railway. During his connection with the London Street Railway Mr. Carr also was general manager and secretary of the Montreal, Park & Island Railway, a 40-mile suburban property, and spent alternate weeks in London and Montreal until the Montreal, Park & Island Railway was sold to the Montreal Street Railway. His connection with the Helena Light & Railway Company extended from 1905 to 1908.

OBITUARY

Willis L. Bryant, a director of the Pottsville (Pa.) Union Traction Company and the Danville & Sunbury Transit Company, Danville, Pa., is dead. Mr. Bryant was also a director of several light and power companies and was prominent in banking circles in Pennsylvania.

W. W. Cargill, vice-president of the LaCrosse (Wis.) City Railway, is dead. Mr. Cargill was also president of the Vote-Berger Company, which manufactures telephone apparatus, and was connected with the LaCrosse Telephone Company and the LaCrosse Gas & Electric Company, LaCrosse, Wis.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Magnolia Spring Company, Groveland, Ga.**—Application has been made by this company for a charter to establish a street railway in Groveland. It also asks the privilege of building power plants. Principal office, Groveland. Capital stock, $5,000. Applicants for charter: W. Elabee, M. E. Carter, L. Banks, E. A. Proctor, D. B. Warnell and W. C. Perkins.

London & Lake Erie Railway & Transportation Company, London, Ont.—Application has been made for the incorporation of this company as the successor to the Southwestern Traction Company. Permission has also been asked to acquire the Woodstock, Thames Valley & Ingersoll Electric Railway as part of its through system, and to construct lines from Brantford, through Paris to Woodstock, Ingersoll, London, Strathroy and Glencoe, and from Delaware to Lambeth and from Ayler to St. Thomas. The new company will also run a line of boats to Cleveland, Ohio, from Port Stanley on Lake Erie. Capital stock, $2,000,000. Provisional directors: W. K. George, Sidney Jones and George B. Woods, Toronto; Dr. Angus MacKay, Ingersoll; F. G. Rumball and John Purdom, London, and Albert E. Thompson, Cleveland.

Carolina Traction Company, Rock Hill, S. C.—Incorporated in South Carolina to build a 30-mile electric railway connecting Rock Hill, Charlotte, Chester and Yorkville. It will connect the Seaboard Air Line Railway at a point in Chester County. Initial capital stock, $150,000. Incorporators: J. M. Cherry, Rock Hill; W. S. Lee and George Stevens, Charlotte. [E. R. J., Sept. 25, '09.]

***Columbia River & Mt. Adams Railroad, Spokane, Wash.**—Incorporated to build an electric railroad from some point on the Columbia River in Klickitat County, northerly through parts of Klickitat, Yakima and Skomania Counties to a point in the vicinity of Mt. Adams. The company also plans to operate steamboats and ferries on the Columbia River, and to generate electric current for light and power purposes. Capital stock, $2,000,000. Trustees: Adolph F. Suksdorf, Edward H. Suksdorf and Oswald N. Suksdorf, all of Spokane. Headquarters, Spokane.

FRANCHISES

***Eureka, Cal.**—George Henderson, through his attorney, Charles P. Cutlen, has applied to the City Council for a franchise for an electric railroad on F Street from the water front to the city limits.

Moline, Ill.—The City Council has granted to the Tri-City Railway & Light Company, Davenport, Ia., a 20-years' extension of the franchise covering its Fourth Avenue line, with permission to double-track the same.

Ottawa, Ill.—The Northern Illinois Light & Traction Company has petitioned the City Council for a 20-year franchise in order that it might continue operating and maintaining its railway and also furnish and distribute electrical current throughout the city for power and lighting purposes. The petition also requests that the company be empowered to carry its electric light wires and operate its cars over the new bridge.

Indianapolis, Ind.—The Commissioners of Marion County have granted a franchise to the Shore Line Traction Company for the construction of an electric railway in Churchmans Pike from Indianapolis to Beach Grove, a distance of 9 miles. The Commissioners refused to bear the expense of constructing a new concrete bridge 60 ft. wide over Bean Creek to replace the 12-ft. bridge now in use. Louis McMains, who is promoting this line, says it has not been decided whether the company will seek an independent entrance into Indianapolis and build a power house at Beach Grove. [E. R. J., Oct. 23, '09.]

Logansport, Ind.—The Commissioners of Cass County have granted a 75-year franchise to the Indiana & Northwestern Traction Company to build an electric railway through the county. The franchise provides for safeguarding the crossings over public highways, and stipulates that the charges for freight and passenger services shall be even throughout the county. [E. R. J., Nov. 6, '09.]

Chicopee, Mass.—The Board of Aldermen has granted to the Springfield (Mass.) Street Railway a franchise to extend its track for about three-fourths of a mile on East Street, Chicopee.

***Pittsfield, Mass.**—P. J. Moore has applied to the City Council for a franchise to construct and maintain a gasoline-electric railway in the eastern portion of Pittsfield.

St. Joseph, Mo.—The City Council has granted to the St. Joseph Railway, Light, Heat & Power Company a 35-year franchise for a street railway on Sixth Street from Messanie Street to Patee Street.

***Medford, Ore.**—John R. Allen, New York, N. Y., has applied to the Medford City Council for an electric railway franchise. Mr. Allen will apply for similar franchises in Grants Pass and Ashland and intermediate points. It is his intention to build an electric railway connecting all points in the Rogue River Valley.

***Uniontown, Pa.**—William A. Stone has been granted a franchise for an electric railway in Uniontown.

West Newton, Pa.—The City Council has granted the West Penn Railways, Pittsburgh, a franchise for the operation of its Sewickley Valley line through West Newton.

TRACK AND ROADWAY

Highland Pacific Railroad, Lakeport, Cal.—It is announced that this company, which was recently incorporated to take over the holdings of the Sonoma & Lake County Railroad, and which is now procuring rights of way from Lakeport via Cloverdale to Santa Rosa to operate an electric line over this district, is figuring on extending the line to Tidewater via McNear's Point. A movement is on foot to secure control of the Petaluma & Santa Rosa Railway, or to provide traffic transportation facilities over it. A feeder is to be used as a street railway system both in San Rafael, Petaluma, Santa Rosa and Healdsburg. A. Dickinson, president. [E. R. J., Oct. 9, '09.]

Shore Line Electric Railway, New Haven, Conn.—This company is said to have awarded a contract to Joseph Lyons, Marlboro, Mass., for the construction of the section of its proposed railway from New Haven to Irvington.

Meriden, Middletown & Guilford Railway, Meriden, Conn.—This company has decided to proceed with the final survey of its proposed electric railway from Durham to North Branford. As soon as this is done the work on that section will be started. The road will be standard gage and will be constructed with 70-lb. rails laid on steam road ties heavily ballasted. Francis Atwater, Meriden, president. [E. R. J., Oct. 23, '09.]

People's Railway, Wilmington, Del.—This company has opened its new extension between Brandywine Springs and Marshalltown, a distance of about 1 mile. Direct service is now operated between Wilmington and Marshalltown. It is proposed to eventually extend the line to Newark.

***Swainsboro, Ga.**—It is stated that Alfred Herrington, Monte Sano, is considering the advisability of building an electric railway around Swainsboro, also to extend to Monte Sano, a suburb of Swainsboro.

Indiana Union Traction Company, Anderson, Ind.—This company is said to be buying an additional 30 ft. of land along its track with a view of double-tracking the line between Anderson and Indianapolis. The company announces that the work will be begun next spring.

Des Moines, Council Bluffs & Western Railway, Des Moines, Ia.—It is stated that an agreement has been made by this company with the Red Oak & Northeastern Railway, Red Oak, whereby they will jointly construct the railway between Des Moines and Red Oak. It is the plan to consolidate the two companies in the near future. The Red Oak & Northeastern Railway is to build the line from Red Oak to Stuart, while the Des Moines, Council Bluffs & Western Railway will start its line at Des Moines and connect with the other company at Stuart. The combined capital of the two companies amounts to about $500,000 at present. [E. R. J., Sept. 19, '08.]

Kansas City & St. Louis Electric Railway, St. Louis, Mo.—At a meeting of the stockholders and directors of this company on Oct. 29 the capitalization of the company was increased from $5,000,000 to $15,000,000. The following officers were elected: D. C. Nevin, president; John H. Berkshire, first vice-president; B. L. Dorsey, second vice-president; Charles A. Loomis, general solicitor; J. H. Reeder, assistant general solicitor; H. E. Insley, secretary and auditor, and H. V. Johnson, treasurer. It is the intention to build an electric railway between St. Louis and Kansas City. [E. R. J., Nov. 6, '09.]

St. Louis County Belt Railroad, St. Louis, Mo.—James D. Houseman, general manager, advises that it will be at least six months before this company will take up construction work on its proposed railway. It will be an electric belt railway, 30 miles long, extending through St. Louis County from north to south, and circling St. Louis.

It will also pass through Affton, Webster, Maplewood, Clayton, University City and Ferguson. The proposed railway will connect with nine steam railroads and thirteen electric railways. Capital stock, $300,000. Officers: Thomas M. Gallagher, St. Louis, president; B. H. Lang, St. Louis, vice-president; E. W. Rannells, Maplewood, secretary; James E. Hereford, Clayton, treasurer; James D. Houseman, St. Louis, general manager. Main office, 414 Roe Building, St. Louis. [E. R. J., Sept. 11, '09.]

*Laurel, Mont.—W. R. Westbrook and L. A. Nutting, Laurel, are said to be considering a plan to build an electric railway to Billings and up Clark Fork and Rock Creek.

Public Service Railway, Newark, N. J.—This company has applied to the Board of Works for permission to extend its Mount Prospect Avenue line to the Forest Hill station of the Greenwood Lake branch of the Erie Railroad. The request will be considered at a public hearing to be held Nov. 18.

Vineland, N. J.—Herbert C. Bartlett, Vineland, advises that a company has not yet been formed to construct the proposed electric railway between Vineland and Bridgeton. [E. R. J., Oct. 30, '09.]

Fostoria & Fremont Railway, Fostoria, Ohio.—J. D. McDonel, secretary and treasurer, advises that construction is to be started within 30 days on this proposed electric railway, which is to extend from Fremont to Havens, Burgoon, Kansas, Amsden and Fostoria, a distance of 21.4 miles. The company has purchased the Fremont City Street Railway, now in operation between Fremont and Ballville, 2.5 miles, and will use it for an entrance to Fremont. It is intended to grade the line during the winter and complete it by July, 1910. Capital stock, authorized, $300,000. Bonds, authorized, $300,000. [E. R. J., Oct. 23, '09.]

Steubenville & East Liverpool Railway & Light Company, Steubenville, Ohio.—It is reported that this company will extend its interurban railway, terminals of which are now in Steubenville and Beaver, Pa., from Beaver over the Ohio River at that point and up the river to Alequippa, Pa. The new extension will give a continuous traction service from Moundsville, W. Va., up the Ohio River to within a short distance of Pittsburgh, likewise from Cleveland.

Oklahoma City, Lexington & Sulphur Springs Electric Railway, Lexington, Okla.—This company has presented a proposition to the people of Wynnewood to extend its electric railway through that town providing the sum of $25,000 is taken in stock. The railway when completed will extend from Oklahoma City to Sulphur. Jas. Sherman, Lexington, president.

*Toronto, Ont.—F. L. Fowke, M. P., will present a bill to the Dominion Parliament applying for authority and charter for the Toronto & Eastern Railway to build an electric railway connecting Cobourg and Toronto, passing through Port Hope, Newcastle, Bowmansville, Oshawa and Whitby.

Altoona, Hollidaysburg & Bedford Street Railway, Pittsburgh, Pa.—John G. Burns, president of this company, advises that plans and estimates are now being prepared and it is probable that by April 1, 1910, construction will be started on the electric railway which is to connect Altoona, Hollidaysburg, Everett, Bedford and Roaring Springs. Headquarters, Thirty-first Street and Liberty Avenue, Pittsburgh. Capital stock, authorized, $1,200,000. Bonds, authorized, $1,200,000. Officers: John G. Burns, president; J. Weidman Murray, vice-president; George W. Burke, secretary and treasurer. [E. R. J., Oct. 30, '09.]

Warren & Jamestown Street Railway, Warren, Pa.—This company is said to be considering the feasibility of extending its line from Jamestown, N. Y., to Dunkirk, running through the towns of Ellicott, Gerry, Ellery, Stockton, Charlotte and Pomfret.

South Dakota Interurban Railway, Centerville, S. D.—W. E. Miller, president, announces that this company proposes to build an interurban railway from Sioux Falls to Bijou Hills, 160 miles, and that the survey has been made as far as Parkston, which has donated $50,000 toward the enterprise. The right-of-way has been secured as far as Freeman, and fully a third of the money required to promote the enterprise has already been subscribed. [E. R. J., Oct. 30, '09.]

Gallatin, Tenn.—C. H. Fidler, Gallatin, writes that he is promoting a railway, about 12 miles long, from Gallatin to a connection with the Tennessee Central Railroad, at a point 18 miles east of Nashville. This railway will also connect with a line of steamers on the Cumberland River. [E. R. J., Oct. 23, '09.]

Tennessee Traction Company, Memphis, Tenn.—George E. Bushnell advises that this company has been organized to construct an electric railway from Memphis to Nashville and Jackson, a distance of 210 miles. Articles of incorporation were filed for the company on Nov. 1. It has not yet been determined what motive power will be adopted. Capital stock, authorized, $50,000. Officers: W. K. Burton, president; W. R. Gilbert, vice-president; Horace N. Smith, secretary and treasurer; George E. Busnell, general manager, all of Memphis. [E. R. J., Nov. 6, '09.]

Bryan, Tex.—J. T. Maloney, Mayor of Bryan, recently held a conference with a committee of the board of directors of the A. & M. College in regard to the construction of the proposed 5-mile railway from Bryan to College Station. Two routes have been surveyed and estimates made of the costs of construction. The people of Bryan have put up a bonus of $10,000 and will take $10,000 in stock. The committee representing the board of directors of the college agreed to subscribe $10,000 in aid of the new line. [E. R. J., Oct. 30, '09.]

Twin City Light & Power Company, Chehalis, Wash.—This company has awarded to A. J. McCabe the contract for the grading of this proposed railway which is to connect Chehalis and Centralia. Arrangements are pending with the Northern Pacific Railroad to build a 600-ft. viaduct over its tracks in the north end of the city, so as to cut out the dangerous grade crossing leading to Sitka Street. [E. R. J., Oct. 30, '09.]

La Crosse & Winona Traction Company, La Crosse, Wis.—W. J. Ferris, president, is said to have announced that the construction of this proposed electric railway between Winona and La Crosse will be started early next spring. Mr. Ferris says the money required, approximately $1,000,000, is now available, and that the company is making preparations to commence building as soon as terminal rights are secured. Concerning the request of the company for a franchise to enter Winona, Minn., the business men have adopted a resolution favoring the construction of railway between the two cities by the way of Galesville. [E. R. J., Oct. 30, '09.]

SHOPS AND BUILDINGS

Northern Indiana Railway, South Bend, Ind.—This company is building a new fireproof carhouse and repair shop in South Bend on the site of its power plant, which has been dismantled. The brick walls of the power house will be used but the new structure is to be much longer than the old and work on the new foundation is now well under way. The interior of the building is to be divided into three sections. One will be used for cleaning, painting and washing cars, another will be entirely for interurban cars and the third will be for repair work.

Worcester (Mass.) Consolidated Street Railway.—The Worcester Consolidated Street Railway has closed its car house on East Main Street, Westboro, and will move it to Northboro and the cars handled from there. The present car house at Westboro will be used only for storage of closed cars in summer and open cars in winter.

Buffalo & Lackawanna Traction Company, Buffalo, N. Y.—This company is said to be considering plans for the erection of a one and two-story brick carhouse and general office building at Swan Street and South Cedar Street and Myrtle Avenue. The two-story structure will face on South Cedar Street and will be 35 ft. x 52 ft. The carhouse, which will have entrances on Myrtle Avenue and Swan Street, will be 178 ft. x 50 ft. The estimated cost of the structure is $13,500.

New York & North Shore Traction Company, Mineola, N. Y.—This company has purchased a tract of about four acres of land on Alley Creek, Bayside Meadows, where it will erect a carhouse.

POWER HOUSES AND SUBSTATIONS

Worcester (Mass.) Consolidated Street Railway.—The Worcester Consolidated Street Railway will discontinue operating its power plant on Brigham Street, Westboro. The plant will be dismantled and the equipment installed in the Westfield power station on the system of the Woronoco Street Railway.

New York & North Shore Traction Company, Mineola, N. Y.—This company has bought a tract of land on Alley Creek, Bayside Meadows, where it will erect a power plant. The power to be generated at this plant will supply the new line from Whitestone Landing to Flushing, and the line connecting Nassau and Queens Counties.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—This company has begun work on its new power station near Lagoon. This main power plant will be built of brick and concrete measuring 141 1-3 ft. x 106 ft., one story high. The estimated cost of the building with complete equipment is $200,000. At Stockdale, Lagoon, Clearfield and Ogden the company will build substations costing $25,000 each.

Manufactures & Supplies

ROLLING STOCK

Hagerstown (Md.) Railway is reported to be in the market for rolling stock.

Schenectady (N. Y.) Railway, it is reported, expects to buy 12 cars early next spring.

British Columbia Electric Railway, Vancouver, B. C., recently purchased six cars from the Ottawa Car Company.

Huntington (N. Y.) Railroad has purchased one Russell snow plow from the Wendell & MacDuffie Company, New York, N. Y.

Edmonton Radial Railway, Edmonton, Alta., Can., has recently placed an order with the Ottawa Car Company for four passenger cars.

Des Moines (Ia.) City Railway has purchased a single-truck sweeper from the McGuire-Cummings Manufacturing Company, Chicago, Ill.

Rochester (N. Y.) Railway has placed an order with the Wendell & MacDuffie Company, New York, N. Y., for two McGuire-Cummings snow sweepers.

Cedar Rapids & Marion City Railway, Cedar Rapids, Ia., has ordered a single-truck snow sweeper from the McGuire-Cummings Manufacturing Company, Chicago, Ill.

People's Railway, New Hamburg, Ont., contemplates purchasing, some time in January, the 10 combination passenger and baggage cars, and an electric locomotive, mentioned in the ELECTRIC RAILWAY JOURNAL of May 8, 1909.

Grand Forks (N. D.) Street Railway is in the market for a second-hand snow sweeper in good condition, and two second-hand or rebuilt single truck, closed motor cars, complete and ready for operation; to be painted as required.

Quebec Railway, Light & Power Company, Quebec, Que., has purchased six 18-foot closed vestibule cars, 10 nine-bench open cars, two large suburban cars, two heavy double-broom sweepers and two wing plows from the Ottawa Car Company.

Fresno (Cal.) Traction Company, mentioned in the ELECTRIC RAILWAY JOURNAL, Aug. 28, 1909, as being in the market for 10 double-truck cars of the California type, has ordered this rolling stock from the American Car Company. These cars will be equipped for pay-as-you-enter service.

Rock Island-Southern Railway, Monmouth, Ill., has just placed an order with the Niles Car & Manufacturing Company, Niles, Ohio, for eight interurban passenger cars with smoking compartments. These cars are to be 62 ft. long and 92 in. wide, mounted on Baldwin class 90-40 trucks, with standard 37½ in. steel-tired wheels. The company has also purchased two Niles 50-ft. express cars mounted as above.

Peoria (Ill.) Railway Terminal Company has placed an order for one combination passenger and baggage car with the McGuire-Cummings Manufacturing Company, Chicago, Ill. This car is to have the following dimensions: Length over buffers, 56 ft.; over corner posts, 46 ft. 2 in.; width, 9 ft. The following special equipment has been specified: Allis-Chalmers motors and air brakes, Nichols-Lintern sanders, Hale & Kilburn seats, Safety car heaters, Earll retrievers, Pantasote curtain material with Acme friction rollers, McGuire-Cummings 20-A trucks, steel wheels, and McConway & Torley radial drawbars.

Aurora, Elgin & Chicago Railway, Chicago, Ill., mentioned in the ELECTRIC RAILWAY JOURNAL of Oct. 30, 1909, as contemplating the purchase of five single-truck city cars and one interurban car, has placed an order for five single-truck city car bodies, 22 ft. 8 in. over all, with the Niles Car & Manufacturing Company, Niles, Ohio. These cars will have eight side windows and vestibules at each end, and will be finished in quartered oak. They will be furnished with Hale & Kilburn No. 99-A rattan seats. The company is also having the Niles Car & Manufacturing Company build a 46-ft. interurban express and baggage car of the standard type used on this road.

Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind., mentioned in the ELECTRIC RAILWAY JOURNAL of Oct. 30, 1909, as having ordered four combination passenger and baggage cars, 20 single-truck semi-convertible city cars, four trailer freight cars, and two interurban freight cars, has drawn the following specifications for the four combination passenger and baggage cars:

Seating capacity 52	Width over posts at belt 8 ft. 6½ in.
Weight ..... 45,000 lb.	Sill to trolley base..9 ft. 6 in.
Bolster centers..length 31 ft. 10 in.	Height, rail to sills....43 in.
Length of body..... 55 ft.	Body ..... Wood
Length over vestibule 53 ft. 8 in.	Interior trim.....Mahogany
Width over sills..8 ft. 5¼ in.	Underframe ..... Composite

Manufacturers of Special Equipment.

Air brakes..General Electric	Motors Four G. E. 205 interpole
Bolsters, body, Cincinnati M. C. B.	Registers ..... Ohmer
Bolsters, truck.....Curtis	Roofs ..... Cincinnati
Brakeshoes.A. B. S. & F. Co.	Sanders...Knight & Yergens
Bumpers ..... Cincinnati	Sash fixtures.....Edwards
Center bearings .....Curtis	Seats.H. & K. non-reversible
Control system....G. E. L-4	Seating material Plush and Quride
Couplers .McConway-Torley	Side bearings.....Cincinnati
Curtain fix....Curtain S. Co.	Springs.Ry. Steel Spring Co.
Curtain material...Pantasote	Trolley retrievers Knutson No. 2
Destination signs Ft. W. & W. V. T. Co.	Trolley poles General Electric
Fenders or wheelguards Pilots	Trolley base General Electric No. 3
Gears and pinions General Electric	Trolley wheels General Electric
Gongs E. S. S. Co.'s pneumatic	Trucks.....Curtis J-669
Hand brakes.....Peacock	Ventilators, Hart's ratchets, swing transom
Heating system Peter Smith No. 1-C	Wheels..Schoen rolled steel
Headlights....G. E. Form B	
Journal boxes....Symington	

The details of the four trailer freight cars are as follows:

Weight..... 25,000 lbs.	Sill to top of roof.....9 ft.
Bolster centers.....28 ft.	Height, rail to sills 12 ft. 9 in.
Length of body.....38 ft.	Body ..... Wood
Length over vestibule.40 ft.	Underframe ..... Composite
Width over sills.8 ft. 4½ in.	
Width over posts at belt 8 ft. 6½ in.	

Manufacturers of Special Equipment.

Air brakes....Westinghouse	Hand brakes Tower freight car
Bolsters, body Cincinnati M. C. B.	Journal boxes.....M. C. B.
Bolsters, truck, Diamond frame trucks M. C. B.	Side bearings Cincinnati M. C. B.
Brakeshoes.A. B. S. & F. Co.	Springs ..... Simplex
Bumpers ..... Cincinnati	Trucks, type, Diamond frame truck M. C. B.
Couplers ..... Janney	

The following are the specifications covering the two freight cars:

Weight ..... **45,000 lbs.**	Sill to trolley base.9 ft. 3 in.
Bolster centers, length.37 ft.	Height, rail to sills....43 in.
Length of body.....60 ft.	Body ..... Wood
Length over vestibule.59 ft.	Interior trim....Plain finish
Width over posts at belt 8 ft. 6½ in.	Underframe .... Composite

Manufacturers of Special Equipment.

Air brakes..General Electric	Headlights....G. E. Form B
Bolsters, body Cincinnati M. C. B.	Journal boxes....Symington
Bolsters ..... Curtis	Motors.....G. E. No. 205
Brakeshoes.A. B. S. & F. Co.	Sanders Knight & Yergens
Bumpers .....Cincinnati	Springs.Ry. Steel Spring Co.
Center bearings ..... Curtis	Trolley retrievers Knutson No. 2
Control system...G. E. L.-4	Trolley Poles General Electric
Couplers..McConway Torley	Trolley base General Electric No. 13
Destination signs Ft. W. & W. V. T. Co.	Trolley wheels General Electric
Fenders or wheelguards Pilots	Trucks.....Curtis J-669
Gears and pinions General Electric	Wheels....Shoen rolled steel
Hand brakes..... Peacock	
Heaters.....Caboose stove	

TRADE NOTES

Duplex Metals Company, New York, N. Y., has moved its offices to the thirty-second floor of the Singer Building, 149 Broadway.

General Electric Company, Schenectady, N. Y., has moved its branch offices in Cincinnati from the Perin Building to the Providence Building.

John A. Roebling's Sons Company, Trenton, N. J., has removed its Cleveland office from 88 Superior Street to its own new building at 701 St. Clair Avenue, N. E.

Dearborn Drug & Chemical Works, Chicago, Ill., have removed their Milwaukee office, which is in charge of E. T. Ward, from 183 Fourteenth Street to 340 Twenty-fourth Street.

Willett Press, New York, N. Y., announces that C. N. Manfred has become its secretary. Mr. Manfred was formerly advertising manager of the H. W. Johns-Manville Company, New York, N. Y.

Perry Ventilator Corporation, New Bedford, Mass., has received a contract to equip with Perry ventilators the 12 city and six interurban cars being built by the Niles Car & Manufacturing Company for the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.

Wonham, Magor & Sanger, New York, N. Y., are supplying the Chicago (Ill.) Railways Company with H.-B. life guards with which to equip all of its cars which will approximate 2000 in number, when the rehabilitation of the property of the company shall have been completed.

Western Electric Company, Chicago, Ill., reports that Western Electric telephone apparatus and Gill selectors are used throughout on the telephone train dispatching circuit which the Atlantic Coast Line is constructing from Richmond, Va., to South Rocky Mount, N. C., a distance of 121 miles. There will be 32 selector way stations and two local telephone stations in the chief dispatcher's office and the superintendent's office at Richmond. These stations will be called by means of a buzzer. The Western Electric Company reports that within the last six weeks, the Chesapeake & Ohio Railway, Richmond, Fredericksburg & Potomac Railroad and the Seaboard Air Line have placed orders for telephone train dispatching circuits leading out of Richmond.

Dodge Manufacturing Company, Mishawaka, Ind., power transmission engineer and manufacturer of Dodge transmission machinery, maintains large stores and warehouses in Boston, New York, Brooklyn, Pittsburgh, Philadelphia, Cincinnati, Chicago, St. Louis, and London, Eng., in connection with expert engineering departments, which makes possible immediate deliveries and the solution of transmission problems without delay. From time to time the company has enlarged and extended this service and now announces the addition of Minneapolis, Minn., and Atlanta, South Ga., to the list of cities in which it maintains branch establishments. These two branches will serve as local stores and distributing stations for the Northwest and the South. The Minneapolis store is located at 202-204 Third Street, South and the warehouse at 312 to 320 First Street, North. The agency arrangement with the Minneapolis Steel & Machinery Company has been discontinued. Burke Richards, former resident salesman at Cleveland, Ohio, has been made manager of the Minneapolis branch. The Atlanta branch and warehouse is located at 54 Marietta Street, and S. L. Dickey, resident salesman at that place, has been appointed manager. No change has been made with any of the agency connections in the South.

ADVERTISING LITERATURE

McCord & Company, Chicago, Ill., have issued a booklet in which the McCord journal box is described and illustrated.

C. J. Coulter Company, Hammond, Ind., describes and illustrates the Coulter track wrench and rail weld in a four-page circular.

Western Elaterite & Roofing Company, Denver, Col., has issued a folder illustrating the uses of Elaterite paint and Elaterite roofing.

Duplex Metals Company, New York, N. Y., is sending out a folder pointing to the merits of copper-clad steel trolley wire, especially for use on curves.

Electric Railway Equipment Company, Cincinnati, Ohio, describes its tubular iron and steel poles in an 18-page booklet. Tables are presented giving the features of the different poles.

Emery Pneumatic Lubricator Company, St. Louis, Mo., has issued catalog B, which has for its subject "Automatic Lubrication for Air Brake and Pneumatic Multiple Control Systems."

Buckeye Electric Company, Cleveland, Ohio, has issued Bulletin 5-B, entitled "Modern Street Railway Lamps," in which the application of tantalum lamps to street railway service is described.

Underfeed Stoker Company of America, Chicago, Ill., sole manufacturer of the Jones underfeed mechanical stoker, has issued an elaborate folder in which the Jones stoker is described and illustrated.

Cooper Heater Company, Dayton, Ohio, has issued an 8-page folder in which 19 reasons for the superiority of the improved Cooper heater are given. Exterior and interior views of the heater are shown.

Valentine-Clark Company, Chicago, Ill., has issued a circular entitled "Doubling the Life of Cedar Poles," in which the application of C. A. wood preserver is described and the scientific reasons given for its use.

Barber Car Company, York, Pa., has issued a publication illustrating and describing the Barber car. A feature of the booklet is a large double-page illustration of the Barber car with arrows pointing from the printed description to the features in the illustration.

Gulick-Henderson Company, Pittsburgh, Pa., has issued bulletin No. 80, in which the address "Engineering Responsibility," made by Dr. Charles B. Dudley, president of the American Society of Testing Materials, at Atlantic City on June 29, 1909, is reprinted.

Cleveland Ventilator Company, Cleveland, Ohio, has issued a catalog illustrating and describing the construction and operation of the R. T. L. automatic exhaust ventilator. This new device is specially designed for ventilating steam and electric railway passenger cars, and can be quickly and easily inserted in the deck sash frames.

Electric Service Supplies Company, Philadelphia, Pa., and Chicago Ill., has issued an 8-page circular describing and illustrating the pay-within cars as operated by the Capital Traction Company in Washington. A feature of the publication is a letter from D. S. Carll, second vice-president and general manager of the Capital Traction Company, commending the cars.

T. H. Symington & Company, Baltimore, Md., have issued a publication entitled "Journal Boxes," in which the Symington journal boxes are described and illustrated. Six important factors in journal-box design and construction are tabulated, and it is pointed out wherein the Symington boxes meet these requirements. The publication is concluded with a supplement showing various types of rolling stock equipped with Symington journal boxes.

Wisconsin Engine Company, Corliss, Wis., has begun issuing a series of bulletins on its manufactures in such form that they can be readily bound in a neat, flexible cover furnished by the company. The first bulletin issued under this plan is No. C-4, on heavy duty Corliss engines of belted type. It is well worth a place in the steam engineer's library, as it contains far more detailed and well-illustrated information than is customary in publications of this kind.

Standard Motor Truck Company, Pittsburgh, Pa., is distributing three new sections for its loose-leaf catalog, which are intended to be inserted in the binder previously distributed by the company. The sections show Standard truck No. C-80, for trunk-line service, under a car of the Ohio Electric Railway, standard truck No C-100-A as arranged for quill suspension motors mounted under a steel passenger coach of the New York, New Haven & Hartford Railroad and the Standard automatic brake slack adjuster.

E. R. Barnard, Philadelphia, Pa., is distributing a circular in which an interesting comparison is made of the consolidated 5 per cent bonds of the Rochester Railway & Light Company, Rochester, N. Y., when first issued and the first and refunding 5 per cent bonds of the Chattanooga Railway & Light Company, Chattanooga, Tenn., which E. R. Barnard offers for subscription at 96½ and interest. E. W. Clark & Comapny, Philadelphia, Pa., and Hodenpyl, Walbridge & Company, New York, N. Y., were responsible for the organization of both the Rochester Railway & Light Company and the Chattanooga Railway & Light Company.

C. & G. Cooper Company, Mt. Vernon, Ohio, under the title "Seventy-five Years of Engine Building," has published a beautifully printed and illustrated memento of its diamond anniversary which is being celebrated this year. It was in the spring of 1834 that the first foundry of the C. & G. Cooper Company was put in operation at Mt. Vernon, Ohio, by Charles and Elias Cooper, under the firm name of C. & E. Cooper. The business prospered and in 1836 the company built its first engine which was of the slide-valve type with a piston 6 in. in diameter and 24 in. in stroke. In 1852 the company built its first blowing engine and some of the engines built at that time are still in operation. In the early fifties also, the company constructed a number of steam locomotives, which were the first to be built west of the Allegheny Mountains and for many years ran on the western division of the Baltimore & Ohio and on other railroads. In 1869, the concern was known as C. & G. Cooper & Company and in 1895 it was incorporated under the present name. Although the company began building Corliss engines in 1869 this type of machine did not become the principal product of the works until about 1886. Since that time, the company has devoted its attention and facilities almost exclusively to the building of this type of engines and has enjoyed a large business among electric railway companies as well as in other lines of industry. The pamphlet contains many views of the works and products of the company and portraits of the officers.

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Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

The Great Northern Electrical Equipment

The speakers at the discussion of Dr. Hutchinson's interesting paper at the meeting of the American Institute of Electrical Engineers, last Friday, included members who described themselves as "single-phase advocates," as well as others who might perhaps be considered as direct-current partisans. Nevertheless, none criticised Dr. Hutchinson's selection of three-phase equipment for the Great Northern tunnel, although Mr. Katte qualified his statement by suggesting that if only the tunnel section had been considered, direct current might have been preferable. Undoubtedly, the conditions in the Cascade installation were particularly favorable for three-phase operation. The acceleration required was low and the total time spent in accelerating the train was small. Constant speed was not considered a drawback. The yards to be equipped with the double overhead system were simple and few in number, and while the conditions were such as to make regeneration unnecessary, it can be installed later if the system is extended. These facts do not necessarily mean that the three-phase system is the most desirable for pusher service. A careful review of all of the conditions in the case of the Central Pacific installation, cited by Mr. Sprague, for instance, may result in the recommendation of some other system. But the unanimity with which different engineers indorsed three-phase locomotives for this particular undertaking, after hearing Dr. Hutchinson's description of the conditions, suggests the benefit to the art which would follow a closer delimitation of the respective fields for which the different electrical systems are most fitted than has been the case up to this time. While the Great Northern installation is not the first application of three-phase locomotives to railway purposes in this country, as they were used a short time on the Miami & Erie Canal Railway, in Ohio, in 1903, it is their first application here to trunk line service, and so far as the locomotives themselves are concerned, the installation furnishes an example in this country comparable with those of the same type abroad.

Fresh Air Cars

The Erie Railroad has given over one car in some of its suburban trains to the commuters who object to the steam heat and stuffy atmosphere of the regular cars. The cars carry signs reading "Fresh Air," and are started out from the terminals with the doors, ventilators and alternate side windows wide open. Any person riding in these cars is privileged to close the window next to him, but has no right to insist on the closure of other ventilation openings. The will of the majority of those who ride in the cars will control the turning on of the steam heat, which may be wanted in very cold weather. Those who find the cars too cold can always move to other cars in the trains. This is a novel but sensible way of solving the vexatious problem of heating and ventilating cars in winter. In some cities there are ordinances requiring all cars to be heated to a certain degree when the temperature outside is below a certain amount, and a hearing to consider the reasonableness of such a requirement is now being conducted in New York City. Without considering the question as to whether

one degree of heat or another is most agreeable to a majority of passengers, it is safe to say that a considerable number of street railway patrons would like the privilege, now enjoyed on the Erie Railroad, of opening the windows and riding in unheated cars. For many years an ordinance in New York City has required street railway companies to operate a certain proportion of closed cars on each route during the summer months. Why cannot those who desire fresh air and little or no heat during the winter be granted equal privileges?

The Gas Engine as an Auxiliary

We have from time to time considered the application of the large gas engine to the purpose of producing auxiliary power for railway and other generating stations. Theoretically, the proposition is a most attractive one, for the efficiency of the gas engine from the thermal standpoint is notoriously great, being approximately double that of a first-class steam engine or turbine. Moreover, if there is some storage, a gas auxiliary plant can be put into operation on extremely short notice to tide over peak loads or an accident, while the efficiency, reckoned from the coal pile to the switchboard, is conspicuously good, better under favorable circumstances than with any form of steam engine yet produced. Further, the big gas engine, operated either by producer gas or by other cheap gas supply, has been for some years in successful use abroad, and has made a good name for itself. Nevertheless, in spite of this, when the proposition has actually been put to practice in this country, results, while sometimes satisfactory, have not been uniformly so, and there is considerable doubt among engineers as to the practical effectiveness of the scheme in spite of its theoretical advantages and undeniable successes under certain conditions.

It is pertinent to inquire somewhat into the causes of the difficulties encountered in so far as they have been determined. The gas or gasoline engine, when worked with relatively high-grade fuel, has proved itself over and over again both economical and reliable, and so far as one can judge from present information the chief trouble in auxiliary gas plants which have failed to give satisfaction has been connected with the supply of producer gas, and particularly with the performance of the producer itself. Producer gas is lean gas, as a rule running from 100 to 150 b.t.u. per cubic foot of gas. The first difficulty which one meets, then, is that such gas requires large engine capacity for the output required, much larger than with fuel of high thermal value. This in itself is a disadvantage at the start. And in spite of a great deal of ingenuity spent in the construction of simple and efficient gas producers, no form yet devised seems to be able to be operated by unskilled labor with good permanent results, at least so far as practice in this country is concerned. Very remarkable results have been sometimes reported from producer plants, even small ones, and under proper conditions there is no denying the fact that a producer can be operated with comparatively little attention and with good efficiency.

A recent bulletin of the United States Geological Survey, No. 393, on "Incidental Problems in Gas Producer Tests," throws at least some light on the difficulties of producer operation, and especially the difficulties of procuring reliable tests. When the initial charge of fuel in a producer is, as it has been in many careful Government tests, very nearly equivalent to the total consumption of fuel in a 24-hour run of the producer at its rated capacity, it is obvious that exact knowledge of the state of this initial supply and the fuel applied to its replenishment is necessary to satisfactory results even in all-day tests. When the period involved in the test is only a few hours, the possible errors involved, even in the most conscientious and careful estimate of fuel conditions, may easily rise to 30 or 40 per cent. The fuel in a producer is in all stages of combustion, from green coal to coke and ash, and just what the relative condition of the coal in various parts of the mass may be is nearly impossible to determine during a practical test. Hence it is very easy, even with the best intentions, to make serious errors. When, as sometimes unfortunately happens, the experimenter is looking for good results for advertising purposes, it is extremely easy to get them. For example, in one of the Government tests reported in the bulletin just referred to, the consumption of coal per brake horse-power hour in consecutive eight-hour periods had an apparent variation sometimes exceeding 100 per cent. When the producer had been in steady operation for a day, so that it had settled down to somewhat uniform performance, these discrepancies still existed in spite of the fact that the average results, reckoning from the beginning of the test, were fairly uniform. Certain periods of eight hours showed less than half a pound of coal per brake horse-power per hour apparent consumption, while other periods showed in excess of 1¼ lb. The average of the whole test, covering 18 eight-hour periods, was 0.93 lb. of coal per brake horse-power hour.

It is therefore evident that producer tests lasting only through a working day are liable to lead to erroneous judgments, even when made with the most conscientious care. Even 24-hour runs may lead to considerable errors owing merely to the extreme difficulty of determining the real depth and condition of the fuel bed. Hence when one hears reports of producer gas plant tests running down to 0.6 lb. or 0.7 lb. of coal per brake horse-power hour, as is sometimes the case, it is pertinent to inquire diligently into the exact condition of the test. It is not unlikely that some of the apparently disappointing results procured have been due to reliance upon tests subject to errors of this kind.

On the whole, therefore, one is inclined to look to the producer, rather than to the engine itself, for explanation of difficulties of the gas power situation. A producer can be operated after a fashion with almost any kind of attention, and still keep the engine turning over, but it is fool proof merely in this sense, and not in the sense of being able to go steadily on working efficiently without intelligent care. Here we believe is to be found the cause of the really great difference between good foreign producer plant practice and that which has sometimes proved highly unsatisfactory in our own country. Every central-station man knows to his cost the difficulty of getting the proper grade of labor, particularly when the tasks in hand are of unfamiliar character. On the other hand, abroad, where the gas engine and producer have been used for a much longer time than here, a proper grade of labor is much more easily obtainable, and hence average results are likely to be

better. It may not really take as much skill in the abstract to operate a producer and gas engine plant as a boiler and steam engine plant, yet it requires skill and a different kind of experience, not easily obtainable here.

We are not disposed, however, to acknowledge a permanent defeat of gas power, since in certain places the results already attained have been highly satisfactory. The possibilities of gas power have not yet been approached. It has, however, been pretty thoroughly demonstrated that operating a gas plant successfully is not so easy a task as the more enthusiastic advocates of it assert. The convenience of the system is so great and its economic possibilities so alluring that the matter will not be dropped on the strength of any casual failures, and we hope and believe that the work of the Government on the subject will lead to a far better understanding of practical working conditions and a greater application of the system, especially since recent experiments give hope of the successful utilization in this way of fuel not well adapted for ordinary purposes.

An Intangible Value

The real problem in State valuation of a public-utility plant resolves itself into a computation of the values that should be allowed above the actual physical property which can be appraised by an engineering investigation. Whatever differences of judgment may exist between interests that are necessarily somewhat opposed in a valuation of this character, it should be agreed generally that for a beginning the reasonable investment required to reproduce the physical property will be assumed.

With equitable principles established for the basis of the purely physical items of the plant, there would still be room for negotiation in fixing the values of units and the incidental costs which are inevitable in construction. These, however, can be worked out much more easily than the complex problems attendant upon the determination of a fair and reasonable value for the assets which will never be discernible in any appraisal that aims to strip the value of the plant in an arbitrary way to the lowest possible amount that will represent physical property whose existence cannot be denied.

While the question of valuation is one that has naturally alarmed the holders of securities who could not foresee what terrors might be involved, it is now a fact which must be accepted that under the authority of recent laws, commissions are proceeding to make appraisals as a basis for careful consideration in decisions relating to rates.

Since this is the situation and appraisals of this character have been completed or are under way in which all the vital questions concerned will arise, it is highly essential that the best and fairest thought of well-balanced minds be given to the problem until some reasonable bases shall be adopted generally. It is to be regretted that the public, through false teaching as much as through lack of proper information, is inclined to segregate the values of public utility plants into the loose terms usually designated as "physical" and "franchise" values. That much being done, the public, following to a conclusion the train of thought started by agitators on this subject, is disposed to sweep aside all merit in any but net physical value and to insist that nothing more than it shall be recognized in any case.

However, those who have given most careful thought to this subject have reached conclusions which, although varying in detail, may be traced to the recognition of the same fundamental principles that must form a part of the foundation in any valuation that is just to the security holders whose funds have been invested in a property. The latest formal expression of judgment on one of the questions bearing on valuation is that of the Railroad Commission of Wisconsin.

While the decision of the Wisconsin commission, in which it discusses its attitude, is rendered in connection with a case involving electrical rates, the principles stated do not differ in kind from those which have existed in the early years of many electric railway enterprises. The commission says, in the case of the Menominee & Marinette Light & Traction Company, that "the value of a plant is made up of a reasonable cost-value of the physical property used and useful in carrying on the business, and in many cases, also of the cost of developing the business of the plant as represented by the deficits during the development period."

This point is discussed with a clear recognition of the fact that the cost of "building up a business," as it is expressed by the commission, may be a necessary element which will demand and secure recognition. Although the Wisconsin commission feels that it is not in a position to state definitely just what loss was sustained during the early years of operation in this case, its conclusion concerning the principle involved is plain from the following excerpt:

"But from the facts given, and from the conditions generally which are known to surround plants so situated as the one in question, it appears to us that it might not be fair to the respondent, nor in line with public policy, to limit the rates in this case to only a bare 7 per cent return on the cost of reconstructing the plant new. For these reasons, it appears that justice may require that an extra allowance be made in the amount or expense upon which the rates provided for in the order herein rest or have been computed."

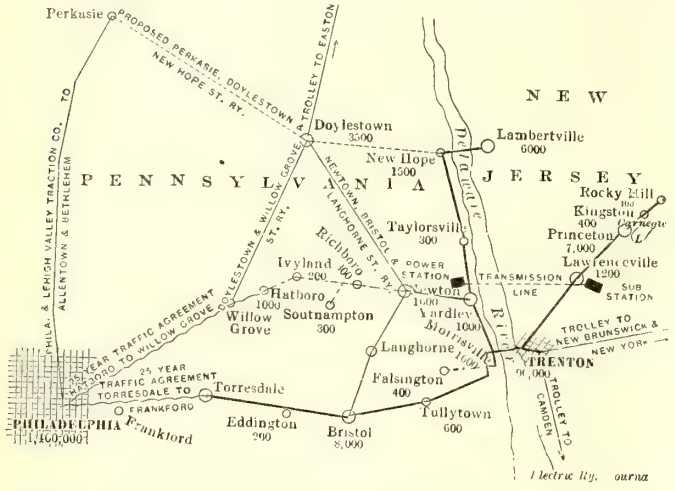
The history of street railways, due to their longer life and more unfortunate susceptibility in many cases to expensive changes in the art, is filled with investments which have been of greater cost than any that electric light or power plants have found necessary to keep equipment and service abreast of the times.

Prof. M. E. Cooley, in testifying before the Railroad Commission of Wisconsin early in the present year in the case involving the rates of fare of the Milwaukee Electric Railway & Light Company, discussed two values which he designated as "going cost" and "going value." He discussed these as additions to the inventory value, comprising (1) the cost of making the property a going concern and (2) the value of the property as a going concern. In his analysis of these values, he showed that the common history of properties included an actual loss in the early days and this loss was a just cost which in all fairness should be taken into account in an appraisal.

While the extent of values of this character differs in each case, such values form part of the undoubted cost of construction of public-utility properties.

PASSENGER AND FREIGHT BUSINESS OF THE NEW JERSEY & PENNSYLVANIA TRACTION COMPANY

The New Jersey & Pennsylvania Traction Company with headquarters at Trenton, N. J., operates about 40 miles of single track. As shown on the accompanying map, which also gives the population of the communities served, the lines run out of Trenton to Princeton on the northeast, to



New Jersey & Pennsylvania Traction Company—Map of Territory Served by the Company and Population of Communities in the District

Lambertville on the north, to Newtown on the northwest and to Morrisville on the west.

SOURCES OF TRAFFIC

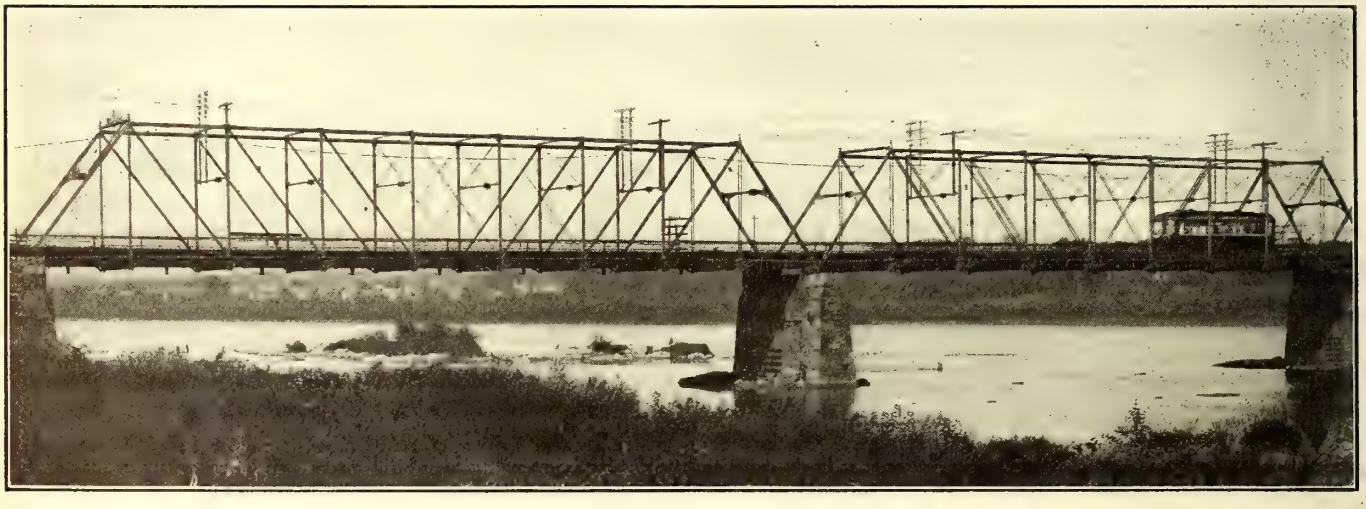
Besides the normal traffic between the places shown on the map, the company gets considerable business through its connections with other railways. Thus trips to Philadelphia can be made over the Philadelphia, Bristol & Trenton Street Railway, which enters Trenton via the home company's Morrisville line. There is a 15-year agreement made with the entering company in the year 1905, whereby the latter pays 4 cents out of every 5 cents collected on the local run between Morrisville and Trenton. The foreign cars go in with their original crews, but use the Trenton company's track, line and power.

In the summer months there is heavy travel to Willow Grove, near Philadelphia, despite the fact that Trenton passengers are obliged to take the roundabout way via Doylestown. To increase the popularity of this trip, the New Jersey & Pennsylvania Traction Company is planning to shorten the trip by building a 12-mile line from Newtown via Richboro, Ivyland and Hatboro. It will be observed from the map that aside from the effect of other indicated extensions, the company already meets the Camden lines on the south and the electric railways from the most populous section of New Jersey on the east. Both of these connections bring many trolley tourists into and beyond Trenton. Another good factor in the company's summer earnings is that produced through the bungalow settlements on the Delaware River, between Trenton and Lambertville. The earnings per car-mile in August, 1909, were 28.52 cents.

One of the illustrations on page 1050 shows the neat brick passenger station and general office building in Trenton, which adjoins the car house and repair shop. As will be apparent from the following paragraphs, the New Jersey & Pennsylvania Traction Company has no uniform rate of fare for given distances owing to the variety of franchise requirements, but a unique feature is that all fares are straight cash.

FRANCHISE AND FRANCHISE CONDITIONS

The New Jersey & Pennsylvania Traction Company, which is a consolidation of several lines, has actually constructed but 1.91 miles of track, and that section is entirely within the city of Trenton. Of this 1.25 miles is of 4 ft. 8½-in. gage, connecting with the Princeton line, and 0.66 mile of 5 ft. 2⅛-in. gage, connecting with the Trenton City Bridge Company and Yardley, Morrisville & Trenton division. The local franchise runs for 50 years, with renewal privileges. Continuing the Princeton line, the subsidiary Trenton, Lawrenceville & Princeton Railroad extends for 9.57 miles over a private right-of-way to Stony Brook. A 50-ft. right-of-way was acquired by purchase, and under the steam railroad act no franchise of any kind other than the State charter was required. From Stony Brook to Witherspoon Street, Princeton, 1.46 miles, the Trenton, Lawrenceville & Princeton Extension Railroad has the same kind of charter. From the foot to the head of Witherspoon Street, Princeton, the Princeton Street Railway has a street railway charter to cover its 0.52 mile of track. This is a 30-year franchise, with renewal privileges. The company was required to pave with Belgian block between the rails and to the curb line within a period of years, but a compromise was made whereby it laid paving at once between and for two feet on each side of the rails with yellow vitrified brick and also laid macadam to the curb.



New Jersey & Pennsylvania Traction Company—First Two Spans of Bridge over the Delaware River

Beginning at the Trenton city bridge, the subsidiary Yardley, Morrisville & Trenton Street Railway has 6.09 miles of track, of which 4.57 miles extends directly through to Yardley. An additional track leaves the main line at the river bridge, circling through Morrisville and meeting the line again after covering 1.56 miles. All this portion of the system is along or upon public roads and streets. From Yardley, the Newton & Yardley branch extends 5.23 miles to Newton, almost entirely upon private right-of-way alongside the public highway.

The Trenton, Newhope & Lambertville division begins at a point in Yardley, distant 5.07 miles from the Trenton terminus, or 4.71 miles from the terminal of the New Jersey & Pennsylvania Traction Company's sole section and extends almost entirely over private right-of-way to New Hope and Lambertville, a distance of 10.88 miles. There are no uncommon conditions in any of the franchises on the Pennsylvania side of the river, except the usual macadamizing between the rails, etc. All of this line is on private right-of-way or public right-of-way, excepting the New Hope-Lambertville bridge, on which the bridge company receives a stipulated rental for trackage rights.

TRACK

The different sections of the New Jersey & Pennsylvania Traction Company's system were built at different times by different interests and consequently the construction varies somewhat. The tracks within the city of Trenton are laid with 7-in. Trilby rails, on 6-in. x 8-in. x 8-in. ties embedded in concrete. The same standards are used in Princeton. In Morrisville and Yardley 9-in. girder rail is used, and in Newtown and New Hope 7-in. girder rail. On the Trenton, Lawrenceville & Princeton line 65-lb. 5-in. high T-rail is used, but a portion of the line in Trenton is laid with 80-lb. A. S. C. E. section. The line outside of Yardley and Morrisville is laid with 60-lb. A. S. C. E. sections, while the Newtown and New Hope divisions have 80-lb. A. S. C. E. rails. In all future non-city work on its system the company will use 80-lb. T-rail.

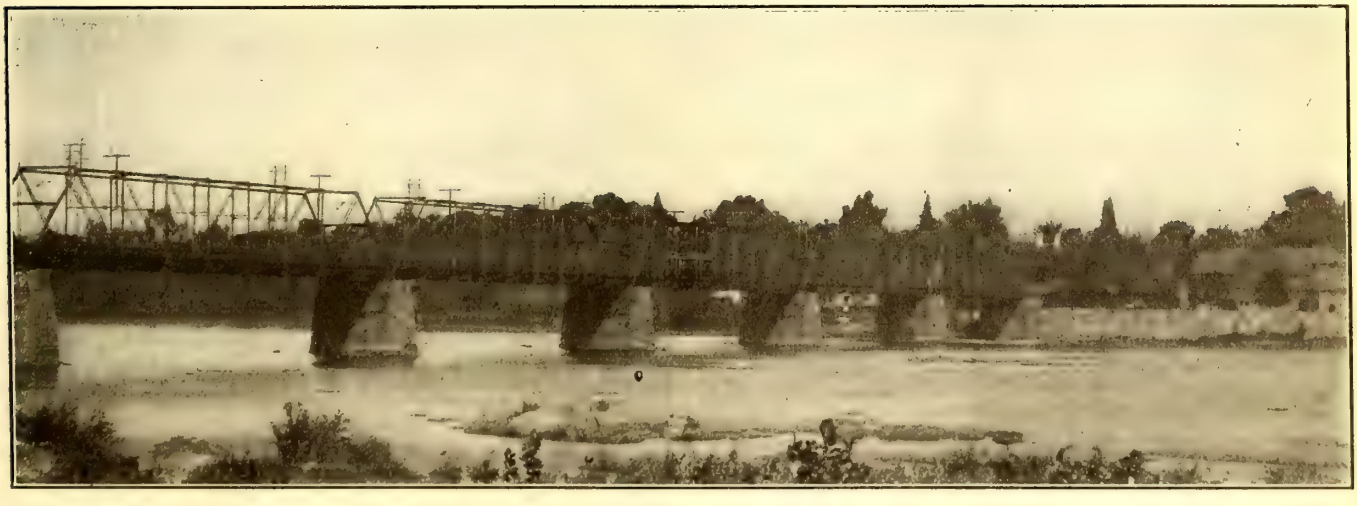
The maximum grade is 5 per cent and its length is 1700 ft., but it offers no operating difficulties as it is only about half a mile from the Yardley power house. On the New Hope line there is a 350-ft. stretch of 4 per cent grade, but the rest of the line varies from level to 1 per cent, except for two short 4 per cent and 5 per cent grades on the Yardley, Morrisville & Trenton line. The Trenton, Lawrenceville & Princeton line has a maximum grade of 1.98 per cent and the maximum curvature is 7 deg. at Lawrenceville; no other curve exceeds 4 deg., the majority being 2 deg. and 3 deg. The Princeton line has four freight sidings, which are also used as emergency passing sidings. The switches are all split point with spring frogs and most of them are spring point. The targets are lighted by electricity.

The largest bridge on any of the lines is the handsome structure across the Delaware River at Trenton, shown in two accompanying views. This bridge is 1300 ft. long and has seven through spans. It was purchased from the Trenton City Bridge Company's stockholders in 1901. This bridge is the only electric railway entrance into Trenton from the west, besides which the company derives revenue from vehicle and passenger tolls. At Neely's Mills, on the Lambertville division, is one steel through span of 90 ft., with 150 ft. of trestle now being filled in with dirt. There are no other bridges on the Pennsylvania divisions of more than 50-ft. span, all deck plate girder or low through trusses. On the Princeton line there are two 53-ft. through plate girder spans, one crossing each branch of the Shabbekunk Creek, besides the Stony Brook Bridge. The latter consists of two 45-ft. deck plate girder spans, with 36-ft. trestles at each end and stone culverts for short distances beyond to carry off the overflow. There are quite a number of 10-ft. to 24-ft. span deck bridges both of steel and wood.

The lines are ballasted principally with broken stone from the company's quarries on both the Lambertville and Princeton divisions, but some gravel and cinders are used on the Princeton line. The overhead construction offers no special features, being carried from wooden poles throughout, except that iron poles are used in the larger towns. Bracket construction is used for 5 miles out of the total of 40 miles.

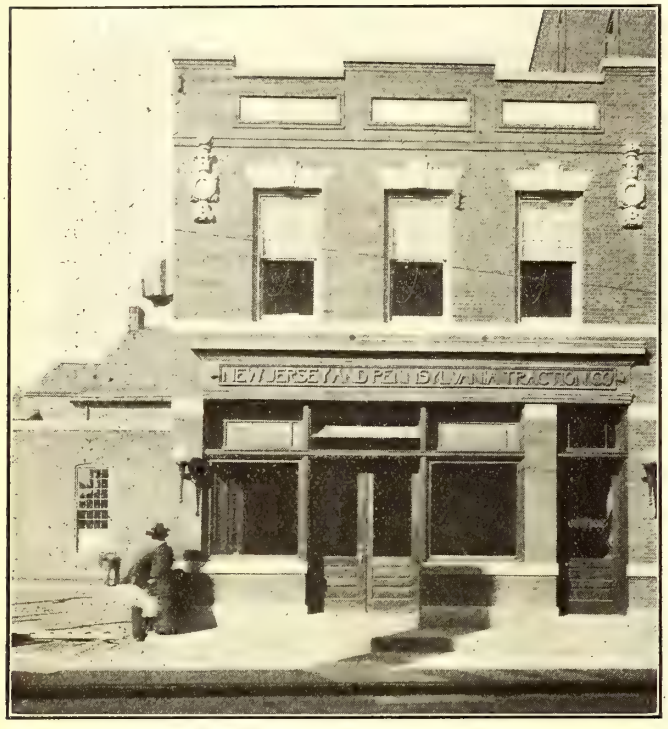
THE FREIGHT BUSINESS

The freight business, which now amounts to about $15,000 a year, really has been in operation longer than the passenger service as some goods were carried on the Trenton, Lawrenceville & Princeton Railroad by steam locomotives prior to the installation of electric power and the passenger service. For several years the freight business was regarded as a necessary evil and was carried only because the Princeton charter demanded it. During the past three years, however, closer attention has been paid to this subject, and since April 1, 1909, the business has been put on a thoroughly sound basis both as to operation and accounting. During a period of six months not a trip has



New Jersey & Pennsylvania Traction Company—Remaining Five Spans of Bridge over the Delaware River

been missed by the freight cars on either of the three divisions, and 80 per cent of the time the cars have left their terminals on the minute. The longest delay within this period was 33 minutes, and the average delay was 3½ minutes. This record is all the more remarkable inasmuch as shipments are received up to 10 minutes of the leaving time, are then billed and the conductor's and agent's sheets enclosed.



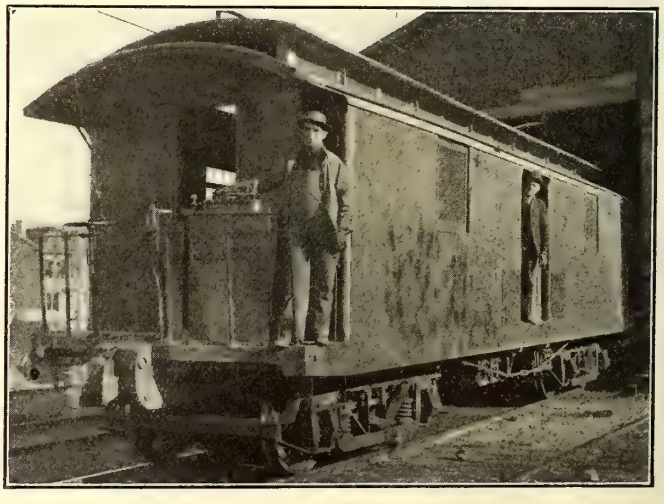
New Jersey & Pennsylvania Traction Company—Waiting Room and General Offices in Trenton

During the earlier period of the freight service, various hours of the day and night were tried and the day schedules found to be the best. The first car leaves at 5 a. m. for New Hope, 16 miles distant, making 11 regular stops to discharge freight, arriving in New Hope at 6 o'clock. Returning at 6:20, the same number of stops are made, principally to pick up milk cans, and, counting in a 25-minute layover at Brownsburg to clear passenger cars, the car arrives at Trenton at 7:50 a. m. The same crew again loads the car and leaves for Newton, double heading with the 9:50 a. m. passenger car. It returns with that car on the 10:50 a. m. trip from Newtown and arrives in Trenton at 11:40 a. m. At 2:25 p. m. the crew leaves, on another car (owing to the different gages), for Princeton, picking up through cars from the Philadelphia & Reading Railway at the Trenton city line and distributing freight along the route. As high as 624,000 lb. has been hauled on a single trip, the load including two steel hopper-bottom cars containing 106,500 lb. and 107,300 lb. of coal each. From two to four loaded cars is a usual day's haul, although there are some days on which no through cars are hauled. The return trip from Princeton is begun at 4:40 p. m. and is supposed to end at 5:15 p. m., but very frequently work along the line delays the return from 30 minutes to an hour. Extra trips are made from time to time, usually with one member of the regular crew and an extra man, another extra being added to the regular run. Special attention has been paid to hauling ice during the past season, and on the Princeton division trips have been made at any time from 5 a. m. to 12 midnight. None of the steam railroads in this territory gives service to compare with this for promptness.

Contrary to the usual claim made by electric railways, this company does not find the package business to be a source of revenue. Even with a minimum rate of 25 cents per 100 lb. the package business produces less than 3 per cent of the total business. It is the heavy freight, such as coal, ice, stone, paper, baled hay, straw and large shipments of meats and provisions which pays. All the through freight cars are secured from the Philadelphia & Reading Railway on a per diem basis. The incoming freight includes nearly every kind of goods manufactured, while the outgoing consists principally of artificial ice, baled hay, straw, apples and stone. The rate on these items is 25 cents per ton in carload lots, with a minimum of $5 per car. One hay-pressing plant along the line is a heavy shipper to New York. Cars for this point are frequently called for as late at 2 p. m, are ready at 3 p. m., loaded and prepared for the incoming train from Princeton at 5:02 p. m., placed on the Reading's East Trenton branch, 5 miles away, by 5:15 p. m., taken from there by a local freight at 5:25 p. m., transferred to the Trenton branch of the Philadelphia & Reading and deposited the same night in Jersey City.



New Jersey & Pennsylvania Traction Company—Standard Type of Passenger Rolling Stock for Suburban Service



New Jersey & Pennsylvania Traction Company—Baggage Car, with Four 75-hp Motors, Used for Handling Freight

The New Hope-Lambertville division is the only one

upon which the freight traffic is almost exactly balanced, with a slight advantage in favor of incoming material. On the outbound trip merchandise, bread (which is a large item here) and empty milk cans form the load, while on the return trip paper from a New Hope mill and filled milk cans balance the earning load. On the Newton division the inbound material consists of large quantities of flour aside from a few small articles. Milk tickets are sold at the rate of one-half cent a quart on 30-quart tickets. On the New Hope division the milk is carried on the freight car, but on the other divisions it is transported via the passenger cars. All the empty cans are returned on the freight car.

The average receipts per motor-car mile on the Princeton division are 58 cents, with 20 cents as operating charges to cover the crew, agents, supervision, printing, etc., exclusive of power; on the Pennsylvania line the receipts are 25 cents per motor car-mile, and the expenses are 16 cents. The expenses for 1909, excepting power cost, will run about 33 1/3 per cent of the freight receipts. The losses and damages amount to about 1/6 of 1 per cent of the gross receipts. None of the claims is large, the usual one is for a missing package in a lot of two dozen or more. As receipts are taken for all goods delivered to the consignee, it is not difficult to determine whether or not the claim is just The only loss claims during a period of three months were for a bag of sugar, a small bag of flour and a can of milk accidentally overturned. The flour was part of a large consignment and was mixed in delivery; the milk was very much in evidence, but the sugar was not located. A single claim for breakage was made and promptly settled. The company is now building in its shops a freight car with steel floor framing. The general traffic and freight business is in charge of T. G. Kitchin.

POWER IMPROVEMENTS

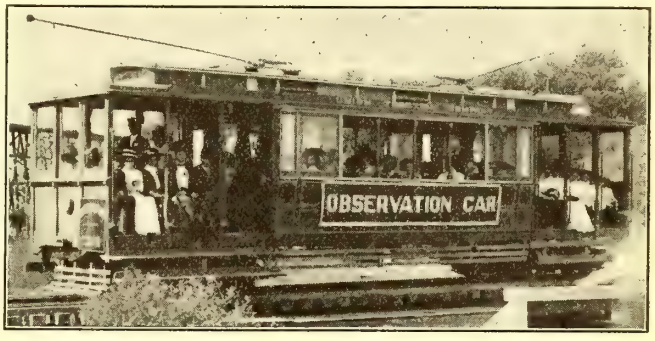
During the past year or two the company has secured some remarkable savings in power cost and distribution. The changes in plant location and apparatus made to secure these economies will be described in an early number.

ELECTRIFICATION OF THE SPIEZ-FRUTIGEN RAILWAY

The Bernese Alpine Railway has made a contract with the Siemens-Schuckert Company for the electrification of the Spiez-Frùtigen line in Switzerland with 15,000-volt, 15-cycle current. This potential will be delivered directly from two 3200-hp turbo-generators at Spiez. The trolley wire will be hung from a catenary at heights ranging from 4.8 m (14 ft. 9 in.) to 7.2 m (23 ft. 6 in.). The rolling stock will consist of two locomotives and three motor cars. The latter are to be arranged for 64 third-class seats and have double trucks. On the Spiez-Frùtigen section, which has a maximum grade of 1.55 per cent, the cars will have two motors, totaling 440 hp; but on the Lötschberg line, which has grades up to 2.7 per cent, the motor equipment will be doubled. A complete motor car will weigh 55 metric tons and will be capable of taking a trainload of 240 tons up a 1.55 per cent grade or a trainload of 160 tons up a 2.7 per cent grade at 45 km (27.9 miles) an hour. Each motor car is supplied with two bow collectors. The step-down transformers have six voltages for running, and also supply heating current. The car lighting is by direct current obtained from a motor-generator set and storage battery equipment.

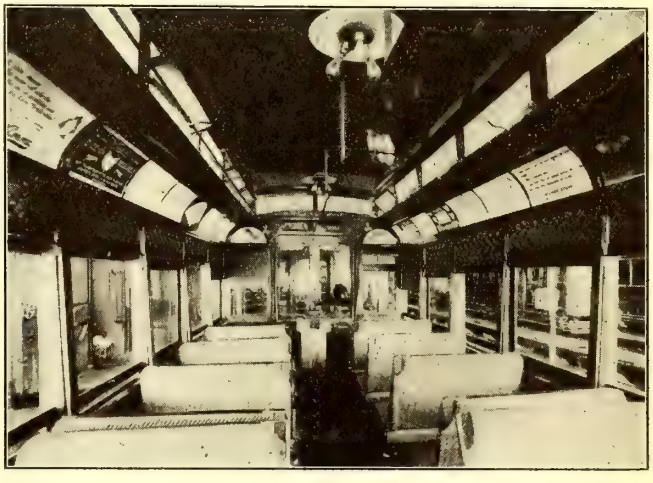
OBSERVATION CAR SERVICE IN SANTA CRUZ, CAL.

S. W. Coleman, manager of the Union Traction Company of Santa Cruz, Cal., operated an observation car on the lines during the last summer. An ordinary passenger car was used for this purpose, and a trip of 18 miles was



Exterior of Santa Cruz Observation Car

given for a fare of 25 cents. Santa Cruz is a city of 15,000 in winter, and in summer it has probably 40,000 people, including the visitors. The car, besides passing the principal points of interest in Santa Cruz, took the pas-



Interior of Santa Cruz Observation Car

sengers to Capitola, a suburb 6 miles from Santa Cruz.

As it was necessary to cover the same route twice, a novel feature for entertainment was introduced on the return trip. A phonograph was placed in the front end of the car and good music was furnished.

GEAR AND PINION GREASE IN DETROIT

On page 902 of the ELECTRIC RAILWAY JOURNAL for Oct. 23, 1909, a short account was presented outlining the methods used by Sylvester S. Potter, master mechanic, Detroit United Railway, for reducing the cost of gears. The second sentence stated that the cost of lubrication had been reduced to a certain amount. It should have read that the cost of the gears had been reduced to a figure ranging between 56 and 80 cents per 1000 miles, and the cost of pinions to an amount of from 32 to 40 cents per 1000 car-miles. Mr. Potter advises that these costs for gears and pinions are made possible by the use of the gear lubricant, which is compounded according to the formula presented.

The motormen of the Swindon (England) municipal tramway system receive a bonus for attaining a fixed minimum current consumption in operating their cars.

THE ELECTRIC SYSTEM OF THE GREAT NORTHERN RAILWAY AT CASCADE TUNNEL*

BY CARY T. HUTCHINSON, CONSULTING ELECTRICAL ENGINEER OF THE GREAT NORTHERN RAILWAY

The first three-phase installation on a trunk line railway in the United States was put into operation early in July of this year at the Cascade Mountain tunnel on the Great Northern Railway, about 100 miles east of Seattle, Wash.

The Great Northern Railway crosses the Cascade Mountains through a tunnel 13,873 ft. long; this tunnel is on a tangent and has a uniform gradient of 1.7 per cent. Rising to the tunnel from Leavenworth, on the east, the ruling grade is 2.2 per cent, and from Skykomish on the west to the summit the ruling grade is 2.2 per cent.

The operation of the tunnel with steam locomotives was at all times difficult and frequently very dangerous on account of the heat and smoke from the locomotives. In the tunnel the rails became very wet from condensed steam, and were frequently covered with a layer of coal soot and ground sand, making them very slippery. The temperature in the locomotive cab was almost unbearable, rising at times as high as 200 deg. Fahr. This tunnel is the limiting feature to the capacity of the Great Northern Railway for hauling freight across the mountains. Mallet compound locomotives are used on this division, one at the head of the train and one pushing. It is impossible for steam locomotives to haul heavy trains on the mountain at a greater speed than 7 or 8 m. p. h.



Great Northern Electric System—Cascade Yard Showing Bracket Construction on Curve

The original problem was to provide electric equipment to handle a train having a total weight of 2000 tons, excluding the electric locomotives, over the mountain division from Leavenworth to Skykomish, a distance of 57 miles. The system was to be first tried out at the Cascade Tunnel. The tractive effort required to accelerate a train having a total weight of 2500 tons on a 2.2 per cent grade, using 6 lb. per ton for train resistance, 10 lb per ton for acceleration, and 44 lb. per ton for grade resistance, making a total of 60 lb. to the ton, is 150,000 lb.; this would require four locomotives of a tractive effort of 37,500 lb. each. The railway company's engineers limited the weight on a driving axle to 50,000 lb.; therefore four driving axles per locomotive were needed, giving a coefficient of adhesion of about 19 per cent. The locomotive was, therefore, designed to give a continuous tractive effort of approximately 25,000 lb., and it was expected that four would be used with a train of maximum weight. The locomotives as built greatly exceed this specification.

GENERAL DESIGN OF LOCOMOTIVE

The locomotive as built has the following principal characteristics: Total weight 230,000 lb., all on drivers; two trucks, connected by a coupling, each truck having two driving axles; a three-phase motor connected by twin gears to each axle; gear ratio 4.26; diameter of driving wheels, 60 in.; synchronous speed of motor, 375 r.p.m., giving a speed of 15.7 m.p.h at no load, dropping to 15 m.ph for a load corresponding to the one-hour rating The motors are wound for 500 volts and are completely enclosed and air cooled; clearance between stator and rotor, ⅛ in.; trolley pressure, 6000 volts. Each locomotive has two three-phase transformers reducing the pressure from 6000 to 500 volts, arranged with taps so that 625 volts may be used on the motor.

The specifications of the motors required an output of 250 hp continuously for three hours with 75 deg. C. temperature rise when supplied with not more than 2000 cu. ft. of air per minute. The test results of the motor show a continuous output of 375 hp at 500 volts with 1500 cu. ft. and 400 hp at 625 volts with the same air. The one-hour rating of the motor at 500 volts with 1500 cu. ft. of air per minute is 475 hp. The continuous output at 500 volts corresponds to a tractive effort of 9350 lb. per motor and the one-hour output to a tractive effort of 11,900 lb. per motor. The locomotive will therefore give 37,400 lb. tractive effort in continuous duty, or 47,600 lb. tractive effort for one hour.

The locomotive has been tested to a maximum tractive effort of nearly 80,000 lb., corresponding to a coefficient of adhesion of nearly 35 per cent. With 60,000 lb. tractive effort each locomotive can accelerate a train of 885 tons trailing on a 2.2 per cent grade, using 60 lb. per ton as the unit tractive effort. Making some allowance for the sake of conservatism, the rating of the locomotives on this division can be put at 750 tons trailing load.

ELECTRIC EQUIPMENT OF LOCOMOTIVE

Each locomotive is equipped with four three-phase induction motors, wound for 500 volts at the primary or stator. The motors are completely enclosed and are cooled by forced air circulation from a large blower. They are suspended from the axles in the standard manner, except that they are geared at both ends of the armature shaft. On account of the low speed and high torque required it was not considered safe to use a single pair of gears. The gear has 81 teeth, the pinion 19 teeth, giving a gear ratio

* Abstract of paper read before the American Institute of Electrical Engineers, New York, Nov. 12, 1909.

of 4.26. The gears are of specially hardened steel, and in order to secure perfect alignment the two pinions on each shaft were cut simultaneously. At first it was the intention to use some form of spring connection between motor and driving wheel, but this was subsequently abandoned, as it seemed that there would be sufficient flexibility in the armature shaft to take out any small differences between the two sets of gears. As far as can be told at present, this assumption appears to be correct, for there has been no difficulty with the gears and no unequal wear. The gears run with little noise and the construction seems satisfactory.

The locomotive carries two three-phase air-blast transformers, having a nominal rating of 400 kw each, transforming from 6000 volts to 500 volts normally, or to 625 volts by the use of taps. The continuous capacity of the transformers is not as great as that of the motors, although it is fully up to the specification, and it may be that the quantity of air to the transformers will have to be increased when the locomotives are put in continuous service.

Compressed air for the brakes is supplied by two 100-cu. ft. induction-motor-driven compressors; the cooling air is supplied by a 9400-cu. ft. motor-driven blower. The locomotive is equipped with a combined straight and automatic air-brake system.

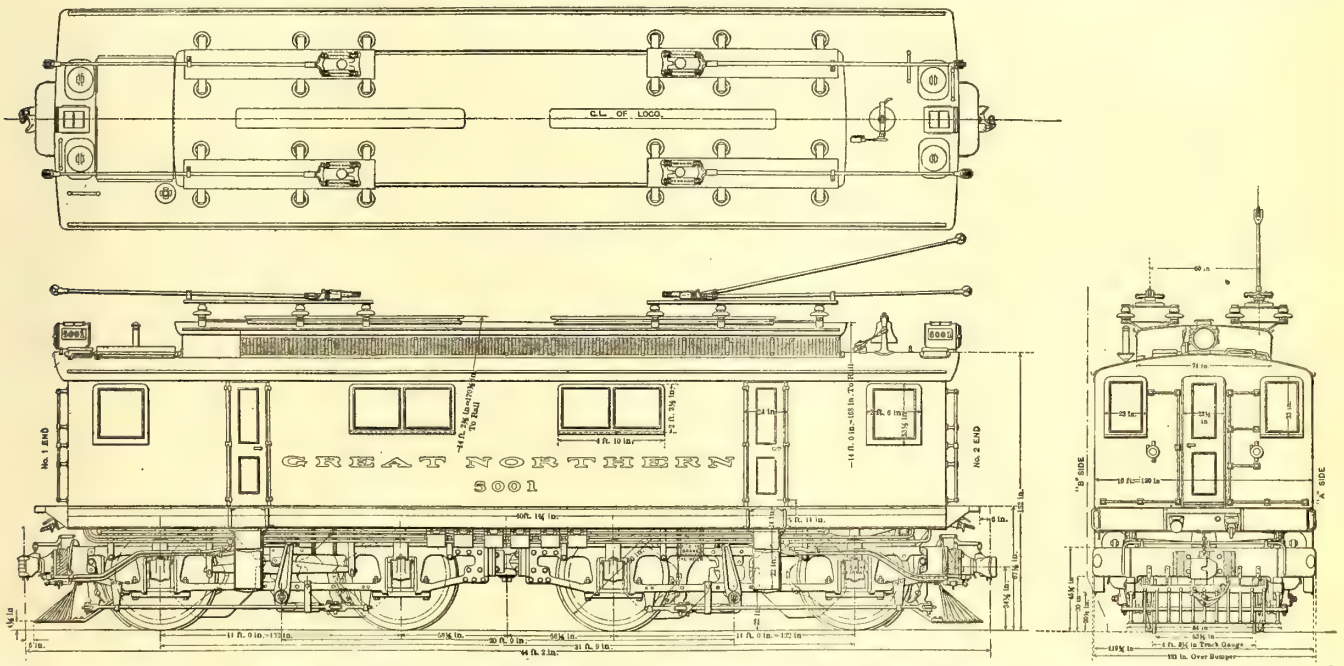
The control system of each motor is separate; the circuits branch from the transformer and are independent through

MECHANICAL DESIGN OF LOCOMOTIVE

The locomotive is of the articulated or hinged type, having four driving wheels on each half of the running gear, without guiding wheels. The hinged sections are so rigidly connected that they tend to support each other vertically and guide each other in taking the curves, although the hinges are designed to offer minimum resistance to lateral flexure. There are no springs to prevent this flexure, and the wheelbase is free to accommodate itself to any curvature. The effect of this guiding action is to minimize the flange wear, as in the Mallet locomotive.

The equalization system takes advantage of the vertical rigidity of the truck to distribute the spring stresses over groups of springs instead of concentrating them on single springs; the truck section on the one end is side equalized, but the section on the other end is carried on a three-point suspension. The springs are thereby equalized in groups, and the groups are so arranged as to eliminate all skew or twisting stresses in the truck frame.

The framing of the running gear is of substantial steel castings annealed and held together by body-bound taper bolts in reamed holes. Side frames are castings of truss pattern; end frames and bolsters are steel castings of box-girder type; the end frames and all parts are designed for buffing stresses of 500,000 lb. Bolsters are hollow castings, and form part of the air reservoir for the motor ventilation; the air being supplied to the motors through a hollow center



Great Northern Electric System—Plan and Elevations of Three-Phase Electric Locomotive

the resistances. There are 14 contactors in each motor circuit, or 56 in all. The pilot control is in duplicate, one switch at each end of the locomotive. There is a clear aisle on each side of the locomotive from end to end, all of the apparatus being assembled in the center of the cab.

Iron grid resistances are provided for each motor. There are 13 steps in the control, but in order to reduce the number of contactors to the lowest possible point an unsymmetrical system is used. A change is made in the resistance of one phase only in passing from step to step. This arrangement in effect treats the three-phase circuit as a single-phase circuit. On each step of the control the torque is the average of the three values of the torque of the separate circuits. The principal advantage of this is that 56 contactors do the work that would otherwise require 128, thus effecting a great gain in the simplicity of the control apparatus.

Experience with the locomotive in service indicates that the initial torque, which is approximately 20,000 lb., is somewhat high, and the control is now being changed so that on the first step two motors only will be thrown in circuit, and on the second step all four motors. This change is readily made by eliminating step 12, which tests have shown to be of little or no value.

pin. The motor gears are shrunk on an extension of the wheel hub, thus eliminating the torsional stresses from the locomotive axles.

The cab is carried on the trucks through center pins on each bolster, the center pin on one end having a slight longitudinal sliding motion to allow for variation in the distances between truck center pins in taking curves. The cab extends the entire length of the platform, and is made of No. 10 steel plates, which carry a monitor that supports the trolley base and has a ventilated opening running through the center and perforated side plates to permit the escape of air from the interior of the cab. The greater part of the control apparatus, the rheostat, the transformers, contactors, etc., is placed in a separate compartment 60 in. wide and 22 ft. long, enclosed by steel partitions extending directly up to the monitor roof. This leaves two open operating spaces at the ends of the locomotive, connected together by two side aisles 30 in. in width. This center compartment is divided into three parts by steel-plate partitions; the middle part contains the high-tension apparatus, including switchboard; the end parts are duplicates, each containing one transformer and the contactors for two of the motors. The rheostats are placed in the monitor at the top of the cab. The air for ventilation, after

passing through the transformers, cools the rheostats and then escapes to the atmosphere. Placing these rheostats at the top of the cab has also the advantage of raising the center of gravity of the locomotive, which is nearly 60 in. above the rail head, higher than is usual with electric locomotives.

GENERATING SYSTEM

The power house is located on the Wenatchie River, about 2.5 miles west of Leavenworth. There is a low concrete diverting dam in the river at a point about 12,000 ft. west of the power house, and from this dam a pipe line leads to the waterwheels. The pipe line gives a static head at low water of 203 ft., and in ordinary water of about 200 ft. The operating head at rated load is 180 ft. The pipe line ends in a surge tank at the corner of the power house, having a total height of 183 ft. above its foundation. The tank proper is 30 ft. in diameter, and with a storage height of 54 ft. above its hemispherical bottom, gives a storage capacity of approximately 38,000 cu. ft.

The power house is designed for three main units and two exciter units. There are now installed in the power house two main units, each turbine rated at 4000 hp, directly connected to a three-phase alternator. The two main units now erected, with the exciter, require approximately 500 cu. ft. of water per second when operating at full load of 8000 hp, giving a velocity of flow in the penstock of 8.7 ft. per second. The extreme low flow of the river at the dam is estimated to be 380 second-feet. The small pond formed by the dam has a storage capacity equivalent to 8000 hp-hours for a depth of 1 ft. It is possible to draw the water in the dam down 3 ft. There are two other power sites in the canyon, each affording a head of 200 ft., available for subsequent developments.

The entire hydraulic installation was designed and constructed under the direction of J. T. Fanning, of Minneapolis.

ELECTRIC EQUIPMENT OF POWER HOUSE

The two main generating units have each a nominal capacity of 2500 kva at 375 r.p.m., 6600 volts and 25 cycles. There are two exciter units, each having a nominal capacity of 125 kw at 750 r.p.m. These units also have a large overload capacity; they frequently carry 150 per cent overload, on account of the very poor regulation of the waterwheels. A third unit, identical with the first two, has been ordered.

The power house also contains four transformers for raising the pressure to 33,000 volts, each of a nominal capacity of 833 kw, but guranteed to operate on 100 per cent overload for one hour, with a low rise in temperature. Three of these units are in service, and the fourth is kept as a spare.

The switchboard apparatus is of the usual type, having panels for the generators and the feeders, and is provided with the usual measuring instruments.

One reason leading to the use of the three-phase system was the possibility of returning energy to the system on down grades. With the present installation it is not possible to make any use of the energy so returned, but in order to prove this practically an automatic rheostat controlled by the speed of the generator was installed in the power house; when a train on the down grade reaches a little more than the synchronous speed, the electrodes of the water rheostat are automatically lowered by an amount proportional to the difference between synchronous speed and the speed of the generator; this throws a load on the system and acts as a brake to the train. The operation of this apparatus is entirely effectual.

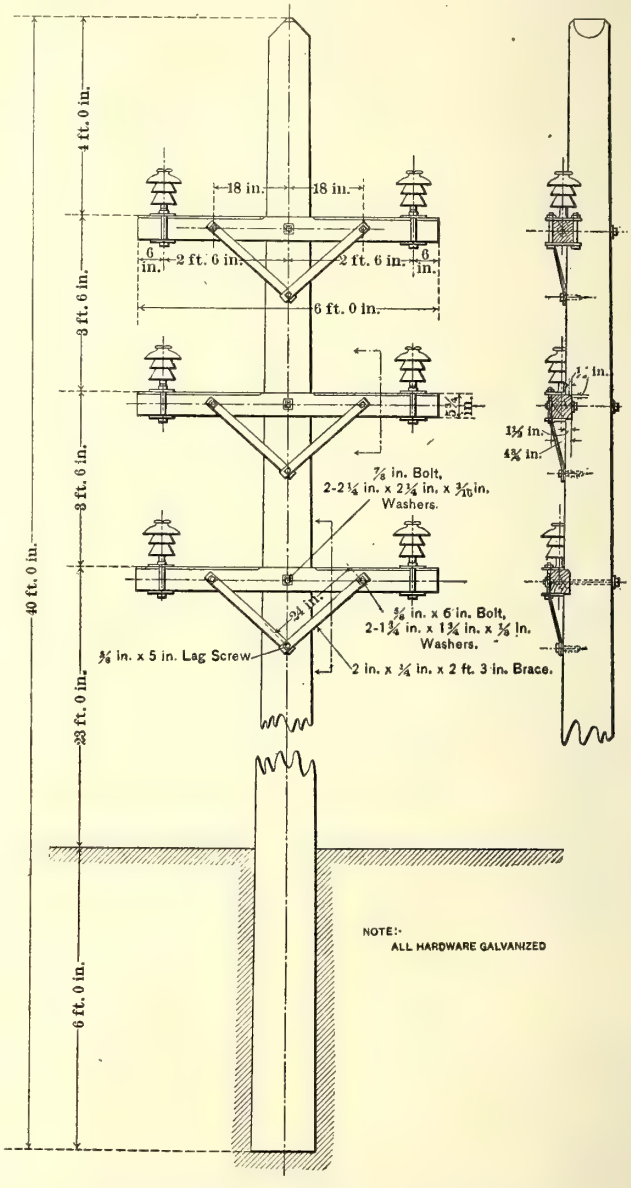
The nominal capacity of parts of this equipment, in particular of the transformers, may seem unusual; but it must be remembered that the plant is intended to operate on a load having extreme fluctuations, the entire load being on for, say, 15 minutes, and then off for two or three hours; consequently the transformers can be made small.

This plant has operated satisfactorily, with the exception of certain troubles with the waterwheels. In particular, the generators have shown ability to hold their rated pressure under extreme variations of speed, due to the effective control of the Tirrill regulators. The generator fields, designed for 125 amp, have frequently carried 300 to 350 amp, and the regulators have held the pressure normal, in spite of fluctuations of 35 to 40 per cent in speed.

TRANSMISSION LINE

The transmission line extends from the power house at Leavenworth to the substation at Cascade, a distance of approximately 30 miles, following the railroad all the way. The line carries two circuits each of No. 2 B. & S. gage stranded hard-drawn copper wire. Each circuit is in a vertical plane at one side of the pole, thus permitting the use of short cross-arms. The upper cross-arm was placed some distance below the top of the pole in order to leave room for a ground wire, which has not as yet been installed. The line is divided into three sections by two out-of-door switches operated by means of a pole deposited with a station agent; each switch is near a station.

The telephone line is carried on the same poles. The



Great Northern Electric System—Details of Standard Transmission Line Pole and Cross-Arms

transmission line is not transposed, but the telephone line is transposed at every fifth pole.

The construction of this line was completed a year ago, and it has stood through one winter, during which there were more than 30 snow and rock slides. Only one of these slides caused damage to the line, and in this case only one of the two circuits was interrupted. The same slide interrupted the operation of the railroad for 8 to 10 hours.

SUBSTATION

The single substation is at Cascade, near the east portal of the tunnel. Three single-phase transformers are in service and a fourth is in reserve; these transformers are duplicates of those in the power house. The equipment of the substation is along the usual lines, and calls for no spe-

cial comment. The low-pressure busbars at the substation are connected to the overhead wires in the Cascade yard, and also to the Wellington feeder, which runs through the tunnel to the extreme end of the Wellington yard.

TRACKS ELECTRIFIED

In the two yards at the ends of the tunnel the main track and two side tracks are electrified, together with the necessary crossovers, etc. The total length of the track equipped, including the tunnel, is about 6 miles.

The length of the several parts of the overhead structure is as follows:

Substation to east portal of tunnel.....	200 ft.
East portal to west portal.....	13,900 ft.
West portal to end of electrified track.....	6,960 ft.
Total	21,060 ft.

OVERHEAD CONSTRUCTION IN YARDS

Bracket and cross-catenary construction is used in the yards. The trolley wires are 24 ft. above top of rail and 5 ft. apart. For single tracks a bracket type of construction is used, and for multiple tracks a cross-catenary type, supported by very heavy wooden poles located about 8 ft. from the center line of the outer tracks, thus leaving unobstructed the space between adjacent tracks. The wires are supported at intervals of 100 ft.

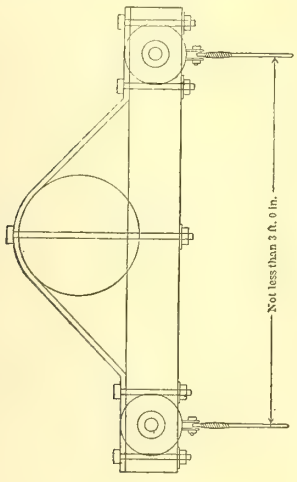
Multiple track supports consist, for each phase, of a steady span supported by and insulated from a cross-catenary span, both spans being secured to cross-arms on the poles by means of porcelain petticoat strain insulators. The spans for the two respective phases are 3 ft. apart. The wires of the same phase, for the different tracks, are insulated from each other by means of wood breaks and porcelain link insulators, in series. On the brackets each phase is insulated from ground by means of a wood break in series with a porcelain petticoat strain insulator.

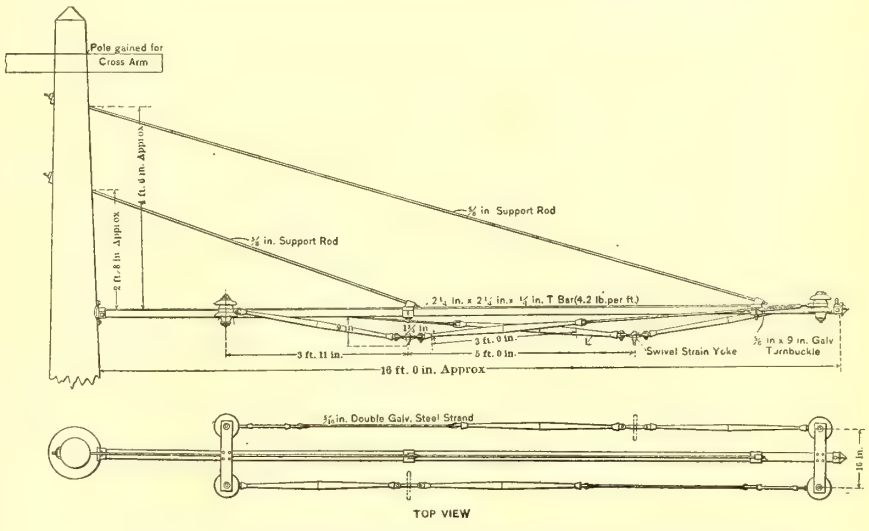
Where wires of opposite phases cross at turn-outs, they are insulated from each other by section insulators made of wood and about 5 ft. in length. Four insulators are used, each connected at one end to a special 8-deg. crossing pan and at the other end to one of the four wires converging toward the crossing. Except for one track, whose wires are cut straight through the crossing pans without section insulators, it is necessary to switch the controller to the off position when the trolley wheel passes under the insulators. Methods of avoiding this are being tried out.

Heavy steel bridges, forming anchorages for the trolley wires, are located in both yards at intervals of 1000 ft. Lightning protection, though thunder storms are rare, is afforded by arresters connected to the wires at the ends of the tunnel and yards.

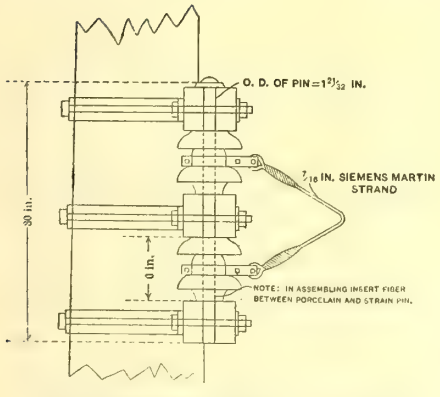
Both rails in the tunnel and one rail in the yards are bonded, with cross-bonding at frequent intervals. A single No. 0000 exposed bond is used at each joint, having a length of 36 in. in the tunnel and 36 in. and 50 in. in the yards.

The use of double insulation everywhere is the reason for the almost total freedom from troubles of any kind originating on the overhead structures. The only troubles experienced up to the present have been at the section breaks and turn-outs, and have been caused by the trolley wheel leaving the wire. There has been no failure of the wires at any point of the overhead structure nor any breakdown of insulation.

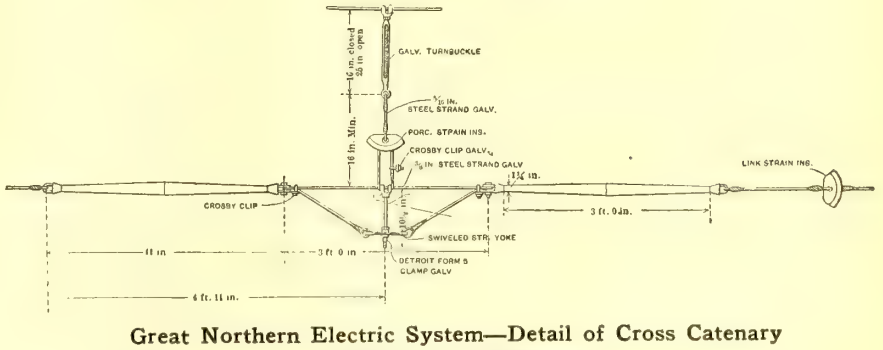




Great Northern Electric System—Bracket Construction in Yards



Great Northern Electric System—Method of Attaching Cross Catenary Spans to Side Poles



Great Northern Electric System—Detail of Cross Catenary Trolley Wire Suspension

OVERHEAD CONSTRUCTION IN TUNNEL

In the tunnel the wires are 17 ft. 4 in. above the top of the rail and 8 ft. apart; the latter spacing enables train-men to operate the hand-brakes, or walk on the tops of freight cars, the construction being such that head-room is not interfered with. Each wire is supported every 50 ft. by means of a 14-in. Detroit clamp attached by swiveled connection to a stud, which is in turn swiveled to the middle point of a turnbuckle. The two eyes of the latter, by means of strand wire, connect each to a link and petticoat strain insulator arranged in series, the two petticoat insulators being secured to the roof of the tunnel by means of two expansion bolts, about 5 ft. 6 in. apart. Anchors and side-braces for the wires in the tunnel are located at intervals of 3000 ft.

Practically all metal work in the tunnel supports is copper or bronze, but experience has shown that galvanized iron, soon becoming protected by a slight coating of soot, would have been satisfactory. The insulators when first put in service were covered by a very thick coating of wet soot, but, even under these conditions, it was found possible gradually to bring the voltage up to normal without breakdown. Volumes of smoke and steam issuing from steam locomotives caused only a slight surface leakage, and one rough cleaning sufficed to put the insulators in reliable working condition.

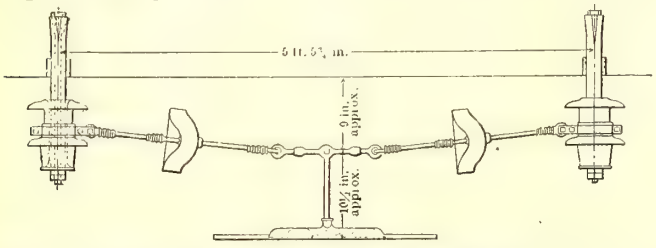
Spacing the wires 8 ft. in the tunnel was necessitated by the requirement of the railroad company that there should be no construction in the roof of the tunnel which could possibly interfere with a brakeman's walking on top of a freight car. This change in the location of the wires complicated the construction somewhat, and was one of the principal reasons leading to the use of a trolley wheel in place of a bow collector. It has, however, caused no material inconvenience and is satisfactory as long as the trolley wheels are in use, but if a change is made to a bow collector, which is not impossible, there may be difficulty in adapting the bow to this location of the wires.

ELECTRIC LIGHTING

It is intended ultimately to clean and whitewash the tunnel and light it electrically, and for this purpose a lighting system has been installed. Five transformers of 4 kw capacity each are placed in refuge chambers. Incandescent lights are spaced 50 ft. apart and are connected five in series of a 500-volt system. Several plans were worked out for this lighting system, but taking into account maintenance costs, it seemed best to use a standard 110-volt carbon filament lamp.

TELEGRAPH LINES

The telegraph wires, 10 in number, run through the tunnel in a cable. The service on these wires was thrown entirely out of commission when the electric locomotives began running. There is no interference with the tele-



Great Northern Electric System—Longitudinal View of Tunnel Suspension Scheme, Supports Spaced 50 Ft. Apart

graph wires due to the transmission lines paralleling them for 30 miles, and the entire interference seems to originate in the tunnel. In order to eliminate this interference, a neutralizing transformer has been installed, and adjustments are now in progress. There has been little difficulty in making the ordinary single-wire telegraph service satisfactory, but considerable difficulty has been experienced in getting the quadruplex to work satisfactorily; this matter is still unfinished.

OPERATION OF THE SYSTEM

The electric service was started on July 10, although one or two trains had been handled previously. From that time to Aug. 11 practically the entire eastbound service of the company has been handled by electric locomotives.

During this period of 33 days there were 212 train movements, of which 82 were freight, 98 passenger and 32 special. In each case the steam locomotive was hauled through with the train. The tonnage handled was as follows:

Freight tonnage	171,000	tons
Passenger "	88,500	"
Special "	15,500	"
Total	275,000	tons

This was an average of 8350 tons per day, all eastbound.

The average freight train weight was as follows:

Cars	1,480	tons
One Mallet locomotive	250	"
Three electric locomotives	345	"
Total train weight	2,075	tons

The maximum weight of cars was 1600 tons; the minimum 1200 tons.

The representative passenger train handled was made up as follows:

Coaches	426	tons
One steam locomotive	250	"
Two electric locomotives	230	"
Total train weight	906	tons

The maximum was about 125 tons greater.

The power required to haul these trains seemed greater than it should be, and investigation showed that the difference was accounted for by the unexpectedly high frictional resistance of the steam locomotives as a trailing load. Tests were made on several engines, with the following results:

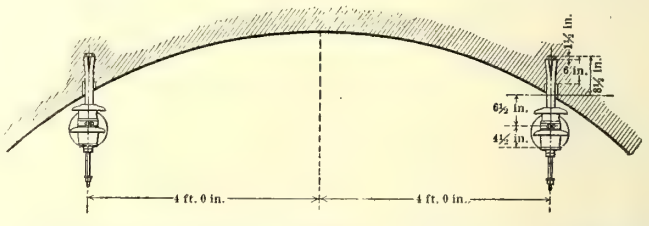
LOCOMOTIVE FRICTION TESTS

Test No.	Engine classification.	Total weight with tender Tons.	Weight on drivers Tons.	Total resistance on 1.7 per cent grade lb.	Equivalent weight of freight cars Tons.
1	Mallet No. 1904..2-6-6-2	250	158	19,340	482
2	" No. 1911..2-6-6-2	250	158	17,500	432
3	" No. 1905..2-6-6-2	250	158	24,200	602
4	Consolidation.....2-8-0	159	90	10,080	255
5	Pacific.....4-6-0	188	70	10,270	257

The tests were made by towing an engine through the tunnel behind an electric locomotive, fitted up with test instruments. An allowance of 6 lb. per ton was made for the resistance of the electric locomotive. The equivalent load in cars is based on car resistance of 6 lb. per ton.

If the grade resistance be deducted from the total pull, and the difference lumped as "pounds per ton" for the locomotive and tender, there results an average for the three Mallets of 47.0 lb. per ton for the frictional resistance on a straight level track as against 13 lb. per ton for the electric locomotive. The figure for the electric locomotive was obtained from tests made by towing it by a motor car on straight level track at Schenectady, N. Y. Included in it is the resistance of the gears and bearings of the motors.

During the period of 33 days under consideration there



Great Northern Electric System—Cross Section Through Top of Tunnel, Showing Supports for Trolley Wires

were no delays due to failure of the electric locomotives, and but two trifling delays due to failures of the electric plant, both chargeable to the transmission line and both caused by accidents beyond the control of the operating force. On Aug. 11 the electric service was discontinued, owing to failure of both waterwheels. Service was resumed on Sept. 9, and has been continued regularly since. The plant was taken over by the operating department of the railroad late in September.

The westbound service was not at first regularly handled by the electric locomotives, as there is nothing gained by braking the trains electrically on this short stretch, but now westbound passenger trains are so handled for the benefit of the passengers.

REGENERATION

A number of tests have been made to determine the power returned when regenerating. The following is a typical example:

TRAIN: MALLET ENGINE, 1550 TONS CAR WEIGHT, TWO ELECTRICS ON 1.7 PER CENT GRADE

Force due to grade	Frictional resistance	Remainder for acceleration
Mallet ..... 8,500 lb.	11,500 lb.	— 3,000 lb.
1550 tons in cars....52,500 "	9,300 "	+43,200 "
Three electrics.....11,700 "	2,070 "	+ 9,630 "
	Total for acceleration	49,830 lb.

This is equivalent to 1495 kw delivered to the gears of the motors at 15 m.p.h.

The efficiency of the locomotive is approximately 80 per cent—hence the power returned to the line should be 1200 kw. The test of this train gave 950 kw; this difference is due to the standard practice, not yet abandoned, of keeping a certain number of pressure retaining valves on the cars set on down grade.

The Mallet, instead of adding to the delivered power, is an additional load that has to be carried by the train.

A similar test on a 10-car passenger train weighing 950 tons gave:

Delivered power, calculated.....590 kw
Delivered power, measured.....597 kw

In this case there was no added resistance due to the use of pressure retaining valves.

These tests merely confirm the calculations, as they should. On a 1.7 per cent grade, 1 ton descending at 15 m.p.h. will deliver 0.67 kw to the system; on a 2.2 per cent grade it will deliver 0.91 kw.

EFFICIENCY

The losses in the system when delivering 4000 kw to the locomotive at the west end of the Wellington yard are:

Place	Power Kilowatts	Per cent
Power house low-tension busbars.....	4,740	100
Substation low-tension busbars.....	4,250	89.8
Trolley wheel of the locomotive.....	4,000	84.5
Driving axles of the locomotive.....	3,320	70

The average efficiency is somewhat higher than 70 per cent.

HANDLING OF TRAINS

The maximum duty was imposed upon this equipment from the outset. On account of very poor regulation of waterwheels steam has been used in one of the Mallet engines in starting all freight trains in the Wellington yard. An attempt has been made to use just sufficient steam to enable the Mallet engine to turn itself over, and steam is shut off at the portal of the tunnel. In addition to this, in order to provide smoother starting, a slight braking pressure has been maintained on the locomotive at starting, which is gradually reduced.

On several occasions trains have broken in two, due to the trolley wheel on the rear locomotive leaving the wire and thus cutting off part or all of the power supply to the



Great Northern Electric System—Overhead Construction Above Switch Point in Wellington Yard

rear locomotives. This throws a greatly increased drawbar pull on the front locomotive, and the consequence is that the train is jerked apart. This happened in the early stages of the work, and was due to the fact that the turnouts were not in the best order, and also that the engineers had not sufficient experience in handling trains. Another means taken to avoid the broken drawbars was to use the rear Mallet engine to assist the train over the trolley crossings in the Wellington yard. This was a temporary measure and has been discontinued.

ECONOMY OF STEAM LOCOMOTIVES

It is interesting to compare the performance of a Mallet compound locomotive under the same operating conditions as this system. The data for this are given by Mr. Emerson, superintendent of motive power of the Great Northern Railway, in a discussion before the American Society of



Great Northern Electric System—Anchor Bridge in Wellington Yard

Mechanical Engineers on locomotives of this type. As an excellent performance, he gives these data:

Recent performance shows that on a round trip over this division the L-1 engines handled 1600 tons with a total of 43 5/6 tons of coal, or equivalent to 25.13 lb. of coal per 100 ton-mile.

The division referred to is from Leavenworth to Everett, 108.7 miles. The work done per ton for a round trip over this run is readily calculated from the profile as 4.26 kw-hours at the rail. This is the work done per ton in lifting the train. The work done against train resistance, assuming it to be 6 lb. per ton, for 108.7 miles, is 1.3 kw-hours. The total work done in a round trip per ton, therefore, is 5.56 kw-hours. There should be a negligible addition to this for starting the train.

The average train weight is 1980 tons. The coal used was 43 5/6 tons, equal to 87,660 lb., or the coal per kw-hour was 8 lb.

A modern steam station can deliver 1 kw-hour for 3 lb. of coal at the busbar, which, with an efficiency of 70 per cent to the rail, gives a consumption of 4.28 lb. per kw-hour at the rail. In other words, the Mallet compound requires nearly twice as much coal per kw-hour at the rail as would be used in a modern steam station in the place of the hydroelectric station at Leavenworth.

ADVANTAGES OF THREE-PHASE SYSTEM

This installation has demonstrated that the three-phase induction motor has certain very marked advantages over any other form of motor for heavy traction on mountain grades. These advantages may be summarized as follows:

1. *Maximum electrical and mechanical simplicity.* This was one of the principal reasons for using the three-phase system, as the motors will stand any amount of abuse and rough use.

2. *Greater continuous output within a given space than can be obtained from any other form of motor.* This is due to the fact that the losses can be kept lower in a three-phase motor than in any other type. The electrical efficiency of the motor is high for a wide range of load.

3. *Uniform torque.* This is important, particularly at starting. A three-phase motor will work to a 3 or 4 per cent greater coefficient of adhesion than a single-phase motor at 15 cycles.

4. *The possibility of using 25 cycles.* This leads to less cost and a better performance of power station apparatus; moreover, the power supply can readily be used for other purposes, as well as for traction.

5. *Constant speed.* This is ordinarily stated as a disadvantage of the three-phase motor; but it is a distinct advantage in mountain service, particularly in limiting the speed on down grades. It has also the advantage on up

grades that meeting points can be arranged with greater definiteness. There is a general notion that the impossibility of making up lost time with the three-phase motor will be a decided drawback to its use. This would be true if there were the same liability to lose time with three-phase motors; but when a train can be counted on to make a definite speed, without regard to conditions of tracks or of its load, there is less liability to lose time.

6. *Regeneration on down grades.* This matter has been discussed since the earliest days of electric traction, but has not been, up to the present, put into practice. Although this result can be attained with other forms of motors, yet it is most perfectly attained by three-phase motors, there being no complications involved. This is of importance in reducing the power house capacity required for a given service; although, no doubt, the saving in power house capacity will not be as great as indicated by theory, owing to the various emergencies that must be provided for. Nevertheless there will be a material saving. A 2500-ton train on the average down grade of 1.5 per cent will deliver about 1400 kw to the system. The equivalent power house capacity would cost at least $200,000; hence if only 20 per cent of this can be utilized, the saving will equal the cost of one locomotive.

7. *Excessive short-circuit current is impossible.* Consequently destructive torque on the gears and driving rigging is eliminated. There is no necessity for the complication of a friction connection between the armature and driving wheels, as in the design of recent large direct-current electric locomotives.

8. *Impossibility of excessive speeds.* Even when the wheel slips the speed remains constant. Therefore, the maximum stresses put on the motor are less and are more accurately known than with any other form of motor.

DISADVANTAGES OF THREE-PHASE SYSTEM

The principal disadvantages of the three-phase motor, for traction use, are commonly stated to be:

1. *Constant speed.* This is rather an advantage for this class of service.

2. *Constant power.* The fact that the motor is a constant-power motor, and therefore requires the same power at starting and while accelerating as at full speed, is not a matter of any particular consequence in a service where the stops are very few, and consequently the proportion of total time spent in acceleration is small, or where the additional power required to accelerate the train is a small percentage of the power used by the train at full speed. In this particular case on the 2.2 per cent grade, when accelerating at the rate of 10 lb. to the ton, the power required during acceleration is only 20 per cent greater than that required at full speed; this is not a serious matter.

3. *Small mechanical clearance.* In this particular motor the clearance is ⅛ in., which is ample for all practical purposes.

4. *Inequality of load on several motors of a locomotive due to differences in diameter of driving wheels.* To meet this an adjustable resistance is included in the rotor of each motor. The motors are then balanced up and no further attention is required as long as the wear on the driving wheels is approximately the same. If, at any time, the load becomes badly unbalanced, it is a simple matter to readjust the resistances.

5. *Low power-factor of the system.* This does not seem to be borne out by practice. The power-factor, as shown by the switchboard instruments in the power house, is 85 per cent. This is a good result, and is much higher than the power-factors of many single-phase systems.

6. *Two overhead wires.* There is no doubt that two wires will cause more trouble than one, and in case of complicated yard structure it might not be practicable to use two overhead wires; but where the problem is that of a single track with an occasional turn-out or crossing, there is, practically speaking, no more difficulty in maintaining two wires than one.

In brief, in service of this character the three-phase motor has marked advantages in capacity, reliability, simplicity and general trustworthiness, when compared with any other motor.

SOME MINOR ADVANTAGES OF ELECTRIC TRACTION

In the many discussions of electric traction which have recently taken place, several minor advantages have not been sufficiently emphasized. One of these advantages lies in the fact that with electric traction the exact performance and condition of the locomotives and of all elements of the system are accurately known at each moment. On the other hand, with steam locomotives neither the engineer nor the motive power officer can have any clear knowledge of the conditions of operation at the moment; he can only ascertain the performance of the locomotive by elaborate tests, which, as a matter of fact, are seldom made. The ratings and performance of steam locomotives are made up largely by "authority" based on a few tests from time to time, and take no cognizance of the actual condition of the locomotives.

With electric locomotives the operation on a heavy grade becomes as simple as on the level. The engineers and trainmen feel much greater confidence in the electric locomotives, and consequently the mountain division ceases to be a terror to them.

Electric traction will permit the use of very long tunnels, which are not now possible on account of difficulty of ventilation. There is no particular reason why tunnels of 10 or 12 miles should not be operated as easily as those of 1 mile.

The great increase possible in the speed of trains with electric traction and the consequent increase in the capacity of a single track will operate to postpone for a long time the necessity for double tracking. This double tracking on a mountain is very expensive, and this saving alone will, in some cases, more than offset the cost of electrical equipment.

CONCLUSION

The construction work in the tunnel and yards was carried out under great difficulties, owing to the necessity of not interfering with the regular service of the road. At times it was not possible to work in the tunnel for more than one hour a day, and for days at a time two or three hours was all that could be allowed, but in spite of this the work was carried out with very satisfactory speed, due particularly to the skill and ability of R. Beeuwkes and W. S. Skinner, the author's assistants, and the unstinted assistance of the engineering department of the Great Northern Railroad.

DISCUSSION

In introducing the speaker, President Stillwell referred to the history of three-phase motors, which were introduced in this country in 1888. A serious effort was made at that time by American engineers to adapt this motor for railway use, but the conclusion was reached that its constant speed characteristic rendered it unsuitable for that purpose. Mr. Stillwell then paid a tribute to DeKando for his services in connection with the development of three-phase traction in Europe.

After the paper had been read by Dr. Hutchinson, W. S. Murray, electrical engineer of the New York, New Haven & Hartford Railroad, was called upon to make some remarks.

Mr. Murray stated that, although an advocate of single-phase motors, he agreed with Dr. Hutchinson in the wisdom of selecting three-phase motors for this particular service. One reason was that the acceleration required was low, but for general railway work he believed a motor with the characteristic of a series machine would be preferable. The resistance per ton during acceleration of one of the freight trains on the Great Northern Railway on a grade of 2.2 per cent can be divided as follows: Gravity, 20 lb. per ton, or a total of 44 lb.; acceleration, at the rate of 0.1 m.p.h.p.s., 10 lb.; friction, exclusive of the locomotive, about 8 lb.; or a total of 62 lb. After the train has been brought to speed, 10 lb. disappears, leaving, as stated in the paper, about 20 per cent more power during acceleration than in operating the same train on the same grade at full speed. The two factors that cause this low ratio are that the acceleration is slow and the grade is high. The reverse

conditions exist in high-speed suburban service where the acceleration is high and the grade is low. Thus, with no grade, a passenger train which is being accelerated at 0.7 m.p.h.p.s. would require 70 lb. per ton, and assuming the average friction per ton up to 60 m.p.h. to be 10 lb., the total pounds per ton required would be 80. After the train has arrived at the balancing speed of 60 m.p.h. the resistance may be 15 lb. per ton, or a difference in power of 530 per cent instead of 20 per cent. This illustrates the difference in the two problems. Mr. Murray also discussed the question of power factor, which, he said, on the New Haven road seldom rises above 85 per cent, and more frequently is below 80 per cent.

E. B. Katte, chief engineer of electric traction of the New York Central & Hudson River Railroad, thought it would be hard to improve either the electrical or mechanical design of the Great Northern locomotives for the purposes for which they are intended. He thought the reasons for adopting the system over the entire mountain division were obvious, but if only the tunnel section was to be considered, it seemed to him, without going into the figures, that the direct-current system would have had several advantages, such as the possibility of using storage batteries and multiple-unit control, with two or more locomotives at the head of the train. He also thought that it would be interesting if Dr. Hutchinson would explain why the ground wire, for which provision had been made on the top of the transmission lines, had been finally omitted. On the New York Central, where similar provision had been made, the ground line was omitted because the poles were made of steel, and each was carefully grounded to a large copper plate set in permanently wet ground, and it was believed that each pole would act as a lightning rod, and thus protect the line. But on the Great Northern Railroad the poles were of wood and the insulator pins did not appear to have been grounded. The speaker also asked if any special protection had been provided against the destruction of the wood poles by fire. In conclusion, he said that the experience described with insulators covered with the soot from steam locomotives was similar to that of the New York Central. At first the New York Central engineers were much perturbed because of this accumulation on the 11,000-volt insulators, but after careful tests on several insulators which were well covered with soot it was found that the flashing-over point was several times the normal voltage, even when the soot was well saturated with water.

B. J. Arnold said that last summer he had the privilege of personally inspecting the line, and the operation appeared very successful. In the yards the use of the double overhead conductors seemed somewhat complicated, and he agreed with Mr. Murray that where there were many yards a system requiring a single conductor was more desirable. That was one of the principal reasons why the single-phase system was selected for the Sarnia tunnel. He did not believe that there was any ideal electric railway system, but that each system possessed special advantages for certain conditions.

F. N. Waterman, of New York, quoted some figures from the Valtellina Railway, which he had inspected in Italy some time ago. The traffic was a combination of freight and passenger service. The average run was short and required frequent acceleration, and with a number of trains on the line the load factor was 55 to 60 per cent. The ratio of maximum to average output was as favorable as 3.5 to 1 with single train operation. He attributed this to the employment of cascade control on most of the trains and the characteristic of three-phase motors, which cease taking current when the frequency falls by the amount of their slip, and return current to the line if it falls to a greater extent. The water wheels driving the generators at the power station of the Valtellina Railway would fall off in speed some 5 per cent, as the full load came on, while the average slip of the synchronously running trains was less than 1 per cent. He thought that this property of induction motors should be of great value in cases where a small number of light trains was operated. He had recently made some calculations of the effect of cascade control in comparison with a series-multiple control, such as used on the New York Central locomotives, and had found with two speeds at least an equality for the two systems. If considered on the basis of constant current, the three-phase locomotive would show an advantage. Mr. Waterman then discussed motor clearances, which he said on the Italian locomotives were only 2 mm, but very large bearings are used and the wear is very small.

J. H. Davis, electrical engineer of the Baltimore & Ohio Railroad, presented the following comparison between the conditions on that road and on the Great Northern Railway:

Physical conditions:	B. & O. R. R.	G. N. Ry.
Length of electrified section, miles	3.7	4.0
Ruling grade	1.5%	2.2%
Average grade	1.0%	1.7%
Length of longest tunnel	7,400 ft.	13,873 ft.
Train weights:		
Freight, inc. steam and elec. locos	1,928	2,075
Passenger, inc. steam and elec. locos	990	906

	B. & O. R. R.		G. N. Railway.	
Tonnage handled per day:	No. Tr.	Weight.	No. Tr.	Weight.
Passenger	21	6,630	3	2,690
Freight	28	29,600	2½	5,290
Special	0	.....	1	470
Totals	49	36,230	6½	8,350

	B. & O. R. R.		G. N. Railway.
Equipment:	Pass.	Freight.	Freight.
Number of locomotives	5	2½	4
Weight (tons)	90	160 (2 units)	115
Number of motors	4	8	4
Rated horse-power	1,100	1,600	1,900
Tractive eff. rated load	26,000	70,000	47,600
Speed at rated load, mph	16	8½	15

(NOTE: Data on B. & O. equipment based on natural ventilation—Great Northern on forced ventilation.)

L. R. Pomeroy, of the American Locomotive Company, said that seven years ago he had made an examination of the Cascade tunnel situation to determine the possibilities of electrical equipment. At that time it was very difficult to arrive at the actual cost of steam operation. Since then he had been furnished with a road test of the Mallet steam locomotives over the section described in the paper—that is, from Leavenworth to the Cascade Tunnel summit, and also for a neighboring road with similar physical conditions. From these figures, which he quoted, he concluded that a train with a trailing load of 2500 tons over the section on which the test was made, would require about 5750 kw-hours at the rail per trip. Assuming 5 lb. of coal at the power station per kw-hour, a total of 28,750 lb. of coal would be required. The coal consumption of steam locomotives to do the same work at the same speed would be 68,832 lb. Mr. Pomeroy then discussed the monetary saving by electricity, and found that for the service assumed the saving for coal and water with electric locomotives would amount to $268,769 per year.

W. N. Smith, electrical engineer of Westinghouse, Church, Kerr & Company, said that the operating conditions on the road in question were particularly favorable to three-phase operation, but he was doubtful as to whether the double trolley system would be satisfactory at higher speeds. He thought that the mechanical reliability of the moving contact system was at the foundation of successful electric railway operation and that this was one of the advantages of a single-phase system. He also thought that

the future development of the overhead moving contact would be on the lines of a wide roller type of collector, with pantograph mounting. He then referred to recent electric locomotives with side rods, and expressed his belief that the development of electric locomotive design was in this direction, not only because the center of gravity was thereby raised, but because the mechanical parts could be standardized independently of the electrical equipment, so that the same arrangement of frames and running gear could be used in either direct-current, single-phase or three-phase locomotives.

F. S. Denneen, of the Ohio Brass Company, gave some reasons for the selection of the type of overhead construction used. He said that direct suspension instead of the catenary type was employed because of the use of two contact wires over each track, having a difference of voltage of 6600 volts, and that the installation of auxiliary supporting wires would greatly have complicated the problem of insulation. The diagrams of the overhead structure in the single track yard also show that each phase is supported by an independent span and that auxiliary insulation is provided in every case; that is, the major insulation may be said to consist of two heavy porcelain strain insulators, and the auxiliary insulation of the wooden break strains. The former insulators are rated for 10,000 volts and the latter for 3200 volts or over. The wires of the same phase are carried on one cross catenary and those for the opposite phase are carried on another, and there is insulation between the wires of the same phase over different tracks. This was done to keep the circuits entirely independent. The hanger is made up on the unit system, so that any piece can be removed and another piece inserted, and the time required for repairs cut down to a minimum. In the tunnel construction bronze fittings were generally used on account of the presence of moisture, although, as Dr. Hutchinson had said, it is possible that malleable iron or other iron properly galvanized would have answered. The expansion bolts which carry the large porcelain strains in the tunnel were made from steel tubing, galvanized by the hot dip process. Originally, it was proposed to design the overhead frogs with tongues, but this was abandoned at the time because of complications, but the speaker thought this could be done now if necessary.

W. I. Slichter, of the General Electric Company, referred to some of the details of the design of the motors used in the locomotives. The principal characteristic which differentiates the equipment from European railway installations is the weight of the trains, which are about three times as heavy as the European trains. This made it necessary that there should be no reduction in the tractive effort after it was once applied, and that there should be sufficient control steps so there would be no danger of slipping the wheels or straining the drawbars. The control is accomplished by using rheostats in the secondaries of the motors, varying the resistance by contactors. The control system consists of 14 contactors per motor, five of which are in the primary, there being one contactor on one phase and two on each of the other two phases to provide for reversing the motors. This leaves nine contactors in the secondary to give 13 steps, which is accomplished by a scheme of dividing the resistances into two or three groups, each having its contactor, and these groups are brought into different combinations, so that each group is used over and over again, sometimes in series, sometimes in multiple with the others, and not left idle after being used once. A separate and independent set of resistances is provided for the secondary of each motor to avoid the tendency of the motors to exchange current and "buck" when they are all connected in multiple to one set of resistances. The speaker also described the automatic device at the power station by which the water rheostats mentioned by Dr. Hutchinson are thrown into service.

C. L. DeMuralt, of New York, said that the paper to his mind brought out, first, that the efficiency of the three-phase system was extremely high, and, second, its great recuperative feature. With a longer line and with more trains this would become a very important factor. He thought that there was no serious objection to the double trolley, because it was largely a question of design. There should also be little additional maintenance, because the maintenance cost was made up principally of labor, and the same gang of workmen could work on two wires almost as quickly as on one. Referring then to the constant speed of the motors, he thought that as a rule this was advantageous rather than disadvantageous. He hoped that the installation would do a great deal toward demonstrating the desirability of the three-phase system in this country.

Calvert Townley, vice-president of the Connecticut Company, emphasized the benefit to electric traction which this successful installation involved, and expressed his belief that this feature was of far greater importance than that of the particular system used, although the system employed had been adopted under conditions where it should produce as favorable results as it would anywhere. He thought some additional particulars in regard to the capacity of the locomotive would be instructive, as there seemed to be a difference between the rating as given for the locomotive and that as quoted for the transformers. In conclusion, Mr. Townley said that while the induction motor was very simple, the control system required was naturally more complicated than with the direct-current or single-phase system, because with three conductors it is necessary to protect against twice as many surges. He also doubted whether the uniform speed characteristic of the three-phase motor was not a disadvantage from an operating standpoint, because it is often necessary to make up lost time.

Dr. Steinmetz stated that the successful development of the rotary converter had had a great deal to do with the great impetus given in this country to direct-current railway work some 15 years ago. Abroad, where a prejudice existed against the rotary converters, correspondingly greater attention had been given the three-phase motor. The single-phase motor furnished one solution of the electric railway problem, but most engineers have come to realize that it is not a universal motor. Its application was seriously circumscribed, in the opinion of the speaker, by the necessity claimed for it by many designing engineers of a lower frequency than the standard. The three-phase motor, being a constant speed motor, had all of the characteristics inseparable from this type of motor; that is, low efficiency in acceleration and automatic regeneration. It was well suited for certain conditions, such as mountain divisions, for running continuously with heavy torque, both positive or negative, and for very high-speed passenger service. But it was not so well suited for general railway work as the direct-current or single-phase commutating motor, because the latter can replace the steam locomotive without requiring the rearrangement of operating methods to a constant speed service. Whether the latter is an advantage or a disadvantage as compared with variable speed requires further consideration. In rapid transit service the series characteristic in a motor is generally considered to

be especially necessary, but it is somewhat of a curious coincidence that in the most extreme case of rapid transit, the high-speed passenger elevator, the shunt motor and induction motor are used for the sake of reliability and capacity.

Frank J. Sprague referred to three installations which were very similar in their characteristics; the Sarnia tunnel, the Detroit tunnel and the Cascade tunnel, yet different electrical systems had been selected for each; for the first, single-phase; for the second, direct current, and for the third, three-phase. In each, also, the advantages of electricity over steam were marked. Another somewhat similar installation was that of the proposed equipment of some 140 miles over the Sierra Nevada division of the Central Pacific Railway, which he was now studying. In this distance there are 30 miles of snow sheds and 2 miles of tunnels. At present freight trains of various lengths up to a half-mile long and 2500 tons in weight are run in both directions at from 7 to 10 miles an hour. Passenger trains are operated at about twice the speed of freight trains. The grade conditions are very severe. Electrification, if carried out, will be for the purpose of increasing the capacity of the section. The specifications require larger capacity at the head of a passenger train than that of any locomotive yet constructed. The speaker said he believed that the system if equipped would be another successful example of electrification.

Dr. Hutchinson, in concluding the discussion, stated that he had not described the system employed as being applicable to any other conditions than those to which it had been applied, except that be believed it was suitable for the entire mountain division. The ground wire mentioned by Mr. Katte was not installed because there was no lighting, and wooden poles were adopted because they seemed to suit the service best. The points on regeneration made by Mr. Waterman were interesting, but regeneration was of no value until several units were in use. The location of the trolley wires mentioned by Mr. Smith was determined by operating conditions, and not by the electrical conditions. Referring to the capacity of the locomotives, Dr. Hutchinson said that the transformers had a rated capacity of 800 kw and a guaranteed overload capacity of 100 per cent for half an hour. This, he thought, would be sufficient for the entire run.

At the conclusion of the meeting President Stillwell announced that any members who desired to do so could submit written discussions on the paper.

ELECTRICAL CONTRACTORS FOR THE GREAT NORTHERN RAILROAD ELECTRICAL EQUIPMENT

According to a rule of the American Institute of Electrical Engineers, the paper on the electrical equipment of the Great Northern Railroad presented by Dr. Cary T. Hutchinson last week did not contain the names of the manufacturers of the apparatus used in the installation. Through the courtesy of Dr. Hutchinson, however, the following names of the manufacturers who supplied a considerable part of the equipment are mentioned below:

Electric motors and control, General Electric Company; trucks and locomotive frames, American Locomotive Company; overhead material, Ohio Brass Company.

The Prussian State Railways is now operating 70 storage-battery motor cars on its lines, and has ordered 33 more of the same type.

T-RAIL CONSTRUCTION IN LITTLE ROCK

At the annual meeting of the American Society of Municipal Improvements, held at Little Rock, Ark., Nov. 11, D. A. Hegarty, general manager of the Little Rock Railway & Electric Company, read a paper on T-rail construction in paved streets. Mr. Hegarty made a strong plea for T-rail, in which he said the greatest portion of the metal is in the head, where it is needed, and which can be reversed when one side is worn, which is not the case with the grooved rail. He also declared that the effect of wear on the latter rail is to sharpen the edge of the head, and this makes the rail injurious to the rubber tires of vehicles, but he maintained that with a T-rail wear of this kind cannot occur.

Mr. Hegarty then described the method of installing T-rail track in Little Rock. The section used is a 70-lb. A. S. C. E. The roadbed is first graded to the proper depth; the earth is then tamped. If any soft places are encountered in the subgrade, the earth is removed and the space is filled with coal cinders. A layer of 8 in. of broken stone is then placed on the subgrade and thoroughly packed. Then creosote ties, which are 6 in. x 8 in. x 8 ft. are laid upon the ballast and are spaced 2 in. centers except at joints, where they are placed 18 in. centers. The rail is then laid on the ties and the joints connected with 4-bolt Continuous rail joints, suspended between the ties. After the track is thoroughly tamped and surfaced, concrete is filled in up to the top of the ties. Then a sand cushion, 1 in. in thickness, except where crowned in the center, is placed on the top of the concrete. The brick paving is then placed on the sand and thoroughly grouted and rolled. A special brick is laid next to the rail on the inside and the space between the outside of the rail and paving is filled with grout.

The rails are bonded at each point with two soldered and compressed terminal bonds of No. 0000 capacity each, placed under the angle plates. The track is cross-bonded every 300 ft. with two No. 0000 tinned copper conductors and is also connected every 300 ft. to a 1,000,000 circ. mil tinned copper wire ground return.

THE PARMA PROVINCIAL RAILWAY

The Parma (Italy) Provincial Railway runs partly in the city of Parma and is now operated with single-phase current from the city to several suburban points. The city section is 10.9 km (6.7 miles) long over all with a maximum grade of 4.6 per cent, while the suburban lines are 38.74 km (24 miles) long and a maximum grade of 3.2 per cent. The operating potential in the city limits is 400 volts and in the country is 4000 volts at 15 cycles. Catenary construction of the Siemens-Schuckert type is installed on the suburban sections only. The rolling stock comprises 10 motor cars, 11 trailers and 18 freight trailers. The motor cars carry two 50-hp motors which are arranged for automatic voltage conversion at a point near the power station. These motor cars have seven first-class seats, 21 second-class seats and a freight compartment. The power station equipment consists of Cornwall boilers and superheaters, two Tosi steam engines of 750 hp each coupled to a 750-kva single-phase generator. Two 43-kw d.c. generator sets furnish the excitation and lighting current. The electrical equipment in the power house, the suburban cars and the catenary work were furnished by the Italian Siemens-Schuckert Company.

REVIEW OF THE DENVER MEETING OF THE CLAIM AGENTS' ASSOCIATION*

BY ELLIS C. CARPENTER, PRESIDENT OF THE ASSOCIATION AND CLAIM ADJUSTER, INDIANA UNION TRACTION COMPANY

The Denver convention was attended by one of the most representatives bodies of street and interurban railroad claim adjusters that I have ever seen assembled. They represented large interests operating in Massachusetts, New York, Pennsylvania, New Jersey, Maryland, Alabama, Tennessee, Ohio, Indiana, Illinois, Missouri, Iowa, Oklahoma, Colorado, Washington, Oregon, California and British Columbia. Written contributions upon various subjects were sent by delegates who could not be personally present, representing properties in Kansas City, Syracuse, St. Louis, Louisville, Fort Worth, Cincinnati, St. Paul and Minneapolis.

The prompt and regular attendance of almost every delegate at every session showed the deep interest in the convention. At every session there were present, besides the claim adjusters, delegates representing the legal, operating and accounting departments, to all of whom a cordial welcome was extended.

MEANS OF PREVENTING COLLISIONS

During the various sessions eight subjects were before us. After the reading of the paper and the written discussion, the subject was open for general discussion. The first subject was, "What Is the Best Means of Preventing Collisions of Cars and of Cars with Vehicles and Pedestrians?" The collision of cars is a class of accidents causing injury to many passengers, and there is seldom any escape from the payment of resulting damages. The following suggestions were offered:

The proper instruction and training of employees before being permitted to operate a car; on city lines during heavy fog, or at night, run car so that it can be stopped within the distance a motorman can see; in some cities the schedule is waived, and motormen are instructed to operate so as not to strike the car in front; motormen must know that hand and air brakes are in good condition before taking the car from the car house; bulletin boards, 30 x 48 in., are hung in reporting places, and at the end of each month there is posted a comparative statement for all divisions, showing collisions (as well as other accidents) occurring during the month and the same month of the previous year.

Collisions with vehicles are handled in much the same way. Motormen are impressed with the necessity of anticipating what the driver may do, and approaching in such a was as to avoid colliding by running at proper speed, sounding gong vigorously, having current off, and relying more upon the brakes than the gong.

Pedestrians, especially children and aged persons, will not always be as careful as they should when they pass behind a car from which they have just alighted, and attempt to cross in front of a car on the other track. Conductors should ever be watchful to see if a car is approaching on other track, and, if danger is apparent, shout out a warning. Motormen must be constantly on the lookout, and especially careful in such cases, cars being brought almost to a stop before passing, and, when approaching children starting toward the track, or near the track, run very carefully and under complete control. In one instance, a "kangaroo court" was organized among the employees, and those having this kind of accidents were brought before this court and tried.

A cash reward was suggested for trainmen operating cars without accident during a given time. Make the minimum age of employees 25, and give preference to married men and men of middle age, who feel that, in case of accident, they have something more than their positions to lose, and something more to look forward to than "pay day."

Careful physical examinations should be made, and men with imperfect vision rejected. Keep motormen upon the same line, so that they may become familiar with the dangerous places. Last of all, careful, proper and constant instruction should be given by the superintendents, adjusters and others, as to the dangers of having and the delights of avoiding accidents.

BOARDING AND ALIGHTING ACCIDENTS

The second subject considered was "How Can Boarding and Alighting Accidents Be Diminished or Prevented?"

Inquiry from various sources indicated a surprising state of affairs regarding this class of accidents. Some reported about 25 per cent of all accidents to be of this class; others as high as 90 per cent. This certainly indicates the existence of a condition worthy of the attention of every department of the service interested in saving the dollars.

This class of accidents is of such more frequent occurrence on city lines. Some of the causes assigned were: Lack of uniformity in types of cars; carelessness of employees; the almost universal habit of men in boarding and alighting from moving cars; the old, old story of women getting off backward, many times just before the car stops, due probably to the fact that a very large percentage are right-handed and carry their bundles or hold their skirts in their left hand, so as to leave the right hand free to hold in alighting from the car; the type of summer car with running board along the entire length of the car, with so many exits; the lack of guards to prevent boarding and alighting from moving cars.

The remedies suggested were: Proper instructions to employees, so that they may understand that the prime virtue of railroading is safety; shouting warnings to persons about to be placed in danger; discontinuance of the open or summer type of cars; placing a mirror on the outside of the front of the car so that the motorman can see that the rear of the car is clear before starting; printing on the back of transfers, the proper way to alight, so that it will be before the passenger when on the car; the use of the semi-convertible pay-as-you-enter and pay-within cars with folding step; interesting school superintendents, and having teachers of all grades instruct children in the proper way to alight from cars, and the danger in alighting from moving cars. These, with other suggestions, were offered as some means of preventing this class of accidents.

The person to whom the third subject had been assigned did not respond, so that subject was passed.

FURNISHING COPY OF STATEMENT

The fourth subject was: "Is It Good Practice When Statement of Injured Party Is Obtained of Accident to Furnish Him with Copy of His Statement?" This was one which more directly concerned the legal and claim departments. There were arguments for and against the proposition, but the consensus of opinion seemed to be that only in extreme cases was it desirable to furnish copies of statements taken to either claimants or witnesses and this should be left to the judgment of the person taking the statement.

In procuring signed statements there seemed to be a unanimous opinion that the investigator should seek facts, treat the party giving the statement fairly, setting out as clearly as could be done the witness's version of the matter under investigation, even though the facts were unfavorable to the company, so that when full investigation was had the adjuster, from the facts reported in the statements, could have a basis upon which to act. Some companies take only the signed statements of injured persons, merely interviewing the witnesses, and keeping a written memorandum of the facts elicited by the investigator.

SCHOOL OF INSTRUCTION

The fifth subject was: "Is a School of Instruction for Trainmen Essential? If So, in What Departments Should the Instruction Be Given and by Whom?" This subject was so closely allied to many of the other subjects that during the various discussions it was usually touched upon from some standpoint.

Every road, so far as the expressions indicated, instructs its employees in one way or another, but there seemed to be a lack of uniformity in such instruction.

That trainmen should receive instruction before entering the active service and that the instruction should continue at intervals throughout their entire term of service, there seemed to be no question. This instruction should cover

*Abstract of paper read before the Central Electric Railway Association, Indianapolis, Ind., on Nov. 18, 1909.

the essentials in the operating, mechanical and claim departments as they were the departments most effected, and these departments, acting under and with the management, should join hands in the proper course of instruction, looking to the prevention of accidents where possible and the proper handling of accidents when they occur. All jealousy should be eliminated; the good of the service, the promotion of good fellowship and the saving of money should be first considerations.

The authority of the claim department with some companies is very limited; in others it is very much greater. With the larger companies both legal and medical departments are under and responsible to the claim department, and representatives of these talk to the men, who thus have the opportunity to view accidents and their results from various standpoints.

Many companies require trainmen to pass written examinations. Where proper instruction has been given a better service is rendered and accidents are reduced.

INFORMATION FOR NEWSPAPERS

Our friends the newspapers were not overlooked. The sixth subject was: "Should Information Be Furnished Newspapers Regarding the Work of the Claim Department?"

This subject aroused a rather heated discussion, as there were several ex-newspaper men among the delegates. Some had obtained good results by reposing confidence in the news-gatherers, and seldom was there occasion to say that the confidence had been misplaced; others had not fared so well. In the smaller communities, where a personal acquaintance means much, it seems to be the better policy to keep close to the papers. Where accidents occur of sufficient importance to be of general interest, the main facts, upon which can be based a readable story, should be given out. This does not necessarily apply to minor accidents or matters of small moment.

Whenever a verdict is rendered against a corporation the plaintiff's attorneys seldom fail to see that it is properly advertised in the newspapers; on the other hand, the defendant corporation, when a verdict is rendered in its favor, seldom pays further attention to it and the papers can mention it or not as they see fit.

Although more than 80 per cent of personal injury damage suits result in favor of the defendants, so little attention is given to them after the verdict is rendered, and so much attention is given by the attorneys for plaintiffs in their successful cases, that the newspapers have molded sentiment to such an extent that in some localities the opinion prevails that in order to get justice you must at once go to court with your case. In order to offset this sentiment and get the public on the right track considerable attention should be given to reporting correctly the facts and outcome of law suits which result favorably to defendant corporations.

In case of fake claimants, where convictions secured, the widest publicity should be given.

RELATIONSHIP BETWEEN MEDICAL AND CLAIM DEPARTMENTS

The seventh question proved to be of considerable interest. It was "What Should Be the Relationship of the Medical and Claim Departments? How Can the Medical Best Serve the Claim Department in the Handling of Accidents?"

The experience of one of the very largest companies, operating in a large city, has shown the best policy to be to practically ignore the doctor, and not in any way to protect his bills, but let him look wholly to the claimant for his compensation.

With the smaller companies, and those serving the smaller cities and country districts, this policy was not advocated, but rather the opposite. There seemed to be a higher standard of ethics among medical men in the smaller places and they are more apt to reciprocate if treated fairly and courteously.

With the smaller companies, in case of accident, the nearest physician is called to give first attention. With many of the larger companies regular employment is given to a company surgeon and some have a surgical staff subject to call. Many times the physician can promote a good feeling for his company, or its representatives, and by kindly words pave the way for the claim adjuster

Physicians, in making reports upon cases of injury, should always give the company the serious side, and not minimize the extent of injuries.

RELATIONS OF CLAIM AND OPERATING DEPARTMENTS

The next question considered was "The Claim Department and Its Relation to the Operating Department." This was treated under three heads:

(a) "The importance of reporting all accidents promptly to the claim department." The prompt reporting of this class of accidents will practically eliminate one of the great and costly evils, "the blind or unreported claim." The operating department can, by proper discipline, materially aid in the matter. Employees must be made to understand that when an accident happens on or about the cars or property of the company, the first duty, after caring for the injured, is it procure witnesses and make prompt report of the circumstances. They must not assume the duties of court and jury, and pass upon the matter as one of no moment, and one of which no report is necessary; for fear the injured party will not concur in this decision, prompt reports must be made of trivial as well as of serious matters.

(b) "The importance of co-operation between the operating and the claim departments in all matters relating to accidents." Where co-operation does not exist between these departments, there is a deficiency in results. Valuable data can be gathered by the claim departments regarding various kinds and cost of accidents, and by co-operation the operating department can aid in decreasing or eliminating such accidents. A unique way of keeping tab upon the various kinds of accidents was suggested. Upon a map of the lines of the company various colored pins are used to designate the location and type of accidents. For instance, in all cases of wagon "hits," a black-headed pin is used; automobile "hits," green; pedestrians, red; "fall-offs," white; car collisions, brown, etc. Where accidents become frequent in any locality, special attention is given to that locality for a time, until the trouble is remedied.

(c) "The opportunities afforded the claim department by learning the causes of many accidents and suggesting a remedy to the operating department for its consideration." Many times in the investigation of an accident the real cause that may have been overlooked by others will be discovered by the claim department and a remedy suggested. The attention of the operating department can be called to the more dangerous places. The cause of sentiment against the company or its employees in certain localities where it appears to have been aroused can be ascertained and reported.

THE UNREPORTED ACCIDENT

The last question taken up was: "The Unreported Accident: Its Evil and Remedy."

This class of accidents is a bugaboo to the claim adjuster. When such a claim is presented he has absolutely nothing from which to determine its merits, and whether or not a settlement should be effected. He must put his wits to work to uncover and develop the case from what information he can elicit from the claimant.

As a rule, it is not wise to make speedy settlement of this class of claims. It is in this class the fakir is usually found. The adjuster must claim his residence to be among the Ozarks, and be shown before making settlement.

Where the claim finally appears to be just, and the fault with the employees, settle with the claimant if it can be done within reason; but remember that there should also be a prompt settlement between the head of the department and the employee at fault.

Should a fakir be uncovered, then, too, remember that a speedy settlement in court is due, so that he may, after conviction, have ample time for reflection.

By means of proper instruction, conversation, meeting in smokers, or other forms of entertainment, where the management and heads of departments can greet the employees and promote good-fellowship, the evils of the unreported accident can be discussed, and in a great measure eliminated.

If there has been anything of value suggested herein, we commend to you a careful reading of the full report of the convention proceedings when published.

Throughout the entire convention the deepest interest

was manifested by the delegates. The kindly spirit of the first greetings grew as the meetings progressed until when the hour arrived to bring the convention to a close there seemed to be such a bond of good-fellowship existing as could be expressed only by singing "Auld Lang Syne," which was done with a hearty good-will while marching about the convention hall with hands joined, and when the last word had been sung the convention was adjourned.

REVIEW OF DENVER MEETING OF THE TRANSPORTATION & TRAFFIC ASSOCIATION*

BY J. B. CRAWFORD, SUPERINTENDENT, WINONA INTERURBAN RAILWAY

The American Street & Interurban Railway Transportation & Traffic Association was organized in January, 1908. At the convention held in Atlantic City in the following October, the officers elected at the organization meeting were re-elected for the coming year and it is a great pleasure to call your attention to the excellent results obtained by them and the various standing committees during the past year. When we consider the short time this association has been organized, we can but be impressed by the large amount of work done and the good accomplished, as shown by the valuable reports presented at the Denver convention this year.

In President Allen's annual address before the association at Denver he discussed with strong approval the work of the standing committees and the future progress which can be made by perpetuation of the plan of organization of this association, which provides for the maintenance of such committees. The standing committees of the Transportation & Traffic Association are on the following subjects: Passenger traffic, interurban rules, express and freight traffic, city rules, transfers and transfer information and training of transportation employees. As these reports have all been printed in pamphlet form and distributed to member companies, I will confine my remarks to the discussion brought forth and to the lessons to be learned. The committee on passenger traffic had an exhibit of 358 samples of printed matter received from 137 different companies, consisting of time-tables, pamphlets, folders, flyers, post-cards, etc. The discussion which followed quickly resolved itself into one on advertising, and was exceedingly interesting and instructive. The consensus of opinion seemed to be that a pleased patron was the best advertising medium, that time-tables and display advertising in newspapers were productive of the most far-reaching results, and that it was best not to place advertising matter in folders, for while the advertising paid for the folder it also cheapened it; in other words, the better the folder the better the results.

Among the unique methods of advertising brought out by the discussion were the following: Sending copies of new folders and pamphlets to all newspapers within a radius of 50 miles, thereby securing flattering notices from many of these newspapers, which resulted in numerous written requests for copies of folders; stringing banners across the intersecting streets where a great many people passed each day calling attention to any special excursion; sending circular letters to various business houses whose traveling representatives canvassed the territory served; sending personal letters setting forth the important features of some particular park or resort; putting up a large electric sign at some prominent point which was passed by several steam as well as electric lines; sending a complete time-table and folder to each one of the ticket agents of the steam railroads in the vicinity; advertising in newspapers that certain cars to a summer resort or park would be overcrowded and instructing the public when to take cars and how to avoid the crowded cars; distributing folders from house to house, not in the old way of throwing them over the fence, but by ringing the door-bell and handing the folders with a polite remark to the person opening the door; advertising the fact in newspapers that beautifully illustrated folders could be had on inquiry at certain department stores.

The lessons to be learned from this discussion seem to me to be: First, that good advertising and lots of it pays and pays well; second, that it behooves us all to exchange ideas with our neighbors so as to find out what the other fellow may be doing of which we may take advantage, to the great development of our own particular property; third, that while nearly every electric railroad in the country advertises more or less advertising is scarcely ever done in a methodical or carefully planned manner.

The next report taken up was that of the committee on interurban rules which, owing to its length, was not read, but was considered for discussion by divisions. This discussion was lively and interesting from the start, especially on the subjects, "Movement of Trains" and "Taking of Train Orders." It became evident, as one proposed amendment after another was voted down, that the committee had given this report more thought and attention than had been expected, and was well prepared to defend the report and explain the reasons why rules were recommended.

The report of the committee on express and freight traffic was read next by P. P. Crafts, the chairman. The old question as to whether freight and express business pays was considered, as was also the question of soliciting. The committee believed that a good lesson could be drawn from the experience of the steam railroads on the latter question and that the employment of a live freight solicitor who could be depended upon to pursue the subject constantly and in an intelligent manner could not fail to result in increased freight earnings. The statistics of traffic accompanying this report are most instructive and show among other things that a number of companies have made contracts with old line express companies. The discussion following the report was principally about the proper operating charge for freight cars. The chairman suggested that the committee on express and freight for the coming year might go into the question of operating expenses very carefully and he hoped that the companies would respond freely to all questions asked by the committee.

On account of lack of time the paper of Mr. Vaughan, of Grand Rapids, Mich., on this subject was read by title only. This is an exceedingly clear and interesting paper and should be read by all.

The report of the committee on city rules was next taken up and discussed by sections in the same manner as the report on interurban rules, and while all did not agree with the committee, it was very evident that earnest effort had been made in the accomplishment of a task by no means easy and one of great value to the city railways of the country at large.

The report of the committee on transfers and transfer information, and the paper on "Transfer Laws and Suggested Changes," by Arthur A. Ballantine, of Boston, were postponed until next year, announcements being made by President Allen that the entire subject would be taken up again in 1910.

The paper by J. V. Sullivan, Chicago Railways Company, entitled, "Chicago's Transfer Crusade," was next read. In this paper Mr. Sullivan showed how Chicago had probably more transfer points than any other city in the world. To those who have city lines, the story of this crusade should be one of exceedingly great interest, as there is hardly a city in the United States in which transfers are issued where the privilege is not abused to such an extent as to seriously affect the revenue. This paper shows what can be accomplished by appeal to the better nature of the traveling public, and by the aid of a carefully planned and well-directed campaign beginning with a properly enacted law and ending with a strict and continual enforcement thereof. The abuse of the transfer privilege is a constant and growing menance to city properties throughout the country, and it is to be hoped that the Transportation & Traffic Association will recommend a plan of action and a law such as is outlined in Mr. Sullivan's paper. If passed and enforced, such a law would put a stop to the misuse of a privilege which was never intended to be abused. The discussion following the reading of this paper was principally about the difficulty of securing convictions under the present laws and of the necessity of collecting transfers at the end of each trip and of checking them at least once a week.

Matthew C. Brush, formerly of the Newton & Boston

*Abstract of paper read before the Central Electric Railway Association, Indianapolis, Ind., on Nov. 18, 1909.

Street Railway, stated that that company collected transfers at the end of every half trip, the envelope containing them being inserted in a time stamp before deposit at the terminal. In this way an absolute check was kept. Several delegates liked the idea of the time stamp, as explained by Mr. Brush, and desired to know more about its use.

J. W. Brown, chairman, then read the report of the committee on the training of transportation employees. Following the reading of the report, N. W. Bolen, Public Service Railway, of New Jersey, presented a written discussion in which he recommended that the report be studied carefully. W. R. W. Griffin, of the Rochester Railway Company urged the adoption of the standard forms and blanks recommended by last year's committee. C. J. Franklin, Portland Railway, Light & Power Company, and P. P Crafts, Iowa & Illinois Railway, spoke in favor of the merit and demerit system, although the committee did not see fit to recommend its adoption. The committee, however, did recommend that this system of discipline be watched carefully by member companies in order that the results obtained might be fully understood and its value as a means of discipline completely determined.

I would like to make a few suggestions for the consideration of every member of the Central Electric Railway Association. The Transportation & Traffic Association is to be congratulated and the State of Indiana is honored by the selection of Robert I. Todd as president of the association for the coming year, and I would therefore suggest that we all stand shoulder to shoulder with our new president and assist him in every possible way, to the end that the greatest good may be accomplished during his administration. Another suggestion is to call your attention to the benefits to be derived from becoming an associate member of the American Street & Interurban Railway Association. Time will not permit me to enumerate the benefits, but if you will look into the matter it is my belief you will be convinced that you cannot afford not to join. This year the associate membership has increased from 249 to 817, which is a strong evidence of the appreciation of the great work done by the association for our chosen field, the electric railway industry.

A CENTRALIZED TESTING ORGANIZATION *

BY JOHN G. CALLAN, ELECTRICAL ENGINEER, ARTHUR D. LITTLE, INC., LABORATORY, BOSTON, MASS.

In the purchase and administration of supplies, street railroads are confronted by the same problems which have driven several governments and large steam railroads and industrial plants to establish standardizing and testing laboratories, to buy wholly on specification, verifying quality of shipments by test, and to keep systematic account of every item consumed.

The principal reason which has deterred street railroads from adopting this method of purchasing is the practically prohibitive cost of establishing, manning and operating a laboratory of such scope and personnel as to be of any real use. Compromise attempts to use slight equipment and an inexpensive staff—almost never adequately trained and experienced—usually cost much, achieve little, and in their eventual abandonment discredit the whole idea. With a road of moderate size, any given element of the testing equipment is idle most of the time, and the man in charge is most often employed on matters wholly foreign to his training. When we add to this the fact that specifications based on this man's inevitably meager experience and obscure reputation would possess doubtful value and command scant respect, it is natural that most managers have continued to buy on the word of the seller.

The logical way of handling purchases is the support of a thoroughly adequate laboratory by a considerable number of roads or similar enterprises, and its employment by each road or company for exactly and only such part of the time as is necessary. In this way there is available for each road at any time a staff ample in numbers and equipment, having experience and the specialized technical skill which experience alone can impart, at a minimum of expense to each road. This laboratory might conceivably be organized and operated by associations of street railways, by the State, or by an educational institution; or it may be established by private enterprise and its services in such amounts as required be contracted for by individual roads or groups of roads. For several reasons the course last named offers the greatest guarantee of an organization of that vigorous and alert character and keen initiative which insures results. In such an essentially non-competitive business as street railroading the interchange of experience and ideas which such a clearing house promotes is not only wholly unobjectionable, but constitutes a valuable source of usefulness. Such service saves considerable sums of money, but only by centralized effort can the work be done at once well enough and cheaply enough to render such savings available except to the largest roads. It is probable that even these could with marked advantage consolidate their laboratory service with that of the right kind of commercial laboratory.

The work that such a commercial laboratory will be called upon to do will usually fall within the following groups:

1. Fuel Engineering: Choice of coal; specifications; tests; fire-room practice.
2. Lubrication: Lubricated parts.
3. Specifications backed by tests and inspection for all important supplies.
4. Electrolysis and corrosion.

FUEL ENGINEERING

In buying coal the essential purpose is to buy power, and the proper criterion is the number of horse-power hours bought for a dollar, firing cost included. Numberless purchasers, even where coal is the largest single expense item, buy that coal by methods which invite and obtain results materially inferior to those easily attainable and daily secured by the Government and by other consumers using scientific purchasing methods. The purchase of coal without specification is quite generally decided by price coupled with the custom of the locality, the recommendations of firemen, dealers or nearby power users, eye inspection and the like, without any accurate knowledge of heating value. Often purchase is made on the strength of a reliable trade name which possesses commercial value precisely because it enables the dealer to command for a given coal a better price than the same coal would bring if it were divested of that name.

In the absence of specification buying, the purchaser has much justification in paying this additional sum for a trade name, since then his only reliance is on the reputation of operator and dealer. For example, coal from two adjacent veins, one with a "bone," the other without, or "run of mine" from the same vein, in one case "shot off the solid," in the other properly undercut, will differ in value to so considerable a degree that the risk involved in the use of unknown and unanalyzed brands renders experiment very doubtful and hazardous.

In the fire room there is a chance for astonishingly wide differences in production of power resulting from combustion of the same amount of a given coal, and, in addition to this, the combustion chambers, grates, draft and like elements may cause a plant to be very ill suited to one kind of coal and well adapted to another.

The prevention of scale and corrosion in boilers is frequently a matter of grave importance, and affords a problem always amenable to attack by a chemist skilled in this particular art. The percentage profit on proprietary boiler compounds is usually exceedingly high, and while many are good, many others are practically valueless. In a lesser measure corrosion of surface condenser tubes, erosion and fouling of turbine blades and like problems afford an opportunity for the mechanical and chemical engineer to save money.

A well-authenticated case in Fort Wayne, Ind., shows an average saving of over 20 per cent in coal per electrical horse-power through the adoption of a new fire-room practice, with no other change whatsoever. This and other instances indicate that the magnitude of possible fire-room economies is seldom realized, and in the same plant where much well-justified attention has been lavished on jackets, reheaters, lagging, feed heaters, and countless minor de-

* Abstract of a paper read at the November meeting of the Central Electric Railway Association, Indianapolis, Ind., Nov. 18, 1909.

tails of engine-room practice, the boiler room has too often received little thought and scant attention. Frequently, the only working expert on fire-room practice and choice of coals is the fireman, and the coal dealer's estimate of suitability of his wares goes unchallenged and unchecked.

To stop these leaks requires the establishment of methods at once scientific and practical in the purchase and the burning of coal. The best results are achieved by placing the whole matter in the hands of a competent fuel engineer either in or out of the organization. He will first note the firing, draft, flue gas, type of boiler, shape of combustion chamber, and other like basic premises. This information, coupled with consideration of location relative to coal fields, character of load and local smoke ordinances, will give him an accurate idea of what reliably available coal will in this particular case impart the maximum heat units for a dollar spent on coal and firing. This may be a different coal in summer and in winter. A certain 5000-hp plant saves $4,500 a year by this simple expedient.

If all coal of the same nominal size and from the same field were alike the expert would have finished, but this is never accurately true, and often the discrepancy is wide. The next step is to draft a specification based on the characteristics which an average good quality of this particular coal should possess—that is, its heating value per pound, volatile matter, ash, moisture, and constituents, such as combined sulphur with associated iron which give rise to a tendency to clinker. The contract should preferably agree to pay a certain price for coal of this specified quality, with equitable deductions for worse quality and premiums for better, and option to reject for drop below a certain point. Systematic tests determine the quality of each shipment and afford basis for settlement.

Such an arrangement affords substantial advantages in view of the wide variations in ash, moisture and heat units of nominally identical shipments. The buyer suffers much more frequently than the seller through these variations. He always suffers through failure to select that coal and maintain that fire-room practice which are best suited to his needs.

LUBRICATION AND LUBRICATED PARTS

The basis of maximum economy in lubrication is that founded on specifications prepared by an engineer familiar in detail, not only with the technique of oil and grease manufacture, but also with the requirements and results in numerous similar cases. At the same price and for the same service are sold oils of widely different lubricating value, and conversely substantially identical oils under different names sell at widely different prices; while particular brands are insistently and successfully heralded as exclusive possessors of the most extraordinary properties.

When it is realized that a simple change of gearcase grease has in at least one instance practically doubled the average life of pinions on a high-speed interurban road, it becomes clearly apparent the lubricants cannot be chosen at random, while, on the other hand, an examination of current prices for absolutely interchangeable oils shows that an excessive outlay is not needed to secure a good lubricant, and that a large percentage of the expenditure can easily go for the trade name. Due attention to feed, filtration and to accurate analysis and record of lubrication cost always pays. They are too often neglected.

It may broadly be said that no oils and few greases possess abstruse or recondite properties, and that they are always a proper subject for purchase on straight specification basis. Babbitts and bronzes for bearings require specifications checked by analysis and occasionally microscopic examination of samples, but they further require on the part of the purchaser expert broad experience and a knowledge of foundry practice, since a number of bronzes of like analysis may possess rather widely different characteristics, and elements are often introduced for deoxidizing, purging, and the like, which do not finally appear. A properly qualified expert allows for these and bases his judgment on experience as well as analysis. It is not unusual for one bearing metal to show five times the wear under like conditions that is found with another of about the same cost. A large Eastern commercial laboratory has made an excellent profit for one group of roads by establishing a small foundry for bearings and other parts.

SPECIFICATIONS AND INSPECTION

In buying supplies on specification and determining quality of shipments, judgment must again be coupled with specialized skill. Certain materials can be fully determined as to value by laboratory tests, while others require careful observation and tabulated comparison. Steel rails, cement and trolley wire may properly be bought on straight physical and chemical specifications, backed by brief and summary tests and inspection, while finishing and insulating varnishes, and the like, require prolonged tests closely approximating service, under systematic observation. The latter will be true wherever the same materials differently treated may produce widely different results, and where, at the same time, wear is essentially a prolonged process of aging. Obviously, experience and knowledge of the trade are here of paramount importance, and the properly qualified expert should be able to furnish such knowledge and experience quite as much as to make analyses.

Paints exemplify a class of materials occupying an intermediate position, where analysis and a knowledge of the trade are co-ordinately important. The best paint is invariably the cheapest, but the most expensive is not always the best, nor is the paint best for wood necessarily at all suitable for iron. Insulating compounds for fields and armature coils vary from excellence to comparative worthlessness, and the prices of those possessing value are by no means a measure of that value. There is a truly extraordinary amount of misinformation current on this subject, and the short-cut tests most in vogue are for the most part not only valueless but wholly misleading.

Preservation of wood by coal tar creosote, bichloride of mercury, zinc chloride, petroleum residue or other agents deserves distinctly more attention than is usually accorded it. In very many cases it will be found that, figuring interest rates and probable cost of replacement at probable replacement date, this expenditure is a very profitable one.

Structural material, cement, rails, special work, car wheels and axles, motor gears and pinions, brushes, springs, brake shoes, trolley wire, ears, insulators and other overhead material, trolley wheels and harps, rail bonds, poles and ties, cables and small supplies, such as packing and solder, should all be bought strictly on a specification basis, with analysis and inspection to check deliveries.

ELECTROLYSIS

The subject of electrolytic corrosion is certain to become more prominent with lapse of time, and as in other matters affording opportunity for agitation, this prominence is likely to be sudden and somewhat irrational. Those roads will be in the strongest positions which have resorted early to all reasonable preventive measures. There are occasionally geographical arrangements of trackage and extraneous conductors which concentrate electrolysis at certain points, and in such cases it is often necessary to resort to expedients other than good bonding. Relay switches or aluminum cells and suitably placed earth or sea plates each have their proper function, but all require skilful application.

CONCLUSION

There can be no valid question of the financial wisdom of fuel engineering, specification buying, system in lubrication, scientific attention to boiler corrosion and scale, electrolysis and the other things set forth above. Most roads, indeed, make some more or less perfunctory effort to attend to some of these things now, often by employing a man to look after some detail that has come up for attention and giving him a vague roving commission to care for as much more as he can. The man that supervises the firing must know more about firing a boiler than the fireman—not only theoretically, but in the practical way that spells results. Similarly, the man who draws specifications on coal must know the coal fields, methods of mining and preparation, the technique and personnel of the trade, besides being a coal chemist; and so with oil, wire, rails, paints, preservatives and all the rest. One man who could make himself felt in all these fields may exist, but no moderate-sized road could profitable pay for all his time, nor is that more necessary even with the largest roads than that each family should have a private and exclusive doctor, dentist and oculist. Carrying the somewhat absurb analogy further, we may imagine the lame character of

specialized skill which might be expected from such a family attendant, especially if he filled spare time with a bit of barbering, manicuring and chiropody.

Clearly this is one of the fields where the engineering is best done by an organization larger and better than any one road can support, and impartially at the service of all, whether maintained by the State, by a college, an association of operators, or, probably best of all, by enlightened private enterprise.

PUBLICITY FOR ELECTRIC RAILWAYS*

BY A. D. B. VAN ZANDT, PUBLICITY AGENT, DETROIT UNITED RAILWAYS

In the daily and weekly newspaper along your lines, either city or interurban, with which you come in contact your railway is mentioned oftener than any other one subject. Did you ever stop to think what that means?

Day after day, month after month and year after year the name of your railway appears in public print—in the advertising columns and in the news columns—many times more frequently than does the name of any other corporation or individual. Whether with praise or with blame, whether with truth or with falsehood, it is a rare issue of the home paper you read if no mention of your road is made.

And the public, reading, believes. Why not, then, try to intelligently direct this information that goes to the people, for they are interested in what is said about you? They are your patrons.

This, then, is the reason and not the excuse for a department of publicity. Such a department is the connecting cog between the actual operation of the railway and the people through the press.

Publicity is of two kinds: First, advertising; second, news. Just where one ends and the other begins is not clearly marked; it depends greatly upon the newspaper itself. The division of publicity may be expressed in another way: First, information as to when and where the cars go; second, stories of events arising in the management and operation of the road.

Whenever there is any uncertainty as to what is reading matter and what is paid matter, leave it to the business manager of the paper. He will let you know.

Let me first consider the matter of advertising, that function of publicity where money is spent in the expectation of increasing the business of the road.

Let this be the keynote of all advertising matter—a dollar spent must bring back, either directly or indirectly, something over a dollar. If it does not, it is bad advertising. Advertise what you believe in, and whenever you believe you have something to sell. Advertising simply because the business office of a newspaper or a program solicitor asks you is a waste of good money and good printers' ink. The advertising solicitor makes his money by persuading you to take his space; that is his business. To make absolutely sure that the advertising will produce results in the way of increased travel is the business of the railway's publicity agent.

What shall a street railway advertise? It should advertise what it has to sell—rides. To properly advertise its rides that are for sale it must of necessity keep constantly before the people where the cars go and when they go. The people must be impressed with this: that at certain times the cars leave the waiting room for certain places. This structure of advertising is founded upon reliable power, reliable tracks, reliable cars. Indeed, your publicity man may very often cause the public to overlook a little lack of reliability.

Your advertising can be made picturesque by pointing out places of interest. All decorative features are most excellent aids in developing business, but the one great thing ever to remember is that you are advertising the fact that at certain hours your cars go to certain places.

Where shall traction lines advertise? First of all, in the newspapers. For exclusively city lines and for interurban lines where the service is more frequent than half-hourly I do not believe there is much in the way of direct benefit to be derived by publishing timetables; the advertising in such cases should call attention to what is going on in the way of extra attractions that will draw extra business. Because the thing the railways have to advertise is time, and because of the probability of shifting schedules, I prefer the daily and weekly publications. I do not believe much profit is to be obtained from the monthly paper, and nothing comes out of the yearly issue.

Almost equally prolific in its results, and certainly much cheaper, is the use of the cars themselves, both inside and out. I would suggest that for neatness and for eventual economy in the way of saving printed matter, every car be equipped with a glass front frame in which can be pasted such information as to schedules or other matter as will help to produce results. Similar frames, or, at least, bulletin boards, in the waiting rooms can be made to produce excellent results.

In connection with the publicity of timetables, I desire to emphasize strongly the absolute necessity that the operating department give ample notice to those in charge of the press department of coming changes. If a car is scheduled to leave the station at 10 a. m. and the new schedule calls for 9:45 a. m., a lack of knowledge by the public does not add many new friends.

Another source of publicity, and one that is growing in favor, is the issuance of a monthly or weekly leaflet or magazine by the railway itself. Such periodicals, while advertising the timetables, possess a greater usefulness in fostering a spirit of concord between the company and its patrons. They require, however, considerable thought and application to accomplish the work for which they are intended. One thing to guard against is a tendency to increase the expense beyond that warranted. A small publication full of life and widely circulated, will produce much better results than the artistically labored but heavy-toned periodical that costs so much that its issue is limited. Prepare your copy for the masses; the rich can read their coupons.

The source of publicity most bothersome to railways and other quasi-public utilities is the church, the political and the social advertising sheet issued by each organization only occasionally, but issued by so many organizations during the year that the demand upon the advertising fund is close to startling. Personally, I do not like these sheets. Money spent this way, however, is wasted no worse than when it goes to the average industrial edition with which we are so familiar. If the exigencies of the occasion call for contributions, charge them up to the charity account, not to the advertising man's fund.

The other feature of publicity has, I fear, been overlooked at times by some of the quasi-public companies. I mean the matter of dealing with the press in the matter of news.

No matter what may be the motive of the man higher up in newspaper ownership or control, whether that motive be just or unfair, or based on a mistaken view of things, it should be borne in mind that there are two classes of people who believe absolutely in the newspaper they read, unless it is such matter as they of their own personal knowledge know to be different than stated. One class is composed of the reporters who come to you, the men you meet in the course of daily happenings. The other is the reader. To the reporter the paper he is on is a part of himself. Striving always in himself to be fair, the paper is his bias, for the paper is to the average newspaper man the highest type of publicity he has ever been connected with; this is the natural condition of progress. The second believer in the paper is the reader; it is the fountain of his knowledge, the source of his instruction.

Make the giving of news a definite department of organization, with the same attention to it as to the operation of the cars. There is no magnificent isolation of the motorman like that of the engineer; the very makeup of the electric car gives rise to a marked familiarity by the public with a part of the company's business. The same passengers take the same car with the same crew day after day, and this increases the public's familiarity, but the trouble is that this knowledge is only partial. The people who ride see only a small portion of what goes on; the public sees a steady flow of nickels into the coffers of the com-

* Abstract of a paper read before the Central Electric Railway Association at the Indianapolis convention, Nov. 18, 1909.

pany; it does not see the expenditures. The public sees tracks torn up and service rendered under difficulties and proceeds to damn the company almost on the theory that it is being done deliberately to annoy and delay the riders. Of the cost of this track expenditure the public has almost no comprehension; the same public is absolutely unfamiliar with the enormous task it is to maintain power and with the constant outgo of the dollars in the shops and yards.

All these things can be treated instructively and entertainingly in the press and by means of pamphlets. You who are experts know all this; it is an old story to you, but to the passengers and the people along your line it is like an unknown country. Whenever the familiarity of the public becomes real there will be less talk of watered stock and more wonder as to how you can do so much at so little cost to the rider.

The other day I was talking with a newspaper man of many years' experience in Detroit, and during the conversation I asked him what he thought double-truck cars cost. "About $1,500, or probably $1,200," was the reply. And the press is the school to which the public goes!

All such news as I have suggested is educational. There is another class, that might be classed gossip—stories of fighting snowstorms, changes in schedule, the appointment of agents and all that sort of thing. It is well to bear in mind that all news is comparative. The appointment of John Doe as station agent at Snagg's Corner is just as important to the readers of the Snagg's Corner *Courier* as is the selection of Richard Roe as president of the road to the readers of the metropolitan paper.

Then there is the matter of news concerning collisions, accidents, etc. Some railways have gone on the theory that the publication of this class of news worked against the good government of the road and tended to create claims for damages. Some police departments have worked along the same theory in the suppression of stories of crime, but in recent years the police have gradually learned that publicity has made the press an agent in detecting the criminal, and, similarly, railways have found that the publication of accidents has often brought good results in the way of evidence tending to upset outrageous claims for damages.

It should be remembered that misinformation is more dangerous than information, and a story scattered broadcast through the newspapers can never be followed by a correction that will reach all those who read the mis-statement. It is therefore necessary to get in on the ground floor, as it were, in getting your side before the public. Accidents always have their witnesses, and in the excitement of the moment and the high pressure rush of the daily paper to get the story for the next edition much that is fiction reaches the reporters' ears, so that the thing to do is to co-operate with the press by assisting in arriving at the real truth.

To illustrate the point: Recently the bare announcement reached a Detroit paper that an interurban car ran over and killed a man. It was only a few lines, and there would have been no scare head used, but even although it was unexpressed, the impression on the reader's mind would possibly have been that there was carelessness on somebody's part. Our investigation, and I gave the story to the paper almost as soon as it had received the dispatch, showed that the man, as the car reached him, deliberately put himself in front with suicidal intent.

Needless to say, this made more of a newspaper story and, equally needless to say, there was no possible opinion in any one's mind adverse to the company.

By an ordinance recently passed by the Chicago City Council, fares are to be returned to passengers when a surface or elevated car is delayed for 10 minutes or more. It does not appear to be clear whether fares must be refunded in case the delay is not the fault of the traction company, but is caused by a wagon breaking down on the tracks, a fire blockade or some similar cause. Hitherto, although the conductors have usually given transfers to the nearest available line by which passengers could resume their journey, there has been no ordinance requiring fares to be refunded.

TESTIMONY IN CLEVELAND VALUATION

In the proceedings before Judge Tayler of the United States Circuit Court, who is the arbitrator in the negotiation between the Cleveland Railway and the city of Cleveland concerning the renewal of franchises, at Cleveland on Oct. 27 testimony was given by Bion J. Arnold. Mr. Arnold was examined by Horace E. Andrews, president of the Cleveland Railway.

Mr. Arnold described his work as chairman and chief engineer of the Board of Supervising Engineers, Chicago traction, and as consulting engineer of the New York Public Service Commission, First District. Mr. Andrews asked what conclusions were reached regarding overhead charges in the valuation of the Chicago surface railways. The commission which did this work was composed of Mr. Arnold, Prof. M. E. Cooley and A. B. duPont. Mr. Arnold replied that after making a complete inventory of the physical properties of the companies, values were placed upon all of the items in the inventories and certain percentages were added to cover organization, engineering, superintendence, incidentals and contractors' profits, as follows: On track, electric power distribution system and buildings, 15 per cent; on power plants, 10 per cent; and on cars and car equipment, 5 per cent. Nothing was added to the following items: Real estate, patent rights, ordinary shop machinery and tools, stores, supplies, office furniture and fixtures, horses, wagons, miscellaneous items. In addition to the reproduction value of the property thus obtained there was added to cover legal expenses, interest during construction, brokerage and contingencies, 10 per cent.

Mr. Andrews asked Mr. Arnold as to his testimony in the case involving the valuation of the Coney Island & Brooklyn Railroad presented before the New York Public Service Commission, First District, as published in the Electric Railway Journal of Sept. 25 and Oct. 16, 1909. The witness said that his testimony covered the entire subject of appraisal of the property, relating not only to the cost of reproduction, but outlining a method of ascertaining the present value of the property. He thought that it was a complete analysis of the subject. It contained the views of himself and several competent assistants that he had in this work.

Newton D. Baker, city solicitor, said that, of course, this testimony had covered a very much wider range than any inquiry which he supposed existed in Cleveland, but he would not object to its introduction.

Judge Tayler said he would value it as a matter of expression of principle which might be informing to him in interpreting various facts and testimony. Mr. Baker thought it would be valuable.

Mr. Arnold stated that in the New York work he acted simply as an advisor and consulting engineer to the commission and while the views expressed represented his personal beliefs, they might or might not be followed by the Public Service Commission. He did not wish to attempt to commit in any way the Public Service Commission to his personal views and did not wish to answer questions which would tend to show that he was assuming to commit the commission in any way.

OVERHEAD CHARGE NECESSARY

It was testified by Mr. Arnold that he had found that it was necessary to add to the value of the physical property that can be seen by the eye, an amount representing an overhead charge. This charge varied with each specific

case so that his judgment as to what would be a fair overhead charge in Cleveland would be a matter for investigation. It was customary to add generally from 5 to 10 per cent for contingencies. That charge was supposed to cover incidentals, including contingencies, incomplete inventories and loss and wastage of material during construction. Under company's administration expense there would be the following: Rent, officers' salaries, State and city permits and fees, property owners' and local consents, legal expenses in connection with construction, superintendence and inspection, accounting departmet, printing, storeroom expense, etc. These were all connected with construction and had nothing to do with the promotion of the road. Promotion expenses, discount on bonds and other contingencies like those were entirely separate from the items which he had mentioned.

Most of those who had directed construction work had found it absolutely necessary to add something to take care of unforeseen costs. He presumed that in eight cases out of 10, a road cost more than the promoters or the engineers expected when they started to build. There were often expenses in connection with the operation of a road during the first six months or year or undertaken necessarily to bring it up to good operating condition that had to enter into the cost of operation, or of construction and completion of the property, which were not often taken into account in the preliminary estimates or in the construction period. Very often there were carrying charges, such as making up for loss in operating expenses or loss in interest due to the fact that excessive rates of interest had to be paid during the preliminary period of operation of the railroad. If the enterprise was not sufficiently profitable to make enough money to meet operating expenses and pay interest somebody must meet the cost. It was such items as these to which Mr. Arnold referred in discussing the development expenses or charges which were not included in the list given. Mr. Arnold added that he did not recall any other items except those that would be covered by the detailed development expenses that should be included in addition to the overhead charge in valuing a property.

Testifiying regarding some of the development expenses, Mr. Arnold said they would include promotion expenses, discount on bonds, such other items as he had in mind in his reference to the cost of operation for the first few years, and other incidental expenses of that class, legal expenses in connection with securing the charter, the promotion of the road, securing the franchises, securing the property owners' consents, and other items of that character that entered into the promotion of a railroad and promoters' profits if any were paid.

PROFITS OF PROMOTERS

Answering a question as to whether it was fair to assume promoters' profits in the development of a railroad property, Mr. Arnold declared that he would not want to say that a promoter would always have to be paid a profit in order that a road might be built, but that, as a matter of fact, most railroads that had been constructed so far had been created under conditions which paid some one a promoter's profit. Until the public was in a state of mind to subscribe for railroad securities at low rates of interest, and furnishes the money for the construction of the roads under these conditions, he believed that somebody would have to be paid some kind of a promoter's profit. Otherwise it would not be possible to get people skilled in the art to take hold of the promotion of a road and assume the risk of loss for ordinary salary compensation. He did not say that he believed in paying promoter's profits, but those were the conditions which had prevailed in the past.

The New York Public Service Commission, Second District, had allowed promoter's profit in one instance, Mr. Arnold thought, based upon the actual cost of the property. Responding to further inquiries, Mr. Arnold stated that he included experimentation in development expenses, such as passing from the horsecar and cablecar and the storage battery to the present system. In the construction of many large railway systems changes had been necessary as results of progress in the state of the art, requiring the abandonment of the use of horses and the adoption of the cable or electricity. In order to secure the capital to install the cable or electric systems, companies had been required, as a rule, to issue additional securities and thereby increase their capitalization, presumably on the theory that increased earning capacity of the property or its development would make it possible to earn a sufficient amount to pay interest on the increased investment. Few railways would have been constructed up to the present time if some such practice had not been adopted. Such capitalization has become necessary on account of the changes in the state of the art, and the legitimate development expense necessary to produce the property should remain in the capital account of the company until such time as the company had a chance to earn enough to retire these items, say over a long period of time by an amortization fund of some character

In his testimony on this subject Mr. Arnold assumed that the property had been properly managed and that the company had not been able to earn a sufficient amount of money from the day it was organized until the date the valuation was made to have retired the promotion expenses and other expenses due to development and change in the state of the art. Whatever it had been unable to retire should remain in capital account until it made enough to retire the amounts involved. He believed that those who invested money in a public utility property were entitled to earn a legitimate return upon the investment, but he would not attempt to say what that return should be. It could be agreed upon easily by fair-minded people. If, in order to create a property, there had to be a return on the investment, there should be a return upon development expense until it was possible to make enough to retire the excessive capitalization and, in addition, to pay a reasonable interest upon the investment. He believed that whatever profit had to be paid to the promoter anywhere or discount on bonds, if the securities had to be sold for less than par, should be taken into account together with all the legitimate incidental expenses that seemed to be necessary to get a railway in operation. Everything that was not actually, or that would not actually some day, be a part of the physical property should be retired in some manner, probably through amortization funds for which provision was made at the time the company was organized and the company should be allowed to earn a return on the capitalization and at the same time gradually retire those funds until finally the securities represented the physical property.

Mr. Andrews suggested as a specific case that two railway properties were undergoing valuation in Cleveland. One was built about two or three years ago with modern-type rail, modern cars and motors and apparatus that could be bought to-day, in streets where there had not been rail-

ways previously. The other was started in 1860, or thereabouts, and on some lines was first a horse railroad, with subsequent development into 16-ft. electric cars with 15 hp, which had entirely disappeared. On other lines the cable system was installed first and abandoned later when electric cars were substituted. In other words, the Cleveland property had passed through 40 or 50 years of development of the art. Was it fair, in reaching the relative values of the two properties, to take no account of the history and development of one company as compared with another property built new?

Mr. Arnold stated that he would want to see the books from the day of organization up to the present time and know what the operating expenses had been, how much money had been earned and what dividends had been paid. If the property had earned enough to have paid fair dividends upon the cost of the property and also enough to retire the expenses which he had mentioned, if provision had been made for the retirement of them, he should say that the properties should be valued upon the physical value or approximately that to-day. If it was shown clearly that the property had been incapable of earning enough to retire the funds to which he referred and pay a legitimate return upon the initial and increased costs, he would say that these amounts should be kept in the capitalization and earnings permitted upon them until they could be retired. These items were over and above overhead charges. They were development expenses due to changes in the art and ordinarily called obsolescence.

EARNINGS SHOULD PROVIDE FOR EXPENSES

Provision for amortization of these charges should be made ultimately out of the earnings of the property. Mr. Arnold's principle was that if the property had never earned enough to retire the funds the company was entitled to keep some of the funds in its capitalization, assuming, that is, that they were legitimate expenses and not excessive, that the property had been fairly managed and the obligations fairly contracted in the beginning.

Mr. Andrews asked whether, in Mr. Arnold's opinion, it was fair to include, in valuing a property as a going railroad, the results of energetic development of the property. He had in mind one city of practically the same size as Cleveland which had an earning power, at a 5-cent fare, of more than $1,000,000 less than Cleveland. One company had not adopted electricity as early as the other, did not change its equipment with the times, had not added new cars and had not made traffic inviting. Mr. Arnold expressed his belief in the allowance of a value for skilled management. If he could settle all the traction problems in the country he would pay a premium in some way for suitable skill in the management of properties. He would pay the owners of the properties, in case they were owned privately, a legitimate return upon the investment, a rate of interest which could be agreed upon and something in addition for skillful management. How much that should be he did not attempt to say. Whether the premium would be paid to the managing officer who exhibited the exercise of skill or to the stockholders of the company would be a matter for agreement.

Judge Tayler said that the only criticism which he had heard suggested of the plan under consideration for operation of the Cleveland property was the limitation to a return of 6 per cent on the stock. The company was said to be under no incentive to give such operation as might be induced if 7 or 8 per cent could be attained by more effective and economical management. After all, was not the matter of efficiency in the present human equation of the man who was charged with immediate responsibility? Mr. Arnold replied that it was so in the main. There might be financial conditions which could not be controlled, but assuming that these were not disturbing, efficiency depended upon the human equation.

Judge Tayler said that if the man who was responsible received such reward for his personal endeavor as it entitled him to have, gaged according to the efficiency and economy of his operation, care would be taken of that one element.

Mr. Arnold said that was true so far as the hope of getting results was concerned. He did not know whether capital could be secured to take the chances at lower rates of interest, but hardly thought it could. He believed that capital would have to be offered some increase over 3, 4 or 5 per cent return on the investment.

Judge Tayler assumed that capitalists received 6 per cent from one form of security and would furnish capital for less in another form. In charge of operation of the property was a man who would be under no restraint except that which capacity laid upon him and he would receive a reward which was compensatory with the success of his efforts. Would Mr. Arnold allow for something that might otherwise arise out of want of incentive to give efficient management to the property?

Mr. Arnold suggested that Judge Tayler was assuming that the railroad was built and that the stockholders were satisfied with 6 per cent originally.

Judge Tayler was excluding for the time being the cost of financing. He was referring to the real scientific executive management of the property as a vehicle for the transportation of passengers. Was not that purely personal to the individual if he was not hampered by the board of directors?

INCENTIVE TO MANAGING OFFICER INSUFFICIENT

Mr. Arnold answered the question affirmatively, but said that to put a man in that kind of a position it was necessary to have the financial conditions ideal. He was leaving that side of it to Judge Tayler. Judge Tayler referred to that as a problem of the future, but said that he was hopeful that unsatisfactory conditions which arose would disappear with the lapse of time. Mr. Arnold stated that he doubted the possibility, at any rate at present, of interesting sufficient capital at low rates to create public utility enterprises with simply an incentive to the managing officer to manage the property.

Judge Tayler suspected Mr. Arnold was correct in so far as his statement applied to the beginning of an enterprise; there must be some established quantity of business and conditions.

Mr. Arnold added that the element of risk would have to be removed entirely. Judge Tayler said that problem did not exist in Cleveland or at least it was modified. Judge Tayler asked Mr. Arnold to undertake to make, so far as he could with the data before him, a concrete application of his principles to some of the conditions existing in the Cleveland case. Mr. Arnold answered that he knew nothing about the Cleveland situation. He could simply tell his views and what had been accomplished in Chicago. He had never been on the stand as a professional or expert witness in a legal case and he declined to take that position.

Judge Tayler asked a question designed to show the amount on which the overhead charge would be based. Mr. Arnold said he would base this charge upon the cost of the property new, irrespective of what depreciation had been

allowed in the valuation. An engineer who was building a road new would base his item of incidentals upon the cost of the property new and not upon the depreciated value.

Mr. Andrews asked whether an item should be included for discount, commission and expenses in the sale of securities. Mr. Arnold would call that a development expense in addition to the overhead charge. Interest and taxes during construction were included in the allowance of 10 per cent in the Chicago case. Provision for working capital should be made in the capitalization of the company.

During the cross-examination by Mayor Johnson, overhead charges were defined by Mr. Arnold as non-physical charges upon physical property. Mr. Andrews asked Mr. Arnold whether it would be fair now, in valuing a property in which electric service had superseded a cable railway, to eliminate all of the expenditures which preceded the installation of electric equipment. In answer, Mr. Arnold amplified his previous statement on this subject as given in the foregoing report. His course would depend upon the value he was endeavoring to find. If he wanted to arrive at the cost of reproducing the property new, he would not find any cable system in sight and would not value it because he could not see it. If he endeavored to get the present value of the property, he would not be able to see the cable system because it would not be there. If he endeavored to arrive at the cost of a property for the purpose of fixing a rate of fare, he would include the value of the cable system or any other similar system or development expense unless the records of the company showed that it had earned enough money between the commencement of operation and the time of the valuation to have eliminated the cost of the cable or other experimental system by a proper sinking fund arrangement and to have paid, in addition, a reasonable return upon the investment in the property during the time. If Mr. Arnold found that the property had never earned enough money to eliminate the expense of this development, he would leave in the capital of the company the cost of the cable system or so much of it as he found the company had been unable to amortize.

Mr. Andrews asked Mr. Arnold whether he would think it equitable to the stockholders of two companies, one of which was finished a couple of years ago, while the other had passed through 40 or 50 years' existence, in a valuation for consolidation purposes, to take the history and development into account in one case and disregard these factors in the other. Mr. Arnold thought the same element should be taken into account in the consideration of each company.

CHICAGO CABLE SYSTEM VALUED AS GOING CONCERN

Mr. Andrews asked whether any value was assigned to the cable system in the Chicago valuation. Mr. Arnold said that value was assigned although the cable system was practically out of use at the time. The argument of the railway companies was that the cable system should be valued as a going concern. The cable houses were standing and the cables were in the slots and the properties were maintained so that they could be started at any moment in case the electrical equipment, which had been installed under temporary and revocable permits from the city, should have to be abandoned. The legal representatives of the railway companies contended that since the franchises of the cable companies contained clauses that allowed them to operate until the city purchased, they had the right to operate until purchased and that consequently the property should be considered as a going concern.

The attorney representing the city conceded to that argument, subject to the action of the City Council, and the properties were so valued.

Answering a question by Mayor Johnson, it was stated by Mr. Arnold that it would make no difference whether the cable properties were in operation or not. The appraisals would have been made on the same value because they were based upon a legal position and not upon the actual physical condition. On account of the legal situation the railway companies were allowed several million dollars for properties which were then obsolete or assumed to be obsolete.

ADDITIONAL TESTIMONY

Little work was done last week in the traction arbitration, as Mayor Johnson secured the consent of Judge Tayler to be absent a few days on private business. The work is so far reaching and the manner of presenting testimony so tedious that the conclusion will scarcely be reached, it is believed, before the first of the coming year. Judge Tayler, however, may be following up the testimony in such a manner that little time will be required for him to reach a decision upon the various points at issue.

Prof. E. W. Bemis, superintendent of the water works department, spent some days in Detroit, looking up figures on the life of track and on Nov. 5 was put on the stand to refute the statements made more than a week ago by Charles H. Clark, engineer of maintenance under Receiver Bicknell, and to show that the valuation made at the time of the Goff-Johnson settlement was too high.

The figures presented by Professor Bemis, showed, he said, that the average life of track was slightly over 16½ years. During the cross-examination President Horace E. Andrews of the Cleveland Railway showed the court that the figures of Professor Bemis proved that the average life of track was 38 years.

Mr. Clark took issue with Professor Bemis and explained his computation again. Judge Tayler said he would take Mr. Clark's tables in the absence of any other data. City Engineer Robert Hoffman stated on the witness stand that the value of the tracks should be reduced $1,500 a mile from the figures placed on them at the time of the Goff-Johnson settlement. He said, however, that he had not had any experience in laying street railway track, but that he was able to prepare tables that proved his contentions.

The winter schedules have been put in partial use and it is probable that considerable dissatisfaction will result. Within a few days all of the 100 open cars that have been in use will be taken off and in their place as many of the old closed cars as can be made to operate will have to be placed in service. Within a month or two 25 new cars will be received and they will be distributed where needed the most. But they will not make up for the loss and the receiver believes that nothing but poor service can be expected. He stated some time ago that the system needs at least 75 large cars to give a fair service, but the court could not give unlimited authority to purchase cars in the present unsettled condition of affairs.

The London County Council Tramways comprise a total of 127.6 miles of track, of which 76 miles are operated by underground conduit conductors, 9.5 miles by overhead trolley, and the remaining 42 miles by horse traction.

MEETING OF THE MASSACHUSETTS STREET RAILWAY ASSOCIATION

The regular monthly meeting of the Massachusetts Street Railway Association was held at Young's Hotel, Boston, on the evening of Nov. 16, with President R. S. Goff in the chair. The evening was devoted to a review of the recent trip of the New England party, under the direction of Charles S. Clark, to the Denver convention, Pacific Coast and Southern States. A large number of lantern slides of the trip were shown, and brief descriptions of the trip were made by different members of the party.

President James F. Shaw of the American Street & Interurban Railway Association, who was the first speaker, referred to the large attendance at the Denver convention, and stated that the registration was 2800, compared with that of about 3000 at Atlantic City. The 1909 convention was as successful as any previous meeting of the association. He paid a tribute to the hospitality of Messrs. Beeler and Evans, of Denver, and to the work of the affiliated associations, which, he said, had done the best work this year since their organization. The well-selected exhibits were mentioned, and President Shaw then spoke of the boundless hospitality which the party received all through the trip. The membership in the association was increased by the trip.

H. L. Wilson, treasurer of the Boston Elevated Railway Company, spoke of the delightful character of the trip and the cordiality which was everywhere apparent. He paid a tribute to the managing ability of Secretary Clark, which was enthusiastically received by all present.

Paul Winsor, past president of the American Street & Interurban Railway Engineering Association, reviewed the efforts which the visited companies made to gratify every wish of the party, and stated that his chief interest on the trip was the question of car design. The lightness of the half-open and half-closed cars of Denver was impressive. Mr. Winsor praised the T-rail and mitre-joint construction in Denver, and emphasized the general interest in securing lighter car weights. Traffic men, as well as motive power officers, are anxious to reduce the weight of rolling stock. The first cost and operating expenses of heavy cars are serious matters. Mr. Winsor thought that one could afford to sacrifice a good deal in order to get a light, single-ended, center-entrance, cross-seat box car, as in Seattle and Tacoma. He praised the work of Stone & Webster in the Southwest, and closed with a tribute to the work of E. C. Foster, of the New Orleans Railway & Light Company.

F. R. Coates, of the Stone & Webster organization, spoke briefly of the scenic and engineering wonders of the Canadian Rockies. Henry C. Page, general manager of the Worcester Consolidated Street Railway Company, spoke of the hospitality of the West and the loyalty of the public to their local street railway systems west of the Mississippi River. He was greatly impressed with the physical fitness of the Denver City Tramway Company, particularly its rails and special work. He questioned the value of a center-entrance car for heavy rush-hour traffic, however. Concluding, Mr. Page touched upon the energy shown by the residents of San Francisco in rebuilding their city, and pointed out the enormous development of real estate in Southern California along the lines of the Huntington system.

E. S. Wilde, general manager of the Union Street Railway Company, New Bedford, submitted a humorous sketch of the doings of the party in El Paso, and Charles S. Clark voiced his satisfaction in the success of the trip as the reward for the work of its organization and management. The meeting closed after the presentation of numerous lantern slides made from photographs by members.

CENTRAL INSURANCE RATING BUREAU ORGANIZED

Representatives of a number of the leading underwriters' associations of the country met in New York the latter part of last week and organized the much talked of Central Electric & Lighting Bureau to handle the electric traction and lighting risks through the entire field. United States Manager E. G. Richards, of the North British & Mercantile Insurance Company, was elected president, and General Agent Cofran, of the Hartford Fire Insurance Company at Chicago, was elected vice-president. The executive committee is as follows: R. M. Bissell, vice-president of the Hartford Fire Insurance Company; Manager A. B. Andrews, of the South Eastern Underwriters' Association; Secretary Weiderhold, of the Underwriters' Association of the Middle Department; Secretary F. W. Jemess, of the Underwriters' Association of New York State; George W. Law, of Law Brothers, of Chicago, managers of the Western Department of the Royal Insurance Company of Liverpool; J. H. Lenehan, of Chicago, general agent of the Western & Southern Department of the Phenix Insurance Company of Brooklyn, and Charles G. Smith, secretary of the German-American and German Alliance Insurance companies of New York. The headquarters of the bureau will probably be in New York City.

The organization will include all classes of companies, both union and non-union, and, it is understood, will have absolutely nothing to do with the placing of business, which will be written through the regular brokers or agents having that business in charge. Among the underwriters' associations represented at the meeting were: Fire Underwriters' Union; The Western Union; South Eastern Underwriters' Association; Underwriters' Association of the Middle Department; Board of Fire Underwriters of the Pacific; Underwriters' Association of New York State, and the Board of Fire Underwriters of Allegheny County.

NEW CARS FOR THE ILLINOIS TRACTION SYSTEM

The Illinois Traction System, of which H. E. Chubbuck is general manager, has on order and is now receiving a large number of passenger and freight cars. This company is also asking bids on additional new equipment. The American Car & Foundry Company is now delivering to the Illinois Traction System 50 80,000-lb. capacity coal cars, in addition to 35 of a similar design received during the summer. Twenty-five 80,000-lb. capacity box cars have been delivered, 5 are under way and the American Car & Foundry Company is now building 10 more of this capacity. The railway company has under contract four motor express cars with smoking compartments. These cars are designed to be used at the head end of a fast three-car train, which will be comprised of one of these combination express-smoker-motor cars, a day coach and a sleeping car, two of which are now in operation and two more under construction. Other cars now under contract include four straight motor express cars, 30 pay-as-you-enter cars for the St. Louis-Granite City suburban service, to be operated over the new Mississippi River bridge which the Illinois Traction System is building at St. Louis, and a recently designed single-truck, pay-as-you-enter city car, of which 3 will be operated in Champaign, Ill., and 10 in Peoria. The Illinois Traction System is asking bids on 30 express trail

cars and 6 50-ton locomotives with all-steel box bodies. This company now has on order three double-truck cars for Bloomington city service and two single-truck cars for Jacksonville city service. The two sleeping cars which are being built by the American Car & Foundry Company will be delivered in December. These cars will be very completely furnished, and are designed with windows in both upper and lower berths, a safe in each berth, commodious toilet rooms and full-sized sleeper sections. Next week the American Car & Foundry Company will deliver the special office car for Mr. Chubbuck, which was mentioned in the ELECTRIC RAILWAY JOURNAL for April 3, 1909, page 639. The car is 63 ft. 6 in. long over all, has a complete electrical equipment and is subdivided into an office compartment, with desk, table, typewriter desk and letter files, an observation dining room, six berths in compartments, and a very complete kitchen arrangement.

SIGNALS FOR ELECTRIC RAILWAYS

The Railway Signal Association has appointed a new committee of 12 of its members to consider the subject of electric signaling for electric railways. Its work is outlined as follows:

(a) Establish the history of the first suitable installation.
(b) Describe systems of a.c. track circuits used with d.c. propulsion, stating propulsion voltages; to include all known practices in the United States and Canada.
(c) Same as (b) except a.c. track circuits used for single-phase a.c. propulsion, stating propulsion voltages.
(d) Same as (b) except d.c. track circuits or their equivalent use with d.c. propulsion.
(e) Describe systems of signals in use on above lines, briefly stating method of control and other points of interest in order to assist the student to formulate comparisons and conclusions.
(f) Invite similar information to be submitted by firms in Great Britain and on the Continent.
(g) Historical sketch and all data procurable of jointless track circuits.
(h) Sketches of circuits in use with each class of installation.
(i) Steam roads equipped with a.c. track circuits in anticipation of being electrified.
(j) Steam roads supplied with a.c. track circuits, not anticipating electrification, showing both types of this kind of installation.
(k) Sketches of various track circuits referred to in outlines.
(l) It is suggested that a subcommittee be organized to gather data relating to the use of a.c. current in signal work on steam roads.

The names of the members of the committee follow: C. C. Rosenberg, chairman, Bethlehem, Pa.; C. H. Morrison, vice-chairman, New York, New Haven & Hartford Railroad, New Haven, Conn.; J. V. Young, Boston & Maine Railroad, Boston, Mass.; W. C. Smith, Boston Elevated Railway, Boston, Mass.; J. M. Waldron, Interborough Rapid Transit Company, New York City; W. N. Spangler, Pennsylvania Tunnel & Terminal Company, New York City; James Heywood, Philadelphia Rapid Transit Company, Philadelphia, Pa.; E. B. Smith, New York Central & Hudson River Railroad, New York City; E. C. Grant, Union Pacific Railroad, Omaha, Neb.; H. A. Logue, Cumberland Valley Railroad, Chambersburg, Pa.; T. B. Whitney, Jr., Hudson & Manhattan Railroad, New York City; W. P. Allen, Pennsylvania Railroad, Philadelphia, Pa.

In the whole Russian Empire there are but 30 cities served by electric street railways.

TREATMENT OF DEPRECIATION ACCOUNTS OF NEW YORK PUBLIC SERVICE COMMISSION

The rules adopted for the treatment of depreciation accounts by the Niagara Gorge Railroad have been filed by B. L. Jones, the general manager, with the New York Public Service Commission, Second District, and are as follows:

RULE CONCERNING DEPRECIATION OF WAY AND STRUCTURES

On and after July 1, 1909, the depreciation of way and structures has been determined at 6.5 cents per revenue car-mile, based on the following figures:

The expenditures for the maintenance of way and structures during six years ending June 30, 1909, were $69,220.53, and the revenue car-mileage for the same period was 1,070,282 miles. This amounts to very nearly 6.5 cents per revenue car-mile, and, in the opinion of the subscriber, did not cover the natural wear and tear, but improved the physical condition of the property in fact.

The rate per revenue car-mile on the property of the Lewiston & Youngstown Frontier Railway Company, operated by this company under lease, has been determined at 5 cents for the reason that it operates through a flat country and is not subject to the same conditions.

RULE CONCERNING DEPRECIATION OF EQUIPMENT

On and after July 1, 1909, the depreciation of equipment has been determined at 4 cents per revenue car-mile, based on the following figures:

The expenditures for the maintenance of equipment during six years ending June 30, 1908, were $38,021.92, and the revenue car-mileage for the same period was 1,070,282 miles. The amount figures 3.55 cents per revenue car-mile and not only maintained equipment in full operating efficiency, but created a reserve of $3,392.04 for obsolescence. The additional sum of 0.45 cent per revenue car-mile will create a probable additional reserve of approximately $1,000 a year.

The foregoing rate per revenue car-mile will also be applied to the Lewiston & Youngstown Railway Company, operated by this company under lease.

A LARGE SELF-COOLING TRANSFORMER

Standard cases with corrugated sides are regularly supplied with self-cooling transformers up to about 600 kva or 750 kva, but beyond these capacities the weight and size of case become so great that some method other than mere increase in size must be used to get the necessary radiating surface. A case recently has been developed by the Westinghouse Electric & Manufacturing Company to overcome this difficulty. It consists simply of a plain boiler-iron case to the outside of which radiating tubes are welded. These tubes are in the vertical position and are given a 90-deg. bend at the top and bottom where they enter the case. The mechanical construction is very strong, so that there is practically no chance of ever springing a leak. Because of the ease with which the tubes can be widely separated from one another, the air circulates very freely among them and the efficiency of the radiating surface is considerably higher than for the ordinary corrugated case. Large self-cooled transformers are of particular value in places where cooling water is not available, very



Self-Cooled Transformer

costly, weather conditions so severe that water-cooled transformers may give trouble or where it is desirable to have as little attendance as possible. The Westinghouse Electric & Manufacturing Company has just built 12 1000-kva, 100,000-volt transformers of this new type, as shown in the illustration, for the Southern Power Company. Three of these transformers are for outdoor service and nine are to be used indoors.

AN ELECTRIC TOWER WAGON

An interesting application of trackless electric vehicles for electric railway service has been developed by the General Vehicle Company, of Long Island City, N. Y., in the emergency tower wagon illustrated in Fig. 1. The entire equipment of the tower wagon is mounted on the well-known 2-ton chassis of this builder. All the spring supports and the special parts are vanadium steel castings, and all the renewable parts are accurately machined to size. Another striking feature is the use of Hess-Bright ball bearings on the armature shaft and Timken roller bearings for all the wheels and countershafts, thereby making friction a negligible factor. It will be observed from Fig. 2, which shows the construction of the chassis, that the frame is constructed of steel channels so proportioned as to support the mechanism in the most efficient manner.

The 44-cell storage battery which furnishes current to the motor at 85 volts is suspended below the main frame in a substantial and accessible cradle. The battery is made up of conveniently sized sections, to permit easy replacement from either side of the vehicle. The controller is of the continuous torque type which changes the motor speeds by degrees without interrupting the power supply. Thus

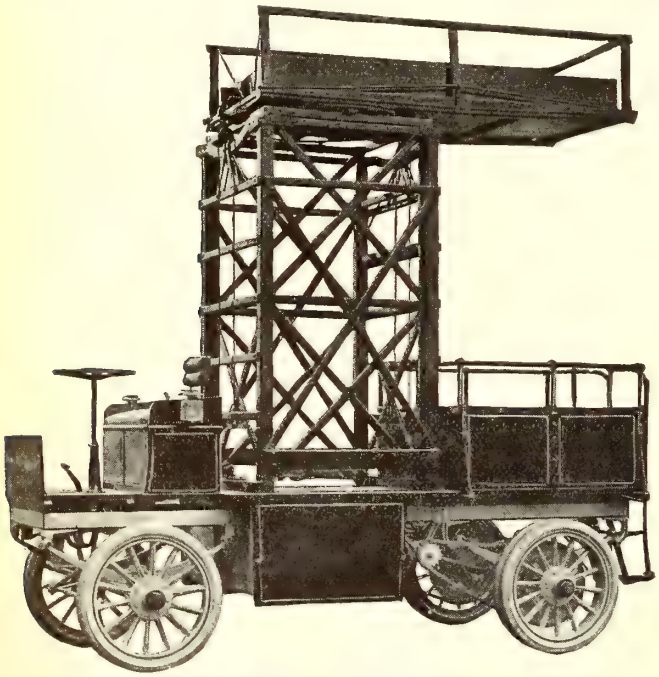


Fig. 1—Electrically Operated Tower Wagon

a smooth, even acceleration is secured, and there are no excessive strains of any kind to decrease the life of the controller, battery, motor, chains, sprockets, gears and tires. The single electric motor used is built along the sturdy lines of an electric railway machine, with a strong, rigid shaft, simple and durable brush fittings, capacity for heavy overloads and high efficiency. This motor, which is of General Electric make, is suspended on a crossbar pivoted to the sideframes in front of the rear axle, as shown in Fig. 3. This pivoted suspension keeps the motor shaft parallel with the countershaft throughout the entire range of chain adjustment and permits the successful use of an efficient silent chain drive. The motor is totally enclosed and protected from water and dirt at all times. It is high above the ground, and may be easily examined from the rear by opening a hinged cover in the motor frames. The use of rigid direct gear drive was abandoned several years ago by this builder in favor of the more efficient and

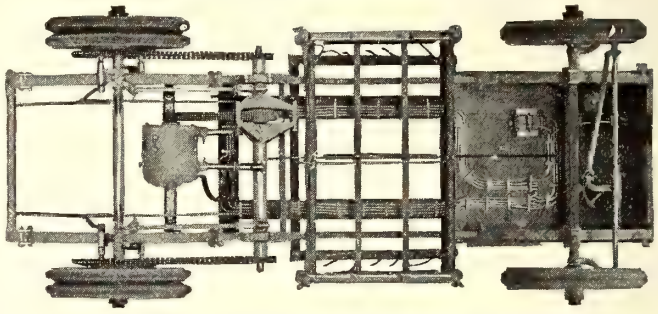


Fig. 2—Top View of Tower Wagon Chassis

flexible chain drive. Easy running roller-bearing chains drive the rear wheels from the countershaft. The large diameters and properly designed teeth, combined with the frictionless roller chain, decrease the transmission losses to a minimum. A single broad silent chain of the tooth-link type drives the countershaft from the motor pinion. A simple and rigid adjustment keeps the chain in its most efficient operating condition.

The artillery type wheels have roller-bearing hubs, giving maximum strength and minimum friction. Solid rubber tires of highest standard quality are used on all wheels. To carry the load easily and transmit tractive effort efficiently, the tires vary in design for different capacities. On the trucks of 4000 lb. capacity and upward, broad single tires are used in front and solid double or twin tires on the rear wheels. The half-elliptic springs, both front and rear,

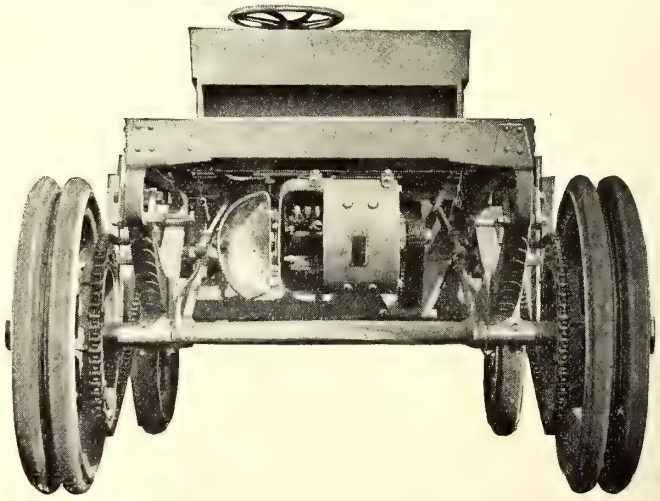


Fig. 3—Rear View of a 2-Ton Chassis, Showing Motor and Drive

are scientifically designed for the load liable to be imposed upon them according to standard capacity rating. The internal expansion leather-faced brakes on both rear wheels are controlled by a foot lever at the base of the steering post. The steering gear is wheel-operated through a vertical steering column to the gear and sector.

The emergency wagon has a speed of 12 m.p.h., and a range of service of 40 miles on one charge of battery. The

wagon has sufficient space for seven men in addition to the driver, besides room for tools and repair materials.

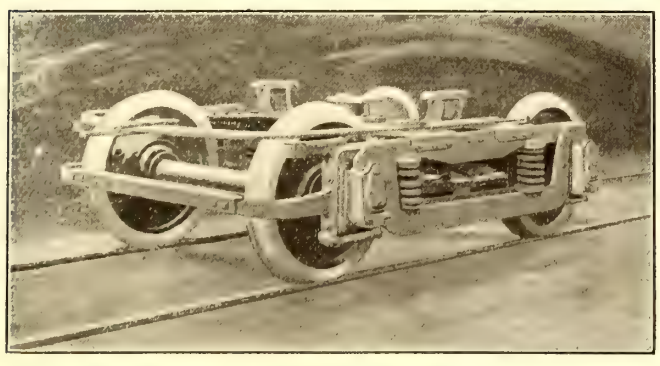
Of course, one of the important advantages of this type of emergency wagon is its immediate readiness for service, and it dispenses with the trouble of maintaining a team of horses for such purposes. Naturally, a broader adoption of electric vehicles by street railway companies will permit the entire discontinuance of horse service. It should be considered that the current required to charge the batteries would not be a source of appreciable expense, because the power could be taken at periods of low line loads. It is interesting to note that the experience of the Rio de Janeiro Tramway, Light & Power Company with electric vehicles of the General Vehicle Company has prompted it to order several tower wagons of the type illustrated.

A NEW M.C.B. TYPE TRUCK

At the Denver convention of the American Street & Interurban Railway Association The J. G. Brill Company, Philadelphia, exhibited for the first time its No. 27-M.C.B. truck, which is specially designed for high-speed service and is built in suitable sizes for use under the heaviest to the lightest cars.

Each side frame, including the pedestals, is forged in a solid piece, eliminating built-up work. While the type of frame is similar to those used in other Brill trucks, it is lighter than the frame of the Brill No. 27-E high-speed trucks of the same carrying capacity. The dimensions of the pedestal yokes and end crossings are smaller, owing to the forged construction and because the load upon the truck is brought to the journal boxes through the equalizing springs and equalizing bars. The truck frame beyond the point of support on the equalizing springs is not subject to heavy load or severe strains except those which occur when the truck enters a curve at high speed. The top of the yoke and the top of the frame have been placed in alignment and the extensions to which the angle iron end crossings are bolted are in line with the axle centers.

The deep channel transoms are held in position by wrought single and double corner plate brackets and wrought gusset plates. The squareness of the truck depends to a large extent on the construction at this point, and the

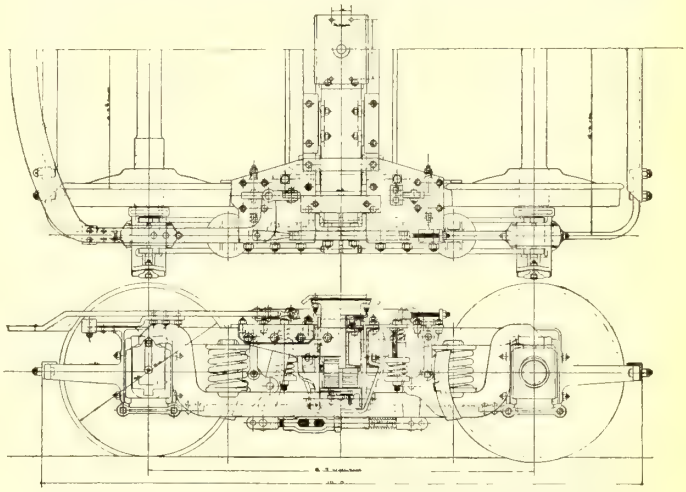


M.C.B. Type Motor Truck

gusset plates, which are of ample dimensions for most severe strains, are folded over the side of the forged frame and are bolted to the frame with bolts which also pass through the wrought plate brackets. This places the minimum number of bolts in shear and secures unusual strength and rigidity.

The tie-bar construction of the No. 27-M.C.B. truck is simple and strong. Channel tie-bars connect the inner pedestals and short tie-bars connect each pair of pedestals. The tie-bars are bolted through the frame in such a manner that they form a rigid reinforcement to the pedestals, and by a simple device the shearing strain is entirely removed from the bolts. The short tie-bars can be readily removed and the wheels and axles dropped.

The brake rigging is also of simple and substantial construction. The radial lever is brought around in a single



Half Plan and Side Elevation of M.C.B. Type Truck

piece to the upright levers, thus reducing the usual number of parts. It is supported by brackets and has a rub-plate bolted to it to provide for wear, but as the bracket forms an extension to the frame, there is no weakening of the frame by bolt holes.

The bolster is cast steel, including the lugs for the side bearings, and rests on two elliptical springs which, in turn, bear on two-part castings in such a manner that shims can be placed readily between the springs and the castings to compensate for wheel wear. The chafing plates on the bolsters and transoms can be taken off and renewed without removing the bolster from the truck. Both of these features are designed to reduce maintenance charges. An additional feature of the bolster chafing plate is its ample vertical dimension, which secures better support to the bolster against tilting and insures uniformity of wear.

A new and ingenious gib construction is used for the No. 27-M.C.B. truck. The gibs are made from pressed steel and the pedestals are machined for absolute fit. The gibs are secured to the pedestal in a special manner. The bolt holes are countersunk on the inner surface of the pedestals to give them a recess into which, by a special form of countersinking of the gib bolt holes, projections of the gib fit to form a socket for the conical bolt heads. There is no reduction in the thickness of the gib where the bolt heads bear against it, and at the same time the bolts are relieved of shearing strain.

The end crossings which serve as an extra safeguard in holding the truck square are angle irons, and are bolted to the extensions of the side frames. The side frame extensions are curved round for extra clearance and present a broad surface where they are bolted to the angle iron crossings, which secures increased strength at this point.

The No. 27-M.C.B. truck has no experimental features. The design is the result of special attention to strength, rigidity and simplicity and a consideration of maintenance.

The Argentine Chamber of Deputies has granted a franchise for the construction of an underground electric railway under the city of Buenos Aires.

News of Electric Railways

Hearing by Massachusetts Commission on Boston Transportation Matters

The Massachusetts Railroad Commission and the Boston Transit Commission, sitting on a joint board, gave a hearing on Nov. 11, 1909, upon the Boston transportation matters referred to them by the last Legislature, including the proposed tunnel and subway of the Boston & Eastern Electric Railroad, the right of the Boston Elevated Railway to own stock of other companies, and several questions in connection with proposed changes in the elevated system and the building of new rapid transit lines.

Frederic E. Snow, of Gaston, Snow & Saltonstall, Boston, representing the Boston Elevated Railway, reviewed the history of rapid transit development in Boston since 1887, and emphasized the expenditures which have been made by the West End Street Railway and the Boston Elevated Railway in the physical equipment of the present system.

The various tunnels and subways have provided for rapid transit through the congested portions of the streets, and have brought the suburban and outlying towns into quicker communication with the business center of Boston. During the period in which the Boston Elevated Railway has been in operation it has provided for heating its own cars in winter at an estimated capital cost of over $1,800,000, and at an annual cost of $240,000. It has also introduced a system of free transfers so extensive that in the year ending Sept. 30, 1908, 158,683,900 passengers used the free transfer privilege, while for the same year the revenue passengers amounted to 273,132,584.

The amount of money required to pay for these improvements in the transportation facilities of Boston, follows: As of Sept. 30, 1889, the first full year in which the West End Street Railway was in operation, the total amount invested by it in permanent property was $12,910,606, or $55,000 per mile of single track. On Sept. 30, 1898, the total amount invested, including the cost of the Tremont Street subway was $29,482,916, or an average of $105,000 per mile, an increase for the 9 years of about $2,000,000 per year. On Sept. 30, 1908, the total amount invested in permanent property, including the cost of the Tremont Street Subway and the cost of the East Boston tunnel, was $66,793,638, or $157,000 per mile, an increase of $3,700,000 a year during the 10 years of operation by the Boston Elevated Railway. Since that date the Washington Street tunnel has been completed, and it is estimated that by 1913 the investment in permanent property will have increased $44,000,000, or at a rate of more than $9,000,000 per year, made up as follows:

Washington Street tunnel, exclusive of approaches, etc.	$7,500,000
Washington Street tunnel approaches, etc.	2,000,000
Main Street Subway, Cambridge and connections to Beacon Hill tunnel	7,000,000
Beacon Hill tunnel	1,700,000
East Cambridge extension	4,450,000
Malden and Melrose extension	3,500,000
Riverbank Subway	3,000,000
Forest Hill's extension	2,000,000
Power stations, equipment, etc., for above	7,500,000
Additions to surface system, estimated	5,000,000
Total	$43,650,000

The investment in permanent property would then amount to $111,000,000, or more than $200,000 per mile of single track. On July 30, 1909, the investment of the Boston & Albany Railroad was only $37,543 per mile and the Boston & Maine Railroad, $41,951.

Mr. Snow said that the facilities to be furnished by a public service corporation must bear a fair relation to the amount of business to be done, and the revenue obtainable. No person could justly require a corporation to furnish additional facilities if the business was not sufficiently large to provide a fair return on the amount of the additional investments required. While improved facilities undoubtedly increase the business of a street railway to a substantial extent, although there may be no increase of population, the company must rely fundamentally for a continued increase in business upon an increase in population in its territory. Since the organization of the West End Street Railway, the increase in the investment provided for transportation facilities has exceeded the rate of population increase many times.

POPULATION OF BOSTON ELEVATED TERRITORY.

Year.	Population.	% Increase.
1890	683,025	—
1895	785,682	15.03
1900	900,497	14.61
1905	971,758	7.91

While the rate of increase of the business of the company since the organization of the West End Street Railway has been far less than the rate of increase of the investment, it has nevertheless been greater than the rate of increase in the population, largely on account of improved facilities. There is no reason to expect a greater rate of business increase in the next five years. Up to the present time the increase in traffic, together with the most rigid economy, has enabled the company barely to earn its fixed charges and maintain a 6 per cent dividend rate; but to enable it to earn its interest charges on the additional investment to 1913 would require an increase in traffic at a much greater rate than for the last 10 years. For the fiscal year 1908 the surplus of the Boston Elevated Railway after paying its fixed charges, 8 per cent dividends, and charging off the very small sum of $200,000 to depreciation, was only $42,063. The completion of the tunnels, subways and other additions to the property will by 1913 impose upon the company an additional charge for interest, taxes and rentals, exclusive of any dividends on additional stock, of $1,638,187, as follows:

4½ per cent on $10,500,000, being the cost of the Washington Street tunnel exclusive of approaches, and of the Riverbank Subway	$472,500.00
4⅞ per cent on $1,700,000, estimated cost of Beacon Hill tunnel	82,875.00
Assuming that one-half the balance would be bonds, interest at 4½ per cent upon $15,725,000	707,625.00
Taxes on the balance to be raised by stock issue, 1¾ per cent on $15,725,000	275,187.50
Assuming that $2,500,000 of the stock will be West End stock on a 4 per cent basis, there should be added for additional rental of the West End Street Railway	100,000.00
Total	$1,638,187.50

During the year ending Sept. 30, 1889, the West End Street Railway carried 104,243,150 revenue passengers, and in the fiscal year 1908, 273,132,584 passengers, or an average annual increase of 8,888,918. The average annual increase for the 10 years ending Sept. 30, 1908, was about the same—9,181,129 revenue passengers per year, in spite of all the improvements which have been made. At this rate of increase the number of revenue passengers for 1913 would be 319,038,239.

The average operating expense per revenue passenger in 1908 was 3.46 cents, while in 1898 it was 3.62 cents. Mr. Snow emphasized the fact that this saving in 10 years was only .16 cent, in spite of the improvements in the transportation system and the fact that every effort was made in 1908 to reduce expenses, owing to the poor condition of general business, due largely to the extension of the free transfer system. It is unlikely that any substantial reduction could be made in the ratio of operating expenses to revenue passengers without restricting the free transfer system. Assuming that the operating expenses per revenue passenger could be reduced at the same rate during the next five years, the operating expense per revenue passenger would be 3.38 cents in 1913, leaving from each 5-cent fare 1.62 cents to be applied to interest charges, taxes, rentals and dividends; and the additional revenue of the Boston Elevated Railway applicable to the payment of interest, taxes and rentals, $936,770, with which to pay additional charges of $1,638,187.50, not including dividends on the additional stock which the Boston Elevated Railway would have to issue.

Mr. Snow urged that these figures show that the transportation facilities of Boston were being developed faster than the business done warrants; that during the next five years the company could not afford to assume any burdens or charges in addition to those which were already provided for, and that even then in order to pay its fixed charges and maintain the existing dividend rate, every effort would have to be made to increase business and reduce expenses. In order to increase the business substantially the company must bring people into Boston with through service between Boston and the districts outside.

Regarding the Boston & Eastern Electric Railroad, Mr. Snow said that the Boston Elevated Railway does not oppose this road, but that if the Boston & Eastern Elevated Railroad is to enter the district in which the Boston Elevated Railway is compelled to maintain tunnels and subways and expensive structures, the Boston Elevated Railway should be given the business in so far as it is business within the city. He suggested that the Boston & Eastern Electric Railroad should either utilize the East Boston tunnel or the elevated structure from Sullivan Square. If the entering interurban roads were to have their own terminals, the Boston Elevated Railway could not maintain an expensive terminal for the benefit of all the people who come within its territory.

Relative to the proposed consolidation of the Boston Elevated Railway and the West End Street Railway, Mr. Snow said that the consolidation would not lessen the expenditures by the Boston Elevated Railway, but would prevent additional expenditures, including $600,000 a year for unnecessary power stations and equipment. The West End Street Railway lease was presumably intended to secure to the public the benefits of a virtual consolidation, meaning a reduction in the investment, and that has been secured to the public up to date. It was essential that this consolidation should be effected before any further extensions of tunnels or subways can be considered.

Regarding divers irresponsible rapid transit bills submitted to the Legislature of 1909 and referred to the joint board, Mr. Snow gave the following figures of their prohibitive expense: Estimated cost of a suggested tunnel from Sullivan Square to Causeway Street, $8,000,000 compared with the cost of $2,900,000 for the existing Charlestown elevated structure and station at Sullivan Square. The completion of the East Cambridge extension and the changes at Sullivan Square will greatly relieve the crowding at Sullivan Square. Estimated cost of suggested South Boston subway, 0.84 mile, $2,500,000, including two stations. This section only has local traffic to furnish revenue, being a peninsula. Estimated cost of suggested subway from Park Street to Main Park, via South Station, 3 miles, $8,570,000. Estimated cost of another suggested subway, terminating at Milton, $16,800,000.

Regarding a proposal to restore elevated trains in the Tremont Street subway, Mr. Snow said this would defeat the purpose of the East Cambridge extension and the operation of the surface cars now in the subway.

Regarding a proposed subway from Park Street to the South Station, length 0.57 mile, cost $3,000,000, the demand for such a service has been very much exaggerated.

The Board then closed the hearing and will report its findings to the Legislature of 1910.

Reports on Valuation of Detroit Property

Engineers of the Detroit United Railway have made a valuation of the property of the company, and publicity was given to their figures before the details of the appraisal made by the committee of 50 were made public.

The appraisal for the company was made under the direction of Robert B. Rifenberick, and it states the reproduction value of the property as a going concern at $24,708,375.40. Some of the detail figures are as follows:

Power stations	$2,432,674.88
Rolling stock	5,129,954.02
Buildings	1,533,775.74
Track, including special work	10,740,842.80
Land	1,627,352.26
Carbarns and waiting rooms	993,294.38
Supplies and stock	1,192,661.07

The remainder of the total is made up by miscellaneous property, tools, etc.

The report of Frederick T. Barcroft, who made an appraisal of the property of the Detroit United Railway for the committee of 50 shows the following results:

Total number of cars	998
Miles of track	170.411
Miles of barn track	12.938

VALUE OF PROPERTY INCLUDED.

1. Real estate	$517,009.55
2. Buildings, except power barns and battery stations	579,876.00
3. Power plants	1,219,050.88
4. Battery stations	189,742.94
5. Power distribution, including overhead feed wires	1,122,636.25
6. Track	2,597,926.89
7. Rolling stock	2,988,312.72
8. Mechanical department, shops, etc	269,901.75
9. Tools, material, supplies, furniture	720,000.00
10. Overhead charges (no depreciation)	1,050,040.00
Total	$11,284,596.98

VALUE OF PROPERTY EXCLUDED.

11. Pavement, subways, suburban station, unused real estate	$1,550,000.00
Total value of all property in city limits	$12,834,606.98

Many reports concerning the figures of the appraisal of the committee of 50 were published before an authoritative announcement was made by the committee. This condition of affairs led J. C. Hutchins, president of the Detroit United Railway, to send the following letter to Chairman Eddy of the committee:

"I do not know that I should be disturbed by some of the reports I read in the newspapers relative to some stated amounts at which the properties of this company are being appraised. It is stated in one newspaper that the values submitted to the committee amount to $12,800,000, and in another at some $10,500,000. Of course these may be only guesses, and I presume are such, but it rather worries me that such figures are floating around, as they, of course, tend to mislead the public.

"We have been perfectly frank and entirely above board in supplying for the information of the committee all of the data at our command. Our local corps of engineers, headed by Robert B. Rifenberick, a very competent engineer, has, after a most thorough study of values, reported to us that the cost of reproducing the company's properties in Detroit would amount to $24,708,375.40, exclusive of good will or franchise values.

"From time to time as this work has been in progress the same data which have been sent to your committee or its engineers have been sent for their consideration to Bion J. Arnold and H. A. Foster, who have been retained as consulting engineers for the company. These gentlemen have not as yet been brought into the situation, except as stated; but it has been our intention, relying on what we have understood to be the policy of your committee, that after all data should have been collected, if differences should arise between our local corps of engineers and the engineers of your committee we would bring in Messrs. Arnold and Foster, engineers of high character and great experience, as our final representatives before your committee. I have no doubt it is the purpose of your committee that such a course shall be pursued. I do not know how far along the committee has proceeded in these matters as to valuations, but am pleased to say to you that we are ready to bring Messrs. Arnold and Foster here at any time that will suit your convenience for a review of the data you have collected respecting values."

The Barcroft appraisal will be purchased by the city for $17,500 and published.

The Detroit United Railway on Nov. 13 accepted the terms of the city ordinance passed recently fixing an operating fee of $300 a day for the use of streets upon which franchises are said to have expired on Nov. 14. The company specifies that it waives no rights as far as an ultimate readjustment is concerned. Of approximately 175 miles of track within the city limits 66 miles are involved in the franchises that are said to have expired. As noted on page 996 of the ELECTRIC RAILWAY JOURNAL of Nov. 6, 1909, the Common Council on Oct. 26, 1909, adopted resolutions declaring that the operation of cars after Nov. 14 on streets where the franchises are claimed to have expired would be by sufferance only and without any expressed or implied waiver on the part of the city, and that after Nov. 14 cars could be operated under conditions heretofore existing, with the added conditions that the company should pay a rental of $300 per day.

The letter of President Hutchins to the Mayor and Common Council of Detroit in relation to this subject says in part:

"The company does not agree with the views and claims stated in said resolutions, which, in its opinion, are contrary to the rights of the company, and believes that after due investigation and consideration you will concede that your position is erroneous. The company, however, recognizes that you are equally desirous with the company that the public shall not be deprived of any service that they have hitherto enjoyed, and that the interest, comfort and convenience of the public will be best served by continuing uninterruptedly the service as now rendered, pending the results of an adjustment of all matters of difference which it is believed all parties desire.

"The company, therefore, without waiving any rights or privileges to which it is entitled under present conditions, and conceding that the city does not waive any of its rights or privileges, and without prejudice to the rights or privileges of either the city or the company, will, in the exercise of its rights and duties, continue to maintain and operate the lines in question under the terms and conditions under which the same are now maintained and operated, and to render service as heretofore, and for the reasons above indicated and to avoid litigation will, in addition, pay to the city the sum of $300 per day for the time being, or until such time as the relations between the company and the city are readjusted."

Final Hearing on Boston, Lowell & Lawrence Electric Railroad

The Massachusetts Railroad Commission gave a final hearing on Nov. 12, 1909, on the petition of the Boston, Lowell & Lawrence Electric Railroad for a certificate of exigency granting it the right to build a high-speed electric railway between Boston, Lowell and Lawrence. William H. Coolidge, counsel for the Boston & Maine Railroad, said that the existing facilities are adequate and that the Railroad Commission has the power to order improvements by the present steam and electric railways if it considers

that the service is not sufficient to meet the needs of the territory. There are five railroads and four street railways in the territory which the proposed road would serve and the rate of fare for the regular patrons of the steam road is less than the new road proposes to charge. Mr. Coolidge argued that the electric railroad law of 1906 is a mere enabling act, saving the Legislature the necessity of considering new charters, and permitting new charters only when the commission finds that public convenience and necessity demand the new road. He claimed that the policy of Massachusetts is to supervise, regulate and control its public service corporations; to require the existing companies to furnish whatever accommodations the public needs, and not to admit competing organizations unless the established facilities cannot be made adequate. Mr. Coolidge said that the project is practically the same as the one which was refused a certificate by the commission several years ago, that the new road would not give faster service by the Boston Elevated Railway than the present steam railroad, and that it would tend to increase the burden of traffic already carried by the Boston Elevated Railway to and from Sullivan Square. He concluded the statement that the Boston & Maine Railroad could build two additional tracks between Boston and Lowell at a cost of $2,547,000, or less than one-half that of the new road, and stated that the total earnings of the Boston & Maine Railroad in the territory were only $700,000 a year, a sum insufficient to pay the expenses and charges of the proposed line, even if it should secure all the business of the steam road.

Counsel for Somerville, Winchester and Arlington spoke in opposition to the road. For the Lexington & Boston Street Railway C. M. Hight said that the road was not fully described in the articles of association and criticised the company for submitting the routes to the board for adjudication. He claimed that the Lexington & Boston Street Railway was built in good faith as a through line between Arlington Heights and Lowell; that its traffic would suffer serious inroads if the new line should be constructed, and that about 25 per cent of its present business is through travel. The gross earnings of that company are $150,000 and the operating expenses $119,000. If its traffic should be cut 25 per cent the results would be disastrous. Mr. Hight said that Lowell has better accommodations than other cities of the same size in Massachusetts and that the new line could not be expected to earn $1,400,000 per year, when the combined earnings of the Boston & Maine and the Lexington & Boston Street Railway are only $750,000.

James F. Jackson, counsel for the Boston, Lowell & Lawrence Electric Railroad, emphasized the good faith of the petitioners, and stated that a certificate was not granted two years ago because the promoters of the road had not investigated the possibilities with sufficient care, and had made concessions with respect to fares and service which were later found to be impracticable. A case thoroughly prepared by one of the best-known engineering organizations in the world had now been presented, and no concessions of questionable permanence have been made. The Massachusetts laws permitting the construction of electric railroads were made because of the general recognition of the attractiveness of electricity as motive power and an appreciation of the possibilities of a high-speed electric service between adjacent cities. The proposed line was to be entirely distinct from either the steam railroad or the existing street railways. To prohibit its construction would be to stay the progress of modern improvements in transportation. Mr. Jackson declared that the policy of the New York, New Haven & Hartford Railroad, which now controls the Boston & Maine Railroad, was uncertain; that it could not for a long time put into effect electrification on the lines north of Boston, even if it so desires, and that the request of President Dumaine of the Boston Railroad Holding Company that the Railroad Commission withhold these improvements for a year made it appear that the electrification of the company's lines is very uncertain. If some of the space that the local passenger traffic now takes up on the steam railroad could be released for other business by the establishment of the new line, it would be a distinct benefit to the steam railroad. Mr. Jackson urged that the railroads would plead for time if the Railroad Commission should request the railroads to electrify their lines, and stated that the board could order a railroad company to spend $20,000,000 or to electrify, as Mr. Coolidge contended. Changes at Sullivan Square would make it feasible to handle the traffic without congestion, and the addition of eight-car trains to the Boston Elevated system would permit the entrance of the Lowell and Lawrence traffic without disturbing the regular traffic of the Boston Elevated Railway.

J. W. Farley, who concluded for the petitioners, dismissed the imputations cast on the earlier hearings and the details of the project as unworthy of consideration in view of the careful preparation of the present case. He urged the progress illustrated by the plans for the road, and contended that it would satisfy a demand which the present facilities cannot meet. The hearing was then closed and the board took the matter under advisement.

Transit Affairs in New York

The beginning of work on the Fourth Avenue subway, Brooklyn, was marked by public ceremonies held at the junction of De Kalb Avenue and the approach to the new Manhattan Bridge in Brooklyn on Nov. 13 at 2:30 p. m. Chairman Willcox of the Public Service Commission formally announced that the contract for the building of the subway had been signed, and H. B. Seaman, chief engineer of the commission, handed the document to Mr. Bradley, the contractor. Mr. Clark then presented Mr. Willcox with a silver spade and that officer turned up the first spadeful of earth. As the formal breaking of the ground occurred bombs were set off. Patrick McGowan, president of the Board of Aldermen; Bird S. Coler, president of the Borough of Brooklyn, and David A. Boody, ex-Mayor of Brooklyn, were in attendance. All of the speakers dwelt upon the advantage of the subway to Brooklyn. On the evening of Nov. 13 a dinner was held at the Assembly, Brooklyn, at which the members of the Public Service Commission, members of the former Rapid Transit Commission and representatives of the city were in attendance.

Beginning at the Manhattan bridge, the subway will be several feet below the surface of the street, with the tracks lower than sea-level. Continuing for some distance at a low grade, the subway gradually rises until it is above sea-level, and comes close to the surface of the street, where a lighter form of construction is used. As the cars will nearly fill the bays they run in, the air in front will be pushed out, and fresh air will be drawn in behind from the outside. Openings will be cut in the partition walls, allowing the air from all four bays to pass out through the gratings. Emergency exits about 4 ft. square, inclined at an angle, will lead directly from the tracks to the street, where they are covered with a portable cover. The exits are between the stations, and as the partition walls are arched, where they are located, they can be used from any of the four bays. The stations, of which there are six for local trains, and two for express trains, will be similar in many respects to those in the New York suubway. Hoods will be built at the entrance and exits covering the stairs which lead to the train platforms. The local stations have platforms along the walls with stairs direct to the street, but at the express stations the platforms are in the center.

The Public Service Commission has adopted an order approving the construction of the South Shore Traction Company line through Queens Borough and over the Queensboro Bridge. The order was issued immediately after the receipt by the commission of the order from the Appellate Division following the decision of the Court of Appeals on the South Shore Traction case. Commissioner Bassett said: "The commission granted the certificate of the South Shore Traction Company to operate through Queens County and across Queensboro Bridge within two hours of the receipt of the order from the Appellate Division. At no time has the commission desired to hold up transit on the Queensboro Bridge. When the franchise to the South Shore Traction Company was granted by the Board of Estimate, the commission acted upon it within 19 days, although the Board of Estimate had had it under advisement more than a year and a half. Steps in the court procedure were expedited in every way, with the result that within five months of the date of the application to the commission, a final opinion has been obtained from the highest court of the State and the sanction of the commission to the bridge operation has been granted."

The Board of Estimate has approved the plan of the White Plains Avenue extension to the Westchester Avenue subway route. This section runs from Deer Swamp Road to Westchester Avenue.

Program for the Quarterly Meeting of the New York State Street Railway Association

A list of the topics to be discussed at the next quarterly meeting of the Street Railway Association of the State of New York, to be held in Albany Dec. 7 and 8, is now in part available. They include the following: "Remuneration for Handling United States Mail," "The Relation of State Highways and Interurban Railways," three questions on electrical subjects and three on mechanical subjects to be selected by W. J. Harvie, Utica, and H. A. Benedict, Albany. These subjects will be announced next week.

Charles R. Barnes, expert of the Public Service Commission of New York, Second District, has also been requested to suggest a topic that will be considered at the meeting. As stated last week. the quarterly meeting will be begun by an informal dinner on Tuesday evening, Dec. 7, at 8 o'clock at the Hotel Hampton. After this dinner one of the subjects mentioned above will be discussed. The sessions on Wednesday will be held at the Fort Orange Club and will begin at 10 a. m.

At the meeting of the executive committee of the association, held in Schenectady Nov. 5, a proposition was received from J. J. Lane, secretary of the New England Street Railway Club, to prepare a railway guide for the New York State electric railways, similar to that published by him for the electric railways in New England. The subject was referred to W. H. Collins, Gloversville, and H. M. Beardsley, Elmira, who will take the matter up with Mr. Lane and present a report to the association.

Decision Affecting Franchises in Ohio.—The Ohio Supreme Court, in the case of the City of Akron against the East Ohio Gas Company, has decided that a franchise, to be perpetual, must have the words "in perpetuity" written into it, and that grants in which the "in perpetuity" phrase is not included are merely indeterminate and may be ended at the will of either party.

Special Counsel for Minneapolis Six-For-a-Quarter Case.—Milton D. Purdy, former assistant to the Attorney-General of the United States and until recently judge of the United States District Court of Minnesota, has become connected with the legal department of the Twin City Rapid Transit Company, Minneapolis, Minn., for special service in association with the regular legal staff of the company for the conduct of the "Six-For-a-Quarter Case" before the United States Supreme Court, in December, 1909.

Cement Products Exhibition.—Announcement is made that at the drawing for spaces for the third annual cement show to be held at the Coliseum, Chicago, from Feb. 18 to 24, 1910, the entire floor and annex space, exceeding 50,000 sq. ft. in area, was assigned to 150 exhibitors. At the time of the exhibition the National Association of Cement Users, American Society of Engineering Contractors, National Builders' Supply Association, Illinois Association of Municipal Contractors, Illinois Lumber Dealers' Association, Illinois Masons' Supply Association and Interstate Mantel & Tile Dealers' Association of the United States will hold their annual conventions in Chicago.

Another Demonstration of the Gyroscope Car.—Louis Brennan, a description of whose model gyroscope car was published in the ELECTRIC RAILWAY JOURNAL of June 1, 1907, page 963, gave a demonstration on Nov. 10, 1909, at Cullingham with a car 40 ft. long fitted with gyroscopes. According to the cable dispatches from London, 40 persons were carried in the car up and down a straight single-rail track and around a circular track 220 yards in length. The car is 10 ft. wide and 13 ft. high to the top of the cab in which the machinery is contained. It weighs 22 tons empty and has a capacity of 10 tons. The two gyroscopes are 3 ft. 6 in. in diameter, weigh together 1½ tons and operate at the rate of 3000 r.p.m.

Power Contract in Baltimore.—The Baltimore & Ohio Railroad has closed contracts with the Consolidated Gas, Electric Light & Power Company, Baltimore, Md., to supply current for operating trains through the Belt Line tunnel. This power was formerly furnished by the Baltimore & Ohio Railroad from its own power plant on Camden Street, but the capacity of that plant has been exceeded recently. The Camden Street station will be maintained to light the Camden yards, the station and various other buildings of the railroad and supply them with power. The Maryland Electric Railways has renewed its contract with the Consolidated Electric Light & Power Company for supplying current to run trains between Baltimore and Annapolis.

Inspection Trip of University of Illinois Students.—The 53 members of the senior class in the departments of electrical engineering and railway electrical engineering at the University of Illinois made a trip of inspection to Gary, Ind., Chicago, Ill., and Lockport, Ill., Nov. 10 to 13, under the direction of four members of the faculty. Nov. 10 was spent in inspecting the electrical equipment of the Indiana Steel Company at Gary and the rolling stock of the Chicago, Lake Shore & South Bend Railway. On Nov. 11 the substations and Fisk and Quarry Street generating stations of the Commonwealth Edison Company in Chicago were visited. The shops and power house of the Metropolitan West Side Elevated Railway, the exchanges of the Chicago Telephone Company and the Hawthorne works of the Western Electric Company were inspected on Nov. 12. On Nov. 13 the party went to Lockport, Ill., to see the Lockport power house of the Sanitary District.

Annual Meeting of Pennsylvania Street Railway Association.—It has been decided to hold the annual meeting of the Pennsylvania Street Railway Association at Harrisburg on Dec. 1, the session to begin at 10 a. m. There will be prearranged talks on important subjects and a paper from Henry M. Stine, the secretary of the association, containing a proposed plan for legislative work. The membership of the association now numbers 43 companies. During 1909 14 new members were enrolled, as follows: Schuylkill & Dauphin Traction Company, Pittsburgh, Harmony, Butler & New Castle Railway; Philadelphia & West Chester Traction Company, Buffalo & Lake Erie Traction Company, Citizens' Traction Company of Oil City, Hummelstown & Campbellstown Street Railway, Montgomery Traction Company, Pittsburgh & Butler Street Railway, Johnstown Passenger Railway, Chambersburg & Gettysburg Electric Railway, West Penn Railways, Erie Traction Company, West Chester, Kennett & Wilmington Electric Railway, and the Carbon Transit Company.

Chicago Traction Situation Discussed.—M. B. Hereley, traction expert for the City of Chicago, addressed the Electric Club of Chicago at the weekly luncheon Nov. 10. There are 140 miles of elevated railways and 800 miles of surface street railways in the city, and Mr. Hereley thinks that Chicago needs a unified system of street railway operation. The joint ownership and operation of the five elevated railways, two surface street railway systems and several minor roads within the bounds of the municipality were advocated by Mr. Hereley. The proposed subway should not be definitely planned until the capacity of existing elevated and surface roads is ascertained with joint operation and through routing, and the subway, elevated and surface lines should be operated in conjunction. The surface roads should have the short-haul business preferably, the elevated roads the long-haul, while the subway should supplement both when their capacity is exhausted. The Union Loop should be abolished. Mr. Hereley closed by speaking of the progress of the extensive work of rehabilitating the street railways of Chicago under the direction of the Board of Supervising Engineers. He said that he thought the proposed subways would extend south to Twenty-second Street and north to Chicago Avenue.

Convention of Railway Commissioners.—The twenty-first annual convention of the National Association of Railway Commissioners was held in the hearing room of the Interstate Commerce Commission, Washington, D. C., on Nov. 16. The call for the meeting was signed by Martin S. Decker, president; O. P. Gothlin, chairman of the executive committee, and William H. Connolly, secretary. The call said in part: "In the past the association has not demonstrated its real efficiency for the reason that reports on important subjects were prepared only a few days before the convention, hastily read and agreed to by the committee, presented to the convention, and perfunctorily adopted. These reports deal with the most important concerns of business and industry and affect, as a whole, the entire movement of commerce throughout the country. They are widely circulated, and the committeemen who expend much time and labor in the conscientious discharge of their duties are entitled to expect other members to do likewise. Only the fullest co-operation by all members can accomplish the real purposes of the association."

Meeting of the Railway Business Association.—The first dinner of the Railway Business Association was held at the Waldorf-Astoria, New York, N. Y., on the evening of Nov. 10, 1909. It is intended to give annual dinners hereafter. The Railway Business Association was formed a year ago "to conserve the interests of the railways of the country and of the manufacturers of railway materials and equipment, contractors in railway constructions and dealers in miscellaneous railway supplies." Its officers are officials of various industrial companies, particularly those doing business with the railroads. Among the speakers were John C. Spooner, former United States Senator from Wisconsin; E. P. Ripley, president of the Atchison, Topeka & Santa Fé Railway; W. H. Marshall, president of the American Locomotive Company; W. C. Brown, president of the New York Central & Hudson River Railroad, and W. P. Hepburn, former member of Congress from Iowa. Geo. A. Post, president of the Railway Business Association, acted very happily as toastmaster. About 700 persons were present. Among them as guests were George Westinghouse and J. P. Morgan. Mr. Spooner in his speech made a personal reference to Mr. Westinghouse which called forth a demonstration lasting two minutes and only paused when Mr. Westinghouse bowed his acknowledgments. A similar demonstration followed a reference to Mr. Morgan, who also bowed in acknowledgment.

Financial and Corporate

New York Stock and Money Market

November 16, 1909.

The Wall Street market during the past week has been irregular and comparatively inactive on account of the continued uncertainty with regard to the money market. The copper shares have advanced, however, due entirely to the confidence felt by the trading public in the reports that an agreement or amalgamation is about to be made that will control the output and price of copper. One of the striking features of the week has been the activity and strength of the Interborough-Metropolitan issues. Both the common and the preferred advanced several points. The same strength was also apparent in Metropolitan Street Railway, which advanced 2½ points.

The money market continues at about the same rates. Quotations to-day were: Call, 4½ to 5 per cent; 90 days, 5 to 5½ per cent.

Other Markets

In the Philadelphia market, Rapid Transit continues to be fairly active, with some selling pressure. Other tractions are dull.

In Chicago, there has been practically no trading in tractions. Even Subway stock makes only an occasional appearance, and prices for it are very weak. Metropolitan Elevated is practically out of the market.

Except for Massachusetts Electric there is little doing in tractions in the Boston market. Even in these issues the trading has been limited. Prices have sagged several points.

In Baltimore, trading in the bonds of the United Railways continues with prices unchanged. During the week some blocks of the same company's stock were sold at prices around 13½.

The only traction securities sold at last week's auction in New York were 200 shares Connecticut Railway & Lighting Company common, at 74¼.

Quotations of various traction securities as compared with last week follow:

	Nov. 9.	Nov. 16.
American Railways Company	a45¼	a45½
Aurora, Elgin & Chicago Railroad (common)	a49¼	a49¼
Aurora, Elgin & Chicago Railroad (preferred)	a95	*95
Boston Elevated Railway	130¾	130
Boston & Suburban Electric Companies	a18½	a18½
Boston & Suburban Electric Companies (preferred)	77⅛	a77¼
Boston & Worcester Electric Companies (common)	a12½	a12
Boston & Worcester Electric Companies (preferred)	a52	a52
Brooklyn Rapid Transit Company	75½	77
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	84¾	87
Capital Traction Company, Washington	a136	a136
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*2	*2
Chicago & Oak Park Elevated Railroad (preferred)	*10	*10
Chicago Railways, ptcptg., ctf. 1	a106	a102
Chicago Railways, ptcptg., ctf. 2	a35	a35
Chicago Railways, ptcptg., ctf. 3	a24	a24
Chicago Railways, ptcptg., ctf. 4s	*10	*10
Cleveland Railways	*84	*84
Consolidated Traction of New Jersey	a76½	a77
Consolidated Traction of N. J., 5 per cent bonds	a106	a106
Detroit United Railway	a67½	62¾
General Electric Company	162	163
Georgia Railway & Electric Company (common)	a100½	a100
Georgia Railway & Electric Company (preferred)	a88½	86
Interborough-Metropolitan Company (common)	20¼	23¾
Interborough-Metropolitan Company (preferred)	50¼	56¼
Interborough-Metropolitan Company (4½s)	83	83½
Kansas City Railway & Light Company (common)	a40	a40
Kansas City Railway & Light Company (preferred)	*82	*82
Manhattan Railway	142	141¾
Massachusetts Electric Companies (common)	a18½	a16
Massachusetts Electric Companies (preferred)	a83	a80
Metropolitan West Side, Chicago (common)	a17½	a16⅞
Metropolitan West Side, Chicago (preferred)	a52½	a53
Metropolitan Street Railway	*24⅝	27
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	79⅛	78⅛
Northwestern Elevated Railroad (common)	a20	a19
Northwestern Elevated Railroad (preferred)	a68	a68
Philadelphia Company, Pittsburg (common)	a49	48¾
Philadelphia Company, Pittsburg (preferred)	a43¾	44½
Philadelphia Rapid Transit Company	a27¾	26¾
Philadelphia Traction Company	*89½	89
Public Service Corporation, 5 per cent col. notes	*100⅛	100⅛
Public Service Corporation, ctfs.	a100½	a100¼
Seattle Electric Company (common)	116	a117
Seattle Electric Company (preferred)	a104½	a103½
South Side Elevated Railroad (Chicago)	a53	a53
Toledo Railways & Light Company	*8	*8
Third Avenue Railroad, New York	19	20½
Twin City Rapid Transit, Minneapolis (common)	109½	109
Union Traction Company, Philadelphia	a53¾	52¾
United Rys. & Electric Company, Baltimore	*13¼	13¼
United Rys. Inv. Co. (common)	42	*42
United Rys. Inv. Co. (preferred)	*73¼	72½
Washington Ry. & Electric Company (common)	a47	a46
Washington Ry. & Elec. Company (preferred)	a94	a92
West End Street Railway, Boston (common)	92½	92
West End Street Railway, Boston (preferred)	103½	105
Westinghouse Electric & Manufacturing Company	85½	85½
Westinghouse Elec. & Mfg. Company (1st pref.)	*140	*140

a Asked. * Last Sale.

Annual Report of East Liverpool Traction & Light Company

In the report of the East Liverpool (Ohio) Traction & Light Company for the two years ended June 30, 1909, a comparative statement is presented of earnings from the beginning of the operations of the constituent properties by the present management, Nov. 1, 1905, to the close of the last fiscal year. It shows the following results:

	Eight months ended June 30, 1906.	Year ended June 30, 1907.	Year ended June 30, 1908.	Year ended June 30, 1909.
Gross earnings	$202,028.37	$363,551.17	$344,535.57	$342,938.45
Operating expenses	113,478.44	207,910.50	195,130.70	174,424.61
Net earnings	$88,549.93	$155,640.67	$149,404.87	$168,513.84
Add:				
Miscellaneous income	.....	.....	.....	49.68
Net income	$88,549.93	$155,640.67	$149,404.87	$168,563.52
Deduct:				
Interest and taxes	66,102.95	129,215.09	147,631.24	164,985.67
Surplus income	$22,446.98	$26,425.58	$1,773.63	$3,577.85
Operating cost per cent of earnings (excluding taxes)	56	57	57	51

Amplifying these figures the report states: "It will be noted that the total surplus income earned from Nov. 1, 1905, to June, 1909, amounts to $54,224, and that there has been a surplus earned in each year, notwithstanding the severely adverse conditions which have prevailed since the fall of 1907. In connection with the above it should be understood that the upkeep of the property has been well provided for; accidents and damages accounts kept fully paid up, and the property maintained in a high state of efficiency in all respects."

Van Horn Ely, president of the company, says in his statement to shareholders that, with the return of normal business conditions, the revenues should be largely increased by reason of the construction of the Ohio River Passenger Railway and the Steubenville & East Liverpool Railway & Light Company, with which traffic agreements were made, as stated in the first annual report. Mr. Ely states in relation to other features of the operations of the company:

"Rock Springs Park at Chester, W. Va., which is the property of the company, is kept in fine condition by the lessees and is constantly increasing in popularity. Within the last two years a large amount of money has been expended by the lessees in adding to the attractions within the park. Many of the improvements made are of a substantial and permanent character.

"The operations of the company's coal mine have been successful. All of the coal used by this company is mined there. The mine is kept in good condition.

"The Youngstown & Ohio River Railroad has been constructed from populous towns on the north to the city limits of East Liverpool. A contract between that company and our company providing for the entrance of the new company into East Liverpool over our lines has been agreed upon. It provides satisfactory compensation for the use of our tracks. The completion of the construction of the Youngstown & Ohio River Railway line connects our properties with Cleveland, Canton and Youngstown, Ohio, on the north and many thriving and populous intervening towns. We expect increased revenues to our property from the construction of the new line.

"The prevailing business depression, which has been especially severe in the Pittsburgh district, has been reflected in decreased earnings. Special local causes of a temporary nature have at the same time contributed to the same result, and the receipts of the past two years do not show the fair earning power of the property under normal conditions.

"It is, however, pleasing to note that since Jan. 1, 1909, gross earnings have increased more than 9 per cent over the corresponding period in 1908."

Brooklyn (N. Y.) Rapid Transit Company.—A successor to the late Edward H. Harriman as a director of the Brooklyn Rapid Transit Company will be elected at the annual meeting of the company in February, 1910. It was expected that the directors would consider the question of the quarterly dividend at a meeting on Nov. 18.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—Representatives of the holders of the underlying and consolidated bonds of the Columbus, Delaware & Marion Railway met in Columbus, Ohio, recently and appointed the following committee to represent them while the property is in the hands of a receiver: W. E. Burdell, president of the State Savings Bank & Trust Company, Columbus, Ohio; Caleb L. McKee, Caleb L. McKee & Company,

Columbus, and Frank S. Stalnaker, president of the Capital National Bank, Indianapolis, Ind. The bonds will all be deposited with this committee through the State Savings Bank & Trust Company, Columbus, as depositary. The bondholders feel that there is no necessity of foreclosure proceedings.

Cumberland & Westernport Railway, Cumberland, Md.—Henry L. Doherty & Company, New York, N. Y., have purchased control of the Cumberland & Westernport Railway, which has 26 miles of track and operates between Cumberland and Lonaconing, Md. The company has outstanding $625,000 of stock and $230,000 of bonds. Doherty & Company propose to improve the property and expect to operate it.

Edwards Hotel & City Railroad, Jackson, Miss.—F. G. Jones, president of the Edwards Hotel & City Railroad, and S. T. Carnes, secretary and treasurer of the company, are reported to have given an option to the American Cities Railway & Light Company, New York, N. Y., on a majority of the stock of the company.

Holmesburg, Tacony & Frankford Electric Railway, Tacony, Pa.—Henry Bain, Jr., William N. Trinkle and John C. Bell have been appointed receivers for the Holmesburg, Tacony & Frankford Electric Railway by Judge Holland in the United States Circuit Court on petition of W. Heyward Drayton, 3d, a judgment creditor. Judgments against the Holmesburg, Tacony & Frankford Electric Railway were obtained by bondholders of the Philadelphia, Bristol & Trenton Street Railway on account of default in the payment of interest on the bonds of the Philadelphia, Bristol & Trenton Street Railway, which were guaranteed by the Holmesburg, Tacony & Frankford Electric Railway. Jacob S. Disston, Henry Bain, Jr., George B. Atlee and Bradford Frailey have been selected as a committee to represent the bondholders of the Holmesburg, Tacony & Frankford Electric Railway, and the deposit of bonds of that company with the Tacony Trust Company as depositary will be requested.

Hudson Companies, New York, N. Y.—The Hudson Companies has sold since July, 1909, $3,000,000 of a new issue of 5 per cent notes dated Aug. 1, 1909, and due Aug. 1, 1912. These notes are secured by pledge with the Standard Trust Company, New York, N. Y., the trustee under a trust dated July 21, 1909, of Hudson & Manhattan Railroad first mortgage 4½ per cent convertible gold bonds, due Feb. 1, 1957, at the rate of $1,500 par value of the bonds for each $1,000 note outstanding, the bonds deposited being part of the bonds acquired by the Hudson Companies on account of work performed. The notes are subject to redemption on any interest date upon 30 days' notice at par and interest, and are convertible at the pleasure of the holder when called for redemption or at maturity into Hudson & Manhattan Railroad first mortgage 4½ per cent convertible gold bonds at 95 per cent of the principal of the bonds. Previous note issues have borne 6 per cent interest.

Manhattan Railway, New York, N. Y.—Kingdon Gould has been elected a director of the Manhattan Railway to succeed T. T. Eckert.

Metropolitan Street Railway, New York, N. Y.—Counsel for the Metropolitan Street Railway, the New York City Railway and the Morton Trust Company, New York, N. Y., have asked the Supreme Court at Washington to dismiss the appeal of the Guaranty Trust Company from the decree of the lower court ordering the foreclosure and permitting the receivers of the property to issue certificates for the betterment of subsidiary lines. Motions on behalf of the same parties for writs of certiorari will also be taken before the Court of Appeals. The case was before the Federal Court of Appeals in the same cause. The appeals have not yet been decided and the Guaranty Trust Company has a motion pending for the advancement of its appeal. The court has taken the motion under advisement. The sale of the property of the Metropolitan Street Railway under foreclosure, which was to have been held on Nov. 15, 1909, has been postponed until Jan. 22, 1910.

Omaha & Council Bluffs Railway & Bridge Company, Omaha, Neb.—Redmond & Company, New York, N. Y., announce that the balance of the $1,500,000 of the first consolidated mortgage 5 per cent gold bonds of the Omaha & Council Bluffs Railway & Bridge Company, offered recently for subscription, have been sold.

Otsego & Herkimer Railroad, Hartwick, N. Y.—The Otsego & Herkimer Railroad, which is the successor to the Oneonta & Mohawk Valley Railroad, has organized as follows: W. Boardman Reid, president; Herbert T. Jennings, vice-president and counsel; Joseph K. Choate, general manager; C. O. Weidman, superintendent of transportation; M. J. Bogardus, purchasing agent and master mechanic; C. S. Stanton, electrical engineer.

Quebec Railway & Power Company, Quebec, Que.—Papers have been filed in Ottawa for the incorporation of the Quebec Railway, Light, Heat & Power Company, with a capital stock of $12,000,000, as a consolidation of the Quebec Railway & Power Company, the Quebec Gas Company, the Frontenac Gas Company, the Canadian Electric Company, the Seven Falls Company and some smaller properties.

St. Francois County Railway, Farmington, Mo.—W. R. Taylor and M. P. Cayer, Farmington, have been appointed receivers of the St. Francois County Railway. The company defaulted on Oct. 1, 1909, on the interest on its second mortgage bonds, of which the Central Trust Company, Chicago, Ill., is trustee.

Susquehanna Railway, Light & Power Company, Parkesburg, Pa.—The report for the fiscal year ended June 30, 1909, shows total net earnings of $612,262, derived from the following sources: Net earnings subsidiary companies accruing to Susquehanna company, $470,070; interest and dividends on securities held, $108,183; interest on loans to subsidiary companies, $28,989; interest on cash balances, $2,752; miscellaneous income, $2,368. From the net earnings there were deducted $139,051 interest on underlying bonds and $108,605 dividends on preferred stocks of underlying companies, leaving a surplus of $364,706, from which dividends of $204,610 were paid. George Bullock, the president, says in his statement to shareholders: "In view of the continued business depression in many of the cities in which our subsidiary companies are operating, the results, which show an increase in net earnings in excess of 10 per cent, are considered very satisfactory. Your directors feel justified, on account of the increase in the earnings of the subsidiary companies, in authorizing the setting up of a reasonable reserve to meet depreciation charges and amortization expenditures for the ensuing year. During the year a sum in excess of $700,000 was authorized and expended for extensions, additions and betterments to the various properties in order to meet absolute requirements made necessary by increased business. The efficiency of the properties has been greatly increased during the past year through the organization of an effective commercial department, and economies in operation secured through the co-operation of the local managers. The revival of business now under way will tend to increase our earnings during the ensuing year."

Third Avenue Railroad, New York, N. Y.—The committee of security holders of the Third Avenue Railroad selected at the meeting at the Hotel Knickerbocker on Aug. 31, 1909, and consisting of William N. Amory, Franklin G. Colby and Charles E. Goodhue, has asked the Public Service Commission of the First District of New York to reopen the general investigation of the affairs of the Third Avenue Railroad and the Metropolitan Street Railway, which was begun by the commission in 1907. The application has been referred to the committee of the whole of the commission.

Toledo & Indiana Railway, Toledo, Ohio.—The property of the Toledo & Indiana Railway will be offered for sale by C. F. M. Niles, receiver, in Toledo on Nov. 27, 1909. The upset price of the property has been fixed at $909,384.

The thirtieth annual meeting of the American Society of Mechanical Engineers will be held in the Engineering Societies Building, 29 West Thirty-ninth Street, New York, N. Y., on Dec. 7 to 10. The social entertainment will be in charge of the members resident in and about New York, under the immediate direction of a local committee appointed by them, of which William D. Hoxie is chairman. The professional papers assigned to the meeting follow: "Tests on a Venturi Meter for Boiler Feed," by Chas. M. Allen; "The Pitot Tube as a Steam Meter," by Geo. F. Gebhardt; "Efficiency Tests of Steam Nozzles," by F. H. Sibley and T. S. Kemble; "An Electric Gas Meter," by C. C. Thomas; "Tan Bark as a Boiler Fuel," by David M. Myers; "Cooling Towers for Steam and Gas Power Plants," by J. R. Bibbins; "Some Studies in Rolling Mill Engines," by W. P. Caine; "An Experience with Leaky Vertical Fire Tube Boilers and the Best Form of Longitudinal Joint for Boilers," by F. W. Dean; "Testing Suction Gas Producers with a Koerting Ejector," by C. M. Garland and A. P. Kratz; "Bituminous Gas Producer," by J. R. Bibbins; "The Bucyrus Locomotive Pile Driver," by Walter Ferris; "Line Shaft Efficiency, Mechanical and Economic," by Henry Hess; "Pump Valves and Valve Areas and a Report on Cast-Iron Test Bars," by A. F. Nagle. In addition to these papers several reports will be submitted by the committees of the gas power section.

Traffic and Transportation

Ohio Commission Commends Ohio Electric Railway

J. C. Sullivan, O. P. Gothlin and O. H. Hughes, members of the Railroad Commission of Ohio, who recently inspected the Ohio Electric Railway, have written to the company commenting on the excellent condition of its physical property. As mentioned on page 996 of the Electric Railway Journal of Nov. 6, 1909, the commissioners were accompanied in their trip of inspection by O. F. McJunkin, Dayton deputy inspector, and John Hussey, Columbus, inspector, and by W. Kesley Schoepf, president of the Ohio Electric Railway; J. B. Foraker, Jr., vice-president; B. J. Jones, Springfield, district manager; H. G. Gilpin, Lima, superintendent, and J. W. Edson, Van Wert, tax agent, and several business men from Cincinnati and other cities. The communication of the commission to the company said:

"The inspection has given us much satisfactory information in the matter of the construction and operation of electric railways, and many features which are incorporated by you and apparently your personal ideas, were pleasant surprises and most commendable. We are informed and believe these various lines have been constructed, or reconstructed, and are operated under your guidance and supervision, and that the expense has been largely borne by foreign capital. The commission feels that the character and condition of that part of the property inspected reflects excellent judgment in the management, and the work done and being done upon these properties indicates proper maintenance, which means enhanced value of the property itself, as well as the development and betterment of the territory traversed.

"The line from Springfield to Toledo and Fort Wayne, Ind., a distance of 203 miles, we find constructed of 70-lb. rails, 146 miles thoroughly ballasted with stone, and the balance with excellent quality gravel, all comparing most favorably with the best constructed steam lines. We commend the good judgment exercised on this line in the construction of concrete abutments and culverts and steel bridges of great carrying strength; likewise, the fact that these lines are constructed on private right of way, from 40 ft. to 100 ft. wide, instead of upon the public highway, and we understand this to be the general policy of your management, and one highly commendable.

"We note the manifestation of good citizenship and due regard to public interest shown by the proper and substantial fencing of your right of way on both sides, construction and maintenance at all public highways of easy and adequate approaches flush with rails to and across your tracks, and the erection and maintenance in good condition of cattle guards at all highways.

"The commission gave close attention to your various substations (some 15, we believe) and waiting rooms; these we found built of brick, with tile roofing, all most substantial, as well as attractive, the waiting rooms being provided with light and heat, and kept in a most sanitary condition. Your entrance into the city of Toledo over your own private right of way, at great cost, no doubt, is a most satisfactory departure in electric railway construction, and the wisdom is very manifest in keeping separate interurban and street traffic.

"We noticed with much satisfaction the elimination by subways of grade crossings within the limits of Toledo, and consider this voluntary act an innovation in railroad building on the part of your management, together with the declared purpose of the installation of full interlockers (one already being installed), as most commendable and conducive to safety, convenience and speed.

"We viewed with much interest the concrete bridge, approximately 1400 ft. long, composed of 12 arches and spanning the Maumee River at Waterville, 15 miles south of Toledo. This substantial and imposing structure, second to none, together with the substantial and most business-like construction and maintenance of the part of your properties inspected, is evidence conclusive of the good will and confidence of the management placed in the future of our great Commonwealth, and bespeaks that these properties have been builded with an eye single to lasting and successful operation, and not for barter and sale, as might be truthfully charged in some instances against other properties. We consider that electric railways could gain much information of practical benefit by going over the lines constructed under your special supervision, and carefully considering your advanced and sound ideas in the matter of construction and operation. Many of the features adopted and followed by your management must be followed by other roads if the lasting good will of the public is to be obtained and held and electric railways made a success. We feel that you are entitled to the public good will and support, and congratulate you upon the success you have made."

Hearing on Heating Cars in New York

The hearing before the Public Service Commission of the First District of New York regarding the heating of street and electric cars within the jurisdiction of the commission, of which an account was published in the Electric Railway Journal of Nov. 13, 1909, page 1018, was continued on Nov. 16. W. O. Wood, president and general manager of the New York & Queens County Railway, Charles S. Banghart, master mechanic of that company, and Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, were in attendance. J. L. Quackenbush represented the Interborough-Metropolitan Company and the Metropolitan Street Railway as counsel.

E. G. Connette, transportation engineer of the commission, said that tests which he conducted on Nov. 12 with steel and wood cars used on the New York & Queens County Railway showed that the wood cars were about 23 per cent more efficient in retaining heat than steel cars with the same heating equipment. Still, with the wood cars, he was only able to increase the temperature 19 deg. in 72 minutes at a current consumption of 12 amp. Heaters which would fill the requirements of the proposed order regarding the temperature at which the cars should be kept should consume from 20 to 22 amp in 72 minutes. The wood cars should be equipped with twice the number of heaters of the type now in use, and the heaters in the metal cars should be increased 25 per cent in capacity. A suspension of the order for 60 days, in so far as the New York & Queens County Railway was concerned would, under ordinary circumstances, afford sufficient time for the company to change its heating equipment so it could comply with the proposed 40-deg. minimum. Mr. Connette considered the 45-deg. minimum reasonable when the temperature in the street was 10 deg. above zero and a 40-deg. mimimum when the outside temperature fell below 10 deg. above zero.

Mr. Quackenbush said that he hoped the commission would consider his request for a minimum of 20 or 25 minutes for taking readings to determine whether a company is endeavoring to comply with the order. Mr. Eustis for the commission said that the members of the commission considered the matter of a minimum of this kind reasonable, and that a communication had been received from Herbert J. Bickford, counsel of the Third Avenue Railroad, in which the case against the use of thermometers in the cars was very ably summarized. The hearing was then closed.

Vestibules in Cincinnati

The Board of Public Service in Cincinnati, Ohio, recently instructed William Wallace, city street car inspector, to report regarding the means adopted by the street railways operating in Cincinnati to comply with the law which requires all cars operated in the city to be fully vestibuled. Mr. Wallace took the matter up with the oldest men at the different divisions in order to ascertain their views, and reported to Robert Laidlaw, president of the board, under date of Nov. 1, that the motormen are satisfied with the vestibules with which cars operated in Cincinnati are equipped. The cars are completely closed, and the men say that they do not suffer from the cold. At division headquarters, from which are operated cars with vestibules that are heated and cars with vestibules that are not heated, Mr. Wallace found that the motormen select runs on lines on which cars with vestibules that are not heated are operated because vestibules which are heated cause sickness.

Regarding the cars operated in Covington, Mr. Wallace says that the vestibules are open on the right side so that the cars can load and unload from the front as well as the rear platform, and that the men there are satisfied with the vestibules. If the vestibules were closed on the right side, they could not be used by passengers, more time would be consumed in loading and unloading, and congestion at Fifth Street and Walnut Street, Fifth Street and Vine Street, and Fourth Street and Main Street would be increased 50 per cent, to the detriment of the public and the embarrassment of the company. The officials of the lines in Covington stated that they would close the vestibules if the city authorities in Cincinnati would not complain about the congestion which would result. Mr. Wallace said that the officials in Cincinnati would not tolerate any additional congestion, whereupon the officials of the company in Covington stated that if they were compelled to close their vestibules the car bodies would have to be discarded and new ones built. This appeared to Mr. Wallace to be going too far, as the rolling stock of the company operating in

Covington was in excellent condition, and he did not think that in dealing with public service corporations Cincinnati wanted to run the risk of repeating any of the follies or bickerings which had forced the street railway in Cleveland into the hands of a receiver.

New York Vestibule Hearing

At a hearing held in New York on Nov. 16 by the Public Service Commission of the First District on the subject of ordering the companies of New York City to equip all of their cars with fully enclosed vestibules, the complainants presented three witnesses, all from Albany, N. Y. Two of them were motormen who testified that in their experience the fully enclosed vestibules were superior to other types which they had previously used on the lines in Albany. Both of these witnesses admitted that they had no knowledge of the weather and traffic conditions in New York City. On the suggestion of Commissioner Bassett, who presided, the complainants promised to have at the next hearing, to be held on Nov. 23, a witness who had had experience as a motorman in New York City. The third witness called by the complainants presented an estimate on the cost of changing over one type of the Brooklyn Rapid Transit Company's cars from the partly enclosed to the fully enclosed vestibule design. At the next hearing the Brooklyn Rapid Transit Company is to present its own estimates to cover all its various types of cars.

Celebration Traffic in San Francisco

The United Railroads of San Francisco has made public the following statement showing the number of passengers carried by the company during the Portola celebration in San Francisco, which continued from Oct. 19 to Oct. 23:

	Cash Passengers.	Transfers.	Total.
Oct. 19	628,165	202,260	830,425
Oct. 20	591,114	217,619	808,733
Oct. 21	701,739	189,687	891,426
Oct. 22	592,414	246,877	839,291
Oct. 23	747,360	217,035	964,395
Total, five days	3,260,792	1,073,478	4,334,270

Accident on Canadian Line.—A passenger car and a work car collided on the British Columbia Electric Railway, Vancouver, B. C., on Nov. 10, 1909, and several passengers and employees were killed and a number of persons injured.

Uniform Fender Ordinance Advised for Berkeley, Oakland and Alameda.—The City Council of Berkeley, Cal., has asked Mayor Hodghead to confer with the Mayors of Oakland and Alameda with a view to adopting a fender ordinance that will be uniform in Berkeley, Oakland and Alameda, as the Oakland Traction Company operates in the three cities.

Vestibuled Trains Between Portland and Salem.—The Oregon Electric Railway has announced that it proposes to establish a vestibule train service between Portland and Salem in the near future. Specifications have been drawn for several observation cars and a service of four trains a day each way between the cities will be established. An observation car seating 42 passengers will be on each train. Arrangements will be made for a buffet service.

Traffic Changes in Springfield, Mass.—The traffic committee, consisting of representative business men of Springfield, Mass., met L. S. Storrs, president of the Springfield Street Railway, on Nov. 2, 1909, in the first of a series of conferences looking toward the betterment of street railway service in Springfield by a readjustment of routes and schedules. A new loop line on which pay-as-you-enter cars will be operated, and certain changes in the system of markers and destination signs were agreed upon.

Steam-Electric Freight Service at Springfield, Mass.—The Springfield & Eastern Street Railway, Springfield, Mass., and the Boston & Albany Railroad have entered into a contract which applies at Palmer and Oxford Heights, Mass., where the companies have a physical connection. On carload shipments the standard steam railroad equipment will be turned over to the Springfield & Eastern Street Railway at Palmer and handled direct, without breaking bulk, to the interior towns of Brimfield and Sturbridge. Heretofore these towns have not had any steam railroad connection. This service will be of particular advantage to coal dealers, a manufacturing company at Brimfield and East Brimfield and woollen mills at Fiskdale. Less than carload shipments will be interchanged at Palmer. The business will be handled in accordance with local rates of the Electric Express Company and no through rates will be applied. The equipment, repairs, etc., will be handled in accordance with the M. C. B. rules and claims for loss and damage to freight in accordance with Claim Agents' Association rules. The service will probably be inaugurated within the next 30 days.

London, Ont., Wants Sunday Cars.—A deputation of the Council of London, Ont., headed by the Mayor, waited upon Premier Whitney on Nov. 4, 1909, in the interest of Sunday cars. The municipal act provides that towns of 50,000 population and over shall have the option of submitting by-laws to the citizens authorizing the establishment of a street car service on Sunday, and London desires a declaration that it has the requisite number of people in order that the necessary by-law can be submitted at the municipal elections in January. The Premier replied that it would be necessary to have documentary evidence concerning the claim of the city regarding its population. On Nov. 12 the Premier and his cabinet were waited upon by a delegation from London protesting against the Government accepting as accurate the statement furnished by the Civic assessment commissioner that the city had a population of 50,069, which would give the municipality the right to submit a by-law to the citizens providing for the running of street cars on Sunday. The Premier replied that the question to be decided by the Government was whether the request contained in the resolution of the Council asking that a census be taken of the population should be granted. If the request was allowed the Government would prescribe the manner, time and nature of such a census.

Welfare Meetings in Augusta.—The first of a series of monthly meetings of the heads of departments of the Augusta-Aiken Railway & Electric Company, Augusta, Ga., which controls the Augusta Railway & Electric Company and the Augusta & Aiken Railway, was held on Oct. 26, 1909, for the purpose of familiarizing the men with the rules of the company and the laws of the city and the State. The meeting was opened by James R. League, general manager, who stated plainly and briefly the object of the meeting. Mr. League was followed by one of the local counsel, who discussed the legal features of cases with which conductors and motormen have to deal in performing their duties. W. H. Bagby and E. E. Mitchell, division superintendents, then consumed about 20 minutes in a talk to the men. John H. Adams, chief engineer, and R. P. Mayo, claim agent, also spoke for 10 minutes each. In order that all the men could attend, the meetings were arranged by the superintendents at different hours during the day, three sessions being held. After having checked off the men, it was found that only two had not attended the sessions. Hereafter the meetings will be held once a month, and the men will be given to understand that they will not be detained from their work longer than one hour. It is intended to have the heads of all departments address the men and also to have the heads of departments of companies in other cities visit Augusta for the purpose of discussing problems with which they have to contend in their respective cities and considering subjects of mutual interest.

Second Annual Conference in Indiana to Consider Railway Accidents.—In response to a call by the Indiana Railroad Commission the second annual conference of division superintendents, engineers, conductors and dispatchers was held in the Senate Chamber at the State Capital, Indianapolis, Ind., on Nov. 10. It was decided that the committee to consider the accidents investigated by the commission during the past year be composed of one division superintendent, one engineer, one conductor and the chief inspector of the commission and that the committee report recommendations with a view of lessening and preventing accidents. J. W. Woods, chairman of the commission, reviewed the work of the commission during the year. He declared that the responsibility of a railroad for an accident does not end with the payment of a claim to a victim of an accident or to the surviving heirs. Mr. Wood next cited the statistics of fatal railway accidents in Indiana for 1908 and 1909, and called attention to the fact that the number of employees killed had been reduced from 105 in 1908 to 80 in 1909. The number of trespassers and travelers on highway crossings killed was 162, and injured 251, thus confirming his advocacy of grade separation. Four passengers were killed, but only one of these deaths was the fault of the railroad. Commissioners McClure and Dowling followed Mr. Woods. Mr. McClure said too much attention could not be given to the improvement of tracks and equipment. It was a matter of gratification to him that at least two railroads and one electric railway had entered upon the work of double-tracking their lines. He advocated the separation of railroad and highway crossing. At the afternoon session increased precaution was declared to be necessary in safeguarding crossings of steam and electric lines to prevent the contact of the high tension wires with telephone and telegraph wires.

Personal Mention

Mr. C. K. Scott has been appointed superintendent of the Salem (Ohio) Electric Railway, to succeed Mr. H. N. Draper.

Mr. P. H. Smith has been appointed electrical engineer of the Butler (Pa.) Passenger Railway, to succeed Mr. George D. Nicoll.

Mr. H. S. Rykert has been appointed general superintendent of the Dixon, Rock Falls & Southwestern Electric Railway, Tampico, Ill.

Mr. J. A. Dyren has been elected secretary of the Hudson River & Eastern Traction Company, Ossining, N. Y., to succeed Mr. C. H. Werner.

Mr. Thomas Armstrong has been appointed superintendent of the Center & Clearfield Street Railway, Philipsburg, Pa., to succeed Mr. H. J. Beck.

Mr. W. H. Greenough has been elected president of the Sunbury & Selingsgrove Electric Street Railway, Sunbury, Pa., to succeed Mr. L. G. Brown.

Mr. H. P. Scott has resigned as general shop foreman of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., effective on Dec. 1, 1909.

Mr. John St. John has been appointed engineer of the power station of the Milwaukee Northern Railway, Cedarburg, Wis., to succeed Mr. J. Rookus.

Mr. E. R. Bliss, general counsel of the Chicago (Ill.) City Railway, has been elected a director of the Metropolitan Trust & Savings Bank, Chicago, Ill.

Mr. A. A. Ainsworth has been appointed engineer of the power station of the Ottumwa Railway & Light Company, Ottumwa, Ia., to succeed Mr. W. H. Grant.

Mr. Albert Stevens has been appointed engineer of the power station of the Pittsburgh & Butler Street Railway, Pittsburgh, Pa., to succeed Mr. C. J. Miller.

Mr. G. A. Schmitz has been elected vice-president of the Newport News & Old Point Railway & Electric Company, Hampton, Va., to succeed Mr. John Blair MacAfee.

Mr. W. Z. Earle has been appointed chief engineer of the St. John (N. B.) Railway, to succeed Mr. Thomas Irwin, who is in charge of the power station of the company.

Mr. D. G. Wallace has been appointed superintendent of the power station of the Bloomington & Normal Railway & Light Company, Bloomington, Ill., to succeed Mr. George W. Wilmarth.

Mr. A. F. Rolston has been appointed superintendent of motive power of the Columbus, Delaware & Marion Railway, Columbus, Ohio, and the Marion Railway, Light & Power Company, Marion, Ohio.

Mr. H. H. Stephenson has resigned as traffic manager of the Toledo Urban & Interurban Railway, Toledo, Ohio, to become traffic manager and auditor of the Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio.

Mr. T. M. Ellis, general manager of the Rockford & Interurban Railway, Rockford, Ill., which is controlled by the Union Railway, Gas & Electric Company, has been elected second vice-president of the company and Mr. Chester P. Wilson has been elected to succeed him as general manager.

Mr. T. J. Hanlon, Jr., assistant superintendent of the Pensacola (Fla.) Electric Company, has been appointed superintendent of the railway department of the company and Mr. R. M. Harding has been appointed superintendent of the lighting department to succeed Mr. E. H. Howard as general superintendent.

Mr. E. G. Howard has resigned as general superintendent of the Pensacola (Fla.) Electric Company and Mr. T. J. Hanlon, Jr., and Mr. R. M. Harding, assistant superintendents, have been appointed superintendent of the railway department and superintendent of the lighting department of the company, respectively.

Mr. Bruce E. Loomis, who as manager of the Underwriters' Electrical Bureau, New York, N. Y., has been instrumental in introducing a great many improvements in the fire protection in a large number of electrical properties, has severed his connection with that organization. Mr. Loomis has not yet announced his future plans.

Mr. F. M. Du Bois has been appointed master mechanic of the Hartford & Springfield Street Railway, Warehouse Point, Conn., to succeed Mr. William F. McCoy, whose appointment as master mechanic of the Pittsfield (Mass.) Electric Street Railway was noted in the Electric Railway Journal of Oct. 30, 1909, page 956. Mr. Du Bois began his railway career with the Syracuse (N. Y.) Rapid Transit Railway, serving with that company 17 years, and finally becoming master mechanic.

Mr. T. R. Cummins, formerly engineer of maintenance of way of the Chicago, Lake Shore & South Bend Railway, has become associated with Marwick, Mitchell & Company, New York, N. Y., chartered accountants, and will devote his time to the valuation of engineering properties. Mr. Cummins was for seven years with the Illinois Central Railroad and for 2½ years with J. G. White & Company, Inc., and for a time served as first grade assistant engineer with the Isthmian Canal Commission at Panama.

Mr. Chester P. Wilson has resigned as general superintendent of the Des Moines (Ia.) City Railway and the Inter-Urban Railway, Des Moines, to become general manager of the Rockford & Interurban Railway, Rockford, Ill., which is controlled by the Union Railway, Gas & Electric Company. Mr. Wilson was for about five years prior to January, 1909, superintendent and purchasing agent of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., and previously was connected with the Milwaukee Electric Railway & Light Company, Sioux City (Ia.) Railway, and the Camps Bay, Cape Town & Sea Point Tramway, Cape Town, South Africa.

Mr. Charles J. Laney has been appointed traffic manager of the Toledo Urban & Interurban Railway, with offices at Findlay, Ohio, to succeed Mr. H. H. Stephenson, who has become traffic manager and auditor of the Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio. Mr. Laney has been connected with the Toledo Urban & Interurban Railway for two and a half years as assistant general freight agent, the duties of which office have been combined with those of traffic manager. Before becoming connected with the Toledo Urban & Interurban Railway Mr. Laney served in the freight department of the Toledo & Ohio Central Railway and the Wabash Railroad.

Mr. J. P. Clark, second vice-president and general manager of the Michigan United Railways, Lansing, Mich., has announced a number of changes in the personnel of the company, resulting in a general readjustment of the duties of the officers of the transportation department. Mr. B. F. O'Mara, who has been superintendent of the eastern division of the company, with offices in Jackson, will take charge of the lines in Kalamazoo and the betterment work which the company has in contemplation. Mr. J. L. Millspaugh, who has been superintendent of the western division of the company, with offices in Kalamazoo, will assume charge of the interurban line between Jackson and Lansing and will act as assistant in supervising operation in Jackson City. Mr. A. H. Mann will continue as superintendent of the lines in Lansing.

Mr. John T. Huntington, whose appointment as general manager of the Green Bay (Wis.) Traction Company was noted on page 956 of the Electric Railway Journal of Oct. 30, 1909, has operated a number of city and interurban railways and electric lighting plants in Ohio, Illinois and Kansas, covering a period of about 15 years. At Green Bay Mr. Huntington will manage more than 40 miles of city and interurban lines for the Green Bay Traction Company and the property of the Green Bay Gas & Electric Company, which furnishes gas for lighting and cooking, and electric current for lighting, power, etc. Interests controlling these companies are developing water-power on the Peshtigo River, about 60 miles north of Green Bay, where eventually 15,000 hp will be developed and transmitted to Green Bay at 60,000 volts for general distribution.

Mr. A. D. B. Van Zandt, who presented the paper "Publicity" at the meeting of the Central Electric Railway Association held in Indianapolis, Ind., on Nov. 18, 1909, is publicity agent of the Detroit (Mich.) United Railways. After a few years of school teaching and a short experience in newspaper work in Ontario, Mr. Van Zandt became a reporter on the Detroit *Tribune* and later was made city editor. The Detroit *Evening News* is owned by the same interests that control the *Tribune,* and Mr. Van Zandt was subsequently transferred to the city desk of the *News.* He resigned from the *News* to organize the local and State staff of the *United States Daily* and four years ago became connected with the Detroit United Railways and subsidiary companies in charge of advertising and matters covered by the newspapers affecting the relations of the company with the public.

NEW PUBLICATION

The A B C of Railroad Signaling. By W. H. Elliott. Chicago, 1909: Mackenzie-Klink Publishing Company; 75 pages, illustrated. Price, $1.00.

This book is based on a lecture delivered before the Harvard School of Business Administration by W. H. Elliott, signal engineer of the New York Central & Hudson River Railroad. It is a very readable introduction to the railroad signaling practice of American steam railroads, and despite its brevity few essentials have been omitted.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Covington & Big Bone Railway, Covington, Ky.**—Incorporated to build an interurban electric railway from Covington to Big Bone Springs, a distance of about 22 miles. The company has secured franchises and rights-of-way through the territory it will traverse. Capital stock, $150,000. Incorporators: M. J. Crouch, J. J. Weaver, J. W. Kennedy, Orlando P. Schmidt, R. S. Holmes, Louis Fritz, William Riedlin, Joseph Feltman and A. W. Koch.

***Cincinnati, Harrison & Indianapolis Traction Company, Cincinnati, Ohio.**—Incorporated with a nominal capital stock of $10,000 to build an electric railway between Cincinnati and Harrison, with the idea of ultimately extending it to Indianapolis. The old Westwood steam road will be used, but 14 miles of new construction will be required. The line will touch Bridgetown, Dent and Miamitown. A. K. Nippert, Charles E. Roth and Will L. Finch are interested.

***Citizens Traction Company, Oklahoma City, Okla.**—Chartered in Oklahoma to build an electric railway from Oklahoma City to Shawnee through Oklahoma, Pottawatomie, Lincoln, Cleveland, McLain, Garvin and Murray counties, and later possibly a line between Oklahoma City and Sulphur. Capital stock, $300,000. Directors: L. E. Patterson, W. F. Harn and J. H. Winans, Oklahoma City; Homer S. Hurst, Holdenville, and Alfred Hare, Shawnee.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—Incorporated to build a belt line in and around Corpus Christi. Capital stock, $100,000. Incorporators, Daniel Hewitt, V. S. Heinly and Earl C. Heinly, all of El Paso. [E. R. J., Oct. 23, '09.]

FRANCHISES

Stockton, Cal.—Application has been made to the City Council by the Stockton Terminal & Eastern Railroad for a franchise over streets within the city limits. The company has also applied for a franchise over Front Street in Linden. It is the plan to build a railway through Waterloo, Linden, Bellota and Jenny Lind and tap the Stockton water front, a distance of 27 miles. Gasoline motor cars will be operated. R. N. Griffith, president. [E. R. J., Nov. 7, '08.]

Ashton, Ill.—The Chicago, De Kalb & Western Railway, Chicago, has applied to the City Council for an electric railway franchise in Ashton.

Lafayette, Ind.—The Commissioners of Tippecanoe County have granted a 55-year franchise to the Indiana & Northern Traction Company for the construction of an electric railway from the battleground north to the county line. The franchise obligates the company to complete the line as far north as Reynolds within two years. The company was incorporated in 1903 with a capital stock of $500,000. Headquarters, Marion. Among those interested are: George A. H. Shiedler, B. F. Burk, E. H. Neal, Marion, and George Breed, Philadelphia, Pa.

Logansport, Ind.—The Indiana Northwestern Traction Company has been granted an entrance to Logansport on Bales Street with a 75-year franchise. The company reports having secured franchises through White, Jasper and Newton Counties for a north line, and has an application on file with the Commissioners of Tippecanoe County for a south line. The company has also been granted a franchise for its line through Remington. [E. R. J., Nov. 6, '09.]

Lake City, Ia.—The City Council has considered the ordinance granting a franchise to the Des Moines & Sioux City Railroad, Des Moines, and has ordered a special election to be held in December, at which time the proposition will be voted upon. [E. R. J., Oct. 30, '09.]

Lawrence, Kan.—The City Council has granted to the Kansas City & Kansas Southwestern Railroad, Kansas City, Mo., an extension to its franchise until April 1, 1910, in which to begin work on the proposed railway. The plans of the company include the construction of electric railways between Kansas City and Topeka, by way of Tonganoxie and Lawrence, and the building of a railway from Lawrence to Independence, Kan. W. Laming, president. [E. R. J., Jan. 23, '09.]

Burlington, Ky.—The Boone County Fiscal Court has granted a franchise to the Cincinnati, Louisville, Lexington & Maysville Traction Company, Dry Ridge. [E. R. J., Oct. 9, '09.]

Kalamazoo, Mich.—The Grand Rapids (Mich.) Electric Railway, through its president, Jerry W. Boynton, has applied to the City Council for a 30-year franchise to operate an electric railway in the city limits, with the consideration that all its lines are completed within one year from the passage of the ordinance. The company plans to build an electric railway from Bay City to Grand Rapids and thence to Kalamazoo. It is also proposed to extend the line easterly from Kalamazoo to Battle Creek, thence southerly to Coldwater and Montgomery and Camden; thence to Pioneer, Ohio, to connect with the Toledo & Western Railway, now operated between Toledo and Pioneer, Ohio. [E. R. J., March 6, '09.]

Anoka, Minn.—An ordinance has been passed granting an electric railway franchise to the Anoka-Minneapolis Suburban Railway Promotion Company. The railway will extend from Anoka to Minneapolis. C. J. Swanson, Minneapolis, is interested. [E. R. J., May 29, '09.]

New York, N. Y.—The Board of Estimate and Apportionment has granted a franchise to the New York & Queens County Railway to operate passenger cars on two tracks of the Queensboro Bridge as an extension to the existing lines in Queens.

New York, N. Y.—The Public Service Commission of the First District has approved the franchise granted by the Board of Estimate to the South Shore Traction Company to construct a line in Queens and run cars across the new Queensboro Bridge.

Columbus, Ohio.—The Ohio Electric Railway and Indianapolis, Columbus & Eastern Traction Company on Nov. 8 notified the City Council that they had accepted the seven-year extension of their franchises granted last July. The acceptances close the contract that the railways have with the city to build an interurban station at Third and Town Streets and the companies are granted permission to lay tracks in Town Street and given the seven-year extension of former franchises.

Florence, S. C.—The City Council has granted a 50-year franchise to John L. Barringer, P. A. Willcox, William J. Brown and S. S. Ingman for the use of all the streets of the city for the building of an electric street railway. The plan is to build a street railway throughout the city and then to run it to Darlington via the Muse Bridge on Black Creek, near which place an amusement park will be built. [E. R. J., July 17, '09.]

Aberdeen, S. D.—The City Council has granted the Aberdeen Street Railway a 20-year franchise. The company is to build 4 miles of track by Dec. 1, 1910. [E. R. J., Aug. 22, '09.]

Salt Lake City, Utah.—The Salt Lake & Los Angeles Railway has asked the County Commissioners for a 50-year franchise from Salt Lake City to Saltair for the purpose of double-tracking and electrifying that line. The matter was referred to the committee on roads and bridges for consideration.

Spokane, Wash.—The Washington Water Power Company has applied for a franchise and a revocation of a franchise in the northeastern part of the city in order to straighten out its line. The revocation calls for the elimination of the present line on Lidgerwood Street between Eighteenth and Liberty Avenues and on Eighteenth Avenue between Nevada and Lidgerwood Streets.

Walla Walla, Wash.—The Northwestern Gas & Electric Company has asked for an extension of its franchise in Walla Walla City, covering its three activities, electric power and lighting, street railway and gas. The extension is asked to make the present franchise correspond with the new $5,000,000 bond issue, which is to run for 25 years. It is stated that the company has under advisement the construction of electric railways to Wallowa, Ore., and Dayton, Wash. This latter, it is said, will be the electrification of the Northern Pacific Railroad from Walla Walla to Dayton.

TRACK AND ROADWAY

Calgary (Alta.) Municipal Railway.—The electors have passed a by-law authorizing an expenditure of $40,000 to be used for extensions and improvements to the local street railway.

Interurban Railway, Helena, Ark.—This company proposes to build at present only 4 miles of the projected street railway from Helena to West Helena. This will require two wooden bridges, each 26 ft. long. R. L. Leonard has the contract for earthwork and C. H. Purvis is engineer in charge, both at Helena, Ark. Connections will be made with the Missouri & North Arkansas Railroad and the Missouri Pacific Railway. E. C. Horner, president and John S. Horner, secretary and treasurer. [E. R. J., Nov. 6, '09.]

Meriden, Middletown & Guilford Railway, Meriden, Conn.—This company has awarded a contract to F. Arrigoni &

Bros., for the building of a section of its proposed electric railway from Durham to Middletown. Francis Atwater, president. [E. R. J., Nov. 13, '09.]

Paris & Northern Railway, Danville, Ill.—W. M. Bridgett, president of this company, which contemplates building an electric railway between Paris and Danville, writes that matters are still in a preliminary stage. At present the company is at work securing the right-of-way. The line, as projected, will be 22 miles long. Capital stock, authorized and issued, $5,000. Officers: W. M. Bridgett, president and purchasing agent; Geo. G. Rowland, vice-president; Charles Troup, secretary; L. C. McGee, treasurer; W. H. Martin, chief engineer, all of Danville. [E. R. J., Sept. 25, '09.]

Yorkville & Morris Railroad, Yorkville, Ill.—A. G. Palmer writes that construction of this proposed 23-mile railway will not be resumed until next spring. About 3 miles of track have been constructed out of Yorkville. This track is eventually to be extended to Ottawa, via Wedron, and Sheridan. By option and contract, Mr. Palmer has secured all stock from an old charter dated Oct. 20, 1901, which has been turned over to this new company. McKeen motor cars will be operated. It is proposed to erect the repair shops at Yorkville. Capital stock, authorized and issued, $500,000. Hugh G. Palmer, Box 305, Aurora, Ill., president and chief engineer. [E. R. J., Sept. 4, '09.]

Delphi, Flora & Burlington Traction Company, Delphi, Ind.—E. W. Bowen advises that this company was organized about six weeks ago for the purpose of building an interurban railway between Delphi, through Flora and up to Burlington, a distance of 22 miles. The electors of Deer Creek, Monroe and Burlington Townships of Carroll County on Nov. 9 voted a subsidy tax amounting to $68,475 in aid of the construction of the line. Directors: James C. Smock, Martin G. Haun, Wm. Donlin, Frank S. Blythe and E. W. Bowen. [E. R. J., Nov. 6, '09.]

Cincinnati, Madison & Western Traction Company, Indianapolis, Ind.—The election held in Saluda and Republican Townships a few days ago, on the question of voting a 2 per cent subsidy tax in aid of the Cincinnati, Madison & Western Traction Company, resulted in Saluda Township giving a majority in favor of the subsidy. Republican Township, which previously voted a tie, gave a majority of 62 against the subsidy. [E. R. J., Oct. 16, '09.]

South Bend & Logansport Traction Company, South Bend, Ind.—Construction was begun on Nov. 10 at Plymouth on the proposed electric railway which is to connect South Bend and Logansport. Work was begun under the direction of the Butterfield Construction Company, Goshen, general contractors for the company. [E. R. J., Oct. 23, '09.]

***Muscatine, Ia.**—A meeting was recently held in Buffalo at which plans were formulated for the construction of an electric railway to connect Muscatine with Rock Island, via. Buffalo Prairie, Andalusia, Drury and Edgington Townships. Preliminary surveys will be made at once. The following were elected officers of the preliminary organization: Dr. E. L. Marston, president; A. W. Elliott, vice-president; Dr. B. V. Marquis, secretary; George Rausch, treasurer.

Detroit, Lansing & Grand Rapids Railway, Detroit, Mich.—This company announces that it is preparing to start construction about March 1 on the proposed railway which is to be extended from Detroit to Grand Rapids via Lansing. The contract for surveying the right-of-way has been awarded to P. C. Johnson, Chicago, Ill. The motive power will be electricity. Headquarters, 706 Union Trust Building, Detroit, Mich. [E. R. J., Sept. 11, '09.]

***Mankato, Minn.**—It is reported that J. D. Browning, K. C. Buckeye, Joliet, Ill., and B. C. Wooley, Sioux City, Ia., are investigating the feasibility of building an interurban railway to connect Mankato with St. Paul and Minneapolis.

Interstate Railway, Kansas City, Mo.—This company has served a notice on Judge J. G. Park of the Circuit Court of an appeal taken in the injunction suit brought against the Missouri River & Cameron Railway from his court to the State Supreme Court. Two months ago the Interstate Railway secured a temporary injunction against the Missouri River & Cameron Railway restraining the latter from building the proposed electric railway between St. Joseph and Kansas City. Last week the restraining order was dissolved. [E. R. J., Nov. 6, '09.]

Nebraska Transportation Company, Omaha, Neb.—It is announced that this company plans to begin work on the new electric railway between Omaha and Fremont about March 1, 1910. The line is to cross the Elkhorn River near Elk City, about 12 miles east of Fremont, and the power plant of the line will be erected on the banks of the river, according to present plans. Already about 20 miles or right-of-way has been secured. C. W. Baker, president. [E. R. J., Oct. 2, '09.]

***Reno, Nev.**—It is stated that surveys have been completed for an electric railway connecting Ely, East Ely, Smelter, Riepetown and the mines of Ely, and construction work will soon commence. G. L. Rickard is said to be interested.

Rockland Railroad, New York, N. Y.—Announcement is made that this company, which proposes to build an electric railway to connect Tappan, Suffern, Stony Point and Nyack, will be ready to take construction work on the line early next spring. It will be approximately 49.12 miles long. Other cities through which the line will pass are Englewood, Closter, New City, Haverstraw, Spring Valley and Pear River. No contracts have been let as yet. Headquarters, 165 Broadway, New York. Arthur C. Miller, second vice-president and general manager. [E. R. J., Sept. 4, '09.]

Findlay-Marion Railway & Light Company, Columbus, Ohio.—A number of men interested in this company met in Columbus a few days ago and discussed the proposition to construct the proposed line at an early date. The estimated cost of building the 46 miles of road is $1,250,000. While the capital stock stands at $250,000, it is possible that it will be increased to an amount that will cover the cost. New York capitalists are said to be ready to take the bonds and build the railway. A construction company will probably be organized for this purpose. G. W. Meeker, Columbus, is one of the projectors of the line. Traffic arrangements have been made with the Columbus, Delaware & Marion Railway for entrance to Columbus and the Toledo, Bowling Green & Southern Railway for connections with Toledo. [E. R. J., Feb. 13, '09.]

Massillon, Wooster & Mansfield Traction Company, Mansfield, Ohio.—J. A. Shaidnagle, a director of the company, states that eastern capitalists have agreed to take the underwriting of the company's bonds to the extent of $3,000,000 and that the line will be built between Massillon and Mansfield, with a branch to Barberton by way of Turkey Foot Lake. [E. R. J., Jan. 16, '09.]

Hocking-Sunday Creek Traction Company, Nelsonville, Ohio.—Warren Badger, chief engineer, writes that this company plans to complete 14 miles of single track during the coming year. One mile of track has been completed and 3 miles are under construction. It will be a gasoline-motor system extending from Nelsonville to Athens and Glouster. Three cars will be purchased from the McKeen Motor Car Company. [E. R. J., July 24, '09.]

El Reno (Okla.) Interurban Railway.—This company has awarded a contract for the completion of its electric railway into El Reno from Yukon to the Adams Construction Company, El Reno. Work has already been started. It is proposed to connect El Reno and Oklahoma City, a distance of 25.5 miles. [E. R. J., April 24, '09.]

Hamilton, Waterloo & Guelph Railway, Hamilton, Ont.—This company has given notice of application to the Dominion Parliament for an extension of time for the completion of its railway, and for power to extend the line from Hamilton to Toronto or, in the alternative, enter into an arrangement with the Hamilton Radial Electric Railway for running rights over its line to Toronto, when that company builds its proposed extension from Oakville to Toronto.

***Toronto, Ont.**—The proposed subway for Toronto was discussed at a private meeting of the special civic committee on Nov. 10. J. W. Moyes, who is preparing his report, was present at the discussion, and gave a brief outline of what is proposed in his report, which will not be ready for a while. The plan is to construct a subway on Yonge Street from the Bay to St. Clair Avenue beyond the north limit of the city, and also one on Front Street near the lake front connecting the Union Station with St. Lawrence Avenue on the east. The whole system will be about 4 miles in length. It is intended to connect the northern and northwestern section with the local street railway and if the operation of the subway proves successful extensions will follow.

Oregon Electric Railway, Portland, Ore.—This company has certified to the State that it proposes to build the following extensions: From Salem to Roseburg on the main line; a branch to leave the main line somewhere between Portland and Tualatin, and operating to a point on Tillamook Bay; a branch line from Albany extending to Cascadia; a branch line paralleling the main line only on the west side of the Willamette River, leaving the main line somewhere between Portland and Wilsonville and running into Eugene, and an east and west line from Dallas through Salem to Mill City.

Crook County Water, Light & Power Company, Prineville, Ore.—This company has awarded to Fred A. Rice the contract for the completion of a survey for an electric railway from Opal City to Prineville. It is the intention of the company to generate the power for the railway at Oden Falls, where contracts have already been awarded for the construction of the power plant. [E. R. J., Feb. 27, '09.]

Duquesne & Dravosburg Street Railway, Duquesne, Pa.—Grading has been started on the right-of-way of this company's line between Duquesne, Dravosburg and McKeesport. John W. Spering, Duquesne, has the contract for the bulk of the construction work which will be necessary. [E. R. J., March 13, '09.]

***Shelbyville, Tenn.**—W. C. Frost, of Nashville, Tenn., wishes to communicate with reliable railroad builders who might become interested in a plan for an electric railway between Shelbyville and Fayetteville, Tenn., of 30 miles. It is stated about 75 per cent of the grading is completed and residents offer to take $100,000 in stock. It is estimated that it will cost $200,000 to build the road.

Washington Traction Company, Walla Walla, Wash.—This company advises that work will be started within the next few weeks on the projected railway which is to connect Dayton, Wallula, Waitsburg, Dixie, Walla Walla, Milton and Pasco. It will be 143 miles in length. A site for the proposed power station has not yet been selected. The repair shops will be built at Walla Walla. Gilbert Hunt, Walla Walla, president.

Washington-Oregon Traction Company, Walla Walla, Wash.—It is announced that this company is about to award contracts for the construction of the projected electric railway between Walla Walla and Pendleton, Ore., 53 miles. It is possible that work will be started by Dec. 1. The power plant and repair shops will be located at Walla Walla. The company expects to furnish power for lighting and industrial purposes. Capital stock, authorized, $1,500,000. Officers: S. Drumhiller, president; E. S. Isaacs, secretary; John Smith, treasurer; W. S. Matthias, acting general manager. [E. R. J., July 3, '09.]

Potomac Valley Railway, Wheeling, W. Va.—L. S. Kirker advises that this company has done considerable construction on its proposed electric railway, but work has now been discontinued. It is planned to resume work next spring. It will connect Bloomington, West Virginia, Junction, Luke, Md.; Keyser, Piedmont and South Keyser, W. Va. Capital stock, authorized, $300,000. Officers: Joseph J. Benter, Edgewood, president; Chas. H. Geiger, Wheeling, secretary and treasurer; L. S. Kirker, P. O. box 426, Wheeling, chief engineer. [E. R. J., Sept. 26, '08.]

SHOPS AND BUILDINGS

San Bernardino Valley Traction Company, San Bernardino, Cal.—This company is preparing plans for the erection of a new building to the east of its car house on South E Street, San Bernardino, in which will be located the carpenter and paint shops.

West Side Electric Street Railway, Charleroi, Pa.—This company is engaged in erecting a new car house in Charleroi. The structure will be 30 ft. x 200 ft. and will be built of brick.

Northern Texas Traction Company, Fort Worth, Tex.—The J. W. Slaughter Construction Company is engaged in erecting a building for this company to be used as a terminal station in Dallas. The building will contain a waiting room, baggage room, ticket office and office for the city passenger agent.

Seattle, Renton & Southern Railway, Seattle, Wash.—This company has filed plans for a two-story fireproof car house, 73 ft. x 109 ft., to be erected at 5039 Ranier Avenue. The building is to cost $8,000. C. H. Anderson, architect.

POWER HOUSES AND SUBSTATIONS

Athens (Ga.) Electric Railway.—This company has secured control of Barnett Shoals, near Athens, and will in the near future develop 4000 hp and transmit it to Athens.

Beaver Valley Traction Company, Beaver Falls, Pa.—This company is said to have authorized an expenditure of $10,000 for additional power plant and storage battery equipment.

Galveston-Houston Electric Railway, Houston, Tex.—This company, which is building an electric railway between Galveston and Houston, will erect its main power plant at Texas City, on the water front of Galveston Bay, about 3 miles from the main line of the interurban. The first installation of 1500 kw will consist of turbo-generators of 1000 kw and 500 kw capacity. Specifications have not been drawn up yet nor has any date been set to open bids for equipment.

Manufactures & Supplies

ROLLING STOCK

Dominion Power & Transmission Company, Hamilton, Ont., it is reported, will shortly buy 10 new cars for city service.

People's Street Railway, Nanticoke, Pa., expects to purchase one or two double-truck semi-convertible cars in the near future.

Indiana Union Traction Company, Anderson, Ind., has purchased one 21-ft. car body from the Dorner Railway Equipment Company.

Columbus, Delaware & Marion Railway, Columbus, Ohio, which is in receiver's hands, has been authorized to buy five new cars for use in Delaware and Marion.

Hagerstown (Md.) Railway, reported in the ELECTRIC RAILWAY JOURNAL of Nov. 13, 1909, as being in the market for rolling stock, will not purchase any cars at this time.

Montreal (Que.) Street Railway has purchased one second-hand Ruggles rotary snow plow from Wendell & MacDuffie Company, New York, N. Y.

Interborough Rapid Transit Company, New York, N. Y., has purchased 20 all-steel work cars about 33 ft. long from the Ralston Steel Car Company, Columbus, Ohio.

General Electric Company, Schenectady, N. Y., placed an order with Wendell & MacDuffie Company, New York, N. Y., for one special narrow-gage McGuire-Cummings sweeper to be used in the company's yards.

Muskegon (Mich.) Railway & Light Company has purchased two 21-ft. car bodies mounted on Brill 21-E trucks from the Dorner Railway Equipment Company. The cars are equipped with Westinghouse No. 49 motors.

Northern Ohio Traction & Light Company, Akron, Ohio, mentioned in the ELECTRIC RAILWAY JOURNAL of Oct. 9, 1909, as being in the market for 15 cars, will purchase six interurban, five double-truck city and four single-truck city cars.

Covington & Southwestern Railway, Kingman, Ind., a road under construction, has purchased from the Dorner Railway Equipment Company, Chicago, one 21-ft. car mounted on Brill 21-E trucks and equipped with GE-800 motors.

Corsicana (Tex.) Transit Company has just placed an order with The J. G. Brill Company for two double-truck, semi-convertible cars. These cars are to replace those lost by fire, as mentioned in the ELECTRIC RAILWAY JOURNAL of Oct. 9, 1909.

Shore Line Electric Railway, New Haven, Conn., is having 12 cars built by the Jewett Car Company, and a number of other cars will be purchased. Mention of this contemplated purchase was made in the ELECTRIC RAILWAY JOURNAL of Sept. 18, 1909.

North Jersey Rapid Transit Company, Paterson, N. J., mentioned in the ELECTRIC RAILWAY JOURNAL of Nov. 6, 1909, as being ready to purchase some interurban cars, has placed an order with the Jewett Car Company to build six 30-ft. car bodies. Peter Smith 3-C heaters will be used on these cars.

Wabash & Northern Indiana Traction Company, Warsaw, Ind., mentioned in the ELECTRIC RAILWAY JOURNAL of Oct. 30, 1909, as contemplating the purchase of nine 50-ft. interurban cars, has placed an order with the Jewett Car Company for seven cars through the Miami Valley Construction Company of New York. Peter Smith 2-C heaters were specified. Several more cars will be ordered early next year.

Yakima Valley Transportation Company, North Yakima, Wash., has placed an order with the Niles Car & Manufacturing Company for one 45-ft. interurban combination passenger, smoking and baggage car, one 45-ft. express and baggage car and one 40-ft. construction car. The passenger car will be equipped with Hale & Kilburn rattan seats, Peter Smith hot-water heaters, Stanwood steps, water-flushed toilets and General Electric air brakes.

Long Island Railroad, Long Island City, N. Y., has closed an order with the American Car & Foundry Company for 15 combination baggage and passenger cars, 65 ft. long, and is also having the Standard Steel Car Company build 15 baggage cars, 64 ft. 5¾ in. long. All this rolling stock will be equipped for electric operation. With the 100 cars mentioned in the ELECTRIC RAILWAY JOURNAL of July 10, 1909, the order for motor cars is now complete, making a total of 130 cars, for which the company was originally in the market.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has ordered two motor express car bodies from the Cincin-

nati Car Company. The cars will have one large sliding door in the center on each side of the car. Other details specified follow:

Bolster centers...29 ft. 6 in.	Control system. GE type "K"
Length of body..50 ft.	Couplers .....Janney
Width over sills.. 8 ft. 8½ in.	Fenders or wheelguards, pilots
Sill to trolley base. 9 ft. 1 in.	
Height, rail to sills.....41 in.	Hand brakes....two Peacock
Body .....wood	Heaters.....caboose stove
Interior trim..pine sheathing	Headlights.....GE arc
Underframe .....composite	Roofs.....Monitor deck
Air brakes.....West. SME	Sanders.....two pneumatic
Bolsters, body..built-up steel	Trucks.....Am. Loco. Co.
Bumpers, 8 in. x ½ in. steel plate	Lamps.....4-Tornado oil tail

The company has also ordered one double-shear electric snow plow from the Cincinnati Car Company which is similar to the one built for this company last year, all the details of which follow:

Bolster centers.....20 in.	Fenders or wheelguards, steel broom
Length of body.....40 ft.	
Width over sills.....8 ft. 6 in.	Headlights.....GE arc
Body .....wood	Journal boxes, Stand. Motor Truck
Interior trim..pine sheathing	
Underframe .....wood	Roofs .....flat
Air brakes. West. straight air	Sanders.....two air-operated
Bolsters, body..built-up steel	Trucks..Stand. Motor Truck
Bolsters, truck, Stand. Motor Truck	Wheels.....34 in. diameter
Brakeshoes, A. S. & I. R. Ass'n Std.	Shear at each end to have adjustable nose operated by air.

TRADE NOTES

Perry Ventilator Corporation, New Bedford, Mass., received an order to furnish the ventilators for the new cars being built for the Oklahoma Railway.

H. M. Byllesby & Company, Chicago, Ill., have secured the services of L. M. Boisen as power engineer. Mr. Boisen was formerly with the Grand Rapids & Muskegon Power Company.

Lackawanna Bridge Company, Lackawanna, N. Y., has elected John H. Nichols, formerly assistant general sales agent of the Lackawanna Steel Company, to the office of vice-president.

American Car & Foundry Car Company, St. Louis, Mo., is contemplating the erection of a one-story building in connection with its Detroit plant, 60 ft. wide and 1000 ft. long, of brick and concrete.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., announces that C. E. Allen, formerly connected with the General Electric Company, has entered its employ in connection with the sale of transformers.

Detroit Graphite Company, Detroit, Mich., will have its Philadelphia office in the Land Title Building managed by DeWitt C. Smith, who was formerly manager of the paint department of the Joseph Dixon Crucible Company, Jersey City, N. J.

George W. Hoffman, Indianapolis, Ind., sole proprietor and manufacturer of U. S. Metal Polish and other specialties, died at his home on Friday, Oct. 22, 1909, after a short illness. His business will be continued by his widow.

O. M. Edwards Company, Syracuse, N. Y., has appointed W. C. Bradbury, of St. Louis, Mo., as its manager in the territory near St. Louis and also the Southwestern States. E. T. Chaffee, formerly Eastern manager of the sales department, has been appointed general sales manager.

Pressed Steel Car Company, Pittsburgh, Pa., and the Western Steel Car & Foundry Company will remove their offices for the Southern district on Dec. 1, 1909, from Atlanta, Ga., to the Munsey Building, Washington, D. C. L. O. Cameron will be in charge as manager of sales.

Stone & Webster Engineering Corporation, Boston, Mass., has been engaged by the General Electric Company, Schenectady, N. Y., to construct a reinforced concrete shop building at the Schenectady works. The building will be 80 ft. x 400 ft., but the plans have not yet been completed.

Cincinnati Car Company, Cincinnati, Ohio, is erecting a building 110 ft. x 255 ft. for the construction of all-steel underframes and semi-steel or all-steel car bodies. The company has under consideration the matter of making additions to its plant calculated to double its present output.

T. H. Symington Company, Baltimore, Md., has placed E. H. Symington at its Rochester (N. Y.) plant as works sales manager. Mr. Symington formerly was manager of the Western sales department of this company, and was located at Chicago. Owing to an injury he has been absent from duty for the past three years.

George W. Jackson, Inc., Chicago, Ill., which has carried out many important engineering undertakings in and about Chicago, including the construction of more than 50 miles of freight tunnels and the foundations and part of the approaches to the $20,000,000 terminal of the Chicago & North Western Railway, has recently organized a railway construction department, which will build electric and steam railways. During the present year George W. Jackson, Inc., has completed the superelevation of the tracks of the Chicago & Oak Park Elevated Railroad at and near the intersection of that line with the 10-track elevated roadway leading to the new terminal station of the Chicago & North Western Railway. This included raising the double-track structure of the Chicago & Oak Park Elevated Railroad, operating on West Lake Street, for a distance of approximately 3500 ft. In conjunction with this elevation a bridge span 155 ft. long and 55 ft. wide was inserted in the elevated structure where it passes over the steam railroad tracks. All this work was carried on without disturbing traffic on the elevated road owning the structure or the surface roads in the street below.

ADVERTISING LITERATURE

Chisholm & Moore Manufacturing Company, Cleveland, Ohio, has issued a catalog of its hoists.

Frank Ridlon Company, Boston, Mass., has issued its list of second-hand electrical machinery for November, 1909.

Handlan-Buck Manufacturing Company, St. Louis, Mo., has issued a catalog of its railroad lanterns and switch, semaphore and train lamps.

St. Louis Malleable Casting Company, St. Louis, Mo., has issued catalog No. 200 of its malleable pole and line hardware and other electrical specialties.

John A. Stewart Electric Company, Cincinnati, Ohio, has issued a special list of electrical and steam machinery for immediate delivery, dated October, 1909.

Pettingell-Andrews Company, Boston, Mass., in the November issue of its house organ, *Juice*, publishes short articles on "The Development of the Knife Switch" and "The Grounded Secondary" and also describes Crown trolley wheels, Sheraduct and a number of other specialties.

New York Pole Company, New York, N. Y., has issued a publication entitled "Old Tubular Poles Made New," in which the company's process of reinforcing metal poles which was the subject of an article in the Electric Railway Journal of April 3, 1909, is described and illustrated.

Flood & Conklin Company, Newark, N. J., has issued a booklet entitled "The F. & C. Line. 'It Goes Everywhere,'" in which is contained a careful description of the Flood & Conklin Company's systems of surfacers for wood and metal railway cars with suggestions about effective methods of applying them.

Niles-Bement-Pond Company, New York, N. Y., has issued a publication in which its machine tools and cranes for electric railway repair shops are described and illustrated. The aim of the publication is to show the varied uses of the Niles-Bement-Pond wheel lathe and a number of other machines applicable to street railway work.

Coleman Fare Box Company, Buffalo, N. Y., has issued a publication entitled "Why is the Coleman Fare Box a Necessity on the Pay-as-You-Enter Car?" The method of collecting fares and handling transfers is described and the application of Coleman fare boxes to pay-as-you-enter cars is illustrated. A list of 20 reasons is given for the superiority of the Coleman Fare Box.

U. S. Wood Preserving Company, New York, N. Y., has published a four-page folder in which is reproduced a letter from the Metropolitan Street Railway, New York, N. Y., signed by W. T. Dugan, engineer of maintenance of way, in which the experience of that company with wood paving is related. The letter is addressed to the chairman of the Eastern Market Street Business Men's Association, Philadelphia.

Buda Foundry & Manufacturing Company, Chicago, Ill., has issued a publication entitled "Solving the Motor Car Question." This company has recently taken over the manufacture of two types of cars formerly made by the Stover Motor Car Company. It has illustrated and described briefly in the publication its No. 14 motor car, a regular work car for section use, with a single seat, with two seats and with two seats and a canopy; its Buda 10-hp engine; its Buda 10-A motor velocipede; its Buda 12-A motor velocipede; its six-passenger inspection car, and its six-cylinder 25-passenger car. This is a car intended especially for service on branch lines and at times when traffic over main lines does not warrant the full service. The company has issued a special booklet descriptive of this car which gives complete specifications.

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Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

The Gyroscope in Transportation

Considerable space has been given in the popular and semi-technical press during the past few weeks to the experiments conducted by Louis Brennan, of England, with his gyroscope car. In these tests a full-size flat car, operated by two gasoline-electric engines, was maintained in equilibrium on the upper surface of a single rail by means of the gyroscopic effect of two flywheels, each 42 in. in diameter. The flywheels weighed ¾ ton each and turned in vacuum at a speed of 3000 r.p.m. The car ran around a circular track of 35 ft. radius and then over a short section of straight track at a speed of 7 m.p.h., carrying a load of people. The trial was certainly interesting both mechanically and scientifically, as demonstrating the application on a large scale of a well-known principle in physics, but we believe the car is of no more practical value in the transportation field than the smaller gyroscope which can be purchased for a few cents at any toy store or than the smaller car constructed by Mr. Brennan in 1907 and described in the ELECTRIC RAILWAY JOURNAL at that time. We have never enthused greatly over any of the many monorail projects, all of which have been widely heralded as about to revolutionize the transportation industry and as desirable substitutes for ordinary two-rail track construction. But of them all that which depends upon a large flywheel or on several flywheels, carried on the car, as the only protection against the derailment of the car and the death of all of the passengers, is about the most impracticable. Some dangers exist in all means of transportation, but they are at least minimized in a railway of the ordinary construction where, if the machinery breaks down and a stop has to be made, the car is in a state of stable equilibrium. We cannot look upon the new car of Mr. Brennnan's in any other way than as a magnified toy, so far as the practical requirements of transportation are concerned.

Freight Revenue of Inland Empire System

Operations of the Spokane & Inland Empire Railroad show a revenue from the transportation of freight that is far greater in proportion to the total gross earnings than most properties report. The total operating revenue of this company for the year ended June 30, 1909, was $1,269,101, of which $1,241,898 comprised the revenue from transportation, and the balance of $27,203 the revenue from operation other than transportation. The revenue from the freight traffic during the year amounted to 25.6 per cent of the total operating revenue. This is a fraction less than the corresponding showing for the year ended June 30, 1908, when the revenue from the freight business aggregated 26 per cent of the total earnings from operation. In the year ended June 30, 1907, 21.9 per cent of the total was derived from the freight traffic. The revenue from freight increased at a greater rate, therefore, in the last two years than that of the entire property, large as the increase has been in gross revenue from all sources. For instance, the revenue from freight was $144,262 in the 1907 fiscal year, but it was a little more than double that figure in the ensuing year. As compared with this increase of 102 per cent, the total earnings from operation in the same period gained 69.9 per cent. Applying the comparison a year later, it is

found that while the freight revenue of the 1908-09 year was 11.7 per cent greater than in the preceding year, the total revenue from operation gained 13.5 per cent in the same period. When the comparison is extended to the gains of the period from the year ended June 30, 1907, to the 12 months ended June 30, 1909, it is shown that the increases in the freight department, and the total revenue from operation were, respectively, 125 and 93 per cent. Especial attention is directed by Jay P. Graves, president of this company, in his last annual report to shareholders, to the policy of the road in installing spurs and sidings where business could be foreseen from the development of industries. It is evident that further material enhancement of the gross revenue may be expected in the future if the policy of establishing new traffic connections is continued.

Transfers Good in New York After Acceptance

The acceptance by a conductor of a transfer in lieu of fare has been recently held to create the relation of passenger and carrier and to permit the former to recover for breach of the contract of carriage without proving that the transfer was good. The decision was rendered during the summer by one of the appellate courts of New York in the case of Kohn against Nassau Electric Railway Company. The undisputed facts in the case were that about five minutes after Kohn had handed a transfer to the conductor the latter claimed that the transfer was invalid and demanded a fare, and when it was not given he assaulted the passenger, although he allowed him to remain on the car for the rest of his trip. The company offered no evidence in rebuttal, but claimed that as the plaintiff did not prove that the transfer was good on the car where it was presented the relation of carrier and passenger did not exist. In unanimously reversing the judgment of the trial judge (there was no jury), the appellate court said that the conductor having accepted the transfer which the plaintiff gave him, the company was in no position to urge that the plaintiff was not a passenger, and went out of its way to utter some *obiter dicta* to the effect that "the transfer system in vogue among the street railroads in New York City is anything but clear and intelligible except to employees of the company." This general expression seems uncalled for, even though the court considered that the conductor's act was unjustifiable. While the opinion seems to indicate some bias, it is doubtless a correct decision upon a rather unusual set of facts, and directs attention to the necessity of determining the validity of transfers when they are presented.

Economy in Oil Handling

Many companies watch their shop storerooms closely to prevent waste or theft in issuing the ordinary materials kept in stock, but are surprisingly lax in the distribution of oil, turpentine, wood alcohol and other liquid supplies. It is true that a dishonest employee cannot find a market for stolen oil as readily as for brass car fittings or tools, but thoughtless waste usually is responsible for much bigger leaks in the stores department than thieving. While the storekeeper can demand that a worn out part should be returned as a receipt for issuing a new one, exchange is not possible when supplying fluids. Some storerooms have a row of barrels containing oils and paint supplies, which any shop employee may tap at will, without giving a reckoning to any one of the uses to which the supply drawn is to be put. Furthermore, no two men are likely to agree on the exact amount of oil needed for a given purpose, and thus another source of waste is introduced. The oil storage should be under the supervision of the storekeeper, even when it is not practicable to distribute the oil directly from the general storeroom. Even if a company cannot afford to substitute steel tanks with gages for the crude practice of drawing from the original barrels, it can certainly eliminate a considerable loss by placing catch pans under all taps and keeping count of the quantities drawn by each man for specific purposes. In one shop an appreciable saving has been made by supplying all the pitmen with sets of brass pitchers, each of which holds the exact quantity of oil required for the periodical lubrication of each type of motor in use. This plan makes it very easy to follow up the use of car lubricants. In places where large quantities of fuel oil are used for blacksmith forges, or gasoline for automobile line wagons, the fire underwriters' rules usually require the liquids to be stored in tanks under ground. In this case the pump for drawing off the oil should be kept locked and opened when necessary only by the storekeeper. Any method which places the oil room in the charge of one individual has the further advantage of reducing the fire risk to a minimum by preventing all irresponsible persons from having access to the most dangerous source of fire on the shop premises.

A New Comparative Unit

A great many essays have been written on the subject of the car-mile, the car-hour, the ton-mile, the passenger-mile and other units used in determining the relative cost of operating electric railway cars. It is generally recognized that not one of these units satisfactorily fulfills all of the functions required of a unit, and that a comparison is not always satisfactory, even when two or more of them are used. More than the usual amount of interest, therefore, will be attracted to the suggestion of John H. Rider, electrical engineer of the London County Council Tramways, who in a recent paper before the British Institution of Electrical Engineers proposed the employment of still a new unit, which, for want of a more distinctive name, he termed "figure of merit." This unit is derived as the quotient of a fraction of which the numerator is the product of the units per car-mile multiplied by an arbitrary factor of, say, 100, and the denominator is the product of the average weight of cars in tons times the average speed in miles per hour. The factors in the denominator represent in effect what might be called the average destructive energy of the cars. It is this energy which consumes electric current and car supplies, racks the trucks, motors and car bodies, wears out rails and special work and affects in some degree every item of cost of operation. As showing how a consideration of weight and speed influence comparisons between operating data from two cities, Mr. Rider quoted the figures of average current consumption of tram cars in London and Glasgow. In Glasgow the consumption is 1.34 kw-hours per car-mile, and in London it is 2.24 kw-hours,

or 67 per cent more. The "figures of merit" for the two cities, however, are 1.299 and 1.312, respectively, a difference of only 1 per cent. In other words, the new unit is not a substitute for any of the units now used, and is really not a unit in the same sense as they. Rather, it is a divisor to be used to obtain the rating of car performance based on the theory that the wear and consumption of power and supplies vary directly with the weight of the car, the distance covered and the speed, instead of simply the distance run, as with the "car-mile."

Rapid Transit and Architecture

Recent construction work in connection with the establishment of new elevated, subway and surface lines in Boston and other cities emphasizes the growing appreciation of public utility corporations and municipal authorities that proper architectural treatment of engineering works makes them a part of the ornamental assets of the community. European construction has long reflected this point of view, and the larger projects of American capital concerned with the erection of utilitarian structures in places where thousands of persons see them each week generally betray the hand of the experienced architect when opened for service. It is nothing new to urge that a tasteful design carefully executed has an economic value through its stimulation of cleanliness and the more thorough inspection and maintenance work resulting. The effect of such structures on the public mind is even more far-reaching, however, and it is significant that an architecturally attractive system of installation tends to facilitate the best use of the property by the public, as well as to stand the company in good stead when the regard of the community for its methods and aims is an issue.

These points are illustrated by the use of suitable architectural schemes in connection with subway stations, for instance. The adoption of a color scheme or of a specially significant type of decoration tends to shorten the station stops and reduce crowding on the platforms. Anything which causes the passenger to leave his seat and be at the car door sooner in approaching a station saves valuable time, and after he reaches the platform, if the architectural treatment of the station is simple and effective, with few distractions drawing his attention away from the exits, his more speedy exit clears the way for other travel. Such are the indirect uses of a tasteful station design in the operations of a rapid transit system. The direct effect of wise architectural treatment on the public mind is, in the main, the establishment of the opinion that the company is a permanent force for good in the community; that it is endeavoring to provide the best possible facilities and the most advanced equipment; that it is trying to raise the esthetic standards of construction by its dignified and suitable designs and to avoid injuring property and neighborhoods through the erection of crude, ill-formed and ugly or inferior structures.

The broader aspects of these improvements appear to best advantage in the construction of new lines over bridges which may or may not be built by the company; in the sheathing of iron and steel work when crossing public parks or other places treated with care by landscape gardeners; in the use of copper trimmings and the application of tiles of high quality inside stations, and in the construction of buildings having liberal proportions and well-directed lines when such structures are to occupy commanding positions on given pieces of property. Many a new substation building has raised the standards of construction for an entire neighborhood, and not seldom does the erection of a way station of neat and simple design add to the attractiveness of a residential section in the suburban or rural districts. The cost of erecting tasteful structures is relatively small, compared with the expense of building purely utilitarian additions to the equipment, for simplicity is always the controlling characteristic of high-class engineering architecture.

An Extension of the Use of Turbines

Turbines have demonstrated rapidly and conclusively their usefulness as prime movers in power stations, but their adoption has not been so rapid in the marine field, where it would seem at first thought that they would be especially desirable on account of their compactness and relatively low weight. It is true that a few ocean liners, among them some of the latest Cunard flyers, have been equipped with turbines, and two of the recent battleships ordered by the United States Government will also employ this type of machine, but the employment of turbines in marine service during the past five years has by no means been so general as on land. The reason has been that the turbine is essentially a high-speed machine, and it has been definitely shown that the efficiency of a propelling screw decreases rapidly after the speed has reached a certain number of revolutions, and that this critical speed is very much less than that to which the turbine, as ordinarily constructed, is best adapted. Although somewhat foreign to the electric railway field, it is of general engineering interest to note that during the last few months radical, almost revolutionary, proposals have been made by prominent engineering authorities to adapt what is practically the high-speed land type of turbine to marine work. One of these plans is the use of direct gearing with a ratio of reduction of 5 to 1, which would permit a speed for a 6000-hp turbine of 300 r.p.m. at the propeller shaft. Such a plan necessarily involves gear problems of unprecedented magnitude, because of the power transmitted. But these problems have been very ingeniously worked out by means of a set of two helical involute gears, with a floating frame for the pinion to equalize the wear and insure permanent alignment. The saving in weight claimed for such a device over reciprocating engines and their auxiliary equipment is from 50 to 65 per cent, a very important consideration in marine work, especially in warships, where every gain in weight means added strength in armor or capacity in guns. The second plan is that of driving the propelling shafts of the ship by electric motors, operated from a high-speed turbine of the central station type, so that both screw and prime mover can be driven at the rate which is most efficient for each. This plan substitutes an electrical connection for a direct connection as at present, or a gear connection as proposed in the first plan. It is yet too early to determine practically the relative merits of the several proposals, but the engineering backing of each insures a very thorough investigation of the subject by naval engineers, and it is not at all improbable that a radical change in marine architecture may result.

RECONSTRUCTION AND STANDARDIZATION OF CHICAGO RAILWAYS COMPANY CARS

The shops of the Chicago Railways Company are now rebuilding 328 double-end vestibule closed cars, some of which have been in operation on its lines for six years. All of these cars are being converted for pay-as-you-enter service under license from the Pay-As-You-Enter Car Corporation. They are being repainted according to the standard dark olive green and mahogany color scheme of the Chicago Railways Company. The reconstruction work includes a thorough overhauling of the body and electrical equipment of each car, rebuilding the trucks and making a considerable number of detail changes. These cars were purchased in separate lots of about 100 each, and as they were not all built at the same time, they have never fully conformed to one standard, although their general appearance is uniform. With the reconstruction work now in progress special care is being taken to standardize all the minor details of the cars and all those parts which need attention, repairing and replacing. It is believed that complete interchangeability of parts will lessen future maintenance costs.



Chicago Railways Car Reconstruction—Exterior of Rebuilt

Of the cars now being reconstructed 323 were built by the St. Louis Car Company, and the other five cars were built by The J. G. Brill Company. An elevation and the seating plan are illustrated. The general dimensions of the cars after reconstruction are as follows: Length over all, 41 ft.; length over body, 28 ft.; width, 8 ft. 3 in. and 8 ft. 6 in.; height from top of rail to top of trolley board, 11 ft. 4 in.; trucks, St. Louis No. 47, rebuilt and reinforced; truck centers, 17 ft. 5 in.; wheels, 33-in., 500-lb. Schoen solid forged and rolled steel; seating capacity, 36; weight, 43,050 lb.; motor equipment, 210 cars, four GE-70 motors; motor equipment, 118 cars, four GE-80 motors; controllers, two K 28. Other special equipment is mentioned later.

RECONSTRUCTION OF CAR BODY

In reconstructing the bodies of these cars the side panels are removed, and where necessary the sag is taken out of the side framing to straighten the belt rail and window rail. The panels are then renewed. If any members of the frame are found to be weak or approaching a decayed condition, they are replaced by new pieces. The underframing is carefully inspected, and in some instances it has been found that decay has taken place in the side sills under the window pockets, where water has entered along the drop sash. Such sills are replaced and outlets for drainage are made from the bottom of each window pocket, so that the wood may remain dry. Needle beams are trussed and the cross framing renewed wherever inspection shows this work to be required.

The roofs of all cars are being covered with National prepared roofing canvas similar to that used on the roofs of the new steel cars recently put in service by the Chicago Railways Company, and where it is found necessary the car ceilings are renewed with waterproof Composite board or Agasote headlining.

Storm sashes are being added to the side windows. The shape and dimensions of these sashes are such that they fit snugly behind the window guards used in the summer, and thus are firmly held at the bottom. Malleable iron buttons serve to clamp the tops of the storm sashes tightly against the window frames. By this arrangement of sashes and window guards the storm sashes may be put up or taken down without removing the longitudinal rods which serve as window guards in the summer.

PAY-AS-YOU-ENTER ARRANGEMENTS

The most important changes in rebuilding these cars are to be found in the platforms, where provision is being made for operation according to the pay-as-you-enter method of fare collection. The wide center door frame in each end of the bulkhead is being torn out, and the bulkheads are being reconstructed with two door openings, one for entrance and the other for exit, according to the pay-as-you-enter method of operation as followed in Chicago.

The two doors in the end bulkhead are of the same width. The right-hand door in the front bulkhead and the left-hand door in the rear bulkhead are set 8 in. from the side wall. The other door of each bulkhead is set 4 in. from the side wall. This variation in position was made to facilitate the movement of passengers. The right-hand doors are used much more than the others, and so they are set more nearly in line with the aisle, with a view to giving a straight passage between the platform and the car body, unobstructed by the corner of the longitudinal seat. In the



Chicago Railways Car Reconstruction—Interior of Rebuilt Car, Showing Electric Lighting

recently built cars of the Chicago Railways Company, purchased in November, 1908, and August, 1909, the doors which serve for entrance from the rear platform and for exit to the front platform are hung on hinges. In the rebuilt cars both doors in the end bulkheads are arranged to slide, because it is thought that service conditions may thereby be improved. A criticism of the swinging door between the platform and the body of the car is that when a front vestibule window is lowered while the car is moving the strong current of air tends to open the hinged door inwardly, and drive the smoky air from the platform into the car body. Some accidents also have been caused by women's skirts and people's fingers becoming caught in the swinging doors. The use of a sliding door will permit of additional standing room for one passenger within the front of the car body.

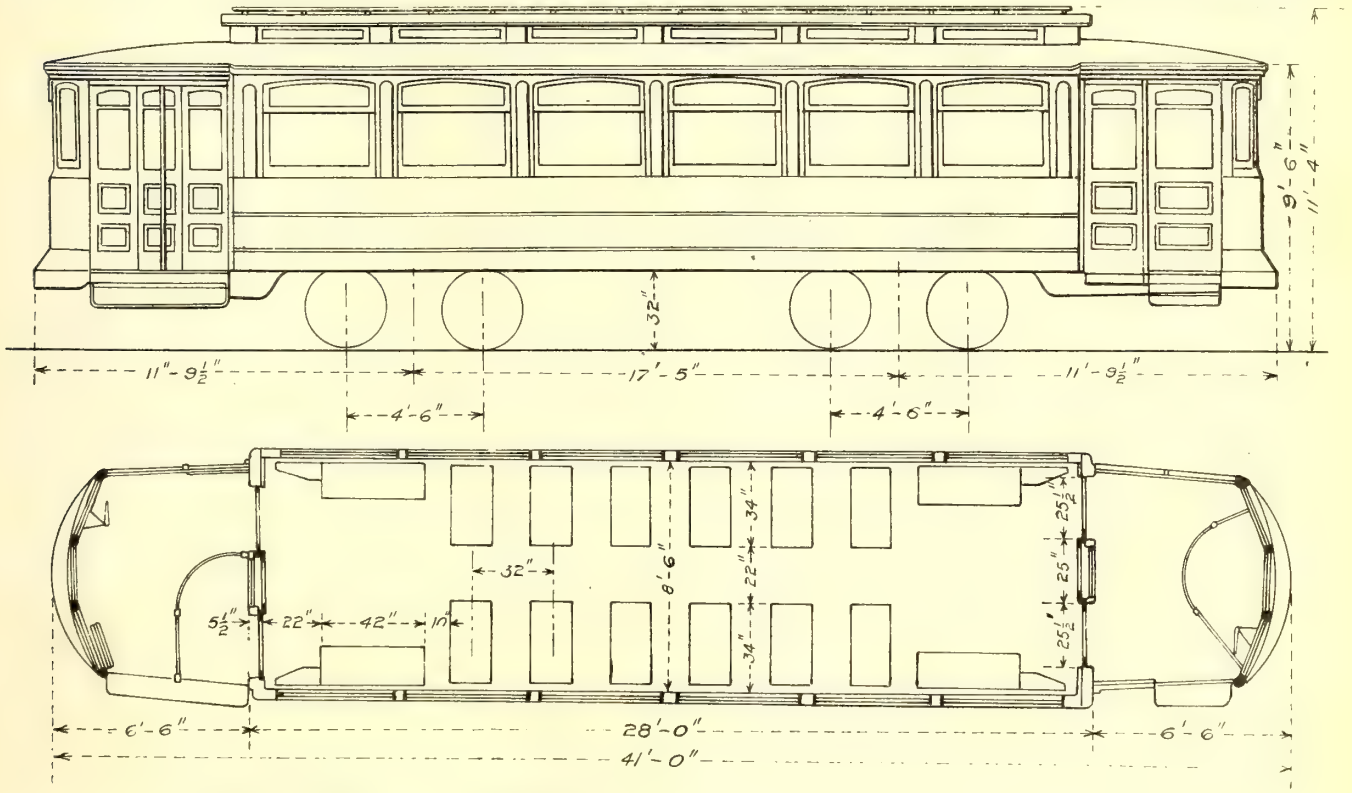
The bulkhead panel between the two end door openings is divided into two parts. The upper half is fitted with glass, and the lower half is paneled to match the sides of the car. The lower panel on the inside of the car is hinged to swing in. Normally, the panel is fastened in place by two screws. It has been found advisable to hinge this panel so that broken glass may be removed easily from the pocket into which the two end doors slide. In rebuilding the end bulkheads and placing the two pay-as-you-enter doors special care was taken to finish the door posts with rounded molding set back far enough to avoid sharp corners. In this way plenty of clearance is provided between the door handle and the posts, and it is not necessary, as in other cars, to recess the post opposite the handle.

The original seating capacity of these cars was sufficient for 40 passengers, but the use of two doors in the end bulkheads required shortening each longitudinal seat by the amount required for one passenger. Thus the rebuilt cars have seats for 36 passengers.

The entrance and exit doors in the platform vestibule sides are arranged similar to those on the 600 pay-as-you-enter type cars built for the Chicago Railways Company by the Pullman Company and described in the ELECTRIC RAILWAY JOURNAL for Nov. 7, 1908, page 1326. The platform on the 600 cars just mentioned are 8 ft. 4½ in. long from end wall to face of bumper. Those on the 328 cars now being rebuilt are 6 ft. 6 in. long between the same points. Each platform is enclosed on one side by a three-leaf folding door, which is left open at the rear end and is tightly fastened in the closed position when the car is operated in the reverse direction. The opposite side of the platform is enclosed half with a fixed panel and half with an exit door operated by the motorman on the front platform. The door arrangements of the two platforms are similar, so that the cars may be operated equally well in either direction.

An important feature in connection with the sliding vestibule door on these rebuilt cars is the use of a new door-operating device, designed and built by the shop department of the Chicago Railways Company. This device differs from others in that all of the mechanism except the operating crank and staff in the vestibule is out of sight. The movement and locking of the door in the closed position is effected by means of a handle directly above the brake handle in front of the motorman. Any movement of this handle is transmitted through a vertical shaft to a bell crank below the car floor, which, in turn, is connected through a rod and adjusting turnbuckle to a rock shaft which controls the movement of a connecting rod, the upper end of which is connected with the back of the sliding door and controls its movement. The simplicity of this door-operating mechanism, combined with the ease of operation and the positive locking of the door in the closed position, are its attractive features. It is stated that the motorman need give only a 12-lb. pull to the door-operating handle to release the door from its locked position. Then the movement to the full open position is made with less than half that amount of pull. No greater effort is required in closing the door.

Both platforms have folding steps interconnected on opposite sides of the car, so that when the steps are down on



Chicago Railways Car Reconstruction—Floor Plan and Side Elevation of Rebuilt Cars

the loading side they are folded against the platform sills on the blind side. All step treads are fitted with lead-filled Universal safety treads. Portable seats are provided for the motorman and conductor. A coating of dark olive green paint applied to the controller boxes, air-brake piping, brake staff and door-operating staff adds to the neat appearance of the platforms.

TRUCKS

The No. 47 St. Louis trucks originally purchased with these cars are being completely rebuilt. This type of truck is also being placed under the five Brill cars that are being rebuilt according to the standard design. The motor equipment is being completely overhauled while off the truck. An illustration on page 1096 shows one of the trucks after it has been rebuilt in the company's shops. This work of reconstruction includes the replacing of the main frame of the truck with heavier members. New side pieces cast with an additional longitudinal rib and weighing from 75 lb. to 100 lb. more than the original design, are installed. The old end angles are replaced with heavier pieces formed from 5-in. x 5-in. x ⅝-in. stock, which are riveted instead of being bolted to the side pieces. Symington ball-bearing center plates and Woods roller side bearings are added to each truck. The 3¾-in. x 7-in. journals are carried in Symington equalizing wedge journal boxes, which are fully machined inside and out.

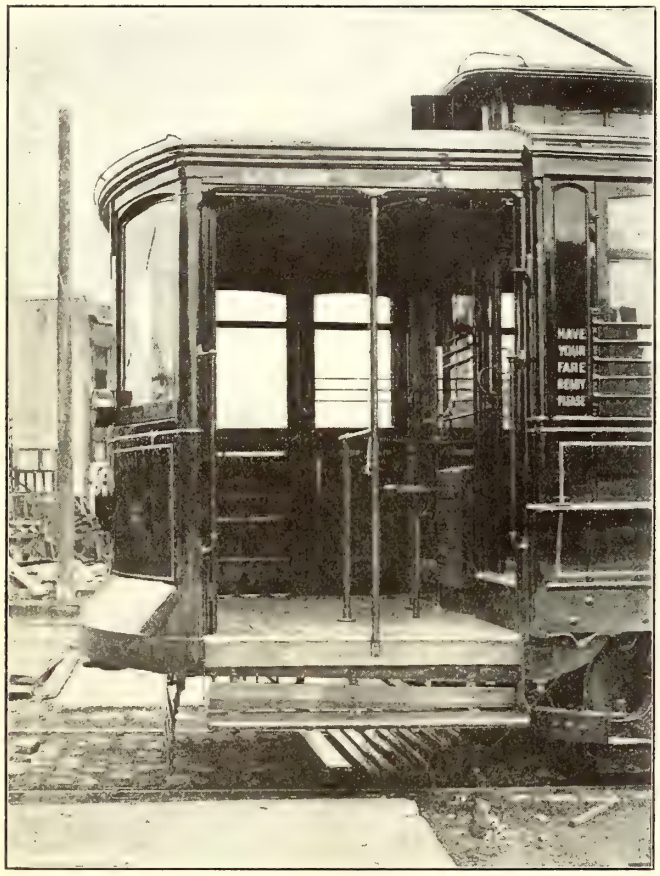
A guard of heavy wood reinforced with iron at the corners is placed around each truck. These guards are so supported that the lower side of the wood is 3 in. above the rail and at the nose each guard has a shield of heavy rubber which reaches down to within about 1 in. above the rail. This type of guard has been used by the Chicago Railways Company about a year, and is said to have given very satisfactory service. In addition to these truck guards each car is being equipped with two "H.B." Universal life guards.

The coupling bars carried on the old cars were made of straight bar iron, but experience showed that they were not stiff enough and frequently would buckle. For this reason new bars are being made for the rebuilt cars. These bars are cut from 3-in. x 3-in. 10½-lb. T-iron, and are finished by flattening the ends and punching the coupling-pin holes. This section of metal gives a much stiffer bar than that orignially used.

CAR BODY INTERIOR

Of the cars now being rebuilt 118 were heated originally by hot-water heaters, and the other cars had an old type of electric heater. All of this earlier heating equipment is being replaced by new double-coil electric heaters manufactured by the Consolidated Car Heating Company. A heater is placed under each of the six cross-seats, one in each of the four longitudinal seat boxes, and a special sized platform heater is mounted on each platform against the end bulkhead. The two platform heaters on each car are so connected in the heating circuits that they are inoperative until the second point of heat is reached.

Platform heaters are wound with No. 20 B. & S. wire. The No. 1 coils in the panel and in the cross seat heaters are wound with No. 18 and the No. 2 coils with No. 16 B. & S. gage wire. These three sizes of wire conform to those used in the heaters of the large new cars purchased during the last year and were chosen so that an economy in purchasing might be effected. All of the heater wiring for each rebuilt car is carried in lorricated conduit fastened to the sides of the car directly under the seat frames with pipes branching off at each seat and connecting directly with the heater outlets.



Chicago Railways Car Reconstruction—Rear Platform Arrangement



Chicago Railways Car Reconstruction—Front Platform Arrangement

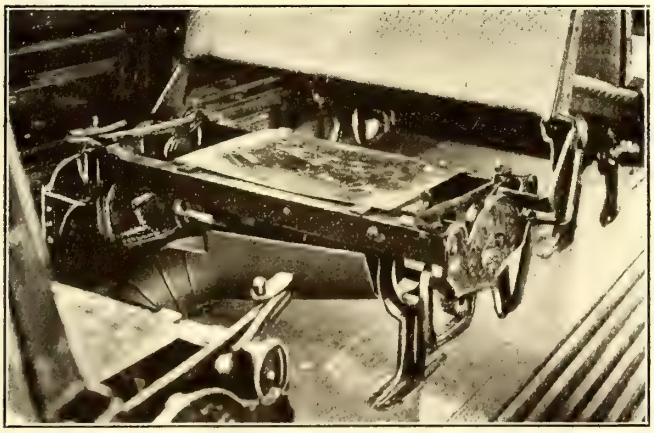
AUTOMATIC VENTILATION

One hundred car bodies will be fitted with Acme ventilators operating in conjunction with the electric heaters. Four ventilators exhaust the vitiated air from the monitor deck space and the partial vacuum thus formed draws in fresh air through openings in the car floor connected with the



Chicago Railways Car Reconstruction—Exhaust Ventilator in End of Upper Deck

heaters under the seats. The deck ventilators are box-shaped copper casings fitted with sheet copper partitions so arranged that with any movement of the car in either direction air from the space within the top of the car body will be withdrawn on the aspirator principle. The ventilators are installed at the front and rear ends of the monitor deck and at the midpoint on each side of the deck. They are designed to fit into the spaces formerly occupied by deck windows. The fresh-air intakes through the car floor have a total cross-section of 375 square inches and are connected to four electric heaters carried under the cross seats and to three heaters under the longitudinal seats. Thus as the air is withdrawn from the top of the car body fresh air is



Chicago Railways Car Reconstruction—Fresh-Air Inlet Under Seats

drawn into the car from below, passing through the coils of the heaters and out into the car body. This system of ventilation is furnished by the Acme Ventilating Company, Chicago, Ill.

A special ventilator has been designed and later will be installed on each of the car platforms. This ventilator is a product of the Chicago Railways Company's shops and tests recently made show that it will give a complete change of air within a closed vestibule four times an hour with the car moving at 8 m.p.h.

LIGHTING

During the reconstruction of the cars a new lighting system is being installed. One row of nine 16-cp spherical, frosted bulb lamps is placed under each of the lower deck rails and three 32-cp lamps are placed in a row along the center of the upper deck. The nine lamps under each deck rail are connected alternately in series, and operating on the same circuits are 16-cp lamps behind the end destination signs. One 32-cp lamp is placed in each platform ceiling and one in each headlight. A three-way switch serves to cut out the rear headlight and the forward platform lamp. The lighting, signal and car-heating wiring is all being done with Simplex flame-proof wire.

Hunter illuminated signs are being installed, one at each end vestibule window and one on each side of the car. As there is an even number of window openings in the sides of the car, the illuminated signs are staggered in position and so placed that the one on the loading side will be forward of the center of the car. The boxes in which the signs are placed are very substantially built. They are so designed that the entire roller-operating mechanism is within the box and can be reached by opening the inside door, which is so hinged that it will close and latch by gravity. The fixtures which hold the curtain rollers are designed to permit the removal and replacement of the rollers without the use of any tools. Ways are cut in the supporting brackets so that either roller may be quickly lifted out.

While the cars are being rebuilt the control wiring is being carefully inspected and repaired. Where necessary the old cables are entirely removed and are replaced with Roebling made-up cables.

A back is being installed at each end of the car for carrying an International register. Formerly the conductors complained that with the pay-as-you-enter system, which required them to stand on the platform when collecting fares, it was impossible to hear the fare register signal for



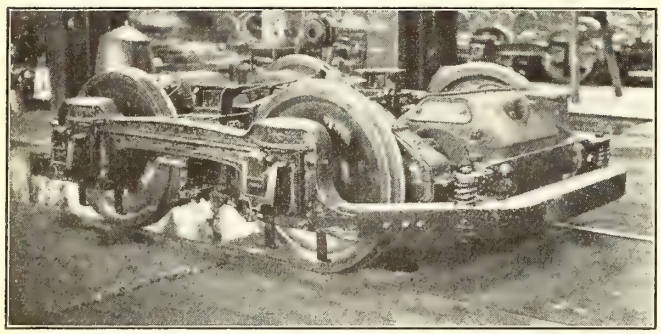
Chicago Railways Car Reconstruction—Special Destination Sign Box

the full length of the car and so the register backs are being placed at each end.

In addition to the equipment heretofore mentioned the following specialities are being installed on these 328 cars: U. S. No. 14 B B trolley bases; MA 13 fuse boxes; Lyon reinforced sheet-steel gear cases; Wilson trolley catchers with Samson spot cord and Keystone cord couplers; Keystone pneumatic bell ringers, which give a continuous ring by reason of compressed air, controlled by Keystone "leakless" foot valves, a flow of air repeatedly driving a steel ball against the gong; large sand boxes with sand traps, built by the railways company, and Keystone "leakless" sander valves. These valves are so designed that on pressing the valve stem to open the admission port a second valve seat

is brought into engagement, thus closing the annular space around the valve stem and preventing the loss of air. New pressed-steel dash headlights, furnished by Adams & Westlake, are being placed on each car. These headlights are provided with a locking device which requires a special wrench for opening the cover. Thus it is thought that the considerable loss of headlight lamps occasioned by tampering and theft may be reduced.

An additional feature being installed on these cars is Consolidated Car Heating Company's push-button buzzer system, which operates directly from the trolley current. The resistance coils, which are used to provide the low-voltage current for this buzzer-operating system, are placed



Chicago Railways Car Reconstruction—Truck as Rebuilt

under a longitudinal seat at one corner of the car. The governor for the air-compressor motor is installed under the same seat and to provide for easy access for inspection, adjustment and repair, these two devices are carried on a shelf so that they are near the top of the seat box. Thus they are free from any dirt that might accumulate on the floor under the seat and also are easily seen and reached when the seat cushion is lifted out.

On 202 of the cars the air-compressor pumps, formerly of 11-ft. capacity, are being replaced by pumps of 16-ft. capacity. Both the old and the new pumps were manufactured by the National Brake & Electric Company.

The work of rebuilding the 328 cars, as here described, is progressing rapidly and the rebuilt cars are being put into service as soon as they are painted.

The Swedish State Railways have accepted bids for the conversion to electric operation of the North Swedish division between Kiruna and the Norwegian frontier. The estimated cost, including a hydro-electric generating station, is $4,000,000. Premiums and penalties are imposed in the contract for variations above or below the guaranteed operating costs.

The United States Geological Survey has just issued a bulletin on "Commercial Deductions from Comparisons of Gasoline and Alcohol Tests on Internal-Combustion Engines," by Robert M. Strong. The tests, which were under the technical direction of R. H. Fernald, engineer in charge of the producer-gas section of the technologic branch, were conducted at the fuel testing plant in St. Louis, Mo., and at Norfolk, Va. The tests were conducted to determine the relative economy and efficiency of gasoline compared with denatured alcohol. When the series of tests was started it was found that it took from one and one-half to two times as much alcohol as gasoline to produce a given power, but with special alcohol engines, entirely suited to the use of alcohol, the latter fuel has been made to do as much work gallon for gallon as the gasoline.

NOVEMBER MEETING OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

The Central Electric Railway Association held a most enthusiastic meeting at Indianapolis, Ind., on Nov. 18. Papers and addresses of unusual value were delivered before an attendance of more than 100 members and guests. President A. A. Anderson was in the chair. It was announced that the next meeting would be held at Columbus, Ohio, on Jan. 27, 1910. This will be the annual meeting and new officers will be elected and installed at that time. The Central Electric Traffic Association will hold a meeting in Columbus on the day preceding that set for the session of the Central Electric Railway Association. Those attending the Indianapolis meeting were entertained with a theater party on the evening of Nov. 18.

STANDARDIZATION OF COUPLERS

The program of the Indianapolis meeting, as announced in the Electric Railway Journal for Nov. 6, was followed. The morning session began with the reading of the minutes of the Detroit meeting by A. L. Neereamer, secretary. R. M. Hemming, general manager, Ohio Southern Traction Company, and T. W. Shelton, master mechanic, Indianapolis, Columbus & Southern Traction Company, members of the standardization committee, reported progress and this committee was voted additional time in which to consider suggestions for standardizing couplers. Mr. Hemming thought that the coupler recommendations of the American Street & Interurban Railway Association did not fully meet the requirements of the roads in the Central Electric Railway Association territory, because some means should be provided for coupling cars of different heights until such time as all cars might have uniform couplers and coupler heights. The idea of his committee, in conformity with that of the American Association, was that the M.C.B. type of coupler should be used finally.

Mr. Shelton showed sketches and described a form of coupling bar pocket and coupling box that could be used in coupling cars of different heights. Other sketches shown presented the positions assumed by cars on curves and exhibited the adverse conditions under which couplers often must operate. The design of a pocket and coupler bar to be used therewith was shown. This pocket was securely anchored to the center sills and the sides of the pocket were so cut away that the coupling bar could swing sideways to accommodate itself to the position of two interurban cars on reverse curves of 40-ft. radius. The bar to be used was 2 in. x 4 in. in section, 4 ft. long and bent to suit the height of the cars to be coupled. This bar was designed for handling cars with varying heights of platforms during the transition stage, which would last until all couplers had been standardized.

L. E. Gould, Electric Railway Journal, described the work of the standarization committees of the American Street & Interurban Railway Engineering Association, which preceded and led up to the recommended standards as approved by the American Association at Atlantic City in 1908. The keynote of that work was to recommend a coupler, or other part, that eventually would be the most desirable to adopt and would be suitable for general interchange, and the committee had asked the member companies to work toward these more desirable designs as they purchased new equipment. This idea had been approved by the American Association.

COMPENSATION FOR CARRYING MAIL

The committee on this subject presented the following

report which was read by H. A. Nicholl, general manager, Indiana Union Traction Company, a member of that committee.

Your committee, appointed to confer with the committee of the American Street & Interurban Railway Association on "Compensation for Carrying United States Mail," begs to report that, after numerous attempts to secure a conference with the American Association committee, it has been unsuccessful. It was not until after our last convention that we learned from the American committee that it had been unable to accomplish any satisfactory results this year, principally on account of the change in the Federal administration and the numerous departmental changes incident thereto, and because the extra session of Congress was devoted solely to tariff revision. Therefore, your committee has not been able to obtain any satisfactory results.

The American Association committee's report made at the Denver convention, after going into statistics at some length, concludes by saying:

"It is important now that the work of the new committee should begin at the earliest possible date after this convention. Your committee strongly feels that with a concerted action on the part of the representatives of the member companies supporting its initiative, it is not unreasonable to hope that something can be accomplished, but this will require active personal co-operation on the part of those interested in electric properties. In the meantime, your committee recommends to all member companies that they respect existing contracts at least, pending the outcome of the attempt to obtain reasonable compensation, but that they should not undertake new contracts or extensions at these unprofitable rates."

Your committee concurs fully in the report of the American committee and strongly urges that a new committee be appointed promptly, or the old one continued, so that plenty of time may be given the committee to secure further information from the American committee, and to be in position to render any assistance in its power to secure results valuable to the members of this association.

Respectfully submitted,

H. A. NICHOLL,
GEO. WHYSALL,
F. W. BROWN.

The association voted that the present committee on "Compensation for Carrying Mail" be continued and instructed to act in conjunction, if desirable, with the committee on the same subject appointed by the American Street & Interurban Railway Association.

Several members discussed the present low rates paid to electric railways for handling mail. Mr. Anderson said that the Indianapolis, Columbus & Southern carried pouch mail and had been asked by the Government to extend the service. The road so far had declined to make the extension, because of the low rates and even had considered cancelling the present contract for that reason. The latter action had not been taken, however, pending the work of the committees mentioned. One member said that it had been ruled in one case that the railway could not cancel a contract to carry mail.

F. D. Carpenter, general manager, Western Ohio Railway, said that the present rates for handling mail on electric cars were made when electric railroading was in its infancy and the service given was poor. Now it was generally known that the electric railways could offer as good service in their territories as could the steam roads, and this should be recognized in the rates paid. He had talked with Congressmen who seemed willing to work for the electric railway interests in this matter and thought that now was a good time to study the means for obtaining concerted action along this line.

T. F. Grover, general manager, Terre Haute Traction & Light Company, spoke of the need of the railways in having the Post Office Department favor their case whenever new laws should be proposed with a view to obtaining the increased rates deserved by the service. No electric road was now making any profit in handling mail.

F. W. Brown, freight and passenger agent, Michigan United Railways, described the experience of that road in cancelling a mail-route contract. Formerly his company had two mail routes, one 20 miles and the other three miles long. The company cancelled the latter route after it had been refused an increased rate equal to that paid for a star route of the same length. This was three times more than the electric railway had been receiving. The Post Office Department refused to give the electric railway company the same rate as was paid for hauling the mail by team and after the contract had been canceled it was given to the driver of a wagon at this 300 per cent increase in cost to the department.

Mr. Nicholl quoted the comparison of average compensation per mile paid to electric and steam railways, wagons and pneumatic service. The contrast was decidedly to the disadvantage of the electric railway companies. He thought that the Post Office Department looked with favor upon the raising of rates, but could not do so until the necessary laws had been passed.

LOOSE LEAF FILING SYSTEM

S. D. Hutchins, Westinghouse Traction Brake Company, chairman of the committee to consider methods for facilitating the loose-leaf filing of information contained in technical publications, reported as follows:

The committee has discussed the feasibility of suggesting changes in the form of publications which would make them more adaptable to filing and indexing for current use. The points considered by the committee at a meeting held last night were as follows:

Wider margins that would permit binding loose leaves into book form, and

Standard punching that would be adaptable to a special set of covers for holding such leaves.

In the opinion of the committee, a wider binding margin would make the pages adaptable for filing under a greater number of methods, and the committee begs that the association refer these suggestions to the publishers of the technical journals devoted to electric railway work with the idea that the publishers study the question in its broad sense and report to the association as soon as definite recommendation can be presented.

On motion, the report of this committee was accepted, and L. E. Gould, western editor, ELECTRIC RAILWAY JOURNAL, was appointed to study this question from the standpoint of both reader and publisher and report later to the association.

CENTRALIZED TESTING

The first paper of the day entitled "A Centralized Testing Organization, Its Function in the Management of Electric Railways," was presented by J. G. Callan, electrical engineer, Arthur D. Little, Inc., Boston, Mass. This paper was published on page 1065 of the ELECTRIC RAILWAY JOURNAL for Nov. 20, 1909.

After the reading of the paper the following committee was appointed to consider the recommendations and suggestions made by Mr. Callan and to report to the association: G. H. Kelsay, Indiana Union Traction Company; L. J. Drake, Jr., Galena Signal Oil Company, and E. J. Jones, Ohio Electric Railway.

PUBLICITY

A paper on the subject of "Publicity" was next presented by A. B. D. Van Zandt, publicity agent, Detroit United Railway. This paper was printed on page 1067 of the issue of this paper for last week.

President Anderson recalled that among his early impressions was one of the vast amount of sometimes abusive publicity which at one time was given the street railways. Later with the growth of the railway business and a better understanding of that business by the newspapers, the publicity circulated by the daily press had a better effect, and about this time the interurban roads began to advertise their service.

The president next appointed the following nominating committee to report at the annual meeting in Columbus, Ohio, on Jan. 27, 1910: F. D. Carpenter, Western Ohio Railway; S. D. Hutchins, Westinghouse Traction Brake Company; W. C. Whitney, Ohio Electric Railway; George W. Parker, Detroit United Railway; J. H. Crall, Terre Haute, Indianapolis & Eastern Traction Company.

AMERICAN ASSOCIATION

The afternoon session was largely devoted to impressions and reports of the Denver convention of the American Street & Interurban Railway Association. Arthur W. Brady, president, Indiana Union Traction Company, and first vice-president, American Street & Interurban Railway Association, spoke at length regarding the progress of the latter-named association, and its valuable convention at Denver. The points brought out were briefly as follows:

On account of the distance of Denver from the large properties of the East, only those undertook the trip to Denver who were interested in the active work of the association. The several excellent special trains in which most of the attendants at the Denver convention traveled served to afford an unusual opportunity for extended acquaintances, so that at the beginning of the sessions every one was ready for work. The Denver convention was to be characterized as an "enthusiastic" meeting. The sessions of the individual associations were well attended and of much worth on account of the spirited discussions which the papers brought forth. By this successful convention the standing of the American Association had been strengthened greatly.

An excellent example for study was afforded in the street railway system of the Denver City Tramway Company. To many railroad men from the East this property was a revelation, with its remarkable, up-to-date methods and numerous operating novelties that were worthy of careful study.

Mr. Brady stated that one result of the Denver convention had been to demonstrate that the American Association was much stronger than ever before in membership and finances. The question now was not whether the association would be a success, but, rather, how great a success the association could be made. It was important to increase the membership and to maintain the present keen interest of the members. The work of the affiliated associations, as exemplified at Denver, had been of a thoroughly practical character. Important evidence of the truth of this statement could be found in the reports of the standardization committee and in the recently adopted rules for both city and interurban service. These were subjects vitally important to all roads.

The work of the American Association itself, as distinct from the affiliated associations, visibly had not been of such important a character as that of the affiliated associations; that was to say, the greatest work done by the American Association had been in the line of organization —in forming the new Transportation & Traffic Association, and in keeping the work of the affiliated associations under movement in the right channels. For this reason the work of the American Association was immensely valuable, although in general it was of such a character that its practical value was difficult to see and to measure. One important question considered at the Denver convention was the nature of the work which the American Association would undertake in the future. It was believed that the great work for this body, apart from cementing that of the affiliated associations and the electric railway interests of the country, would be to continue along the line of improving public relations; that is, it would tend to disseminate a better understanding among the public of the difficulties which the electric railways must meet. The association also should consider the methods of reform that were being and would be undertaken. The question of rates was always one of vital interest. In the past the public had been misled because of a lack of authoritative information as to the real cost of operation, so that in some localities it was thought that the existing fare within the corporate limits of a city should be reduced from 5 cents to as low as 4 or even 3 cents. For similar reasons, demands had been made for reductions in interurban fares. This situation, Mr. Brady said, was due partly to a misapprehension on the part of the public, because it had not been taken into the confidence of the electric railway companies, and did not know of the physical and other difficulties with which they had to contend. The lack of appreciation of railway conditions as they were might also be due to stories circulated by promoters who intended to be honest but were over-enthusiastic.

Thus the American Association would continue to work along the lines of improving public relations and maintaining concerted action on the part of the affiliated associations. The recently published pamphlet on "The Fare Question" was in line with the future policy of the association's work. This pamphlet, Mr. Brady said, was one of the most valuable every issued on a similar subject. The questions of regulation by Government authority and of legislation by the National Congress at Washington would be studied, and the association in this matter alone could be of service to the member companies far out of proportion to the cost for membership.

On behalf of the American Association, Mr. Brady presented to the members of the Central Electric Railway Association the future policy as here outlined. He knew that the value of the work done by the American Association would be appreciated, and urged that the Central Electric Railway Association should be confident that there was no rivalry, because both associations were working for a common cause. The desire was that all companies should join the American Association and that all operating officials should become associate members. Mr. Brady recommended a careful reading of the annual address of President Shaw, of the American Street & Interurban Railway Association as delivered at Denver. This address was a magnificent resumé of the electric railway situation of the country, and the problems which had to be met. Copies of the address might be obtained from B. V. Swenson, secretary, American Street & Interurban Railway Association, 39 West Thirty-ninth Street, New York.

CLAIM AGENTS' ASSOCIATION

Ellis C. Carpenter, claim adjuster, Indiana Union Traction Company, presented a paper outlining the work of the American Street & Interurban Railway Claim Agents' Association, as performed at the Denver meetings. Mr. Carpenter was elected president of the association at the close of the sessions in Denver, as previously announced in the

ELECTRIC RAILWAY JOURNAL, and his paper, as read at Indianapolis, was published in this paper last week.

TRANSPORTATION & TRAFFIC ASSOCIATION

J. B. Crawford, superintendent, Winona Interurban Railway, presented a detailed narrative of the proceedings of the Denver convention of the American Street & Interurban Railway Transportation & Traffic Association. This paper was also published in the issue of last week.

GENERAL DISCUSSION

R. M. Hemming suggested to the members of the Central Electric Railway Association that it would be a good thing for all electric railways if a standard stop sign were adopted and used in every city in the country. The meaning of the sign would become known quickly, and strangers would not be confused by the various methods and places of stopping cars as now followed by different roads at the order or suggestion of the municipalities in which they operated.

A discussion followed on the advisability of stopping cars on the near side of the street. Mr. Van Zandt said that the Detroit United Railway, following ordinances of the City Council, had had experience with stopping cars on both sides of the streets. As a result it was now the practice to stop all cars only on the near side of the street when within a half-mile circle enclosing the business section of the city, where all streets were paved.

John J. Mahoney, superintendent, Indianapolis Traction & Terminal Company, said that some years ago the City Council of Indianapolis had ordered the traction company to stop its cars on the near crossing, and that the results with this method of operation had been highly pleasing both to the riding public and the company. Later, the change to the present method of stopping on the far side of the crossings had been ordered. The former practice had greatly facilitated the handling of faster schedules because it eliminated many unnecessary stops, notable among which were those on the far side of a crossing made to receive passengers after the cars already had stopped on the near side of the street so that the facing switchpoints might be thrown.

C. L. Henry, president, Indianapolis & Cincinnati Traction Company, thought that a rule requiring cars to stop on the near side of the street would work a hardship on passengers riding on long interurban cars.

F. W. Brown, Michigan United Railways, asked if any one present could recite the results of legal action following the ejection of a passenger who had attempted to ride on an expired transfer. Mr. Mahoney said that the Indianapolis Traction & Terminal Company had won several lawsuits based on such premises. The day sheets kept by the conductor showed the serial number of the transfers in hand, opposite the time of leaving for each half trip, and also, whenever a conductor found it necessary to eject a passenger, the names of witnesses were taken and a special report made. One case of the nature cited had been lost when there was doubt about the question of whether the transfer for the right line had been given.

The meeting adjourned to reconvene at Columbus on Jan. 27, 1910.

The London County Council has finally secured permission from the Government to build an extension of its tramway lines from Woolwich to Eltham, passing close to the Royal Observatory at Greenwich, provided it will equip the line with double overhead trolley. The Royal Astronomer objected to the use of either the conduit or the single overhead trolley system on the ground that stray current would affect the delicate instruments in the Observatory.

SOME FEATURES OF STATE REGULATION OF PUBLIC UTILITIES*

BY JOHN H. ROEMER, MEMBER OF THE RAILROAD COMMISSION OF WISCONSIN

The doctrine that the public has an interest in the use of the property of a public utility employed in a public service, though resting upon the principles of the common law, was not agreeable to the managements of public service corporations when State regulation and supervision of such corporations were first proposed. Nor has there ever been a full assent to this doctrine or a frank submission to the regulatory measures adopted by the State on the part of many such corporations. The view that their undertakings, except to a limited extent in the case of common carriers, were purely private business enterprises which could be conducted upon like principles as those prevailing in other commercial pursuits, controlled the managements in the transaction of all the affairs of the corporations, whether pertaining to their private corporate functions or to those relating to their public callings.

It was not until Munn vs. Illinois, the first of the so-called Granger cases, reached the Supreme Court of the United States and was there decided, that the right of the public in the use of private property devoted to a public purpose which, in its nature and because of economic conditions, clothed the owner with a practical monopoly, was fully recognized in its economic aspects and as legally grounded upon the principles of the common law. This case marks the beginning of a new epoch in economic legislation affecting public service corporations in this country. The agitation of Federal control of interstate carriers at once began in Congress and continued until the enactment of the interstate commerce act. State after State took up the subject and enacted laws along the lines of the Federal act until to-day a number of States have provided State agencies for the control and supervision of transportation by railroads and other common carriers. Perhaps the most efficient and certainly the most carefully considered law on the subject is the Railroad Commission act of Wisconsin. Since its enactment the Wisconsin law has been the prototype of practically all legislation upon the subject in other States where intelligent and effective regulation has been desired.

In less than two years from the time the Railroad Commission act became effective, the propaganda resulted in inducing the legislature to supplement the railroad act with the public utilities law now in force. The scheme of State supervision of public utilities embraced in this law is the most comprehensive in all its economic aspects and the most effective of any law of the kind in existence. After two years of administration under its provisions no amendment changing any fundamental provision of the law has been suggested from any quarter. If the intention of the eminent economist and lawyers, who conceived and framed the law, may control in its administration and may not be nullified by judicial interpretation deemed necessary to meet some theory of constitutional requirements or inhibitions, the experiment undertaken in this State to regulate and supervise public utilities in an intelligent and logically consistent manner may become an established policy of the State and a guide to other States in solving a common problem. We have not, however, proceeded far enough at this time to pass intelligent judgment upon the final results of the operation of the law, nor even to predict with any degree of confidence whether the law will fully meet the purposes of its enactment. Nevertheless we do know that the benefits which have resulted to the public and the utilities so far have been great and important, but the full benefits designed by the law, if attainable under it, can only be enjoyed in time to come. Under the circumstances the public, the utilities, and the commission can well afford to labor together patiently and harmoniously and, disregarding the clatter of the blatherskite and demagogue, to take each step cautiously, knowing that the achievement intended will rebound to the material and moral welfare of society and, if successful, as it probably

*Abstract of an address delivered before the Wisconsin State Bar Association at Milwaukee, Wis., Sept. 1, 1909.

will be if confidence and patience are indulged, will be a credit to the State and a blessing to posterity.

Among the most important and salutary provisions of the law is that providing for the valuation of the property of all public utilities operating within the State. The Supreme Court of the United States having in effect determined that the owner of private property devoted to a public use is entitled to exact from the public such charges for the services rendered or product furnished by him to the public as will generally produce revenue sufficient to meet operating expenses, cost of maintenance, and depreciation of the plant, and also to provide a reasonable return upon a fair value of the property so employed, it was necessary to provide for an appraisal of such property in order to have a lawful basis upon which to determine intelligently the question of rates and charges.

That every legitimate element of value, whether tangible or intangible, might be considered, the law provides for the valuation of the physical property and of all the property of a public utility "actually used and useful for the convenience of the public." In view of the indefinite and uncertain statements found in the opinions of most of the courts regarding the elements of value that properly and necessarily enter into the matter and must, therefore, be considered in arriving at the fair and just valuation of the active property of a public utility, the legislature wisely extended the latitude of the inquiry so that no infirmity in the scheme of valuation proposed might exist because, perchance, of some transgression of the provisions of either the State or the Federal constitution inhibiting the taking of private property for public purposes without just compensation being made to the owner thereof. The duty thus imposed upon the commission is the gravest and most important of all its functions. The value of every security of a public service corporation in this State will be determined and perhaps irrevocably fixed by the appraisal made by the commission of the property of such corporation upon the credit of which such security was issued. There can be no escape from this conclusion.

Fair and reasonable as such apppraisal may be, it will signify to the world that in the future public utilities in this State will cease to be subjects for speculative investments. It will also indicate that which is more important, to-wit, that actual and bona fide investments in such concerns, when providently made, will be secure under State supervision and the adequacy of the security will be maintained by a strict enforcement of the law requiring, wherever and whenever possible, an adequate depreciation reserve fund to be set aside so that the physical plant may at all times be maintained to a maximum of efficiency, and the integrity of the investment may not be impaired from any cause or contingency incident to the operation and use of the property.

The need of additional capital to extend existing plants to meet the public requirements may be met at less sacrifice, in my judgment, under such circumstances, than the customary bond discounts of the present day, and if we are to accept the word of some of our leading financiers, capital under the conditions mentioned will be available at less rates than are at present in vogue.

There is no reason why the bonds of public service corporations at a low rate of interest should not compete in a measure with public securities for the favor of those seeking secure investments and such as are readily convertible into cash. In some of the New England States, notably Massachusetts, they stand on a parity with public securities, and by law are permitted to be purchased by savings banks and to become investments for trust funds. Doubtless in time we may find the same conditions prevailing here, but before such is likely to be the case many, if not most, of our public utilities will have to undergo a financial regeneration. To insure stability to the securities it is essential that they approximate a truthful representation of the investment. When the disparity between the actual investment and that reflected by the capitalization becomes a matter of public record, the self-interest of the security holders will doubtless bring about a readjustment of the capitalization upon a sound and truthful basis. This has occurred in almost every public service corporation of any importance in the country, and in some has occurred more than once.

Those who desire to withstand any scaling of capitalization when the latter is discredited by financiers and becomes an impediment to business extension often contend, but never successfully, that the capitalization of a public service corporation does not concern the public; that the securities of such a corporation are mere private corporate contracts between the parties thereto, and should therefore be permitted to assume such lawful form as the parties in interest may agree upon. The contention in relation to stock issues contains an element of truth, but in relation to bond issues and other evidences of indebtedness it is without any moral or reasonable basis for support; but even before it can be conceded as sound in connection with the issue of capital stock there must be a radical change in the character of such securities. If each share of stock represented upon its face but an aliquot part of the property of the corporation, the number of parts into which the corporators should divide the corporate holdings would be of no public consequence, and this is particularly true in this State under the public utilities law, by the terms of which the return to the investors is based upon the fair value of the active property of the corporation which forms the measure of the value of the securities issued against it.

The uniform system of accounting required of all public utilities under the provisions of the law has already demonstrated the wisdom of its adoption.

While the system of accounting comprehends a scientific and carefully arranged separation of accounts, its application to the various situations and conditions under which the utilities are operating may result in certain modifications which experience may demonstrate to be necessary before the method of accounting will be permanently established.

But the principles upon which the system has been constructed, being in accord with the best thought and practice on the subject, will not be changed. Nor will the system be weakened to satisfy the theory of those who believe that the public should be satisfied with general statements of receipts and expenditures rather than detailed reports differentiating the items in accounts that will enable an intelligent judgment to be formed of the various details of operation and management. Any alteration in established business methods necessarily meets with the opposition of the non-progressive and self-satisfied manager, but when a change is once inaugurated such resistance passes away and a return to the old methods would be met with equal aversion.

All municipal public utilities will be required to keep their accounts in conformity with the established system. The most vital objection urged against municipal ownership and operation of public utility plants has been the lack of business ability generally displayed in such undertakings. Under the plan of accounting provided by the law and with the exercise of reasonable diligence on the part of those charged with its execution, I see no reason why municipal plants may not be administrated as efficiently and economically as those controlled by private capital.

The valuations thus far made have been undertaken for the most part in connection with rate complaint cases, although the law contemplates the ultimate valuation of every utilities property in the State.

The engineering staff endeavors to determine as accurately as possible the true "cost of reproduction" of each item of physical property included in the inventory. All available evidence is carefully weighed with a definite purpose of arriving at a "middle-ground" decision on the value of each detail of the property, both as to the "cost new" and the depreciated or "present value." Throughout its work the attitude of the staff is carefully guarded against bias of any kind, with the intention that the service rendered to the commission shall be identical in kind and quality with that of a technical expert chosen independently by the court to give expert advice or opinions in technical matters. This balance of judgment, it is believed, is strongly sustained by the fact that the staff is continually engaged in physical valuations for both taxation and rate-making purposes.

In the course of its work, extending through a period of years and covering the widest possible range or variety of detail of physical properties, there has been accumulated a vast fund of cost data and other information invaluable

in work of this kind, much of the data naturally being of a confidential character. An important feature of the valuation staff work is the collection and assimilation of this information.

Special studies of local conditions, with a view of discovering the underlying causes for defective service and of pointing out the best manner of remedying such defects, afford the sole means of successfully attacking some of the problems which confront the commission.

The commission has carefully guarded against assigning its staff to those lines of service which properly should be undertaken by the engineer in private practice. Such intrusion may perhaps not be wholly avoided, but slight encroachments, if they occasionally occur, are quite certain to be outweighed by the frequent opportunities which already have arisen to suggest to inquiring officials the names of eligible practicing engineers to render a specific service beyond the legitimate scope of the work of the staff. This latter delicate service has been rendered in a number of cases by suggesting the names of several engineers eligible for a given service.

Although not directly concerned with the public utilities law itself, mention may appropriately be made of the exhaustive study of the service rendered by the Milwaukee Street Railway Company, the staff report on which was recently given to the public.

Various reasons have been assigned for the general failure of such corporations to act in accordance with the desire of the legislature respecting the surrender of local franchises and the acceptance of indeterminate permits, but the controlling reasons for the attitude assumed by such corporations in the matter seem to have been (1) a doubt as to the legal right of the directors and stockholders to make the surrender without the consent of the bondholders whose mortgage security covers and includes the franchises of the corporation; (2) the practical impossibility of ascertaining all the bondholders and acquiring their consent, and (3) the erroneous, though perhaps not all-founded, conception of the value of such franchises.

The fact that a new phase, "indeterminate permit," was coined and employed in the act to denominate a franchise when used in its generic sense, that is, as embracing all the secondary or special franchises granted to a public service corporation, either directly by the State under general legislative provision or indirectly by the State through a Common Council or other municipal body duly authorized thereto, has had a deterring effect upon such corporations, and notwithstanding the legislature has again opened the season for exchanging franchises there has been no perceptible change in the attitude of the corporations toward the proposition.

As the utilities are generally desirous of canceling their long time discriminatory contracts with municipalities for service for municipal purposes and those with individuals for private purposes, it would have been, perhaps, better if the Legislature had in the first instance attached less importance to such contracts and amended every franchise by making it exclusive and practically perpetual, although subject to termination by the acquisition of the physical property of the utility under eminent domain.

In considering the features of the law, hereinbefore discussed, in their broader aspects it would appear that the unbiased mind must necessarily come to the conclusion that the system of State regulation and aid provided by the public utilities law of this State is capable of producing eventually more permanent and satisfactory results than any system of local control that can be conceived. It recognizes that public utilities are business enterprises requiring a high character of scientific skill as well as business ability for their successful operation and management. Any public control which ignores this fact must of necessity fail. Local control, as commonly practiced, consists of nothing more nor less than spasmodic attacks upon rates and services of public utilities regardless of the physical conditions of their plants, their financial needs or possibilities. Because of local attacks public service corporations have not infrequently yielded to local pressure and reduced their charges for the sake of peace when public interest, if the situation had been properly understood, would have been best served by maintaining the revenues so as to have enabled them to make improvements by adopting new inventions and thereby rendering better service at a permanently reduced cost. That public regulation which does not deal intelligently with the business interests as well as the physical property of a public service corporation will prove disastrous in the end. The Wisconsin law is well adapted to a wise supervision of all the affairs pertaining to the operation and business administration of every public utility subject to its provisions.

IMPROVEMENTS CONTEMPLATED IN LOS ANGELES BY THE PACIFIC ELECTRIC RAILWAY

The Pacific Electric Railway, under which name the interurban lines of the Huntington system in Los Angeles are being operated, is planning to make important extensions and improvements during the coming year. During the last three months the company has purchased 5500 tons of rails and 300 steel freight cars, most of them of 100,000 lb. capacity. The company is now carrying daily 250 carloads of freight. It is also proposing to extend the capacity of its main passenger station at Sixth and Main Streets, Los Angeles, to accommodate its increasing traffic.

SOME EMPLOYMENT CONDITIONS OF BERLIN CAR MEN

The Grosse Berliner Strassenbahn, operating with its subsidiary companies practically all the street railways and part of the omnibus traffic of Berlin, employs about 7600 motormen, conductors and chauffeurs. The average daily working time for conductors is 10 hours and for motormen is nine hours. This paid working time includes the period needed to make the car ready for operation, for which purpose the conductor is allowed 10 minutes and the motorman 15 minutes. The men are also paid for waiting time. The average paid "lay-over" time is 12 minutes an hour, but compensation is given for "waits" up to and including 30 minutes provided that they occur within working hours. If all paid non-run "waits" are subtracted from the nominal labor time the actual working periods of the motorman and conductor average, respectively, 7 hours and 15 minutes and 8 hours. A platform man is granted at least 8 hours' free time between successive days. When the schedule calls for a little overtime a full hour's pay (½ M) is given for periods of 30 minutes and over. On the average every regular man has a day off every seven days at his own expense. Of this free time at least seven days in the year must fall on Sundays or holidays. Trippers have at least two free days without pay every month.

RATES OF PAY AND OTHER ITEMS

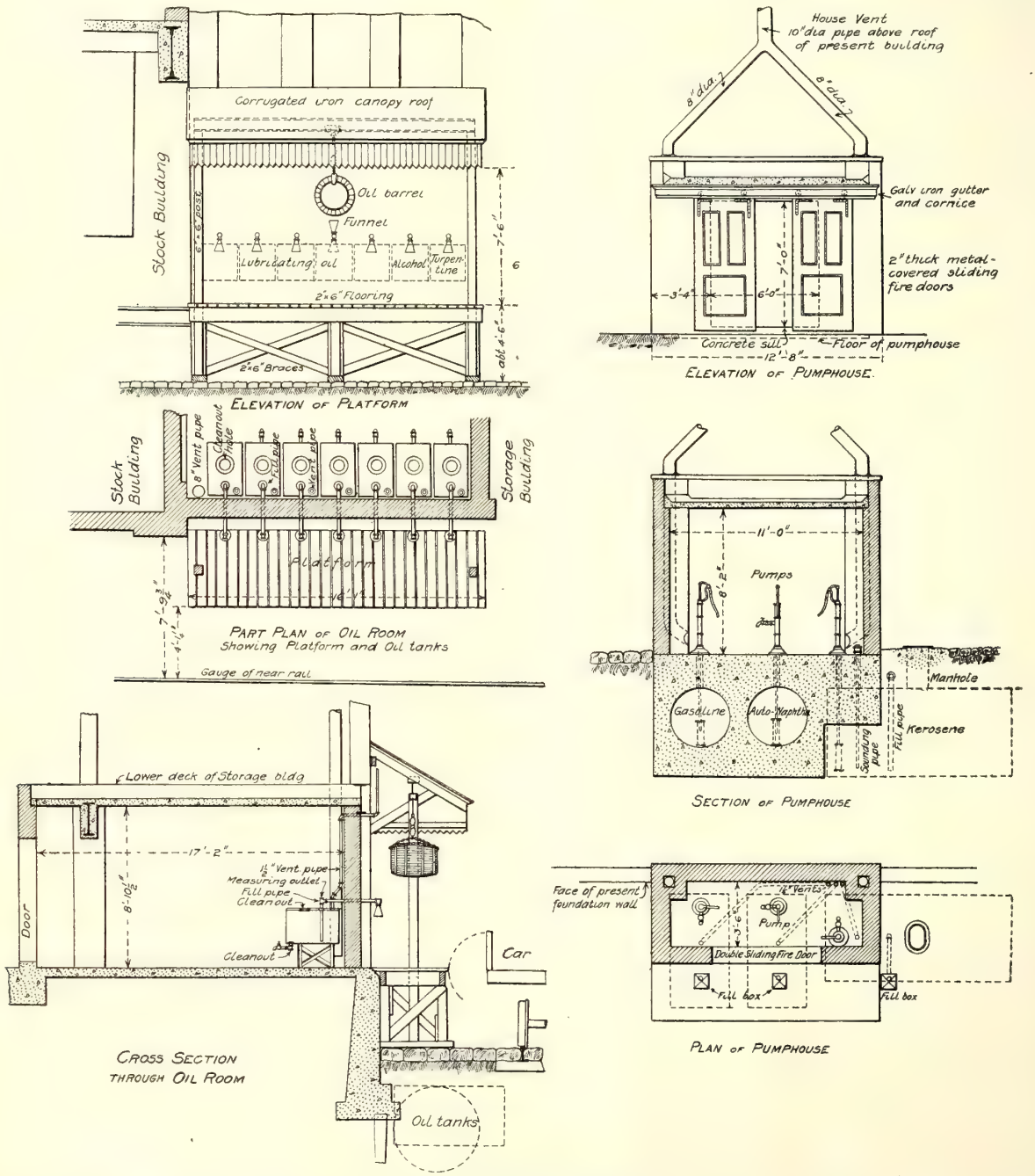
In considering the wages paid to the platform men it should be borne in mind that while the German mark has an exchange value of 24 to 25 cents only many of the expenses of living are lower than in the large Eastern cities of the United States. Consequently it will not give a correct idea to divide by four the figures hereinafter given to obtain the American equivalent in dollars; in many cases a division by two or by two and one-half would give a more exact concept of the purchasing power of the mark in Germany. The monthly wages of motormen and conductors are as follows: First year, 95 M; after one year, 100 M; after three years, 105 M; after five years, 110 M; after seven years, 113 M; after nine years, 115 M; after 11 years, 118 M; after 12 years, 120 M; after 15 years, 125 M; after 20 years, 130 M. It will be noted that seniority is an important factor in the rates paid. Instructor motormen receive extra compensation. Extra men get 3 M

a day. Students are paid 2 M a day, but if they have been in the employ of the company for three months they receive a daily wage of 2.5 M. Overtime for "extras" and "students" is paid for at the rate of 0.3 M an hour.

Every motorman and conductor is provided with a free service uniform as follows: Motormen and conductors, one cap and jacket once a year and one pair of trousers every two years. A cloth cape is also furnished to both classes in addition to which the motormen receive overcoats and winter caps. The company also gives large amounts to various employees' benefit funds. The functions of the latter need not be described in detail in this article, but may be summarized as follows: Sick and illness fund, a compulsory institution to which the company gives voluntarily more than the sums required by the law; pension, widow and old-age fund, which was started in 1905 with a $200,000 endowment from the company; social organization of employees for miscellaneous welfare work, which receives an annual contribution from the company; co-operative building association, an off-shoot of the welfare association, which has been assisted by low interest loans. Compulsory insurance against the injury of employees is cared for by membership in a mutual insurance organization of railway companies.

OIL HANDLING IN BROOKLYN

The Brooklyn Rapid Transit Company recently has installed at its Nostrand Avenue track and line headquarters some fireproof storage facilities and pumping apparatus for handling oil and other inflammable liquids. The installation comprises one unloading and two storage plants, all being arranged alongside the stock and storage buildings adjacent to one of the unloading tracks which run through the yard. The new method of handling oil in bulk greatly simplifies its delivery, and it is quite possible that in future the supplies will be brought in tank cars which will serve the entire system.

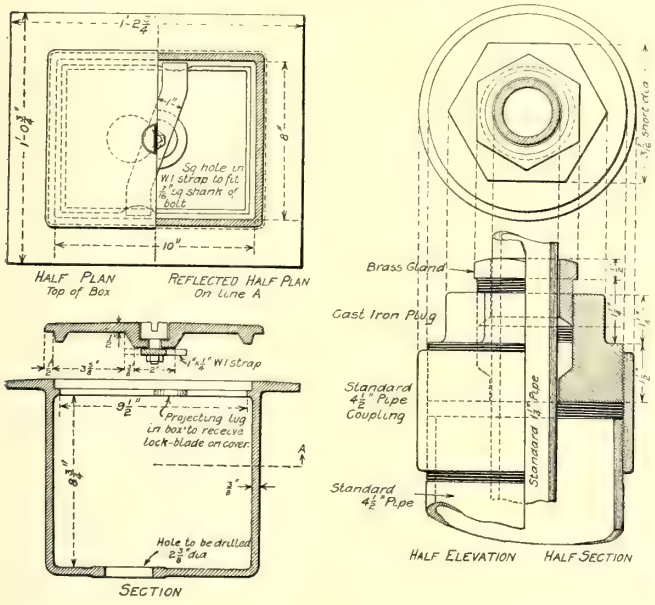


Brooklyn Oil Handling—Elevations and Sections, Showing Transportation of Oil to Inside Storeroom and Also to Underground Storage.

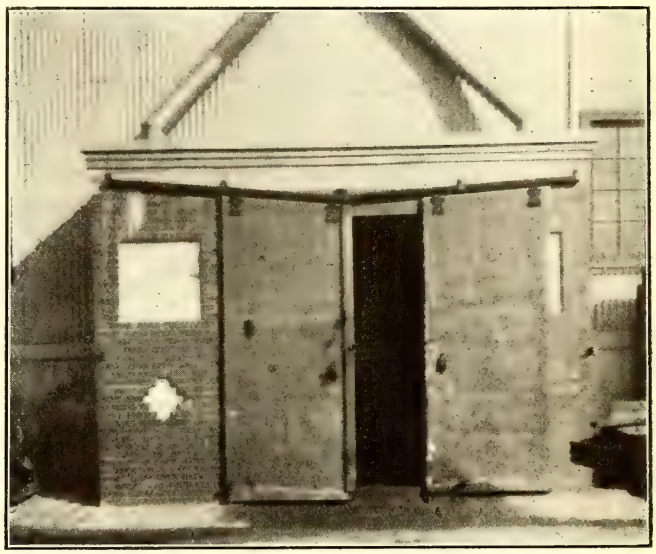
The larger underground storage consits of a concrete pit, in which are buried one gasoline and one auto-naphtha tank, each 3 ft. 2¼ in. in diameter and 5 ft. 10½ in. long inside, and one kerosene tank, 4 ft. 8¼ in. in diameter and 10 ft. long inside. The kerosene tank is provided with a 10-in. x 16-in. manhole, to permit cleaning and inspection. As shown in the accompanying section, each tank has a cast-iron fill box with fill pipe, a pump and a sounding pipe with vent. The gasoline and auto-naphtha tanks are separated from the wall of the storage building by 8 in. of concrete, and from the floor of the pump house by 24 in. of concrete, the whole making a safe and durable construction. The three pumps are protected by a neat brick house, with reinforced concrete roof. Entrance to the house is through a sliding double fire door. The main vent pipe is carried through and above the roof of the pump house to the top of the adjacent building.

The second underground installation was required in connection with the blacksmith shop. It consists of a pit with reinforced concrete base, containing a fuel oil tank 4 ft. 8 in. in diameter and 8 ft. 2 in. inside length, which rests directly against the wall of the building. This tank is also provided with a 10-in. x 16-in. manhole to allow overhauling. The oil is conveyed to the forges on the floor above by means of a suction pump which is driven by belting from a short countershaft outside the building.

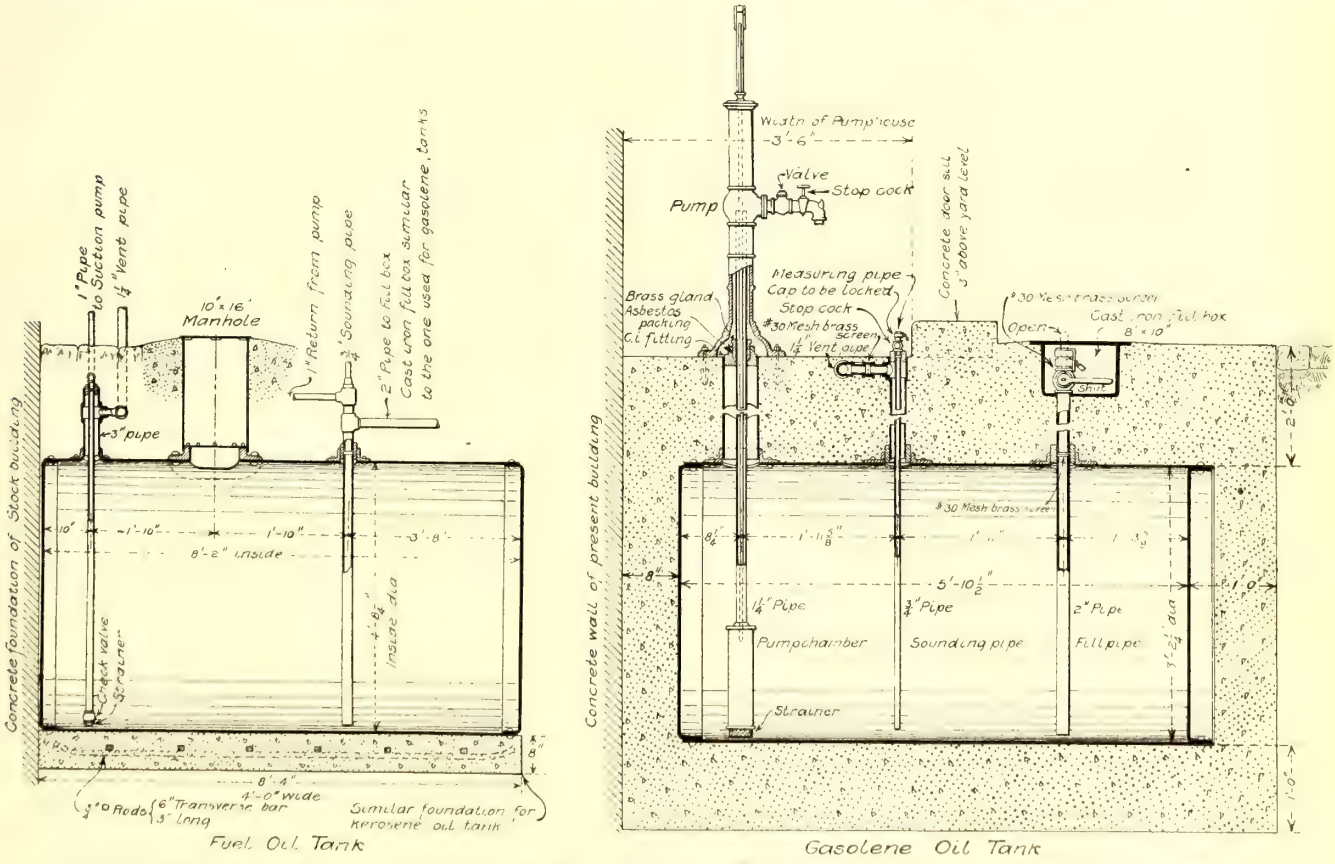
To facilitate the delivery of supplies to the inside oil



Brooklyn Oil Handling—Details of Cast-Iron Fill Box and Fittings

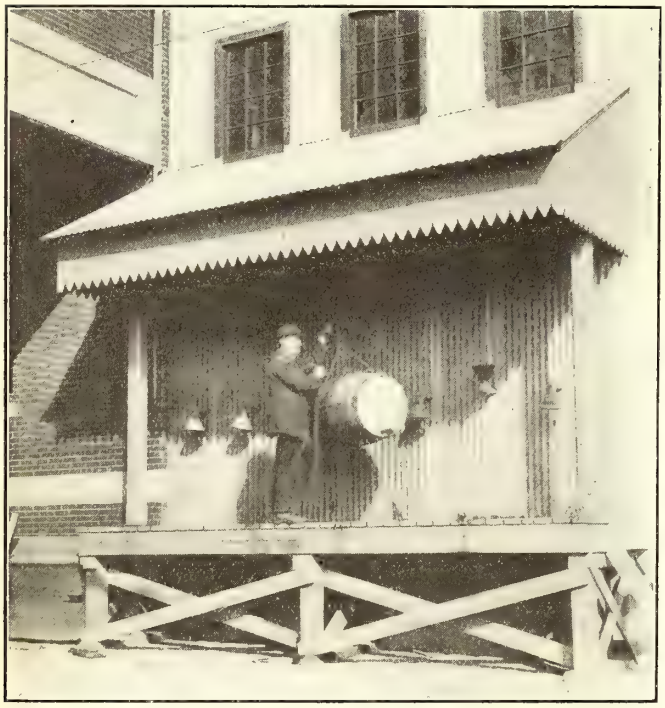


Brooklyn Oil Handling—Pump House Over Underground Storage Tanks



Brooklyn Oil Handling—Cross Section Showing the Pumping Arrangements for Underground Storage Tanks

room, there has been erected between the two pits described a wooden unloading platform with a corrugated iron roof. This platform is opposite the outer wall of the oil storage room and on a level with unloading cars. It is furnished with hoisting blocks, chains and a set of galvanized-iron swivel funnels, one for each kind of liquid delivered. As a barrel is emptied the contents pass from the funnel through



Brooklyn Oil Handling—Filling Oil Tanks in Storeroom From Outside Platform

a corresponding pipe in the wall to the alcohol, turpentine or lubricating oil tanks in the storage room, as illustrated. The tanks are of metal and are carried on steel bents. By storing the oil in this way, the utmost cleanliness is assured, and the barrels can be taken away immediately.

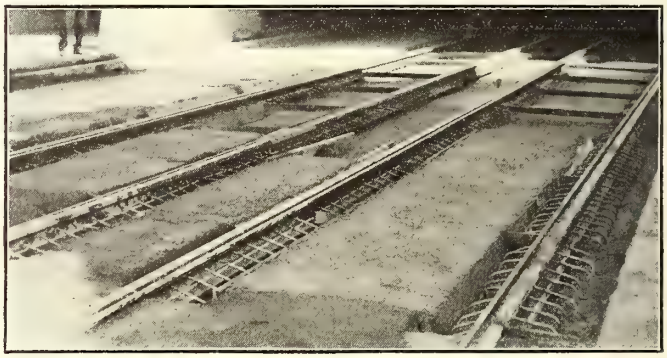
LAYING RAILS IN REINFORCED CONCRETE

Dr. M. Eisig, manager of the Chemnitz, Germany, municipal street railway system, has recently designed a novel construction for rigidly anchoring in a reinforced concrete base rails laid in paved streets. As shown in the accompanying engravings, the anchorage consists of iron rods ¾ in. to 1⅛ in. in diameter and from 20 in. to 24 in. long passing through the web or the base of the rail from 6 in. to 8 in. apart and imbedded in the concrete girder which surrounds the rail below the head. These rods are securely fastened to the rail by conical channel pins and are bent down at the ends to secure a firm hold in the concrete. The rods not only tie the rail to the concrete, but also serve as lateral reinforcement in the concrete beam. Additional reinforcement can be used by placing longitudinal rods in the concrete beam parallel to the rail and tying the two sets of rods together with wires at the points of intersection.

The resistance to lateral motion of the rail under this construction is increased by inserting the transverse rods through the web of the rail close under the head. The distance between the top of the head of the rail and the center line of these rods depends on the depth of the paving and the thickness of the layer of concrete above the rods. As shown in the cross-section engraving, the rods are inserted 2¾ in. below the top of the rail head, with an asphalt pavement 2 in. thick. The adhesion of the concrete to the rail and the rigidly attached reinforcing rods prevent any movement of the rail relative to the concrete beam, and thus there is no grinding or pulverizing due to the rail working loose under vibration.

In laying track with this construction, careful workmanship is essential. The work should be intrusted only to specialists in reinforced concrete construction. To avoid the formation of bubbles, the concrete forming the supporting beam should be mixed with more water at the base than near the top of the rail. Before being imbedded in the concrete the rails and reinforcing rods should be free from all surface imperfections, such as rolling mill scale, rust, dirt and grease. The first section of track laid in Nurnberg, Germany, in June, 1909, was built in the following manner:

The rails, after being bolted together at the joints, were thoroughly cleaned with steel brushes. The transverse



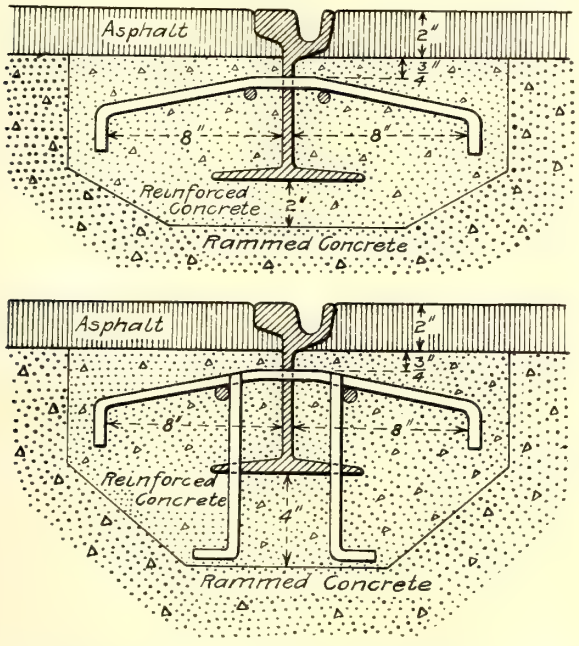
Reinforced Concrete Track Foundation in Nurnberg, Germany

rods were then placed in position and securely fastened with channel pins. Next, the longitudinal reinforcing rods were wired to the cross rods. Mold boards were put in place to confine the main body of plain concrete between and outside of the rails, and this concrete was then placed and tamped to the proper level. About half an hour later the mold boards were removed and the concrete beam surrounding the rail and inclosing the reinforcement was poured and thoroughly worked into a solid mass. Finally, the two masses of concrete were tamped on the surface to obtain perfect adhesion at the contact surfaces. The concrete foundation was allowed to set for 10 days before laying the asphalt paving.

This piece of trial track was about 200 m long, and the cost of laying, including concrete and reinforcing rods, but excluding the rail, is said to have been $1.77 per yard of rail, or $3.54 per running yard of track. The cost of the concrete used in the supporting beam was higher than for ordinary track foundations, because a richer mixture was required, but, on the other hand, the cost of labor was slightly less. While the cost of this method is claimed to be materially less than that of supporting the rails on ties imbedded in concrete, the principal advantage which is claimed is that it insures a unit structure of the rail and the concrete foundation beam. It is not possible for the rail to separate from the concrete unless the latter disintegrates completely. The construction also prevents lateral tilting of the rail head due to the elasticity of the web. If the theory that corrugation of rails is largely caused by vibration is correct, this construction should go far toward eliminating at least one cause of corrugation.

While it may be more difficult to replace or to repair

rails imbedded in concrete in this manner, the increase in the life of the track due to the permanency of the construction, it is believed, will more than offset this disadvantage. It is expected that the track foundation will last at least as long as the rail itself, and, therefore, a renewal of the foundation will not be necessary until the rails are completely worn out. In case repairs are necessary, the concrete can be separated readily from the reinforcing rods by pneumatic chisels, and the reinforcing rods may be broken off of the rail with a sledge, after having been nicked with a chisel.



Cross Sections of Two Types of Reinforced Concrete Track Foundation

This construction is to be tried in a number of German cities next year. It has been patented in Europe and in the United States.

OILING MOTORS ON A MILEAGE BASIS IN BALTIMORE

On Nov. 1 the United Railways & Electric Company, of Baltimore, Md., put into use a system of oiling the motor bearings of all revenue cars on a mileage basis. Motors are oiled at the division car houses on instructions from the office of the superintendent of shops where all records of mileage are computed. Mail, express, maintenance of way and special parlor cars are not included in the plan nor are snow-plows and sweepers. The system is not intended to supplant the previous practice of having car-house foremen follow closely the mileage of the cars in their charge, but it is believed it will relieve those divisions where the work of computing the mileage daily has proved too great a task and will result in better economy and efficiency of lubrication on the whole system.

The mileage of each car is kept by a simple method which reduces the clerical labor in the office of the superintendent of shops to a minimum. A printed card, 3¾ in. x 9¼ in., one of which is reproduced, is used for keeping the mileage record of each car. These cards are filed in a box in numerical order according to the numbers of the cars which they represent. When the system was first put into use each card was stamped with the date and the words "armature and axle bearings." All cards were also given a serial number 1. The armature and axle bearings of all cars were inspected and lubricated just prior to Nov. 1, when the system went into effect.

Each day the transportation department sends to the office of the superintendent of shops a statement of the mileage made by all cars in service on the previous day. One clerk reads off from this statement the car numbers and mileages while another clerk makes the entries on the cards by putting check marks in the small squares. Each small square represent 10 miles and each large square 500 miles. Space is provided for recording 4000 miles in the eight large squares. The record indicated in this way is cumulative and requires no additions to be made by the clerk. The total mileage can be read at a glance.

When a car has made the required mileage since its last oiling its card is removed from the box and another card substituted. The new card is stamped with the date and given the next succeeding serial number. As the intervals between oiling the axle bearings are twice as long as those between oiling the armature bearings, cards bearing even serial numbers are stamped "armature" to indicate that at the end of the proper period only the armature bearings will be oiled. Thus the second card will be marked "armature" while the third will again be stamped "armature and axle bearings," the same as the first card.

MILEAGE SCHEDULE FOR OILING ARMATURE AND AXLE BEARINGS.

Motor.	Armature Bearings.	Axle Bearing.
West. 3	500 miles.	1,000 miles.
West. 12-A	500 miles.	1,000 miles.
West. 49	500 miles.	1,000 miles.
West. 56	500 miles.	1,000 miles.
West. 101-B	Once per month.	1,800 miles.
West. 101-D	Once per month.	1,800 miles.
G. E. 1,000	650 miles.	1,300 miles.
G. E. 80	900 miles.	1,800 miles.
G. E. 90	900 miles.	1,800 miles.

The cards removed each day are stamped with the date in the blank space above the row of squares and are then sent to the foreman of the car houses where the respective cars are stored. Notice is given over the telephone in advance of sending the printed slips so that the foreman will have an opportunity to hold in cars for oiling before the cards are received from the office. When a car has been oiled according to instructions its card is signed by the car-house foreman and returned to the office where it is retained for future reference.

Before inaugurating the system a careful study was made of the lubrication requirements of the various types of motors in service. The accompanying tentative mileage schedule was drawn up and is now being used, but it is expected that the mileage made between oilings can be increased in the future by improved methods of inspection and packing.


Car No._____

THE UNITED RAILWAYS AND ELECTRIC CO.
SHOPS DEPARTMENT.
NOTICE FOR OILING.

The above car has completed its oiling mileage and should be oiled, _____

This notice has been complied with (Signed) _____ Foreman.

Foreman should return this to Superintendent's office promptly after car has been oiled

Mileage Record Card

The United Railways & Electric Company owns about 1500 revenue cars of which lubrication records are being kept with this system. Between 800 and 900 cars are operated each day and to make the entries of mileage on the record cards of this number of cars requires the time of two clerks for about two hours a day.

THE FUEL CONSUMPTION OF LOCOMOTIVES

Prof. W. F. M. Goss has just made an analysis of the utilization of fuel in locomotive practice in a bulletin just issued by the United States Geological Survey. Professor Goss says that the locomotives in service on the railroads of this country consume more than one-fifth of the total coal production of the United States, and places their entire annual consumption at 90,000,000 tons, valued at $170,500,000. The amount utilized and lost is tabulated in the report as follows:

SUMMARY OF RESULTS OBTAINED FROM FUEL BURNED IN LOCOMOTIVES.

	Tons.	Percent
1. Consumed in starting fires, in moving the locomotive to its train, in backing trains into or out of sidings, in making good safety-valve and leakage losses, and in keeping the locomotive hot while standing (estimated)	18,000,000	20.0
2. Utilized, that is, represented by heat transmitted to water to be vaporized	41,040,000	45.6
3. Required to evaporate moisture contained by the coal	3,600,000	4.0
4. Lost through incomplete combustion of gases	720,000	0.8
5. Lost through heat of gases discharged from stack	10,080,000	11.2
6. Lost through cinders and sparks	8,640,000	9.6
7. Lost through unconsumed fuel in the ash	2,880,000	3.2
8. Lost through radiation, leakage of steam and water, etc	5,040,000	5.6
	90,000,000	100.0

In discussing these several amounts Professor Goss says that the amount of fuel consumed in preparing locomotives for their trains, etc., is controlled principally by operating conditions, by the length of divisions, and by the promptness with which trains are moved, and it is reasonable to expect that the normal process of evolution in railroad practice will tend gradually to bring about some reduction in the consumption thus accounted for. The fuel required to evaporate moisture in the fuel and that which is lost through incomplete combustion are already small and are not likely to be materially reduced. That represented by the heat of gases discharged from the stack offers an attractive field to those who would improve the efficiency of the locomotive boiler. So long as the temperature of the discharged gases is as high as 800 deg. Fahr. or more there is a possibility of utilizing some of the heat by the application of smoke-box superheaters, reheaters, or feedwater heaters, though thus far the development of acceptable devices for the accomplishment of this end has made little progress.

The fuel loss in the form of cinders collecting in the front end and passing out of the stack is very large and may readily be reduced. A sure road to improvement in this direction lies in the direction of increased grate area. Opportunities for incidental savings are to be found in improved flame ways such as are to be procured by the application of brick arches or other devices. Such losses may also be reduced by greater care in the selection of fuel and in the preparation of the fuel for the service in which it is used. It is not unreasonable to expect that the entire loss covered by this item will in time be overcome. The fuel which is lost by dropping through grates and mingling with the ash is a factor that depends on the grate design, on the characteristics of the fuel, but chiefly on the degree of care exercised in managing the fire. More skillful firing would save much of the fuel thus accounted for. The radiation and leakage losses may, in part, be apparent rather than real, owing to possible inaccuracies in the process of developing the heat balance. On the assumption that the values are correct as stated in this bulletin, however, Professor Goss does not think it likely that under ordinary conditions of service they can be materially reduced.

In conclusion he says: "Locomotive boilers are handicapped by the requirement that the boiler itself and all of its appurtenances must come within rigidly defined limits of space, and by the fact that they are forced to work at very high rates of power. Notwithstanding this handicap, it is apparent that the zone of practical improvement which lies between the present-day results and those which may reasonably be regarded as obtainable is not so wide as to make future progress rapid or easy. Material improvement is less likely to come in large measures as the result of the revolutionary changes than as a series of relatively small savings in the several items to which attention has been called."

RESTRICTING THE LIMITS OF THE 5-CENT FARE ZONE*

BY J. H. WILSON, PRESIDENT, MOBILE LIGHT & RAILROAD COMPANY

Many electric railway companies have realized that the rates of fare adopted several years ago are inadequate; they find that operating expenses have increased very much and they also see now that they miscalculated as to the prospective profit.

State Railroad Commissions have realized that a mistake was made and have authorized increases in rates. A mistake that many companies have made and are still making, is the extension of the 5-cent fare zone to a distance where it becomes unprofitable and loads the company with an encumbrance that holds it down and prevents the profit to which the investment is entitled. I know of a road that carries a passenger 19 miles for five cents. This road reaches on its 5-cent fare zone a small suburban town, nine or 10 miles away from the business center of the city; the operating expense per passenger per car-mile would indicate that the road loses a few cents on each passenger carried over this suburban line.

The Mobile Light & Railroad Company can tell, with its system of records, whether or not a profit is made on the second 5-cent zone of lines extending to suburban districts. A company having a one-fare zone for the entire district can not accurately determine on account of lack of data whether or not it has adopted the correct plan.

The Mobile Light & Railroad Company operates 55 miles of track in a district having approximately 65,000 population. The gross passenger receipts are about $550,000—transfers being issued. The system is divided into four divisions, the city division or first 5-cent fare zone, and three county divisions, known respectively as the Spring Hill, Whistler and Magazine Point divisions, on each of which an additional fare is collected. The three county divisions commence at points about four miles from the down-town terminus. The first extends three miles and the others two miles into the country. Each month a statement is made giving statistical information and costs of each division. Costs are actual or estimated according to earnings, car mileage or car hours. The form can be used for a yearly or quarterly statement, and is shown on the opposite page.

The extensions of this form for both statistics and costs have columns for current and previous years, increase or decrease, and percentage of such increase or decrease. The items under the heading of "costs" are also carried out for

*Abstract of paper read before the Alabama Light & Traction Association, Birmingham, Ala., Nov. 15 and 16, 1909.

current and previous years per car-mile, and show the increase or decrease of car-mile costs. The same information is shown per car-hour and per car-trip. The statistics are absolute, the costs are partly absolute and partly estimated. The maintenance of roadway and tracks and electric lines are the actual amounts expended, account being kept of all work done on each division. The group entitled "power house operation, maintenance and insurance," is

.....DIVISION FOR.....19.....

STATISTICS.

K.-W. hours .....
Mileage—full-time cars .....
Mileage—tripper cars .....
Mileage—extra cars .....
Mileage—total cars .....
Hours—full-time cars .....
Hours—tripper cars .....
Hours—extra cars .....
Hours—total cars .....
Trips—full-time cars .....
Trips—tripper cars .....
Trips—extra cars .....
Trips—total cars .....

COSTS.

ACCOUNTS.

Maintenance of roadway and track (actual).....
Maintenance of electric lines (actual).....
Maintenance of buildings and structures. Extra power house (mileage).
Maintenance of equipment except power house (mileage).....
Maintenance of shops (mileage).....
Superintendent of transportation (car hours).....
Power house operation, maintenance and insurance.....
Operation of cars (car hours).....
Traffic expense (earnings).....
Administration and general expense, less power house insurance (earnings)
Injuries and damages (earnings).....

TOTAL OPERATING AND MAINTENANCE.

Taxes—State and county (earnings).....
Taxes—city (earnings, city division only).....
Licenses—State and county (earnings).....
Licenses and per cent on earnings (city division only).....
Interest on funded debt (earnings).....
Interest on floating debt (earnings).....

TOTAL FIXED CHARGES.

Depreciation .....

GRAND TOTAL.

Earnings from operation.....
Surplus or deficit.....
Per cent.....

charged according to the current consumed on each division. Taxes for each division are estimated according to earnings. This is a fairly correct method in Alabama in arriving at an estimate of taxes chargeable to the division, as in this State the franchise tax is the principal tax assessed against an electric railroad company, and the value of the franchise is derived from the earnings.

The form is worked up from information derived from our accounts for information of the management only.

The cost of maintenance of tracks and roadway this year has been higher than usual on account of the renewal of a large number of ties, with creosoted ties, but as nearly every year has some extraordinary expense, I do not know that this renewal charge ought to be mentioned.

There are three rates of fare, tickets at the rate of 22 for $1, commutation school tickets in books at 3½ cents each, good only for the month of issue, and the regular 5-cent cash fare. The three county divisions for the first nine months of 1909 carried 471,103 revenue passengers, the company receiving $23,182.64, an average fare of 4.92 cents. The cost of carrying the average passenger on the three county divisions, including operating expenses, fixed charges and depreciation amounted to 6.19 cents, the loss on each passenger being 1.27 cents; assuming that the cost of carrying each passenger on the city division, including fixed charges and depreciation, is four cents, the average fare receved being 4.94, the profit on the average passenger is 0.94 cents. The average passenger who rode over both divisions was carried at a loss of 0.33 cent. How would it be possible to adopt a one-fare zone for the while system of the Mobile Light & Railroad Company with profit to the company? Yet the company in the past had one director who desired the adoption of the one-fare zone.

The country around Mobile is not as thickly settled as around other cities of approximately the same population. Companies in cities having thickly populated suburbs could, of course, extend the 5-cent fare zone farther than is done in Mobile.

If we should abolish to-morrow the additional 5-cent fare on the outside divisions, the costs of operating with the same number of passengers would be the same as at present. If the number of passengers increased, more cars would have to be added, thereby increasing expenses. The number of passengers would have to increase several hundred fold before there would be an advantage, and even then it is questionable whether it is a wise policy in cities of from 30,000 to 100,000 people to induce persons to live six and seven miles away from the business center and carry them for 5 cents, when there are hundreds of acres of vacant land within four miles of the business center already reached by the car lines. In and around Mobile there is sufficient land unoccupied by houses within the limits of the 5-cent fare zone and reached by car lines to accommodate an additional 60,000 people.

If companies in cities of from 30,000 to 100,000 population that carry passengers for 5 cents to thinly populated suburbs 4 to 8 miles away from the business center would estimate the cost of operating the mileage in excess of the first 4 or 5 miles, according to the form used by the Mobile Light & Railroad Company, they would probably find that the cost per passenger for excess mileage equaled the fare received. They would find that at least the balance left to pay for carrying the passenger over the 4 or 5 miles of the strictly city line would be but a small portion of the total cost of carrying the average passenger on the city division.

As a rule there are no franchise requirements that compel an electric road to carry a passenger beyond the city limits for five cents; the 5-cent rate for long suburban rides has generally been made voluntarily by the companies, and was done at a time when the promoters of such roads had not learned as much about operating expenses as is now known, and when car-mile costs were not kept as at present. I cannot understand why a company voluntarily carries a passenger outside the city limits five and eight miles away from the business center for five cents, when the operating expenses, fixed charges and depreciation per car-mile per passenger amount to much more than the fare received.

The Mobile Light & Railroad Company would be much better off to-day if it did not have a single county division; the population then would be more dense inside the limits of the 5-cent fare zone, whch would enable the company to give more frequent service and maintain its tracks more perfectly. The question of extension of lines into the suburbs should be very carefully considered before the investment is made, and it should not be assumed that all fares to be collected will be that much added revenue. A great many of the passengers now carried on suburban extensions would be riding on the city division regularly if the extension had not been built.

This article does not refer to the question of interurban extensions, except where the first 5-cent fare zone extends beyond a reasonable distance.

A mistake that has been made in Mobile and many other cities, is the extension of lines that already run out into the open country, by 2000 or 3000 ft. to accommodate some real estate dealer who pays the cost of building the extension. Each of such extensions means the addition of a car to the service and very little added receipts, so that at the end of the first year, unless it is a rapidly growing city, the company has lost as much as was donated to build the track. It usually takes several years for such an extension to bring in sufficient extra receipts to pay costs of operating, maintenance and fixed charges on car and line.

Extend slowly, let the real estate promoters wait a few years, always extend so that there is considerable vacant land near the line, but extend through no long distance of sparsely occupied territory.

The writer became identified with the street railroads of Mobile in 1892. Previous to that time there was only one line, the Spring Hill line, that reached a greater distance than two miles from the business center. The writer reduced the rate of fare to Spring Hill from 15 cents cash to 10 cents, and built seven extensions reaching from three to four miles from the business center, charging one fare on same. He built the Whistler and Magazine Point extensions, charging an additional 5-cent fare over the extension from the end of the city division. Instead of making a mistake in not charging one fare over the whole system the mistake made was in building too many extensions.

ELECTRICAL WORKING CONSIDERED BY AMERICAN RAILWAY ASSOCIATION

At the semi-annual meeting of the American Railway Association held in Chicago on Nov. 17, a short report was presented from the committee on electrical working. This committee consists of George Gibbs, chairman, chief engineer of electric traction, Pennsylvania Railroad; J. F. Deems, general superintendent of motive power, rolling stock and machinery, New York Central Lines; J. D. Isaacs, consulting engineer, Harriman Lines; W. J. Harahan, assistant to president, Erie Railroad; C. S. Sims, second vice-president and general manager, Delaware & Hudson Company; L. C. Fritch, chief engineer, Chicago Great Western Railway; E. H. McHenry, vice-president, New York, New Haven & Hartford Railroad. Its report, which was dated Oct. 18, 1909, is short, but is of importance as an expression of opinion from representatives of the leading steam railroads of the country in relation to some phases of electric operation of trains. The report in full follows:

The committee on electrical working held its first session in New York City on Oct. 6, 1909. At this session the permanent organization of the committee was effected by the election of George Gibbs as chairman and discussion had of its best usefulness to the association.

In the short time elapsing between the organization of the committee and the meeting of the association, it was impracticable to prepare a lengthy report, or, indeed, to formulate definitely the lines of action which will be of greatest usefulness to the association. When it can be done properly, a report will be presented to the association, giving the present status of electric traction as applied to railway operation under steam railroad conditions. In the meanwhile, the committee holds itself in readiness to make recommendations upon specific questions.

As this committee supersedes the committee on standard location for third-rail working conductors, and as the latter committee had at the date of its last report some questions still under consideration, it was decided by the committee on electrical working to appoint a subcommittee, consisting of Messrs. Gibbs, Fritch and Isaacs, to give special consideration to third-rail and overhead working conductor clearances.

Another subject discussed by the committee and considered by it of present importance is that of standardizing the location of electric connections between cars of passenger trains, especially the connections of electrically equipped cars for multiple unit train operation. The connections are required for controlling current to the cars, for heating, lighting, etc., and they occupy considerable space at the ends and between platforms of coupled cars. It is considered that it will be useful to the members of the association to have information as to these electrical requirements, as well as suggestions for standard locations which will permit of their proper installation without interfering with the functions of other connections, such as couplings, air brakes, etc. A subcommittee, consisting of Messrs. Deems, Harahan and McHenry, has, therefore, been appointed to consider this subject, in order that it may be brought to the attention of the association as soon as practicable.

A third subject has been considered by the committee, namely, the effect of the electrical working of railways upon automatic signaling systems. The conclusions of the committee will be brought out fully in a subsequent report, but it may be of use to the members of the association to know that electrical working requires the adoption of an alternating current track circuit for signals instead of the direct-current track circuit control heretofore in general use. It would seem advisable, therefore, that in the installation of any new automatic signaling an alternating current track circuit should be employed, and that extensions to existing systems should also be made in the same way. This recommendation applies not only to roads contemplating the adoption of electric traction, but to those in localities where electric traction is or may be employed upon nearby roads.

HEARING ON VALUATION OF CONEY ISLAND & BROOKLYN RAILROAD

Frank R. Ford, of Ford, Bacon & Davis, took the stand on Nov. 15 in the hearing before the New York Public Service Commission, First District, of the case involving the valuation of the Coney Island & Brooklyn Railroad. Commissioner Bassett presided.

Mr. Ford testified that his firm had continued, since the hearing of the other cases involving the Coney Island & Brooklyn Railroad, to be the consulting engineers of the company, and he had continued his studies of the physical and financial condition of the property.

Under the supervision of Mr. Ford an estimate had been prepared, which showed that in the calendar years 1910, 1911 and 1912 it would be advisable to make additions and betterments costing $1,207,269. Those were in the nature of additions and betterments to provide for what B. J. Arnold had called inadequacies and obsolescence, and were partly renewals and partly capitalizable.

Testifying in relation to the balance for reserves, contingencies and capital stock of $113,557 shown in the income account of the company for the fiscal year ended Aug. 31, 1909, Mr. Ford said he thought the reserves should

ANALYSIS OF INCOME ACCOUNT OF CONEY ISLAND & BROOKLYN RAILROAD, FOR THE YEAR ENDED AUG. 31, 1909. SHOWING RESULTS OF OPERATION IN FIRST ENTIRE YEAR OF 10-CENT CONEY ISLAND FARE ON WEEK-DAYS.

Presented By Frank R. Ford.

			Per car-mile, cents
Gross earnings from all sources..		$1,485,116.88	24.3
Operating Expenses:			
Maintenance	$134,453.39		2.2
Transportation	575,469.47		9.4
General	249,007.74		4.1
Total	$958,930.60		15.7
Taxes	62,538.35		1.0
Operating Expenses and Taxes..		1,021,468.95	16.7
Gross Income		$463,647.93	7.6
Deductions from income:			
Interest on funded debt and floating debt	251,417.60		4.1
Reserve for depreciation: Amount actually spent for renewals and extraordinary maintenance	98,673.20		1.6
Total deductions		350,090.80	5.7
Balance for reserves, contingencies and capital stock		$113,557.13	1.9
Car miles operated (exc. bdge. locals, etc.)			6,111,630
Passengers carried			35,958,023

be the same as he had stated in his testimony in the previous cases; that is, reserves for increase in outstanding damage claims, for amortization of discount on bonds, for accumulation of surplus to provide for unliquidated damage claims and for contingencies. The expenditure for maintenance, $134,453, averaged 2.2 cents per car-mile. The amount actually spent for renewals and extraordinary maintenance was $98,673, or 1.6 cents per car-mile, making a total for the two items of 3.8 cents. Mr. Dykman asked what balance would have been left if 5 cents per car-mile had been reserved for these expenditures, as suggested by Commissioner Bassett. Mr. Ford replied that the difference was 1.2 cents per car-mile. The balance for reserves, contingencies and capital stock actually remaining from the year's operations was 1.9 cents per car-mile, so that if 1.2 cents was subtracted there would be left 0.7 cent as a balance for reserves, contingencies and capital stock. This multiplied by 6,111,630 car-miles operated would give about $43,000 for that item.

Mr. Ford thought there should be added to the cost of operation of the Coney Island & Brooklyn road, or deducted

from surplus earnings, an amount to cover various expenses which the Public Service Commission did not allow to be capitalized and extraordinary expenses which had to be met infrequently. The contingent items might be grouped under the following heads:

1. Requirements of local authorities that cannot be capitalized, as, for instance:

(a) Cost of protecting tracks while sewers, gas pipes, water pipes, electric conduits, etc., are laid under them. As an instance, it was stated that the company expended in the last year about $6,000 in the protection of its tracks while a sewer was laid in DeKalb Avenue. The commission and its experts and accountants refused to include that item in the valuation of the property, stating that it was a proper operating expense charge. While the company had included this expense in its balance sheet, Mr. Ford understood that the commission had ruled that the item would have to be charged against surplus. This cost was not included either in the capital cost of the property to which Bion J. Arnold testified or in the operating expenses for the year, so that it would have to be charged against the balance for reserves and contingencies.

(b) Cost of changing grade. Under this head Mr. Ford would place the expense of changing the grade of track required of a company, sometimes before the track was worn out, whenever the city elected to change the grade of streets. The company had to change its grade on Jay Street line upon the construction of the Manhattan Bridge approach.

(c) Cost of track repairs not necessary by reason of the condition of tracks, but required by change of paving of streets. There were a number of other similar expenses.

2. Requirements of State authorities that cannot be capitalized, such as administration, legal and technical expenses in connection with appearances before the Public Service Commission in rate and other cases.

Of the extraordinary expenses, 20 years of experience had demonstrated that a street railway investment had many elements of risk, of which the following might be included:

1. Disasters to city under that heading would be the items of general conflagration, flood, earthquake, epidemic, cyclone, riot.

2. Business depressions, which might be either national or due to local retrogression, loss of trade or labor troubles.

3. Fire, strikes, coal strikes, accidents which crippled plant or service and support of amusement enterprises. Such an allowance might also cover the company's participation in a pension system toward which transportation and industrial corporations are tending and other general contingencies applying to street railways, which might be competition of other street railway systems, steam railroads or other transportation systems.

4. Unexpected public burdens. These risks were emphasized by the condition that the property and operations of a street railway company occupied a comparatively small area and were subject to such disasters as had overtaken San Francisco, Galveston, Charleston and Baltimore.

Answering a question as to the effect of the increase of Coney Island fare from 5 cents to 10 cents on week days during the year ended Aug. 31, 1909, upon the earnings of the company, Mr. Ford said he would say that the road was better off to-day by $100,000 as a result of the experience during that year. He thought the gross earnings of the company were about $50,000 larger by reason of the higher rate of fare and that the company had saved an equal amount in operating expenses by carrying fewer passengers. No exact comparison could be made, as the company had no record of the passengers carried on the Coney Island division in the year ended Aug. 31, 1908. As this information was not available proof had to be deduced from other data. Mr. Ford submitted a comparision and analysis of passenger earnings for the years ended Aug. 31, 1906, 1907, 1908 and 1909. Discussing these figures, which are published herewith, Mr. Ford said that the reason for dividing the year into seven winter months and five summer months was that 15 per cent of the total Coney Island business was done in the former period and 85 per cent in the latter. The statement showed that in 1907 there was approximately a decrease of $82,000 in gross earnings as compared with 1906, and in 1908 a decrease of $78,000 as compared with 1907. In 1909 the decrease from 1908 was $83,000. Apparently this continuous decrease was due to some other cause than a change in the rate of fare to Coney Island. Careful investigation showed that the decrease in 1907 and 1908 when the 5-cent rate of fare was charged on week days to Coney Island, were caused by increased competition from the Brooklyn Rapid Transit Company and, so far as the latter was concerned, in part by the business depression. For the fiscal year 1909 and part of 1908 there were two other causes of competition which were more serious than anything the company had experienced during the four years. The opening of the subway to Atlantic Avenue, Brooklyn, had a decided effect on the earnings of the company because of (1) the loss of the short riders on the De Kalb Avenue and Smith Street lines and (2) the loss on the Smith Street line due to the fact that it did not pass a subway station. The opening of the subway had also practically destroyed the business of the Hamilton Street ferry, the service of which had deteriorated and this had reduced largely the riding on the Hamilton Avenue line of the company.

In addition to these competing causes of decreased gross earnings the express service on the Brighton Beach line of the Brooklyn Rapid Transit Company was started on May 30, 1908.

In making an analysis of the decrease of $83,282 in passenger earnings in 1909 as compared with 1908 Mr. Ford

COMPARISON AND ANALYSIS OF PASSENGER EARNINGS, CONEY ISLAND & BROOKLYN RAILROAD, YEARS ENDED AUG. 31, 1906 TO 1909, INCLUSIVE. IN FISCAL YEARS 1906, 1907 AND 1908, 5-CENT CONEY ISLAND FARE WAS CHARGED ON WEEK-DAYS; IN 1909, 10-CENT CONEY ISLAND FARE WAS CHARGED ON WEEK-DAYS.

PRESENTED BY FRANK R. FORD.

	1906	1907	Decrease	%	1908	Decrease	%	1909	Decrease	%
Total Earnings	$1,675,263.53	$1,592,925.09	$82,338.44	4.9	$1,514,824.96	$78,100.13	4.9	$1,431,542.73	$83,282.23	5.5
Total earnings, winter ..	808,015.60	764,101.82	43,913.78	5.4	730,048.75	34,053.07	4.4	682,797.64	47,251.11	6.5
Total Earnings, summer ..	867,247.93	828,822.27	38,424,66	4.4	784,776.21	44,046.06	5.3	748,745.09	36,031.12	4.6

Winter—7 months, Oct. 1 to April 30.
Summer—5 months, May 1 to Sept. 30.

Note:—Coney Island second fares of 7 winter months— $30,087.63 or 14.8 per cent of total second fares year ended Aug. 31, 1909.
Coney Island second fares of 5 summer months— 171,837.02 or 85.2 per cent of total second fares year ended Aug. 31, 1909.

Note.—Brighton Beach Line of Brooklyn Rapid Transit Company opened express service on May 30, 1908.
Ridgewood elevated extension of Brooklyn Rapid Transit Company opened on Oct. 1, 1906.
Subway to Atlantic Avenue opened in May, 1908.

separated the loss as between the various lines of the company, week-days as compared with Saturdays, Sundays and holidays, the seven winter months and five summer months and as between the city division and the Coney Island division for both winter and summer. With the exception of the Franklin Avenue line, which was not affected by competition from the subway and the new Brighton Beach line, all the lines showed a decrease. Mr. Ford thought it could be shown by the following methods that the gross earnings had increased on week-days as a result of the 10-cent fare.

The saving in cost of operation would not be the total operating expenses per car-mile, as some operating expenses which varied with the car-mileage operated, and others practically did not vary.

Taking the operating expenses, which varied with the car-miles, it was found that 50.4 per cent of the gross earnings would be saved by a decrease in car-mileage, and this amounted to 50.4 per cent of 24.3 cents, or approximately 12 cents per car-mile, which, multiplied by 413,909, gave a total saving of $49,669.

John A. Thake, assistant secretary and treasurer of the Coney Island & Brooklyn Railroad, was also called as a witness on Nov. 15. Mr. Thake presented a statement of the underlying mortgages and the trust mortgages and the bonds outstanding thereunder, and also of the floating debt, aggregating $100,000, and the capital stock outstanding. The purposes of the issues of capital stock were stated, as, for instance, when $500,000 was added on account of the change in motive power in January, 1893.

William M. Dykman, of counsel for the Coney Island & Brooklyn Railroad, introduced the complete evidence of Frank R. Ford in the previous cases involving the rates of fare of the company, and also various statements of earnings submitted in connection with those cases.

The hearing was adjourned until Nov. 22.

INFORMATION FOR EMPLOYEES OF THE LONDON UNDERGROUND ELECTRIC RAILWAYS

In line with its policy to give the employees full data on operating and traffic features without using many separate bulletins or obtrusive posters, the Underground Electric Railways of London issue all such information in the shape of a circular which is published on the second and fourth Friday of every month. This publication is prepared specifically for the operatives of the company's three tube lines, and ranges in size from eight pages upward, according to conditions. The contents are necessarily of the most varied character, as the circular goes to all classes of employees. Thus the station ticket agents, or booking clerks, are supplied regularly with a list of the principal attractions in town, with the playing hours, the name of the nearest station and information as to through tickets and the like. This feature is greatly appreciated by the stranger who is looking for pointers on where and how to go for a good time. They also receive change of fare notices in this way. Motormen are informed through the same medium of the running times and train makeups which have been adopted for their lines and what telephonic action should be taken when it is necessary to switch off current at the substations. This publication is also the clearing house with regard to lost caps, badges and passbooks. A great deal of attention is given to having all station furnishings in the best shape, and particularly with regard to the neat and appropriate posting of both the company's and foreign advertising matter.

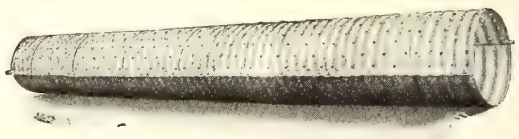
The official circulars give some interesting pointers also on the company's relations with its men. Employees are usually disciplined by reduction in rank, and in every case announcement is made of the offense and punishment. While offenders' names are not published, the company makes a practice of announcing the names of all promoted from one stated position to another. Practically all members of the transportation department are allowed annual leave with pay on the scale shown in the table below. The column A gives the number of days allowed per year to men in the service over six months and under 12 months; column B over 12 months, and column C over three years.

	A	B	C
Switchmen, gatemen, elevator operators, elevator machinery men, porters and lamp men	2	3	4
Motormen	4	6	6
Traveling inspectors, foremen motormen, and shop foremen	6	10	10
Signalmen and conductors	3	4	5
Assistant station masters, ticket examiners, junior ticket agents and constables	3	6	7
Station masters and agents in charge	5	8	9
Telephone operators	7	10	10
Ticket collectors	2	4	5

Inspectors, foremen, yard masters and station masters must advise the superintendent's office before March 6 of each year, giving the dates for which they and their men wish to take vacations, it being understood, of course, that the dates desired are not necessarily those which will be granted. When all the applications have been received and considered the parties mentioned are acquainted with the approved dates. Applications must not be made from any two men at one station for the same dates, and no dates must include public holidays or Sundays "on duty."

CORRUGATED METAL RAILWAY DRAIN

The Canton Culvert Company, Canton, Ohio, whose "Acme" nestable culverts of galvanized "No-Co-Ro" anti-corrosive metal sheets are widely used on both steam and electric railways, has now devised an improved railway drain made of corrugated metal. The new specialty is



Corrugated Metal Drain

known as "Duro." It is based on the style of the company's nestable culvert, made either flat or round bottom, and has the top circumferential sections perforated with ½-in. holes staggered in the corrugation valleys at 4-in. intervals. To eliminate raw edges, the perforated sections are galvanized in the company's plant by hand dipping after the perforations are made.

BOSTON ELECTRICAL SHOW

The first annual electric show to be held in Boston was opened in Mechanics' Building, Huntington Avenue, Nov. 15, and will continue to Nov. 25. The Boston Elevated Railroad Company has a large exhibit space and is showing a complete automatic working model of the company's elevated track and third-rail construction, equipped with an electric locomotive and full-sized block signals. The Edison Electric Illumination Company, of Boston, has a very elaborate exhibit, as have a number of manufacturers of electrical apparatus in Boston.

ELECTRIC RAILWAY LEGAL DECISIONS

LIABILITY FOR NEGLIGENCE

Alabama.—Carriers — Injuries to Passenger — Pleading — Variance—"At"—Electric Railroads—Injuries to Alighting Passenger—Sufficiency—Setting Down Passengers —Duty—Jury Question.

A complaint against a street railway company alleged that a passenger was injured while alighting "at" C., which appears to have been a shed station, and not a town or city. The evidence showed that the accident occurred about two car lengths from the station. Held, that there was no variance, "at" as pleaded meaning "at or near." A complaint claimed specified damages against an electric railway company on allegations that, while plaintiff passenger was alighting at his destination, the car started or jerked, or the speed thereof was suddenly increased, proximately causing him to fall, resulting in specified injuries; that he was thrown or caused to fall through and as a proximate consequence of defendant's negligence in and about carrying him as its passenger. Held, that the complaint was not demurrable as being vague, uncertain, and indefinite, as not showing any duty or any violation of any duty. It was an electric railway company's duty to hold a car at a stopping place sufficient time to allow passengers to alight, and not to start it while a passenger was alighting; but it would have been a defense to an action for injury to him that the car had stopped a sufficient time, and that those in charge did not know that he was alighting. In an action against an electric railroad company for injury to an alighting passenger, held under the evidence a jury question whether the conductor saw that the passenger was about to alight and might have prevented it, or prevented the starting of the car while he was alighting. (Birmingham Ry., Light & Power Co. v. McGinty, 48 S. Rep., 491.)

California.—Street Railroads—Collision with Vehicle—Question for Jury—Contributory Negligence—Trial—Submitting Special Issues to Jury—Appeal and Error—Harmless Error—Refusal of Special Issues—Injury Avoidable by Defendant.

In an action for death of the driver of a vehicle by collision with a street car, evidence held to present questions for the jury as to whether the motorman was negligent in failing to give proper warning of the approach of the car, and in operating the car at an excessive rate of speed. In an action for death of the driver of a vehicle in a collision with a street car, evidence held to present a question for the jury as to whether decedent was guilty of contributory negligence. Where the evidence showed that decedent was driving his vehicle parallel to the track of a street railroad, and as a car approached from the rear allowed the vehicle to swerve toward the track, so that it came into collision with a car approaching from the rear, a special issue requested by defendant, "Did the deceased change the direction in which he was driving so as to swerve in toward the track, and thereby bringing his wagon into a position of danger?" was not subject to the objection that it did not refer to any particular time or place, and improperly refused. In an action against a street railroad company for death of the driver of a vehicle by collision with a street car which approached the vehicle from the rear as it was being driven at the side of the track, error of the court in refusing a special issue as to whether decedent allowed his vehicle to swerve toward the track so as to come into collision with the car was immaterial, where the evidence warranted a finding that the motorman might have avoided the collision by sounding the bell and checking the speed of his car, and that an affirmative answer to the desired special issue would not have been inconsistent with the general verdict for plaintiff. Where the driver of a vehicle was killed by collision with a street car which approached the vehicle from the rear, decedent's negligence in permitting his vehicle to swerve toward the track would not defeat recovery where the car could have been stopped in time to avoid the collision after decedent changed his course. (Ruppel v. United Railroads of San Francisco—Civ. No. 561—101 Pac. Rep., 803.)

Illinois.—Carriers—Injuries to Passenger—Setting Down Passenger—Defects in Street—Evidence—Conclusions of Witness—Intoxication.

Though a city is responsible for the existence of snow and ice in the street near a street railroad track, the street railroad company will be liable for injuries to a passenger received while alighting from one of its cars, where, owing to negligence in operating its car, such passenger slipped on the snow and ice and was run over by the car. Where, in an action by a passenger against a carrier for injuries, defendant has introduced evidence that plaintiff had taken one or more drinks during the evening of the accident, it was not error to permit plaintiff to testify that he was not under the influence of liquor at the time of the injury, and defendant's contention that plaintiff's testimony should have been confined to the quantity of liquor drank was not well taken. (Ward v. Chicago City Ry. Co., 86 N. E. Rep., 1111.)

Indiana.—Master and Servant—Injuries to Servant—Assumed Risk—Obvious Dangers—Hidden Dangers—Superior Knowledge of Master—Compliance with Commands—Apparent Dangers—Commands of Master—Choice by Servant of Dangerous Work—Actions—Findings — Construction—Trial Findings of Evidentiary Facts.

A servant must use his senses to observe and avoid obvious dangers, and must take cognizance of natural laws.

A servant need not search for hidden defects or dangers, that being the master's duty, and he may rely on the master's superior knowledge in the performance of such duties.

Where a servant was injured by slipping on a bridge timber, which, as well as the other objects around him, was covered with sleet and ice, such dangers being obvious to everyone of ordinary intelligence, the master's knowledge thereof could not be superior to the servant's, and the servant could not rely on the master's superior knowledge of the conditions, but assumed the risk of injury therefrom.

Where conditions surrounding the work are not complex, but easily comprehended, an employee with knowledge thereof is bound to know the dangers incident thereto, and if he continues work with such knowledge he assumes the risk of injury.

Where a servant is ordered to go in a dangerous place and perform a dangerous task, or use a dangerous tool at a particular time or in a particular manner, he may obey the order without assuming the risk or quitting the employment, unless the danger is so apparent that a prudent man would not assume it.

Where a servant was injured by falling from a bridge timber while attempting to place it on a trestle, because of ice and snow thereon, an order directing the servant to proceed with the work of constructing the bridge was not a specific direction to go upon the trestle at all, but could have been construed as an order to do any other work about the bridge that could have been done with safety, so that the servant was not justified in attempting the obviously dangerous work of placing the timbers when covered with ice.

In a servant's action for injuries while placing a bridge timber, where the jury answered "yes" to special interrogatories as to whether plaintiff and his men were ordered to go on top of a trestle that morning and place the timbers, and found that the specific order was to "go ahead and push the work on the trestle," and other interrogatories showed that plaintiff was directed to keep working at the trestle and push the work, the answers, taken together, did not find that an order was given to do any specified work at a certain time, but that it was only a general order to do the work in plaintiff's discretion.

Findings in answer to a special interrogatory whether a servant was ordered to place timbers on a trestle, that the order was to "go ahead and push the work on the trestle on the island" was not a finding, of an evidentiary fact, and setting out the order verbatim in the finding did not make it so. (Mellette vs. Indianapolis Northern Traction Co. et al.—No. 6187—86 N. E. Rep., 432.)

Kentucky.—Master and Servant—Injury to Servant—Defective Tools—Assurances and Direction of Master—Obvious Danger—Evidence.

Where an employee, being directed to do work with a wrench, an ordinary one with a piece of gas pipe attached to the handle to give it leverage, told the foreman that it was out of repair and unsafe, and the foreman, who had used it and knew of its tendency, told him that the wrench was all right, and to go ahead and do the work with it, and he, relying thereon, used it, with the result that it slipped and threw him, the master is liable for the injury, unless the danger was so obvious that an ordinarily prudent man would have refused to do the work; and this though two or three times during the week, before his injury, the defects came near causing him to fall, and he made no complaint thereof to the foreman.

That using a defective wrench, which the foreman told a complaining workman was all right, and that he should use, was not obviously dangerous, was indicated by the fact that, several times before it slipped and threw him, it slipped, and he saved himself from injury. (Rogers vs. South Covington & C. St. Ry. Co., 112 S. W. Rep., 630.)

Massachusetts.—Carriers—Injury to Passenger—Action—Evidence—Prima Facie Case—Management of Conveyance.

In an action by a street car passenger for injuries by

being thrown from a platform, plaintiff does not make out a prima facie case merely by proof that the car gave a jerk or similar motion, and that he was hurt; but must further show that it was due to a defect in the track or to negligence in operating the car.

The motorman of an electric street car is not bound to maintain a uniform speed, even though the car is between 250 and 300 ft. from a stopping place for which a signal has been given.—(McGann v. Boston Elevated Ry. Co., 85 N. E. Rep., 570.)

Massachusetts.—Master and Servant—Injuries to Servant—Orders—Negligence in Giving—Fellow Servants—Persons Engaged in Superintendence—"Employee Intrusted with and Exercising Superintendence"—Negligence of Master—Failure to Post Orders—Proximate Cause of Injury—Appeal and Error—Report—Construction.

Where the forgetting of an order by an employee will not be followed by serious consequences, orders may be given verbally; but, where human life depends upon the exact execution of an order, the employer's failure to take precautions to prevent orders from being forgotten or misunderstood may be negligence.

A car dispatcher on a street railroad is an "employee intrusted with and exercising superintendence," within the direct provisions of Rev. Laws, c. 106, § 71, cl. 2, giving employees an action for personal injuries caused by the negligence of such person.

In an action against a company for the death of a motorman in a collision on a special trip, it being the general custom to notify both the conductor and the motorman of a regular car, which is to wait for a special car, and to post written orders for special cars on a bulletin board, the jury was warranted in finding that defendant's car dispatcher was negligent in not notifying both the conductor and motorman of the car which collided with decedent's car, as well as in not posting the order on the bulletin board.

In an action for the death of a motorman in a collision, caused by the motorman of the other car forgetting orders, because of the negligence of the car dispatcher in not posting them, the negligence of the dispatcher in failing to post the orders was the proximate cause of the accident, and not the forgetfulness of the other motorman.

In an action on two counts for the conscious suffering and for the death of decedent, in which the jury found specially $2,500 damages on each count, where by the terms of the report, upon a finding of the law for plaintiff, judgment is to be entered for him for $5,000, with interest and costs, since the two halves of the sum recovered will go to different persons, the report will be construed to mean that verdict be entered for $2,500 on each count, and that judgment, with interest on each verdict and one set of costs, be entered on the verdicts.—(Fitzgerald vs. Worcester & S. St. Ry. Co., 85 N. E. Rep., 911.)

Michigan.—Carriers—Street Railroads—Injuries to Passenger—Premature Start—Verdict—Evidence—Action—Misleading Instructions.

In an action for injuries to a passenger on a street railroad by the premature starting of the car as he was alighting, evidence, though conflicting, held sufficient to sustain a verdict for plaintiff.

The court, in an action for injuries to a passenger, having instructed that the burden of proof was on plaintiff, and that he must prove defendant's negligence and his own freedom from negligence by a preponderance of the evidence, an instruction that the jury were the best 12 men to determine "this accident, because of this negligence, as the case may be, of any 12 men in the world," because the jury had heard and knew more about it, was not objectionable as misleading the jury to believe that defendant's negligence had been established.—(Malinowski v. Detroit United Ry., 117 N. W. Rep., 565.)

Missouri.—Pleading—Consistency—Injuries to Passengers—Carriers—Carriage of Passengers—Injuries—Actions—Instructions—Discharging Passengers.

In an action by a passenger for injuries received while alighting from a street car, plaintiff alleged in her complaint that she was caused to fall by the sudden starting of the car, and also alleged that her fall was the result of the sudden stopping of the car after it had started. Held, that these statements were not so conflicting that proof of one act of negligence would disprove the other, and it was permissible to plead both acts of negligence as the cause of the injury, and recover on proof of the existence of one or both of them.

In an action against a carrier for injuries to a passenger in alighting from a car, the court instructed that it was the duty of defendant to exercise toward plaintiff, if a passenger, the highest reasonably practical degree of care and foresight to carry plaintiff and allow her to safely alight from the car, and that if defendant failed to exercise such degree of care by starting up its car while plaintiff was in the act of alighting therefrom, and before she had reasonable time to alight therefrom, and plaintiff was thrown from said car to the ground and injured without any fault on her part contributing thereto, that the verdict must be for the plaintiff. Held, that this instruction was not defective as ignoring the question whether defendant's servants saw, or by proper care should have seen, plaintiff in the act of alighting when the car was started; all of defendant's evidence being to the effect that the conductor did observe plaintiff while she was alighting, and as the accident occurred at a regular stopping place, and it was the duty of the conductor before giving the signal to start to know whether the passenger was alighting.

Where a street car had stopped at a regular stopping place and passengers were getting on and off, it was the duty of the conductor, in the exercise of reasonable care, before giving the signal to start, to know whether a passenger is alighting. (Alten vs. Metropolitan St. Ry. Co., 113 S. W. Rep., 691.)

New York.—Street Railroads—Operation—Collision with Vehicles—Liability—Negligence.

While defendant could move its street car past a vehicle on the street and sound the gong in crossing another street, the vehicle being necessarily close to the car because of the narrowness of the street, the motorman was bound to exercise reasonable care in sounding the gong and starting the car, and if he unnecessarily and violently sounded the gong, so as to frighten the horse, or suddenly increased the speed of the car, so as to cause a collision with the vehicle, by which the persons therein were injured, the company would be liable. (Sauter vs. International Ry. Co., 112 N. Y. Sup., 863.)

New York.—Subways—Injuries to Passengers at Stations—Actions—Instructions—Submission of Issue Not in Case.

In an action by a passenger against a subway carrier for injuries from stepping into an opening in the station platform while boarding a car, where it appeared that the station platform was crowded, but no negligence of defendant was claimed in respect thereto, a charge that defendant was not negligent in permitting crowding, but was obliged, in view thereof, to take such reasonable precautions as would reasonably protect its passengers from injury, was erroneous, because inapplicable and calculated to distract attention from the real issues. (Becker vs. Interborough Rapid Transit Co., 112 N. Y. Sup., 816.)

New York.—Carriers—Street Railroads—Injuries to Passengers—Collision—Res Ipsa Loquitur—Negligence—Presumption—Res Ipsa Loquitur.

Plaintiff, a street car passenger, was injured in a collision between the car on which she was riding while it was standing still letting off passengers at a regular stopping place, and a following car. Two other lines of cars used the track at the place of the accident, which were operated by a company other than defendant. Held that, in the absence of evidence that defendant owned and operated the following car that caused the collision, the circumstances of the accident did not establish a prima facie case of defendant's negligence under the maxim res ipsa loquitur, which applies only to cases where the occurrence would not have happened in the ordinary course except by negligence on defendant's part.

A presumption of negligence does not arise except out of the fact that there is no other way to account for the occurrence, in which case the burden is on defendant to show freedom from negligence. (Elliott vs. Brooklyn Heights R. Co., 111 N. Y. Sup., 358.)

Pennsylvania.—Negligence—Injuries to Trespasser—Wantonness—Duty of Defendant—Questions for Jury.

It is the duty of the owner of a city lot on which there was an electric motor to avoid intentional or wanton injury to a trespasser by any act which would expose him to danger.

Where plaintiff, a minor, went on a lot owned by defendants on which was an electric power house, while the employees of the owner were not bound actively to care for such minor by keeping her off the lot, or by protecting her after she had entered it from injury that might result from the condition of the property, there was a duty not to injure her negligently.

Where a minor trespassing on property of defendant was injured by the starting of the machinery of an electric motor thereon, whether the employee starting the machinery observed where the minor stood and realized the consequences resulting from his act in starting the machinery, and that it would expose the minor to danger, were questions for the jury. (Walsh et al. vs. Pittsburgh Ry. Co., 70 Atl. Rep., 826.)

News of Electric Railways

Discussion on Rapid Transit in New York

The *Evening Post* of New York is publishing a series of six articles on the subject of rapid transit development in New York. Sections appeared on Nov. 16, 18 and 20, and they are being continued on alternate days of this week.

The first article outlined briefly the history of the elevated, surface and subway lines in the city, and then declared that the great defect of the present rapid transit system is the lack of rapid transit in the downtown districts. The congestion caused there extends to the suburban districts. One of the greatest dangers, the article declared, to the present development of a comprehensive rapid transit system in the city is the demands from the residents of suburban localities for non-self-supporting lines. The writer also stated that surface car feeders to existing and new rapid transit lines should be encouraged.

The second article was entitled "Companies Block Transit," and contained various allegations that the existing companies had manifested an attitude of hostility toward proposed extensions to their systems and to other projected lines. The fact that no company had yet accepted a contract for operating the Center Street subway and the lack of complete use of the Williamsburgh Bridge were quoted, among other instances, to prove this claim.

The third article pointed out three places where the city needed more rapid transit. One was Manhattan, south of Central Park, the downtown district of Brooklyn and the borders of the East River, which, together, were claimed, offer the richest traction area in the world. The second was the built-up residential districts of the city which comprise a less profitable field, but should be provided with rapid transit by companies which enjoy the downtown traffic. The third was the suburbs, which are the least profitable of all to the railway company, but through the increase in land values are the most profitable to real estate owners. Here rapid transit should be provided by assessment, either in part or entirely upon the land benefited.

The fourth article appeared Nov. 22, and compared the New York rapid transit system to that in Paris which, it is claimed, was far superior to that in New York in arrangement and in the degree by which the public interests were safe-guarded, and also that the fares in Paris were much lower than those in New York.

Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, gave out an interview to the *Evening Post* for Nov. 19 in reply to statements made in the second article. He said that that company was and always had been prepared to build any extensions which would prove to be profitable. Under the old Elsberg law, by which the franchise was limited 25 years, it was impossible to secure money for subway construction. The present law authorizes the Public Service Commission to grant franchises on much more liberal terms. The company on June 27 offered to build an extension uptown on Lexington and Third Avenues; but the Public Service Commission suggested Madison Avenue, and the company accepted the change promptly, but has as yet received no reply to its offer. The extensions which the company is prepared to build will cost $100,000,000 to construct and equip; but the authorities seem to be more interested in attempting to induce the company to build lines in the suburbs than to relieve the congestion in Manhattan and the Bronx. Mr. Hedley also denied the statement made in the article that the company had been compelled by the commission to install side-door cars. He said that in October and November, 1906, eight months or more before the commission was appointed, the company had prepared designs for new steel cars with center side doors, and in March, 1907, had ordered 50 of these cars. In 1908 the company was requested by the commission to equip an eight-car train with end-side doors and had done so at a cost of about $35,000. After a trial these doors were found to be unsatisfactory, and the commission finally approved the center side door design originally planned by the company. At an expense of $1,300,000 the company has recently improved its signal system and is now spending $65,000 to reduce the headway of the trains 7 seconds.

Edwin W. Winter, president Brooklyn Rapid Transit Company, also denied that that company had attempted to obstruct or delay the construction of new lines over the Williamsburgh Bridge, as stated in the article. Arrangements for the use of this bridge were made a year before it was opened and more than five years before it was possible to put it into effect immediately upon the completion of the bridge elevated and trolley cars were put in operation, the trolley cars within six hours after it was ready for that traffic.

On Nov. 23 the commission issued a reply to Mr. Hedley.

Cleveland Traction Situation

On Nov. 16, 1909, the manner of financing the proposed improvements of the Cleveland Railway was discussed. Judge Tayler favored a bond issue because the interest was limited to 5 per cent., whereas the dividends on stock would be 6 per cent. Horace Andrews, president of the company, stated that he would prefer to secure the money by selling stock in Cleveland, as the interests of the property would be conserved better if the securities were owned to a large extent by local people. He said that a bond issue such as will be necessary would have to be secured in the East. A stock issue would also afford a much better financial basis than a bond issue. Mayor Johnson also favors the sale of stock in Cleveland.

Prof. M. E. Cooley surprised both sides by declaring as a witness on Nov. 17 that the schedules prepared during the Goff-Johnson negotiations were incomplete and that the value of the Cleveland lines was $20,000,000 instead of the figures that were finally made at that time. Prof. Cooley mentioned a number of items to which attention has not heretofore been called, and said that the contractors' profits should be from 10 per cent to 15 per cent. Judge Tayler said that Prof. E. W. Bemis, in his valuation work in Detroit in 1899, agreed with the ideas of Professor Cooley. Mayor Johnson asserted that Professor Bemis was not then and is not now a practical railway man.

Professor Cooley discussed overhead charges and stated that a substantial allowance must be made for this purpose, as no inventory could ever be complete. However, in this case items had been omitted from the schedules to such an extent that he would be unable to make anything like a close estimate of the distribution of the items.

On Nov. 18 Mayor Johnson and Attorney D. C. Westenhaver presented arguments for the protection of the claims of the guaranteed stockholders. They stated that those who purchased stock on the influence of the advertisements in the newspapers and magazines, through the so-called free stock exchange, should be protected, but that those who purchased the stock in other ways should receive no preference, whether they were influenced by the advertising or not. Those who patronized the free stock exchange paid par, whereas they could have secured the stock in the Cleveland Exchange for much less.

Mayor Johnson, at the meeting on Nov. 19, complained that the testimony of the experts introduced by the Cleveland Railway put the valuation at an extreme. Mr. Andrews said that he had warned witnesses to make no statement that had not been proved by their own experience, and he believed they had complied with his injunction in all their testimony.

At the close of the hearing on Nov. 19 Judge Tayler authorized the payment of the remainder of the preferred claims against the Municipal Traction Company, amounting to about $75,000. The question of interest will be taken care of later.

As there has been no objection, the Cleveland Construction Company will purchase the 250 tons of scrap rail on hand at $20 a ton.

Mr. Andrews has stated that he will continue as president of the Cleveland Railway until a settlement of the troubles of the company is effected and the proposed improvements financed.

Convention Trip of Detroit United Railway Car

A party of representatives of the Detroit (Mich.) United Railways traveled in a special car of that road to Indianapolis and return from Detroit on the occasion of the meeting of the Central Electric Railway Association on Nov. 18. Those who made the entire trip were: G. W. Parker, general express and freight agent; John F. Keys, general passenger agent; A. D. B. Van Zandt, publicity agent; L. S. Tackabury, assistant to the general manager; Nathan Rumney, traveling freight agent, and James Wier, chief clerk of the electrical depot, Detroit United Railway; Elmer C. Allen, division superintendent Detroit Jackson & Chicago Railway; James Anderson, general manager Sandwich, Windsor & Amherstburg Railway, and R. G. De Lisle.

traveling freight and passenger agent Detroit Monroe & Toledo Short Line Railway.

The following bulletin issued by A. L. Neereamer, secretary-treasurer of the Central Electric Railway Association, shows the route on the car to and from Indianapolis:

GOING SCHEDULE, NOV. 17, 1909.		Authority of
Lv Detroit, via Detroit, Monroe & Toledo Short Line	7:00 a. m.	
Ar Toledo	9:00 a. m.	
Delivery to the Toledo, Forstoria & Findlay Railway	9:18 a. m.	F. W. Adams, 11-8-09.
Lv Toledo, via Toledo, Forstoria & Findlay Railway	9:22 a. m.	
Ar Findlay	10:30 a. m.	
Lv Findlay, via Western Ohio Railway	10:35 a. m.	F. D. Carpenter,
Ar Lima	11:50 a. m.	11-5-09.
Lv Lima, via Western Ohio Railway	1:00 p. m.	C. M. Paxton,
Ar Piqua	2:35 p. m.	11-5-09.
Ar Dayton, via Dayton & Troy Electric Railway	3:20 p. m.	
Lv Dayton, via Ohio Electric Railway	3:25 p. m.	W. S. Whitney,
Ar Richmond, Ind.	4:55 p. m.	11-5-09.
Ar Indianapolis, Ind., via Terre Haute, Indianapolis & Eastern Traction Company	7:10 p. m.	R. I. Todd, 11-5-09.

RETURN SCHEDULE, NOV. 19, 1909.		Authority of
Lv Indianapolis, via Indiana Union Traction Company	7:00 a. m.	H. A. Nicholl,
Ar Peru	9:30 a. m.	11-5-09.
Lv Peru, via Ft. Wayne & Wabash Valley Traction Company	9:35 a. m.	C. D. Emmons,
Ar Ft. Wayne	11:30 a. m.	11-5-09.
Lv Ft. Wayne, via Ohio Electric Railway	12:35 a. m.	W. S. Whitney.
Ar Lima	2:35 p. m.	11-5-09.
Lv Lima, via Western Ohio Railway	2:35 p. m.	F. D. Carpenter,
Ar Findlay	3:38 p. m.	11-5-09.
Lv Findlay, via Toledo Urban & Interurban Railway	3:40 p. m.	C. F. Smith,
Ar Toledo	5:25 p. m.	11-5-09.
Delivery to the Detroit United Railway	5:50 p. m.	
Lv Toledo, via Detroit United Railway	5:50 p. m.	
Ar Detroit	7:50 p. m.	

Proposed Railroad Terminal Electrification in Chicago

The subject of compelling the railroads in Chicago to electrify their lines within the city limits has reached the stage of public hearings, and the first meeting of this character was held by the local transportation committee of the City Council on Nov. 17. Representatives of the railroads and railroad trainmen were heard on the one side, while on the other speakers for the people of Chicago presented their case. The proposed ordinance was read first. It provides that within six months after its passage the railroads must submit plans to operate their lines in Chicago by means other than steam and without the production of steam, noxious gases or noxious vapors. It is also stipulated that by Jan. 1, 1912, all trains must be operated by means other than steam on penalty of a fine of $200 a day.

The first speaker was P. J. Calkins, an organizer of locomotive engineers. He said that the railroads and their employees were doing their best to abate the smoke nuisance. Electrification in New York had resulted in loss of life and injuries to trainmen. Furthermore, the Chicago situation was very different from that in New York. Many locomotive engineers would have to leave Chicago if the railroads were electrified, for their occupation would be gone. To do away with a little smoke, it was proposed to imperil the lives of many men employed on the railroads. The end does not justify the means.

As a representative of the Anti-Smoke League, Judge A. N. Waterman addressed the committee. He pointed out that every great reform has been strenuously, even violently opposed. The locomotive engineers were entitled to consideration and so were the mine operators and the dealers in soft coal. Nevertheless, the soft-coal burning locomotives constitute a great nuisance, and the speaker made a plea for the homes of the people constituting the community of 2,000,000 men, women and children in Chicago.

For the Illinois Central Railroad, Blewett Lee, of counsel, suggested some modifications of the ordinance. He said that the railroads of Chicago were so interlinked by interchange of traffic that the subject of electrification should be considered by all of them together and not by any one railroad. He thought that Jan. 1, 1912, gave altogether too short a time to make such an extensive improvement. The penalty of $200 a day he also thought excessive. The proposed ordinance apparently prohibits the burning of hard coal or coke to get smokeless operation, as it expressly mentions noxious gases and vapors, as well as smoke; the speaker thought that this should be modified. Furthermore, he was of the opinion that the measure should only apply to thickly-populated districts and that no hardship would result if steam locomotives were permitted in the outlying parts of the city.

W. A. Gardner, vice-president of the Chicago & Northwestern Railway, read a paper giving many interesting details of practical railroad operation in Chicago. The railroads, he said, were bound up intimately with the industrial and commercial life of the city, and it would be impossible to change the motive power of the railroads without affecting the business interests. The Chicago & Northwestern Railroad alone had approximately 375 miles of track in the city, and it had never less than 10,000 freight cars on these tracks. Considering all the railroads, 2000 passenger trains enter and depart from the city every day, and there was a movement of no less than 65,000 freight cars in and out of Chicago daily. The change proposed in the ordinance was a revolution, and should receive very careful and long-continued investigation. Conditions in New York and Chicago were very different. For instance, there were 13,000 track switches in Chicago. His company used coal for which it pays $3.05 a ton especially to abate the smoke nuisance, although Illinois soft coal could be bought for $1.70 a ton.

The date of the next meeting has not yet been announced.

Transit Affairs in New York

The Public Service Commission has notified the Board of Estimate that plans for the so-called Lexington Avenue route, the Broadway-Lafayette route and the extension to the Fourth Avenue Subway have now practically been completed by the engineering department of the commission, and the legal department is now engaged upon forms of contracts. A change has been made in the Broadway-Lexington Avenue route which will necessitate the approval of the Board of Estimate and of the property owners or the Appellate Division of the Supreme Court. It is anticipated that the consents required may be obtained and bids to these routes advertised early in 1910.

Theodore P. Shonts, president of the Interborough Rapid Transit Company, and Frank Hedley, vice-president and general manager of the company, have resumed the conferences with the Public Service Commission begun last summer and continued until a few weeks ago, regarding the plans of the company for the construction of subway and elevated lines. A session was held on Nov. 19, but it was announced that matters have not yet reached the point of considering the terms of construction.

In response to the resolution passed by the Board of Estimate and Apportionment requesting the Public Service Commission to make application for the appointment of condemnation commissioners in connection with the Fourth Avenue Subway, Chairman Willcox has written to the Board of Estimate expressing the opinion that it would be unwise for the city to institute proceedings for the condemnation of easements along the Fourth Avenue Subway until the Court of Appeals has passed on the same question in the Joralemon Street case. This decision is expected within a short time, and if the contention of the city is sustained in that case there will be no need for condemning the easements.

The Public Service Commission has sent to the Board of Estimate requisitions for more than $13,000,000 corporate stock to complete payments for the construction of the Fourth Avenue subway in Brooklyn, according to the contracts let recently.

Officers and directors of the Pennsylvania Railroad made a trip of inspection through the company's Hudson and East River tunnels on Nov. 18, 1909, on a special train of four cars which left Philadelphia at 9 o'clock. Stops were made at all the points of interest, including the new uptown station and the Long Island terminals. The company announces that the entire system will be open to traffic on June 1, 1910.

The engineers of the Department of Bridges of New York are preparing plans for the reconstruction of the Brooklyn Bridge so as to accommodate subway traffic. It is understood that the reconstruction work will not be begun until the Manhattan Bridge is in service. One of the tentative plans provides that the upper deck of the railroad tracks shall be used by the elevated trains and the lower deck by the subway trains. The cables need not be disturbed. It is reported that the work of completing the plans and carrying out the reconstruction will consume four years.

Rehearing of Ohio Franchise Case Refused.—The Supreme Court of Ohio has refused the request of the solicitor of Akron to rehear the case of the City of Akron against the East Ohio Gas Company, in which it was decided that a franchise to be perpetual must have the words "in per-

petuity" written into it, as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 20, 1909, page 1079.

Rochester Railway Employees' Ball.—The tenth annual ball of the Rochester Railway Employees' Association was held in Convention Hall, Rochester, on Nov. 17, 1909. It is estimated that 1200 persons attended, including the heads of the various departments of the company. In the absence of E. J. Cook, general manager of the company, W. R. W. Griffin, superintendent, represented the company officially. Mayor Edgerton of Rochester was among the guests.

Power Contract in Indiana.—The Indiana & Michigan Electric Company, South Bend, Ind., began to deliver power to the Chicago, Lake Shore & South Bend Railway, South Bend, Ind., and the Northern Indiana Railway, South Bend, on Nov. 16 under a 15-year contract. The Indiana & Michigan Electric Company is also furnishing power to the Southern Michigan Railway, South Bend, and the Chicago, South Bend & Northern Indiana Railway, South Bend, which control other lines in South Bend and vicinity.

Niagara Power Contract Approved.—The Public Service Commission of the Second District of New York has approved the contract between the Niagara, Lockport & Ontario Power Company and the Buffalo, Lockport & Rochester Railway, Buffalo, N. Y., leasing and granting to the Niagara, Lockport & Ontario Power Company the right and privilege of using the excess capacity of the transmission line of the Buffalo, Lockport & Rochester Railway for the purpose of transmitting and selling power to persons, corporations and firms other than the railway in the locality traversed by the transmission line.

Meeting of New England Street Railway Club.—The regular monthly meeting of the New England Street Railway Club will be held at the American House, Boston, Mass., on Thursday evening, Dec. 2. The date has been changed from the fourth Thursday of the month, because that fell upon Thanksgiving Day. Dinner will be served at 6:45 o'clock. A charge for members of 75 cents will be made for dinner tickets and $1.25 for guests. After the regular business meeting there will be brief addresses on "Impressions of the City and Interurban Railway Systems in the Far West" by a number of those who participated in the trip of the Massachusetts Street Railway Association to Denver, Seattle and the Pacific Coast on the street railway special. The remarks will be illustrated by the aid of an opaque projector, or reflectoscope, through the courtesy of the Boston & Northern Street Railway. Among those who will speak will be James F. Shaw, B. V. Swenson, Henry C. Page, Paul Winsor, M. H. Bronsdon and Nugent Fallon.

Public Utilities Commission Ordinance in Los Angeles.—The City Council of Los Angeles has passed over the veto of the Mayor an ordinance to create a public utilities commission to supervise the work of the public service corporations operating in Los Angeles. The ordinance provides for a commission of five members to be appointed by the Council, each of the five commissioners to receive a salary of $1,000 a year, the secretary to receive $2,400 a year and devote his whole time to the work of the commission. The ordinance carries an appropriation of $8,000, which leaves only $600 for the work of the body after meeting the salaries of the commissioners and the secretary. The Mayor favored a somewhat similar ordinance advanced by the Municipal League, which provided for a commission of three members to be appointed by the Mayor and confirmed by the Council, the commissioners to serve without salary and to select their own secretary. This ordinance carried an appropriation of $12,000, to be employed at the discretion of the commission, and required the Council to submit applications for franchises to the commission for approval.

Second Fall Meeting of the Technical Publicity Association.—The Technical Publicity Association, an organization composed of the men in charge of the publicity departments of a number of the large manufacturing concerns, held its second fall meeting on Nov. 11, 1909, at the National Arts Club, New York, N. Y. There was an unusually large attendance. After an informal dinner the association held a business meeting at which the principal speakers were James H. McGraw, president of the McGraw Publishing Company; Robert Frothingham, advertising manager of *Everybody's*, and J. George Frederick, managing editor of *Printer's Ink*. In the absence of President Redfield, O. C. Harn, advertising manager of the National Lead Company, was toastmaster. Howard M. Post, chairman of the publicity committee, reported very satisfactory progress. He presented a portfolio of technical and trade paper comments showing graphically the increasing recognition of the Technical Publicity Association as a factor in the technical advertising field. The association, at the close of a very profitable evening, adjourned to meet on Dec. 8, 1909.

Financial and Corporate

New York Stock and Money Market

November 22, 1909.

The stock market during the past week has been more concerned with large deals affecting domestic companies than with the financial situation. The prices for Interborough have remained practically stationary; Third Avenue, however, has declined 2 points or more upon the suggestion of a reorganization plan that involved a heavy assessment on the stock.

The foreign situation is better, and American bankers seem to carry their load without much trouble. Quotations to-day were: Call, 4½ to 5 per cent; 90 days, 4¾ to 5 per cent.

Other Markets

In the Philadelphia market prices are practically unchanged. There has been some little trading in Union Traction without any change of price.

In the Boston market, Massachusetts Electric issues have been traded in to some extent, especially preferred, but the prices at the close of the week were practically the same as at the opening. There have also been a few scattered sales of Boston Suburban stocks.

In Chicago there have been a few sales of Chicago Railways, Series 1, the price being 100, which is many points below the last previous sales reported. Series 2 remains about the same price.

In Baltimore, the bonds of the United Railways Company continue to be the absorbing traction interest and are liberally dealt in at prices that are practically unchanged from former quotations. There have been a few sales of the stock of the same company at about 13½.

The only traction securities sold at the weekly auction in New York last week were 201 shares Brooklyn City Railway Company, $10 each, at 197⅜.

Quotations of various traction securities as compared with last week follow:

	Nov. 16.	Nov. 22.
American Railways Company	a45½	a45½
Aurora, Elgin & Chicago Railroad (common)	a49¼	a50
Aurora, Elgin & Chicago Railroad (preferred)	*95	a92
Boston Elevated Railway	130	130
Boston & Suburban Electric Companies	a18½	15
Boston & Suburban Electric Companies (preferred)	a77¼	77
Boston & Worcester Electric Companies (common)	a12	a12
Boston & Worcester Electric Companies (preferred)	a52	a52
Brooklyn Rapid Transit Company	77	77¾
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	87	86¼
Capital Traction Company, Washington	a136	a135
Chicago City Railway	a190	*190
Chicago & Oak Park Elevated Railroad (common)	*2	*2
Chicago & Oak Park Elevated Railroad (preferred)	*10	*10
Chicago Railways, ptcptg., ctf. 1	a102	a101
Chicago Railways, ptcptg., ctf. 2	a35	a32½
Chicago Railways, ptcptg., ctf. 3	a24	a20
Chicago Railways, ptcptg., ctf. 4s	*10	*10
Cleveland Railways	*84	*84
Consolidated Traction of New Jersey	a77	a77½
Consolidated Traction of N. J., 5 per cent bonds	a106	a107
Detroit United Railway	62¾	*60¼
General Electric Company	163	162
Georgia Railway & Electric Company (common)	a100	a103
Georgia Railway & Electric Company (preferred)	86	a88
Interborough-Metropolitan Company (common)	23¾	22½
Interborough-Metropolitan Company (preferred)	56¼	54¾
Interborough-Metropolitan Company (4½s)	83½	82⅝
Kansas City Railway & Light Company (common)	a40	a39
Kansas City Railway & Light Company (preferred)	*82	*82
Manhattan Railway	141¾	140
Massachusetts Electric Companies (common)	a16	a16½
Massachusetts Electric Companies (preferred)	a80	a80
Metropolitan West Side, Chicago (common)	a16⅞	a17
Metropolitan West Side, Chicago (preferred)	a53	a53
Metropolitan Street Railway	27	a25
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	78⅛	79
Northwestern Elevated Railroad (common)	a19	a18
Northwestern Elevated Railroad (preferred)	a68	a68
Philadelphia Company, Pittsburg (common)	48¾	a48¾
Philadelphia Company, Pittsburg (preferred)	44½	a44½
Philadelphia Rapid Transit Company	26¾	a26⅝
Philadelphia Traction Company	89	a89
Public Service Corporation, 5 per cent col. notes	100⅛	*100⅛
Public Service Corporation, ctfs.	a100¼	a101
Seattle Electric Company (common)	a117	117
Seattle Electric Company (preferred)	a103½	103½
South Side Elevated Railroad (Chicago)	a53	a56
Toledo Railways & Light Company	*8	*8
Third Avenue Railroad, New York	20½	19½
Twin City Rapid Transit, Minneapolis (common)	100	*100
Union Traction Company, Philadelphia	5¼	5¼
United Rys. & Electric Company, Baltimore	13¾	a13½
United Rys. Inv. Co. (common)	*42	*42
United Rys. Inv. Co. (preferred)	72½	*72½
Washington Ry. & Electric Company (common)	a46	a44
Washington Ry. & Elec. Company (preferred)	a92	a91
West End Street Railway, Boston (common)	92	92½
West End Street Railway, Boston (preferred)	105	105
Westinghouse Electric & Manufacturing Company	85½	85⅞
Westinghouse Elec. & Mfg. Company (1st pref.)	*110	*110

a Asked. * Last Sale.

Annual Report of Spokane & Inland Empire Railroad

Gross earnings from operation of the Spokane & Inland Empire Railroad in the year ended June 30, 1909, compare with the previous year as follows:

	1908.	1909.	Increase.
Freight	$ 291,008	$ 325,020	$ 34,012
Passenger	516,071	530,543	14,472
Earnings from street railway system and miscellaneous	310,939	413,537	102,598
Total	$1,118,018	$1,269,100	$151,082
Operating expenses—including taxes	$ 807,388	$ 882,151	$ 74,763
Net operating income	$ 310,630	$ 386,949	$ 76,319

Total operating expenses, excluding taxes, were $844,352, or 66.5 per cent of the total earnings from operation. Of the expenses $262,517, or 20.7 per cent of the total operating revenue, was applied in maintenance. The expenditure for maintenance of way and structures was $143,662, or 11.3 per cent of gross, and the amount used for maintenance of equipment was $118,855, or 9.4 per cent of the operating revenue. Transportation expenses aggregated $459,265, equivalent to 36.2 per cent of gross. General expenses and traffic expenses absorbed 7.8 per cent and 1.8 per cent respectively.

Jay P. Graves, president of the company, says in part in his statement to shareholders:

"In submitting my third annual report to the stockholders of this company I have much of good and somewhat of ill to report, and I shall put the ill report first.

"On July 15 of this year the registration for homesteads on account of the opening of the Cœur d'Alene Indian reservation was commenced in Cœur d'Alene. Owing to the simultaneous opening of the Flathead and Spokane Indian reservations the travel over the Cœur d'Alene division of this company was phenomenal. Even with extra service it was almost an impossibility for us to handle the crowds between Spokane and Cœur d'Alene, and every train that went out either from Spokane or Cœur d'Alene was mobbed. We called upon the police officers of both cities to keep the crowds in some restraint, and with the assistance of many extra employees the rush was handled without a single accident occurring until July 31. On that day special No. 5, westbound, collided with regular passenger train No. 20, eastbound, at Gibbs Station, about 1½ miles from Cœur d'Alene. Both trains were packed, and as a result of the collision 17 persons were killed and between 100 and 200 were injured more or less seriously. No. 20 was in charge of Motorman Delaney and Conductor Seymour, both old and experienced railroad men. It was brought to a stop before the collision, and no one on it was injured to any appreciable extent. Special No. 5 was in charge of Motorman Campbell and Conductor Whittelsey. Both of these men had been in the employ of the company for several years and had had previous railroad experience of a great many years. Both were experienced railroad men, had passed first-class examinations, both at the time of their employment and subsequently, and were rated as among our most reliable employees. The collision was due, however, solely to their negligence and violation of the rules.

"Immediately after the collision the company requested Robert H. Elder, acting prosecuting attorney for Kootenai County, Idaho; Fred C. Pugh, prosecuting attorney of Spokane County, and E. O. Connor, corporation counsel of the City of Spokane, to act together with three members to be named by the Chamber of Commerce of Spokane and three members to be named by the Chamber of Commerce of Cœur d'Alene, as a committee to investigate the cause of the wreck. Their report fully exonerated the company from any moral responsibility for the wreck, showing that it had done everything that could be done by the company to protect its passengers from injury and placing the blame for the wreck upon Motorman Campbell and Conductor Whittelsey of special No. 5.

"While this report exonerated the company from moral responsibility it did not, of course, affect its legal liability for all damages sustained by reason of the wreck. The company has proceeded as rapidly as possible with the settlement of the claims made against it. Many claims have been settled. Owing to the fact that some claimants have shown themselves most unreasonable, so much so that the company has not been able to settle with them on any fair basis, it is probable that some litigation may result, and owing to that fact the claim and legal departments of the company have not yet felt competent to give an accurate estimate of the cost of the wreck. It is hoped, however, that it will be kept within the $300,000 mark, which, considering the magnitude of the disaster, should be regarded as most fortunate.

"I turn now to the other side of the picture, which, I think, shows the property to be in excellent condition.

"As stated in the last report, our power plant at the Nine Mile site is now in operation and is furnishing power to operate the Inland division. We are using for the operation of that division from 4000 to 5500 hp. Our power contract with the Washington Water Power Company, entered into when our lines were first constructed, has yet six years to run. We are using, under that contract 3800 hp, the minimum amount permitted by the contract. We have contracts for approximately 1200 hp with outside parties, for which we are receiving approximately $4 per hp per month. During the ensuing year we have 2800 hp additional business in view to be used in the development of irrigation projects alone. Other business, which is practically certain, will require so much additional power that it will be necessary to increase the plant 10,000 hp this coming winter. The company owns a right of way to its power plant over which the transmission line is built. This right of way was selected over a grade which will permit of the building of an electric road upon the same whenever it appears that business will warrant the construction of such a line. Twenty-two miles of 60,000-volt high tension line have been constructed during the past year and 40 miles will be added this winter. Net earnings of the power plant, exclusive of the amount required for the operation of the railway line, are estimated at $140,000 for the ensuing year.

"The operating and other revenues of the company for the fiscal year ending June 30, 1909, were $1,269,100, an increase of $151,082 over last year's earnings. The operating expenses were $882,151, an increase of $74,763 over the operating expenses of last year. This increase in operating expenses is due to the greater mileage operated during the past fiscal year, about 16 miles of the Inland division and 2 miles of the traction division, and also to the unusually hard winter of 1908-09 and floods on the Inland division, which, in common with all the other railroads in the country, suffered severely from washouts during the unprecedented high water in the latter part of January.

"By divisions the traction division shows an increase of 34.4 per cent in gross receipts over that of the past year. The Inland division shows an increase of 22.5 per cent. Owing to the shutting down of the mines in the Cœur d'Alene mining district, and of the mills about Cœur d'Alene Lake during the greater part of the year, the Cœur d'Alene division does not show any increase in receipts for the year. During the last few months, however, the Cœur d'Alene division shows an increase in receipts of from 25 per cent to 50 per cent per month over the earnings for the same months during the past year. This is exclusive of the registration business, which is not taken into account in these comparisons. This increase was due to resumption of the lumber and mining industries, and is undoubtedly permanent.

"The physical condition of the property is excellent. The roadbeds have been kept in first-class condition, every third tie on the Cœur d'Alene division has been renewed and our lines are all fully ballasted and are comparable with the very best steam railroad lines in this country.

"We have built up, at Liberty Lake, a first-class summer resort. Being near the City of Spokane (17 miles), and maintaining a low rate—75 cents for the round trip—has made it very attractive for pleasure seekers, and our business during the past summer has been excellent. We have so arranged our schedules on the Cœur d'Alene division as to put trains on between Liberty Lake and Spokane which handle not only the Liberty Lake business but the local business through the valley from Greenacres, thus permitting us to make better time with our through trains on the Cœur d'Alene division. It has been decided, on account of the rapidly growing business at Liberty Lake, and also along the line from Greenacres, where a number of new iririgated projects are under way, that it will be necessary during the coming year to double-track the line from Greenacres to Spokane. This, in connection with the double track now in operation between Greenacres and Spokane Bridge, will give us 18 miles of double track—from Spokane to the Idaho line. We expect this to suffice for the double-tracking until the business is very greatly increased over the present time.

"To take care of the increased business we have found it necessary to order two more electric freight locomotives and four two-car trains of heavier equipment for the Cœur d'Alene division. This will permit us to put the lighter equipment, which was put on that road when it was first built, on the branch lines and local service, and will give us sufficient equipment to take care of the business for several years to come.

"The total expenditure for the year ending June 30, 1909, for new lines and extensions, equipment and betterments was $771,562.

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"It has been the policy of the company, in order to build up industries along its lines, to put in spurs and sidings wherever business promised. There were 19 different industrial tracks completed during the past year, aggregating in length about 2.45 miles. This policy not only helps to build up the country through which the road runs, but will add materially, in time, to the earning power of the system.

"The management expected to resume the payment of dividends on the preferred rights during the year 1909, as the earnings of the company warranted it. The deplorable accident, however, will eat up our earnings for the greater portion of the year, and, much as we regret it, the payment of dividends will be postponed until next year. We confidently hope to resume them then, as the earnings will warrant it as soon as this extraordinary and unprecedented demand upon our resources has been disposed of. The management regrets this enforced postponement of dividends, but feels that it is fully excused, in view of this calamity, which the utmost care could not prevent."

The report contains the following traffic and mileage statistics:

	Year ended June 30,	
Passenger—(railroad division)—	1909.	1908.
Number revenue passengers carried	1,088,682	1,096,817
Number revenue passengers carried 1 mile	24,608,962	25,089,489
Number revenue passengers carried 1 mile per mile of road	149,145	167,263
Average distance carried (miles)	22.6	22.88
Total passenger revenue	$501,982.28	$488,605.83
Average amount paid by each passenger (cents)	46.11	44.55
Average rate per passenger per mile (cents)	2.04	1.95
Total passenger earnings, including mail, baggage and express	$530,542.84	$516,070.90
Mileage of passenger cars	1,555,078	1,513,521
Mileage of passenger trains	707,874	713,039
Passenger earnings per train mile (cents)	74.95	72.37
Passenger earnings per average mile of road operated	$3,215.41	$3,440.47
Freight—(railroad division)—		
Revenue tons carried	379,136	331,594
Revenue tons carried 1 mile	15,099,677	11,574,193
Average distance haul 1 ton miles	39.8	34.9
Total freight revenue	$325,020.18	$291,007.58
Average amount received per ton freight (cents)	85.73	87.76
Average receipt per ton per mile (cents)	2.15	2.51
Mileage of loaded cars	797,841	644,597
Mileage of empty cars	539,615	419,055
Total mileage	1,337,456	1,063,652
Mileage of freight trains	194,407	188,755
Freight revenue per train mile	$1.67	$1.54
Freight revenue per average mile of road operated	$1,969.82	$1,940.05
City Traction System—		
Revenue passengers carried	7,821,526	5,790,893
Passenger car mileage	1,602,323	1,396,472
Passenger earnings	$384,933.55	$286,476.25
Passenger earnings per car mile (cents)	24.02	20.5

Reorganization Plan of Trenton & New Brunswick Railroad and the New Jersey Short Line Railroad Approved

The depositing bondholders of the Trenton & New Brunswick Railroad, Trenton, N. J., and the depositing bondholders of the New Jersey Short Line Railroad have approved the plan for the reorganization of the companies prepared by the bondholders' committees, representing the depositing bondholders of the two companies. A. M. Taylor, Philadelphia, Pa., is chairman of both of these committees.

The plan provides that a new company, to be called the Elizabeth & Trenton Railroad, shall be formed to take over the property of the Trenton & New Brunswick Railroad and the New Jersey Short Line Railroad, and that this new company shall issue $180,300 par value in preferred stock, for cash, and $811,350 in common stock. The amount of new preferred stock to be issued is equal to 10 per cent of $1,803,000, the amount of the original bonds outstanding against these properties, and each bondholder is given the right to purchase his proportionate share thereof, namely, an amount equal to 10 per cent of his bondholding, each share of the preferred stock carrying with it two shares of common stock as a bonus. The common stock bonus accompanying the preferred stock allotted to the bondholders is equal to 20 per cent of the par value of the original bondholdings.

All bondholders participate in the distribution of the balance of the common stock proportionately, whether they take their pro rata share of the preferred stock with the common stock bonus accompanying it or not, and this distribution of common stock to all depositing bondholders will give each one an amount equal to 25 per cent of his original bondholding.

Such of the preferred stock of the new company, accompanied by the bonus of common stock, which is not purchased and paid for by depositing bondholder on allotment, will be sold to outside investors.

The bulk of the money necessary to complete the high-speed line through from Trenton to Elizabethport, via New Brunswick, will be raised by issuing bonds against the property acquired by the new company.

Mr. Taylor stated at the bondholders' meeting that a verbal understanding had been entered into between Thomas N. McCarter, president of the Public Service Corporation, and himself, to the effect that the Public Service Railway would later take the property of the new company, provided satisfactory arrangements were made for the raising of the new money necessary to complete the New Jersey Short Line Railroad, and to pay the balance of the cost of rehabilitating the Trenton & New Brunswick Railroad. This would enable the operation of through high-speed cars from Trenton, via New Brunswick, Elizabethport and Elizabeth, to the Newark terminal of the Hudson & Manhattan Railroad, from which point passengers would have the advantage of high-speed service to New York City.

Anderson (S. C.) Traction Company—The property of the Anderson Traction Company has been sold by E. W. Robertson, who bid it in at receiver's sale on Oct. 12, 1909, to a syndicate composed of L. W. Parker, W. J. Thackston, H. J. Haynesworth, J. B. Duke and B. N. Duke. The Greenville, Anderson & Spartanburg Traction Company, it is said, will be organized to take over the property and extend the road.

Boston (Mass.) Elevated Railway.—In a report to the Chamber of Commerce the public utilities committee of that body advises the stockholders of the West End Street Railway to agree to the consolidation with the Boston Elevated Railway on the terms provided for by the Legislature. The committee says that these terms are adequate and gives its reasons for such a conclusion. It suggests an amendment to the enabling act to prevent the minority from preventing the merger.

Boston & Worcester Street Railway, Boston, Mass.—The Massachusetts Railroad Commission has been requested by the Boston & Worcester Street Railway to sanction an increase of stock from $2,025,000 to not more than $2,525,000, to be offered to stockholders at $100 a share to provide for extensions and improvements, and an issue of 20-year 4½ per cent bonds not to exceed $500,000 for improvements and refunding $46,000 of the 5 per cent bonds of the Framingham Union Street Railway which have matured.

Metropolitan Street Railway, New York, N. Y.—The Supreme Court of the United States on Nov. 15, 1909, refused to review the decree of the lower courts ordering the foreclosure of the mortgage of the Guaranty Trust Company on a portion of the property of the Metropolitan Street Railway. At the same time writs of certiorari to the Circuit Court of Appeals in New York in the same suit were denied.

Tarrytown, White Plains & Mamaroneck Railway, White Plains, N. Y.—Justice Keogh of the Supreme Court at White Plains has confirmed the sale of the greater part of the property of the Tarrytown, White Plains & Mamaroneck Railway to Richard Sutro, of Sutro Brothers, New York, N. Y., representing the New York, New Haven & Hartford Railroad. The property was sold under foreclosure, as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 13, 1909, page 1038.

Third Avenue Railroad, New York, N. Y.—An outline of the revised plan for the reorganization of the Third Avenue Railroad shortly to be submitted to the Public Service Commission of the First District of New York, proposes an assessment of 50 per cent on the stock, with the provision that the stockholders for this assessment amounting to $8,000,000 receive $9,000,000 in 4 per cent first mortgage bonds and have their stock reduced by 25 per cent. The plan proposes also the issuance of $6,000,000 new first mortgage 4 per cent bonds for the outstanding $5,000,000 of 5 per cent bonds and the scaling down of the $37,500,000 4 per cent consolidated bonds to $25,000,000 of 4½ per cent income bonds.

United Railways, St. Louis, Mo.—The voting trustees for the common stock of the United Railways under the agreement of Nov. 1, 1904, which expired by limitation on Oct. 31, 1909, have given notice that the trust certificates may now be exchanged for the shares of the common stock which they represent. Brown Brothers & Company, New York, N. Y., and the National Bank of Commerce, St. Louis, will redeem the certificates.

Washington Railway & Electric Company, Washington, D. C.—The directors of the Washington Railway & Electric Company have declared an initial dividend of 1 per cent on the $6,500,000 of common stock of the company for the half year payable on Dec. 1, 1909, to stock of record on Nov. 13, 1909. The directors have also declared the eleventh semi-annual dividend of 2½ per cent on the $8,500,000 of preferred stock.

Traffic and Transportation

Relief and Pension Work on Metropolitan Street Railway, New York.

The annual report of the Metropolitan Street Railway Association of New York, relating to the year ended Sept. 19, 1909, shows the following benefits: Paid to members on account of sickness or injury, $13,707, paid for death claims, $14,690.35; estimated value of medical service and attendance, $6,365.25; total, $34,762.60. There was received in dues and initiation fees from members the sum of $27,976.50, leaving an excess of benefits over the amount paid to members aggregating $6,786.10. Oren Root, chairman of the board of trustees, states that since the organization of the association the following amounts have been paid to members or their heirs: Death claims, $114,366.03; sick or injury benefits, $180,484; value of medical advice and attendance (estimated) $95,868.82; total, $390,718.85. The total amount received in dues and initiation fees from the time of organization to the close of the last fiscal year was $317,278.49, leaving an excess of benefits over the amounts paid by members of $73,440.36. The value of securities and cash on hand in the treasury of the association at the end of the year was $47,247.82.

In issuing the annual report of the association, Oren Root, general manager for the receivers of the Metropolitan Street Railway, sent a copy of the pension regulations together with a statement addressed to all employees. This statement said in part:

"For some years the management of the Metropolitan Street Railway, as a mark of appreciation of long and faithful service, has been paying pensions to employees who have become too old to continue their duties.

"Since this property has been under the control of the receivers, the same policy has been followed, and at the present time there are 19 men on the pension roll drawing monthly pensions varying in amount from $15 to $28.17 each.

"The pension system has been very successful in its operation and the money thus paid out has been of much assistance in the support of men during their old age, and in contributing to the comfort of their families.

"The pension system is supported solely by the railway company, while the Metropolitan Street Railway Association is an organization of the employees. The affairs of the association are managed by the employees with the assistance of the officers of the company, and the association is supported financially by the employees and by donations made by the company and other friends from time to time. The association was formed by the employees of the Metropolitan Street Railway to afford the men an opportunity to protect themselves and their families in the event of illness or injury, which might render a man temporarily unable to work, and also to provide for the payment of $300 to the man's family at the time of his death, when the money would be most needed. By this means members of the association obtain for themselves accident and sickness insurance and secure life insurance for the benefit of their families."

The pension regulations as published are identical with those printed in 1902 for the Interurban Street Railway, then lessee of the Metropolitan system.

Conference on Front Platform Rule in Philadelphia

The members of the Railroad Commission of Pennsylvania met the officers of the Philadelphia (Pa.) Rapid Transit Company in Philadelphia on Nov. 18, 1909, and Chas. O. Kruger, president of the company, and Attorney Ballard assured the commissioners that the officers and representatives of the company would do everything in their power to carry out the requirements of the order of the commission issued on Oct. 30, 1908, prohibiting passengers from riding on the front platforms of cars. It is expected that some definite method of enforcing the order will be determined upon within a few days. The company desires to cause a minimum of inconvenience to the traveling public. At places like the Philadelphia Navy Yard workmen fairly mob the cars in their effort to board the first city-bound cars, and the greatest difficulty will be experienced in complying with the commission's ruling, and additional reserve equipment may be necessary.

Mr. Kruger explained to the commissioners that since the order was issued the Philadelphia Rapid Transit Company had posted notices and placed extra cars on the lines to live up to its provisions. He said that 122 extra trippers were put on the central city lines during the rush hours in addition to the trailers, 60 of which are now in use, and that the company had done everything possible to clear the platforms, but that it was impossible and would probably cause innumerable lawsuits.

In justification of the order that the rule be enforced at all times and under all circumstances, whether the public approves or not, Nathaniel Ewing, chairman of the commission, says:

"The safety of the public demands that this rule shall be rigidly enforced. I want to make it plain that the rule is a benefit to the public, and not the company. Where it might result in some inconvenience and disorder, it is better to have the inconvenience and disorder at the start than danger of accident."

The order of the commission to the companies regarding the carrying of passengers on the front platform was published in the Electric Railway Journal of Nov. 7, 1908, page 1353.

Accidents in New York During October

The Public Service Commission of the First District of New York has issued the following summary of accidents which occurred in October, 1907, October, 1908, and October, 1909, on the railways within its jurisdiction:

OCTOBER.	1907.	1908.	1909.
Car collisions	221	97	123
Persons and vehicles struck by cars	1,145	882	1,134
Boarding	510	533	561
Alighting	593	681	641
Contact electricity	..	33	27
Other accidents	2,397	2,442	1,961
Totals	4,866	4,668	4,447
INJURIES.			
Passengers		1,715	1,742
Not passengers		738	548
Employees		500	440
Totals		2,953	2,730
SERIOUS (Inc. in Above).			
Killed	47	47	25
Fractured skulls	15	15	8
Amputated limbs	9	10	3
Broken limbs	40	36	38
Other serious	80	60	138
Totals	191	168	212

Heated Vestibules in Kansas.—The new State law has gone into effect requiring that street cars operated in Kansas be fitted up so that the vestibules of the cars where the motormen stand be heated the same as the interior of the cars.

East St. Louis Employees Adjust Differences.—The agreement between the employees of the East St. Louis & Suburban Railway and the company regarding terms of service will continue in force unchanged until its expiration on May 1, 1910.

Ticket-Selling Machines in Hudson Terminal Station.—The Hudson & Manhattan Railroad, operating between New York and New Jersey, under the Hudson River, has installed two nickel-in-the-slot ticket-selling machines in its terminal at Cortlandt Street and Church Street, New York City, as an experiment.

Hearing on Lighting of Subway and Elevated Cars.—The Public Service Commission of the First District of New York has ordered that a hearing be held on Nov. 29, 1909, to inquire into the lighting of the cars and stations on the subway and elevated lines of the Interborough Rapid Transit Company, New York, N. Y.

Philadelphia & Western Railway Abandons Beachwood Park.—The Philadelphia & Western Railway, Philadelphia, Pa., has decided to abandon Beechwood Park, a pleasure resort three miles west of Philadelphia, and the buildings at the park are all being razed. The property will be cut up into building lots and offered for sale.

Philadelphia Rapid Transit Company Increases Freight Service.—To meet the increasing demands of patrons which have followed the recently inaugurated policy of carrying freight, the Philadelphia Rapid Transit Company has completed another station at Glenside, and is transporting freight over the Glenside division.

Workmen's Tickets in Racine.—In return for certain rights granted by Council in the streets of Racine, the Milwaukee Light, Heat & Traction Company has agreed to sell six tickets for 25 cents, good during two hours in the morning and two in the evening. The hours selected are from 6 a. m. to 8 a. m. and from 5 p. m. to 7 p. m.

Service in Pittsburgh.—The Railroad Commission of Pennsylvania has been asked to reopen the complaint filed against the Pittsburgh (Pa.) Railways in October, 1908, by Mayor Magee, who hopes to be able to show that the

recommendations of the commission have not been complied with. The Mayor will probably confer with the members of the commission in Harrisburg during the first week in December.

Peculiar Accident on Illinois Traction System.—A freight train on the Illinois Traction System composed of a motor car and two express trailers was derailed at Thayer, Ill., on Nov. 11, 1909, and knocked down a trolley pole carrying a d.c. feeder cable which fell on one of the trail cars and set it on fire. The motor car was saved, but both of the trail cars, fully loaded with express matter, were destroyed. None of the cars was overturned.

Gymnasiums for Pittsburgh Employees.—The Pittsburgh (Pa.) Railway has opened at its Talbot Avenue car house for the use of its employees the first of the gymnasiums with which it is proposed eventually to equip all of the car houses of the company. Four rooms on the second floor of the Talbot Avenue house are given over to the men. Two are equipped with athletic apparatus, one with baths and the fourth is fitted up as a reading and card room.

Placards Showing Way to Alight in New York.—The Metropolitan Street Railway, New York, N. Y., is placing signs in its cars showing the correct and incorrect ways of alighting. One picture exhibits a woman with an umbrella stepping from a car facing the direction in which it moved. She wears a complacent smile. The other picture shows the same woman stepping off backward. She is about to fall and the umbrella is soaring through the air.

Fender Ordinance to be Recommended in San Francisco.—The Public Utilities Committee of the Board of Supervisors of San Francisco has decided to recommend the passage of an ordinance requiring all cars operated in the city to be equipped with fenders similar to those in use on the San Mateo cars. Some modifications will be made in the ordinance to overcome the difficulties that will be encountered in using the fenders on cars operating over lines with heavy grades and sharp curves.

Warning Signs in Chicago.—The Chicago (Ill.) City Railway has posted placards in its cars warning patrons of the danger of attempting to alight before a car has been brought to a standstill. The sign says: "One moment, please! Before getting off or on a car wait until it has actually stopped. Better be safe than sorry." The company has also started a campaign of education through the medium of transfer slips, with the idea of minimizing accidents and of putting a stop to the illegal use of transfers. The advice and warnings are printed on the backs of the transfers and they will be circulated among patrons of the company in the usual manner at the rate of 12,000,000 copies a week.

Inland Empire System Wins Farm Product Prize.—The Inland Empire System, through C. L. Smith, its industrial agent, has won the Hill trophy cup, offered at the Billings Dry Farming Congress, for the best exhibit of farm products raised in Washington, east of the Cascade Mountains within 25 miles of the Great Northern Railway. The exhibit which won the cup consisted of 22 varieties of apples, eight varieties of pears, five of plums, four of field corn, two of sweet-corn, two of popcorn, three of peas, two of beans, four of wheat, two of barley, three of oats, one of rye, five of potatoes and one of carrots, all grown on Moran prairie, on the route of the Inland Empire System between Spokane and Waverly. The trophy carries this legend: "Presented by James J. Hill for best exhibit of farm products raised in the State of Washington east of the Cascade Mountains within 25 miles of the Great Northern Railway under dry farming methods exhibited at the Dry Farming Congress held at Billings, Mont., Oct. 26, 27 and 28, 1909."

Section Foremen Awarded Prizes.—The Oregon Electric Railway, Portland, Ore., has announced awards of prizes for the best maintained section on its system. The foreman of Section No. 5 was given first prize, $25 in cash, and will display a gold-lettered sign on the section house at Waconda which will indicate that for the current year he and his men have kept up their 8 miles of track better than the section crews of the other five sections of the main line. The second prize, $15, was awarded to the foreman of Section No. 4. On a basis of 100 per cent the following points were considered: Alignment and surface, 25; spiking ties, lining, spacing, switches and frogs, 25; drainage and ballast, 20; material, grass and weeds, 10; road crossings, run-offs and fencing, 5, making the total 85. Houses and grounds were allowed 10 points and sidings 5 points, but were not considered in the final awards. Three disinterested steam railroad officials were secured to pass on the rating. The company has announced that next year the first prize will be $30; the second prize will remain at $15.

Personal Mention

Mr. R. I. Brunner has been elected auditor of the Enid (Okla.) City Railway Company, to succeed Mr. C. F. Bruce.

Mr. William Anderson has been appointed auditor of the Wausau (Wis.) Street Railway to succeed Mr. F. A. Heckler.

Mr. E. Leland has been appointed auditor of the Meridian Light & Railway Company, Meridian, Miss., to succeed Mr. E. M. Martin.

Mr. Edward B. Ryan, chief clerk of the Yonkers (N. Y.) Railroad, has been appointed auditor of the company to succeed Mr. Frank Horan.

Mr. George R. McDermot has been appointed chief engineer of the power station of the Citizens' Railway, Waco, Tex., to succeed Mr. Ros Marquis.

Mr. R. A. Bowers has been appointed superintendent and park manager of the Pascagoula Street Railway & Power Company, Scranton, Pa., to succeed Mr. G. B. Chapman.

Mr. J. W. Smith has been elected president of the Fargo & Moorhead Street Railway, Fargo, N. D., to succeed Mr. L. B. Hanna. Mr. Smith was formerly treasurer of the company.

Mr. J. B. Ingersoll denies that he contemplates retiring as electrical engineer of the Spokane & Inland Empire Railroad, Spokane, Wash., to engage in other work, as previously reported.

Mr. H. C. Foss, general manager of the Sydney & Glace Bay Railway, Sydney, N. S., has been elected vice-president of the company to succeed Mr. A. F. Townsend, and will hereafter act as vice-president and general manager.

Mr. J. P. Martin, vice-president of the Fargo & Moorhead Street Railway, Fargo, N. D., has been elected treasurer of the company to succeed Mr. J. W. Smith, and will hereafter act as vice-president and treasurer of the company.

Mr. H. L. Pierce, president of the Laconia (N. H.) Street Railway, who resides in Leominster, Mass., has been elected to the Legislature of Massachusetts by what is said to have been the largest Republican majority ever given a candidate in Leominster.

Mr. F. J. Foote has been appointed master mechanic of the Ohio Electric Railway, Cincinnati, Ohio, vice, D. A. Faut, resigned. Mr. Foote was previously connected with the installation and maintenance department of the Cincinnati office of the Westinghouse Electric & Manufacturing Company.

Mr. Paul Winsor, chief engineer of motive power and rolling stock of the Boston (Mass.) Elevated Railway, and Mr. Edward S. Webster, of Stone & Webster, Boston, Mass., are among the eight candidates who have been nominated by the Alumni Association of the Massachusetts Institute of Technology to be members of the corporation.

Mr. Charles S. Butts has resigned as engineer of maintenance of way of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio. Before becoming connected with the Cleveland, Southwestern & Columbus Railway, Mr. Butts supervised the construction of 75 miles of interurban electric railway for the Illinois Traction System, Champaign, Ill.

Mr. C. R. Pettengill has been appointed general freight and passenger agent of the Elgin & Belvidere Electric Company, Marengo, Ill., to succeed Mr. W. C. Farquhar. Mr. Pettengill entered the employ of the Elgin & Belvidere Electric Company as night dispatcher. About a year later he was appointed chief dispatcher, and continued in this capacity until he was appointed freight and passenger agent of the company. Mr. Pettengill was connected with the Chicago & Northwestern Railway for 15 years as operator and agent before becoming connected with the Elgin & Belvidere Electric Company.

Mr. George R. Grant has been appointed assistant secretary of the Public Service Commission of the Second District of New York. Mr. Grant is a member of the law firm of Grant & De Ceu, Buffalo, N. Y. He was born in Cape Vincent, Jefferson County, New York, won a State scholarship at Cornell and was graduated from Cornell in 1904. In 1906 he was graduated from the Buffalo Law School, and was awarded the Daniels thesis prize for the best English essay on a legal subject. He was admitted to the bar in 1906 and entered the law office of Mr. Daniel V. Murphy. During the first year after his graduation from the Buffalo Law School, Mr. Grant lectured at the school on criminal law.

Mr. C. L. Crabbs, who since 1907 has been principal assistant engineer of the Brooklyn (N. Y.) Rapid Transit

Company, has recently been given the title of engineer of way and structures and placed in charge of the company's engineering department. The office of chief engineer has been abolished and Mr. W. S. Menden, who formerly had the title of assistant general manager and chief engineer, will hereafter be known as assistant general manager and will give the greater part of his time to the operation of the system. Mr. Crabbs was connected with the Metropolitan West Side Elevated Railway, Chicago, Ill., during the construction of that road, was with the engineering department of the city of Chicago, and for six years was engaged in factory superintendence.

Mr. E. D. Reed has been appointed engineer of the Chattanooga Railway & Light Company, Chattanooga, Tenn., to succeed Mr. W. W. Wysor, whose appointment as chief engineer of the Lehigh Valley Transit Company, Allentown, Pa., was noted in the Electric Railway Journal of Oct. 2, 1909. Mr. Reed's street railway experience dates from his appointment in 1894 as assistant engineer of the Scranton (Pa.) Railway. In 1900 he was appointed engineer of the Scranton Railway and continued to serve in that capacity until 1906, when he become connected with the Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., as supervisor of maintenance and construction, including the building of the interurban line from Lewiston to Waterville. Mr. Reed continued with this company until his appointment as engineer of the Chattanooga Railway & Light Company.

Mr. J. A. Young has been appointed superintendent of the London (Ont.) Street Railway. Mr. Young was born in Cleveland, Ohio, in 1870. He entered railway work in 1896 as a conductor in the employ of the International Traction Company, Buffalo, N. Y., and remained in the service of that company until July, 1903, when he accepted a position with the New York Central & Hudson River Railroad at Albany as shipping clerk in the department of stores. Subsequently he resigned from the New York Central & Hudson River Railroad to accept an appointment as inspector of admissions at the St. Louis Exposition, made through Governor Bliss of Michigan. At the close of the Exposition Mr. Young entered the employ of the London Street Railway as night clerk. He was subsequently appointed day clerk in charge of the starting of cars, and was promoted from day clerk to inspector. He entered upon his duties as superintendent of the company on Nov. 1.

Mr. A. D. Miller, whose appointment as manager and superintendent of the Reno (Nev.) Traction Company was announced in the Electric Railway Journal of Nov. 13, 1909, was graduated from Stanford University, California, in 1905 with the degree of electrical engineer. His first commercial work was with the engineering department of the Truckee River General Electric Company, Reno, Nev. Subsequently he was appointed assistant engineer of the company, which controlled the Truckee River General Electric Company, the Reno Power, Light & Water Company and the Reno Traction Company. Several months ago the property of the Truckee River General Electric Company and the Reno Power, Light & Water Company was sold, the former owners retaining the property of the Reno Traction Company as their only interest in Nevada. The former manager of all three properties entered the employ of the owners of the Truckee River General Electric Company and the Reno Power, Light & Water Company and Mr. Miller was appointed general manager of the Reno Traction Company.

Mr. George M. Wegman has been appointed superintendent and purchasing agent of the Rochester & Manitou Railroad, Charlotte, N. Y., to succeed Mr. F. E. Pritchard as superintendent and Mr. K. B. Castle as purchasing agent. Mr. Wegman started as an apprentice to a printer, but in 1889 abondoned his trade to enter the service of the Rochester (N. Y.) Electric Railway as a motorman on the line between Rochester and Charlotte, one of the first electric railways in Northern New York. Five years later he was advanced to the position of electrical engineer of the company. In 1894 the Rochester Electric Railway was absorbed by the Rochester Railway, and Mr. Wegman entered the employ of the Buffalo (N. Y.) Railway and served in the mechanical and electrical departments of this company and the International Traction Company, its successor, until 1902. He then accepted the position of superintendent of the Rochester & Suburban Railway. This company was absorbed by the Rochester Railway in 1905, but Mr. Wegman continued with the company until 1906, resigning to become mechanical and electrical engineer and superintendent of construction of the Standard Electric Construction Company and consulting engineer of the Bryden Electric Supply Company, Rochester, N. Y., with which he continued until appointed to his present position.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***North Carolina Traction Company, Sunbury, N. C.**—Incorporated to build an electric railway from Moore to Piedmont Springs. Headquarters, Sunbury. Authorized capital stock, $2,000,000; issued, $10,000. Incorporators: Dr. H. P. Macknight. Southern Pines; E. Hillman, Aberdeen; W. C. Reflert, Harrisburg, Pa., and E. L. Krafft, Indianapolis, Ind.

Toronto (Ont.) Terminal Company.—Application has been made to the Dominion Parliament for the incorporation of the Toronto Terminal Company by J. W. Woods, Hugh Blain and Peleg Howland. Associated with these parties is Lucien B. Howland, engineer and promoter of the enterprise. The plans of the company contemplate the construction and operation of a viaduct or subway which will handle all railway traffic entering Toronto. The company also asks for the right to construct passenger and freight stations, warehouses and other terminal facilities in Toronto; also branch railways and to acquire water power rights.

***Berks County Traction Company, Fredericksburg, Pa.**—Application will be made on Dec. 2 by this company for a charter to build an electric railway from Wyomissing to Fredericksburg, a distance of 35 miles. Applicants for the charter are W. C. Riffert, Lewis Crater, A. S. Seidel and Henry Fry.

***Castle Valley Railway, Salt Lake City, Utah.**—Incorporated to build an electric railway from Price to Cedar Creek Canyon. W. C. Rice, Salt Lake City, president.

FRANCHISES

San Diego, Cal.—The City Council has granted a franchise to the San Diego, El Cajon & Escondido Electric Railway to construct an electric railway in San Diego and extending to Escondido. G. W. Pursell, general manager. [E. R. J., Oct. 16, '09.]

San Diego, Cal.—The San Diego Electric Railway has asked the Common Council to advertise for bids for a street railway franchise on Thirteenth Street from K Street to L Street. The petitioner asks that the franchise be sold to the highest bidder; also that the Council stipulate that work must be started on its construction within three months after the franchise is granted and completed within nine months. The company desires to secure the franchise so that it will have access from the K Street line to the new car house which is being erected between L Street and M Street.

Waycross, Ga.—The City Council has granted a franchise to the Waycross Gas, Electric & Railway Company for the street railway, electric and gas privileges in Waycross. G. W. Deen, Waycross, president. [E. R. J., Sept. 26, '08.]

Chicago, Ill.—Eugene Purtelle, president of the Chicago Heights & Eastern Electric Railroad, has applied to the County Court for a 75-year franchise for an electric railroad from Chicago Heights east to the State line, the route to run along the south of and near the Elgin, Joliet & Eastern Railroad. Permission is asked for the railway to cross all intersecting highways.

Lapel, Ind.—The Town Board has granted a new franchise to Wallace B. Campbell, Anderson, for the construction of an electric railway in Lapel. The franchise expires Jan. 1, 1912. [E. R. J., Feb. 6, '09.]

Adel, Ia.—At a special election recently held in Adel a franchise was voted to the Adel City Railway, Des Moines, for the construction of a street railway in Adel. This is part of a plan to build an interurban railway from Des Moines to Adel. D. A. Blanchard is interested. [E. R. J., Sept. 18, '09.]

New Orleans, La.—The New Orleans Railway & Light Company has purchased the franchise known as the Villere extension, good until 1956, and agreeing to pay the city the sum of one-half of 1 per cent on the gross annual receipts for this privilege. The line is to be a double track and begin at the intersection of Villere Street and Lafayette Avenue and traverse that avenue to Franklin Avenue and St. James Avenue.

Takoma Park, Md.—The Town Council has granted permission to the Baltimore & Washington Transit Company to extend its railway from the present terminus at the District line over and along Laurel Avenue, in Takoma Park,

Md., to the south line of Carroll Avenue, and to construct a single or double track with the necessary sidings and crossovers. The extension is to be completed within 90 days.

***Laurel, Mont.**—The Eastern Montana Electric Railway has applied to the City Council for an electric railway franchise. The company proposes to build an interurban railway from Laurel to Billings and extend the line west from Laurel to Red Lodge, crossing the hill to Bear Creek, returning to Laurel by a loop which will embrace the entire Clark Fork Valley. George H. Kessethuth, Billings, is interested.

New York, N. Y.—The South Shore Traction Company has paid over to Controller Metz $70,000 and obtained its franchise to operate cars from the Queensboro Bridge to Jamaica, a distance of 18 miles, along Jackson Avenue and Hoffman Boulevard.

Norwood, Ohio.—The City Council has extended the franchise of the Cincinnati (Ohio) Traction Company 25 years.

Colonial Beach, Va.—The Municipal Council has granted a franchise to the Hon. John G. Capers, Evans Building, Washington, D. C., for the construction of an electric railway from Colonial Beach to Quantico, 22 miles. [E. R. J., Oct. 30, '09.]

***Aberdeen, Wash.**—Eldridge Wheeler, Montesano, has applied to the County Commissioners for a franchise for an electric railway along certain highways in Chehalis. It is said to be the intention of the promoters to build an electric railway from Olympia to Hoquiam.

Pasco, Wash.—The County Commissioners have granted a franchise to N. G. Blalock, representing the Walla Walla & Columbia Traction Company, to enter Franklin County with an electric railroad. [E. R. J., April 10, '09.]

TRACK AND ROADWAY

Phœnix, Tempe & Mesa Railroad, Phœnix, Ariz.—H. J. Bennett advises that this company intends to begin work within two weeks on its proposed railway, which is to extend from Phœnix to Mesa, via Tempe, 17 miles. It is the intention to operate four gasoline motor cars upon the completion of the line. Capital stock authorized, $1,000,000. Officers: H. J. Bennett, Phœnix, president, general manager and purchasing agent; Andrew Neilson, Tempe, vice-president; M. L. Vieux, Phœnix, secretary; L. M. Hoghe, Phœnix, treasurer; D. F. Reynolds, Henne Building, Los Angeles, Cal., chief engineer. [E. R. J., Jan. 9, '09.]

Washington, D. C.—An American consul in Mexico reports that the local Legislature has ratified a contract entered into between the Governor of a State in that country and a local business man, representing a traction company, for the construction of a new electric railroad. It is to run between two points about 3 miles apart, at one of which an amusement park or hippodrome is to be built. Name of the contractor can be obtained by interested firms upon application to the Bureau of Manufactures, Washington, by referring to No. 4111.

Kankakee & Urbana Traction Company, Kankakee, Ill.—This company announces that it has made preliminary survey for its proposed railway and has secured about 75 per cent of its right-of-way. It will connect Kankakee and Urbana and thence to Villa George, Camargo and Charleston, 125 miles. Work will include heavy interurban construction. W. J. Brock, president, and W. D. Moore, Jr., is chief engineer, 184 Court Street, Kankakee, Ill. [E. R. J., Aug. 28, '09.]

Mount Vernon, Ill.—A. J. Davis & Company, Security Building, St. Louis, Mo., confirm the report that they are interested in the construction of the proposed electric railway which is to extend from Mount Vernon to a point on the Mississippi River above Chester by way of Winkle, a distance of 83 miles. The company announces that preliminary affairs have not yet been adjusted so as to warrant a statement at this time, although the financing of the line has been arranged. [E. R. J., Oct. 23, '09.]

Bloomington, Pontiac & Joliet Electric Railway, Pontiac, Ill.—This company, with a line now nearing completion between Pontiac and Chenoa, has announced that the railway will be extended to Lincoln, where it will connect with the Illinois Traction System. With a line already in operation between Pontiac and Joliet and Joliet and Chicago, the construction of the Lincoln extension will complete the interurban link between Chicago and St. Louis. The management announces the Pontiac-Chenoa line will be in operation Jan. 15, 1910.

Elgin & Sycamore Railway, St. Charles, Ill.—B. C. Payne writes that nearly all the right of way for this projected railway has been secured. The road is to connect Elgin, Sycamore, DeKalb, Oregon, Dixon and Aurora, a distance of 23 miles. It will have a grade of from ½ to 2¼ per cent for the entire distance, and it will be necessary to build five bridges. It has not yet been decided definitely whether gasoline or electric cars will be used. Capital stock, authorized and issued, $100,000. Officres: B. C. Payne, St. Charles, president and general manager, to whom all communications should be addressed; F. N. Rogers, Oak Park, secretary; F. W. Merrick, Oak Park, treasurer. [E. R. J., Aug. 21, '09.]

***Greenfield, Ind.**—It is stated that Perry J. Freeman, Richmond, is organizing a company to build an interurban railway from Greenfield to Pendleton, 16 miles north. The line, which will be known as the Greenfield & Northern Railway, will be an independent road and will connect with the Indianapolis, New Castle & Toledo Electric Railway at Maxwell and with the Indiana Union Traction Company's line at Pendleton.

***Clinton, Ia.**—Press reports state that the Clarke Construction Company, Chicago, Ill., is interested in the construction of interurban electric railways between Sterling and Clinton and Dixon and Freeport, which, if built, will afford direct connection between Chicago and Clinton.

Moberly, Mo.—Charles A. Wellman, Ottumwa, Ia., writes that a final company is yet to be incorporated and will likely be known as the Moberly & Huntsville Electric Railway, to build the proposed electric railway between the two cities. For construction purposes a preliminary company known as the Manning, Wellman & Judd Construction Company has been formed, with Calvin Manning, Ottumwa, president. The line will consist of about 7½ miles of single track. It will also reach Radium Springs, a health resort. The company plans to operate five cars. C. B. Judd, Clarinda, will probably build the railway as engineer. The company expects to capitalize for $100,000, and at present desires to place a bond issue of $50,000. [E. R. J., June 12, '09.]

St. Louis-Kansas City Electric Railway, St. Louis, Mo.—This company advises that it will be ready to start construction work on its projected railway as soon as preliminary arrangements have been completed. It is to be a standard gage electric line, 550 miles in length, extending from St. Louis to Kansas City, via Fulton, Columbia, Fayette, Marshall, Higginsville and Independence. It is also the intention to supply power to towns along the route. W. B. Cauthorn, Columbia, chief engineer. [E. R. J., Nov. 13, '09.]

Morris County Traction Company, Morristown, N. J.—This company announces that it expects to place contracts during the next two weeks for the construction of 5 miles of single track with turnouts. Address, G. C. Gochnauer, president, Morris County Construction Company, Morristown.

Albany Southern Railroad, Hudson, N. Y.—J. G. White & Company, Inc., 43 Exhange Place, New York, have just been awarded the contract for the double tracking of the Albany Southern Railroad between Rensselaer and Kinderhook Lake, N. Y., as well as the straightening of curves and the rehabilitation of a large amount of the present track of that company.

***Islip, N. Y.**—The Board of Trade of Islip and East Islip is said to be considering a plan to establish a new cross island electric railway. A committee, consisting of Frank Parker, Elliott J. Smith and Frank D. Creamer, has been appointed to determine the feasibility of the project and to report at the Board's next meeting. The proposed railway would extend from Islip to Central Islip, Smithtown, Stony Brook Harbor and possibly to Port Jefferson.

Buffalo, Lockport & Rochester Railway, Rochester, N. Y.—The Public Service Commission, Second District, has given its permission and approval to this company that it may exercise the franchise granted it by the village of Middleport, on Oct. 25. The approval is upon the condition that prior to the construction of its transmission line pursuant to the terms of this franchise, the company shall submit to the commission plans and specifications for such construction and that no construction be made until such plans and specifications are approved.

Utica Southern Railway, Utica, N. Y.—The Public Service Commission of the Second District has granted permission to this company to build an additional extension from the southerly line of Hamilton, via Earlville and Sherburne through Norwich, 27 miles. The company has been previously granted permission to build from Clinton to Hamilton, with a branch between Deansboro and Waterville, 26 miles. The company is authorized to mortgage the extension and to issue bonds to the amount of $628,000, par value, to be used from constructing and equipping the

extension from Hamilton to Norwich, and is further authorized to issue $400,000 five per cent non-cumulative preferred stock, on condition that the proceeds be devoted to the construction and equipment of the extension. [E. R. J., July 17, '09.]

Washington (N. C.) Investment Company.—W. E. Jones, general manager, writes that construction has been stopped on its railway. Considerable grading has been done and most of the poles set. The company wishes to sell its franchise and dispose of its holdings to some responsible party that would undertake to complete the line. The route as planned extends from Washington to Suburban Park, a distance of 4 1/3 miles. [E. R. J., April 17, '09.]

Cincinnati, Portsmouth, Pomeroy & Pittsburgh Electric Railway, Cincinnati, Ohio.—This company is said to have made surveys for its proposed line. The plan is to construct an electric railway from Cincinnati to Pittsburgh along the Ohio River Valley. Right-of-way is being secured, and at present more than 200 miles have been acquired out of a total of 466 miles. It is expected to obtain the rest of the right-of-way by January and to begin construction early next spring. A. E. Cox, 1502 Third Avenue, Huntington, W. Va., president; C. P. Sanborn, chief engineer, Huntington, W. Va. [E. R. J., Aug. 22, '08.]

Coffeyville-Nowata Railway & Power Company, Nowata, Okla.—This company announces that it expects to begin work on its projected railway by Jan. 1. It will be 23 miles long and will extend from Nowata, Delaware, Lenatah, South Coffeyville, Okla., and Coffeyville, Kan. W. V. Thraves states that the line will pass through a rich oil and gas field and that the cities along the proposed route are growing rapidly. It is the intention to furnish power to these cities. Capital stock, authorized, $200,000. Officers: W. V. Thraves, Nowata, president and general manager; W. P. Brown, Coffeyville, Kan., vice-president; J. A. Tillotson, Nowata, secretary and treasurer; E. P. Hannaford, Nowata, chief engineer. [E. R. J., Oct. 30, '09.]

Mid-Continent Traction & Power Company, Tulsa, Okla.—This company, chartered to build an electric railway from Joplin, Mo., through Tulsa, Taneha, Sapulpa and Shawnee to Oklahoma City, has commenced work on its Tulsa-Taneha-Sapulpa division of 15 miles and will have cars running through the Glen pool oil and gas fields connecting up the above three towns by June 1, 1910. A subsidiary company of the Mid-Continent Traction & Power Company now owning and controlling upward of 400 acres of producing gas territory at Taneha, midway between Tulsa and Sapulpa, is preparing to install power plants for both the electric railway and manufacturing enterprises under a 2½ cent rate per cu. ft. for natural gas. The Mid-Continent Traction & Power Company is a reorganization of the Mid-Continent Traction Company. A feature of the Tulsa-Taneha-Sapulpa line will be a 260-acre park whereon an artificial lake of 120 acres will be built for attractions and Chatauqua and club uses. Graham Burnham, Tulsa, president and general manager.

Slate Belt Electric Street Railway, Pen Argyl, Pa.—This company has recently completed the work of straightening its tracks between Wind Gap and Pen Argyl, and eliminating several sharp curves. The company has also erected several miles of additional feeder. J. T. Hambleton, general manager.

West Penn Railways, Pittsburgh, Pa.—This company has taken charter extensions from Greensburg to New Alexandria, Pa., a distance of 7 miles; from Uniontown to Leisenring, 7 miles; from Hunker to W. Newton, a distance of 10 miles, and from W. Newton to Scott Haven, 5 miles. H. F. Barnard, Pittsburgh, purchasing agent.

Porto Rico Railways Company, Ltd., San Juan, Porto Rico.—This company expects to double track 1 mile of its line. Montreal Engineering Company, Montreal, Que., purchasing agents.

Black Creek Power Company, Florence, S. C.—S. S. Ingman advises that this company expects to start construction within the next six months on its 12-mile railway between Darlington and Florence. The company has been granted a 50-year electric railway franchise in Florence. A power plant will be built 2½ miles from Florence. In addition to generating current for its own use the company also expects to furnish power for lighting. Capital stock, authorized, $300,000. Officers: J. L. Barringer, Florence, president; P. A. Wilcox, Florence, vice-president; A. J. Brown, Florence, secretary and treasurer; S. S. Ingman, Columbia, general manager. [E. R. J., Nov. 20, '09.]

Hallam Colonization Company, Brownsville, Tex.—L. H. Hallam, secretary, writes that this company will begin the construction of its railway as soon as the necessary franchise is granted. Three miles of the line will be built in Brownsville and 5 miles extending through the company's additions in West Brownsville and River View Place. It is the intention to operate electric cars on the belt line in the city and gasoline motor cars in the suburbs. [E. R. J., Dec. 19, '08.]

Haskell, Tex.—M. R. Hemphill, Haskell, writes that he is planning to construct a gasoline motor line from Haskell to Hemphill Park, 8 miles distant, which he has established. It is the plan to start work within two months provided that Haskell grants a satisfactory bonus. Three cars will be operated. [E. R. J., Sept. 18, '09.]

Stamford (Tex.) Street Railway.—L. M. MacArthur, Cumuripa, Son, Mex., general manager and chief engineer, advises that this company has done considerable work on the new street railway between Stamford and Anson. The line will have about 19 miles of single track. The company's plans provide for the erection of a car house and power plant at Stamford. Capital stock, authorized, $50,000. [E. R. J., Sept., 4, '09.]

Prosser (Wash.) Traction Company.—This company advises that it has not as yet undertaken any work on its proposed railway. It is the intention to start operations as soon as the final survey is completed, which will probably be in 1910. At present 40 miles of the route are under preliminary survey. The line will pass through Bickleton, Patterson and Goldendale. It is proposed to erect a power plant on the Yakima River, 5 miles below Prosser. Power will be furnished to private interests for various purposes. Capital stock, authorized, $150,000; issued, $10,000. Officers: Frederick Finn, president; Andrew Brown, vice-president; F. A. Jenne, secretary and treasurer, all of Prosser. [E. R. J., July 25, '08.]

Grand Rapids (Wis.) Street Railroad.—The Electric Railway Journal is officially advised that this company expects to open its railway for traffic on Dec. 1. It extends from Grand Rapids to South Centralia, Port Edwards and Nekoosa, a distance of 9 miles. Five cars will be operated. The company will lease power to operate the line. The repair shops will be built at Grand Rapids, and an amusement park will be established at Nekoosa. Knox Engineering Company, Fisher Building, Chicago, Ill., purchasing agents. [E. R. J., July 10, '09.]

SHOPS AND BUILDINGS

Twin City Rapid Transit Company, Minneapolis, Minn.—This company has acquired property between Lake Street and Twenty-ninth Street, and proposes to erect there new car houses and shops to cost about $450,000.

People's Railway, Dayton, Ohio.—Plans are completed and work will be begun at once on the erection of a new car house for this company. The building will be located in Edgemont and its dimensions will be 250 ft. x 180 ft. The cost of the building is estimated at $125,000.

Slate Belt Electric Street Railway, Pen Argyle, Pa.—This company advises that it is erecting a new machine shop and an addition to its car house. Contracts for material and work have all been closed.

POWER HOUSES AND SUBSTATIONS

Southern Railway & Light Company, Natchez, Miss.—This company is installing additional apparatus in its power station which includes a 300-kw d.c. railway generator, a 300-kw a.c. generator for lighting service and a 500-hp boiler.

Slate Belt Electric Street Railway, Pen Argyl, Pa.—This company has recently placed an order with the Electric Storage Battery Company, Philadelphia, for a 400-amp storage battery. The company has also contracted for a new electric lighting unit, consisting of a 150-kva Crocker-Wheeler, 2300-volt, 60-cycle, 3-phase alternator, direct connected to a Porter-Allen engine.

Stroudsburg & Water Gap Street Railway, Stroudsburg, Pa.—This company expects to begin at once the construction of a new power plant.

Waynesburg & Blacksville Street Railway, Waynesburg, Pa.—This company, which proposes to build an electric railway to connect Blacksville, Waynesburg, Marianna and Pittsburgh, is said to have secured 65 acres of land at Blacksville, W. Va., as a site for its power plant and car house.

Everett Railway, Light & Water Company, Everett, Wash.—The Stone & Webster Engineering Corporation has begun work on a new substation for this company on Broadway between Pacific Avenue and Wall Street, Everett. The building will be constructed of reinforced concrete, one story high and covering 50 ft. x 120 ft. Power will be distributed from this station to operate the new line now in course of construction from Everett to Seattle.

Manufactures & Supplies

ROLLING STOCK

Southwestern Traction Company, London, Ont., will buy four interurban passenger cars next year.

Sabraton Railway, Morgantown, W. Va., expects to buy one small car body within the next three months.

Union Traction Company, Sisterville, W. Va., will purchase two or three passenger cars early next year.

Northern Ohio Traction & Light Company, Akron, Ohio, will order one combination work and wrecking car early in 1910.

Chicago & Southern Traction Company, Chicago, Ill., will be in the market for two double-truck trail cars during 1910.

Schuylkill & Dauphin Traction Company, Pottsville, Pa., contemplates buying five gasoline motor cars during the coming year.

Boston & Worcester Street Railway, Boston, Mass., will be in the market for five or six new semi-convertible or closed cars next year.

Winona Interurban Railway, Warsaw, Ind., will be in the market for eight passenger and six freight cars, and one snow-plow during 1910.

Bangor Railway & Electric Company, Bangor, Me., expects to buy two 28-ft., semi-convertible car bodies with double trucks next year.

Tri-City Railway Company, Davenport, Iowa, contemplates buying next year 10 closed car bodies, 43 ft. long over all, for city service.

Hudson & Manhattan Railroad, New York, N. Y., is having two all-steel baggage cars, about 40 ft. long, built by The J. G. Brill Company.

Chattanooga (Tenn.) Railways has ordered five pay-as-you-enter cars from The J. G. Brill Company and also about 120 trucks, No. 22 Special.

Oklahoma Railway, Oklahoma City, Okla., contemplates purchasing 10 double-truck city passenger cars and six interurban cars during the coming year.

Metropolitan Street Railway, Kansas City, Mo., will buy 50 cars next year, if franchise extension is granted at the coming election, to be held December 16, 1909.

Lexington & Interurban Railways, Lexington, Ky., expect to buy three 30-ft., single-truck, city cars, and two 50-ft., double-truck, interurban cars early in 1910.

Exeter, Hampton & Amesbury Street Railway, Hampton, N. H., has purchased one 20-ft., second-hand closed car body from the Amesbury & Hampton Street Railway.

Rutland Railway, Light & Power Company, Rutland, Vt., expects to purchase, during 1910, three 15-bench, double-truck open cars and also two double-truck interurban closed cars, 50 ft. long and weighing not more than 25 tons.

Municipal Tramways, Calgary, Alta., reported in the ELECTRIC RAILWAY JOURNAL of Sept. 18, 1909, as being in the market for six cars, will soon order this number of closed motor cars 46 ft. 6 in. long and two 46-ft open trailers.

Saginaw & Flint Railway, Saginaw, Mich., contemplates ordering two passenger and one express car with equipment complete. One car is being rebuilt and the company will buy one set of double trucks and four motors for this car.

Ohio Electric Railway, Cincinnati, Ohio, has nearly completed the installation of Westinghouse AMM Schedule automatic air brakes on all of its high-speed interurban cars. These new brakes take the place of straight-air equipments.

Atchison Railway, Light & Power Company, Atchison, Kan., mentioned in the ELECTRIC RAILWAY JOURNAL of Oct. 30, 1909, as being in the market for five semi-convertible cars, has ordered these cars from the American Car Company, it is reported.

Yakima Valley Transportation Company, North Yakima, Wash., will have Standard Motor Truck Company's type C-50 trucks for the rolling stock ordered from the Niles Car & Manufacturing Company, as reported in the ELECTRIC RAILWAY JOURNAL of Nov. 20, 1909.

Dayton, Springfield & Xenia Southern Railway, Dayton, Ohio, has specified that the six cars ordered from the Jewett Car Company, as reported in the ELECTRIC RAILWAY JOURNAL of Nov. 6, 1909, be mounted on Taylor improved single trucks and Midvale 34-in. rolled-steel wheels.

Manor Valley Railway, Irwin, Pa., mentioned in the ELECTRIC RAILWAY JOURNAL of May 1, 1909, as being in the market for rolling stock, has ordered two double-truck and one single-truck passenger car and one single-truck baggage and express car from the G. C. Kuhlman Car Company.

Brooklyn (N. Y.) Rapid Transit Company has closed a contract with the Carnegie Steel Company, Pittsburgh, Pa., for 7800 steel wheels which will be used to replace the chilled iron wheels now in service on the elevated cars and on all maximum traction surface trucks. Part of the wheels will be delivered in 30 days and the remainder by Feb. 1, 1910.

Illinois Traction System, Peoria, Ill., is asking bids on 30 express trail cars and six 50-ton locomotives with steel box bodies. The company has ordered two sleeping cars from the American Car & Foundry Company and also a special private car to be delivered this month for which it was reported to be in the market in the ELECTRIC RAILWAY JOURNAL of Jan. 16, 1909.

Twin City Rapid Transit Company, Minneapolis, Minn., in February, 1909, ordered the construction, in its own shops, of 100 cars for the Twin City lines and 11 cars for the Duluth (Minn.) City Railway. The cars ordered for the Duluth lines have been completed, but only a few of those ordered for the Twin City lines have been built. The work of building the balance of the cars ordered in February of this year will be finished by June or July, 1910.

Indiana Union Traction Company, Anderson, Ind., is rebuilding all of its interurban cars in its shops at Anderson. The cars will be lengthened from 54 ft. to 62 ft., the vestibules of all the limited cars will be raised to the floor level and a baggage compartment 10 ft. 6 in. in length will be provided in each car. The cars will all be equipped with M.C.B. couplers. This company has already rebuilt and lengthened eight of the interurban cars used on the Indianapolis, Columbus & Southern Traction Company's lines.

Cincinnati (Ohio) Traction Company has drawn up the following specifications for the 50 closed, double-truck cars reported in the ELECTRIC RAILWAY JOURNAL of Nov. 6, 1909, as being built by the Cincinnati Car Company:

Wheel base.....4 ft. 10 in.	Width over all....8 ft. 4 in.
Length of body.....28 ft.	Height inside.....8ft. 1¼ in.
Length over vestibule 43 ft. 6 in.	Interior finish.... Mahogany
	Body ..... Composite
Length over all.....44 ft.	Underframe ..... Composite

Kind and Makers of Special Equipment

Air brakes National B. & E. Co.	Heaters...Heunefeld hot air
	Headlights..Dayton No. 1561
Axles .....4½ in.	Journal boxes..3¾ in. x 7 in.
Bolsters, body ..built-up steel	Motors, four....West. 101-B
Car trimmings..Solid bronze	Registers .... International
Control....K-35, single end	Roofs ..... Monitor deck
Couplers.. mall. iron pockets	Seats..H. & K. Long. rattan
Curtain fixtures Curtain Supply Co.	Step treads..Am. Mason safety
	Trolley poles....12-ft. poles
Curtain material...Pantasote	Trucks..... Standard O-50
Fenders ..... Hunter	Ventilators.....Deck sash
Gears ..... solid	Headlinings Mahogany veneer
Gongs, one.....14 in.	
Hand brakes, Peacock, Horizontal wheel	

All power and exposed light wire will be run in conduit.

TRADE NOTES

American Bridge Company, New York, will erect a plant at Gary, Ind., to have a capacity of 10,000 tons of fabricated steel per month.

Milwaukee Car Manufacturing Company, Milwaukee, Wis., will spend about $15,000 for a building as an addition to its erecting shops.

Thomas Robins has been elected president of the Robins Conveying Belt Company, New York, N. Y., to succeed E. M. McIlvaine, resigned.

Q M S Co., Plainfield, N. J., has removed its New York offices from 90 West Street to Hudson Terminal Building, 30 Church Street.

Robert W. Hunt & Company, Chicago, Ill., state that their European agent, W. L. Cooper, who has been making his annual trip to the United States, sailed for London on Nov. 10.

J. G. White & Company, Inc., New York, N. Y., announce the opening of a branch office in the First National Bank Building, Chicago, Ill., in charge of Charles T. Mordock as manager.

McClintic-Marshall Construction Company, Pittsburgh, Pa., received a contract from Osgood, Bradley & Sons, Worcester, Mass., for a new power plant, in which about 1500 tons of structural steel will be used.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has begun work at its East Pittsburgh shops

on an order for railroad motors for the Long Island Railroad which represents almost $1,000,000 and calls for 260 motors of 200 hp each.

Goldschmidt Thermit Company, New York, N. Y., announces that the British Corporation for the Survey and Registry of Shipping of Glasgow has sanctioned the use of the Thermit process of repairs to fractured sternposts, lower portions of rudder frames and damages of a similar character.

McKeen Motor Car Company, Omaha, Neb., recently started under its own power three 70-ft. McKeen motor cars to Portland, Ore., coupled together as a train. One of these will be for service on the lines of the Salem, Falls City & Western and the other two will be used in Oregon and Washington by the Oregon Railroad & Navigation Company.

National Brake Company, Buffalo, N. Y., has received orders for more than 1200 brakes during the last 60 days. Of this number 700 are to go to the Pullman Company for installation on the new cars for the Chicago Railways; 165 to The J. G. Brill Company for cars for the Pittsburgh Railways, and 100 cars for the Chicago City Railway. A number of orders from foreign countries were also received.

Metropolitan Inspection Bureau, Fort Dearborn Building, Chicago, Ill., has been formed to engage in practice as inspection engineers. It is prepared to undertake chemical and physical testing, including inspection of cars, car wheels, axles, rails, locomotives, structural steel, lumber, castings and building material. D. W. Schreck, who for several years was with Robert W. Hunt & Company, is connected with this new company, as are also J. W. Jamison and W. H. Doty.

Westinghouse Machine Company, Pittsburgh, Pa., reports that the first six months of the current fiscal year of the company, which ended Oct. 30, 1909, showed a business volume representing the second largest in the history of the company for a similar period. From present indications it is expected that the next six months will show a still better result. This is due to the fact that business conditions generally are improving, and also because the company has taken several new lines of product within the last year, now fully developed. The company reports that the revival of the electric railway business from the financial depression is the source of many new orders.

Pay-as-You-Enter Car Corporation, New York, N. Y., has recently appointed David Murdoch and A. J. Varrelmann as special representatives. Mr. Murdoch was born in Scotland in 1873 and received his early engineering and business training with several manufacturing companies in Glasgow. He came to the United States about 6 years ago and was for three years sales manager of the Tudor Manufacturing Company. For the past three years he has been associated with street railways under the Stone & Webster management. Mr. Varrelmann is 30 years old and is a graduate in electrical engineering from Worcester Polytechnic Institute. He was connected for a time with the engineering department of the Interborough Rapid Transit Company and later was employed by L. B. Stillwell. While the Brooklyn tunnels under the East River in New York were under construction he had charge of the erection of the electrical and drainage equipment. Before coming with the Pay-as-You-Enter Car Corporation he was employed by the Standard Storage Battery Company.

ADVERTISING LITERATURE

Whiting Foundry Equipment Company, Harvey, Ill., has issued a booklet describing its railroad shop and yard cranes.

Wheel Truing Brake Shoe Company, Detroit, Mich., has published a 20-page booklet in which its brake shoes are described and illustrated.

Western Elaterite Roofing Company, Denver, Col., has issued a folder describing its elaterite paint and illustrating its various applications.

Wickes Brothers, Saginaw, Mich., have issued their November stock list of metal-working machinery of all kinds, which they offer for sale.

Pennsylvania Steel Company and Maryland Steel Company, Philadelphia, Pa., describe their organization and equipment in an 8-page publication.

T. H. Symington Company, Baltimore, Md., has issued a 4-page circular which contains several working drawings of Symington journal boxes for city service.

Cortlandt F. Ames, 315 Dearborn Street, Chicago, Ill., has issued a list of steam and electric railway materials which he handles as manager of sales or selling agent.

Duntley Manufacturing Company, Chicago, Ill., has issued a folder in which its pneumatic car cleaner for cleaning railway cars, stations and office buildings is described and illustrated.

Aluminum Company of America, Chicago, Ill., has issued a publication entitled "Aluminum for Electrical Conductors" which contains 30 pages and is in the nature of a short treatise on the subject.

Cooper Heater Company, Dayton, Ohio, has reprinted and is distributing 13 typical letters from street railway companies expressing satisfaction with the Cooper heater for use on street and interurban cars.

Stewart Hartshorn & Company, East Newark, N. J., has issued the November "Hartshorn's Roller." The publication contains the usual amount of light reading interspersed with reminders of the Hartshorn roller and products.

Ironsides Company, Columbus, Ohio, has issued a circular containing a record of a pinion in use on a closed interurban car of the Columbus Railway & Light Company, Columbus, Ohio, with an Ironsides gear shield as lubricant which ran 239,988 miles.

Graphite Lubricating Company, Bound Brook, N. J., has issued a placard calling attention to its Bound Brook bushings for trolley wheels. Bound Brook bushings are sold in the Central West by the Electric Traction Supply Company, 301-312 Market Street, St. Louis, Mo.

Crouse-Hinds Company, Syracuse, N. Y., has issued a folder in which its type W headlight is illustrated. This headlight is made in three types, plain rim door, gird frame door and door with semaphore lens. The outside diameter of each of these types is 11¼ in. and the height 14½ in., but the depths are 4½ in., 7 4/8 in. and 5½ in., respectively.

Lang Retrieving Trolley Company, Petaluma, Cal., has described and illustrated its Lang retriever for city, suburban and interurban cars operated singly or in trains in a 16-page publication. Letters from the Los Angeles Pacific Company, United Railroads of San Francisco and the Petaluma & Santa Rosa Railway indorsing the Lang retriever are reproduced.

Jeffrey Manufacturing Company, Columbus, Ohio, has issued catalog No. 81 of its conveying machinery, dated September, 1909. The publication contains 368 pages, gives general price lists and descriptions of elevating, conveying and power-transmitting machinery and chains, and is profusely illustrated. It is concluded with an index of Jeffrey chains arranged numerically and a general index.

National Tube Company, Pittsburgh, Pa., has published in pocket handbook form Catalogue H, comprising material manufactured at the Kewanee works of the company. This includes wrought-iron pipe for steam, gas, water and air; cast iron, malleable iron and brass pipe fittings; radiators and heating coils and valves of every description. The catalogue is printed on heavy paper with gold edges and is bound in leather. It comprises 470 pages, and some idea of the variety of products described may be gained from the size of the index, which covers 28 closely printed pages.

Baldwin Locomotive Works, Philadelphia, Pa., have just issued the fourth edition of their catalog on electric motor and trailer trucks. These trucks are fitted with axles and journal boxes conforming to the American Street & Interurban Railway standards and are divided into eight classes, dependent upon their type. Drawings and half-tone engravings of typical examples of each class are presented, with the name of the road for which they were built, the main dimensions and other data. The catalog also includes views of different types of cars, mounted on Baldwin trucks, and an appendix in which are given tables and diagrams of standard wheels, axles and journal boxes, physical tests of materials and a partial list of purchasers of Baldwin trucks. The catalog is being issued in a flexible binder.

NEW PUBLICATIONS

The Prevention of Industrial Accidents. By Frank E. Law and William Newell. New York: 1909. The Fidelity & Casualty Company of New York. Paper, 185 pages. Price, 25 cents.

This pamphlet has been prepared for the information and benefit of the industrial liability policy holders of the company. It is estimated that each year from 30,000 to 35,000 lives are lost in industrial accidents and that 2,000,000 more minor accidents occur annually. A close study of the returns of many liability and accident insurance companies shows that possibly 60 per cent of these accidents are preventable. The pamphlet just issued outlines a few of the many preventative measures which might and should be employed. It is divided into six chapters dealing with steam boilers, engines, electrical apparatus, elevators, woodworking machinery and miscellaneous factory machines.

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HENRY W. BLAKE, Editor.

L. E. GOULD, Western Editor. RODNEY HITT, Associate Editor.

FREDERIC NICHOLAS, Associate Editor.

CHICAGO OFFICE.....590 Old Colony Building

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Heating Cars

The order in relation to heating regulations, issued by the New York Public Service Commission, First District, appears to be more reasonable than some similar requirements by other public bodies. While the period of six months during which the commission prescribes a temperature of 40 to 65 deg. Fahr. indicates that occasional rather than prevailing weather will dictate the heating of cars at many times in the fall and spring of the year, the latitude in the degree of heat ordered is such that the temperature of the outside air frequently will be high enough at long periods to assure compliance without artificial heat with the language and intent of the ruling of the commission. It seems unnecessary for the companies to meet the cost of displaying the order of the commission in each car, but the possible use of thermometers, involving expense that might have been included in a rigorous ruling, is not prescribed, so that the principal expenditures will be for the apparatus and power or other means of heating needed, because the order includes both electric and horse cars. Chicago companies have been put to inconvenience as well as needless expense by the constant theft of thermometers carried in their cars. Since the heating of cars for the comfort of passengers is an additional element in the cost of transportation, it is right that public authorities with jurisdiction over such matters should refrain from including any expenses that are not necessary.

Changing the Standard Code of Interurban Rules

In another column of this issue we print a letter from J. N. Shannahan, chairman of the committee on interurban rules of the American Street & Interurban Railway Transportation & Traffic Association, protesting against the action of the Railroad Commission of Ohio in proposing to adopt a number of important changes in the standard code of interurban rules as submitted at the Denver convention. We heartily agree with Mr. Shannahan that radical changes in the standard code should not be made by the authorities of any State except for overpowering reasons, and then only after conference with the committee of the American Association. When the present standard rules were adopted the association and committee realized that some slight modifications might be necessary in a few instances to adapt the code to peculiar local operating conditions, but fundamental changes in practice were not contemplated. The committee gave the widest publicity to the proposed wording of its rules before the final form was adopted, and welcomed criticisms and suggestions during that time. While there were some close divisions in the convention at Denver when voting separately on the adoption of a few of the rules, the code as a whole was approved by an al-

most unanimous vote of those present. This endorsement carries great weight, and changes such as have been proposed for the Ohio roads must be backed up by very strong arguments in their favor in order to justify what practically amounts to repudiation of the association's earnest efforts. The adoption of the proposed revised code in Ohio would establish an unfortunate precedent.

Modernizing the Power System of the Medium-Size Railway

Throughout this country there are scores of power stations which are operated either with old d.c. belted dynamos or the pioneer designs of a.c. generators. Necessarily the progress in generating machinery has made these antiquated types uneconomical, even where the apparatus is well preserved. Yet the owners of some of these obsolete plants often appear to take more pride in the age of their equipment than in its efficiency. There may be a certain degree of pleasure in patting some faithful old "Kodak" or bipolar on the back, but there should be a great deal more in getting a reasonable kilowatt-hour cost from a generating set which embodies the hundred and one improvements of the last decade. After all, it would not be a bad plan for the proprietors of old-time stations to get some figures on the cost of up-to-date machinery and see whether the reductions in the coal pile and labor accounts would not result in a high return on the investment.

Two recent instances will make plain what remarkable improvements are possible through the adoption of modern machinery and the revision of distributing lines in connection therewith. The first company operated about 50 miles of track and had three small d.c. stations. This scheme was replaced by one turbo-generator station and an 11,000-volt transmission to two outside substations at a cost of $750,000. The result of installing the more efficient generating system and cutting down the line losses through substation distribution was a reduction of the cost of a d.c. kilowatt-hour from 2.2 cents to 0.61 cent. The earning on this investment is now exceeding 33 per cent. The second company operated about 40 miles of track in city and suburban territory. In this case the old machinery was replaced by the latest type of reciprocating engines, with such success that the $100,000 invested for these changes is earning a dividend of 25 per cent. It is worth noting that on both of these lines part of the saving was due not only to the installation of high-tension distribution throughout, but to better care of the return circuit.

Rail Standards Abroad

Both the British and German tramways companies have progressed rapidly during the last few years in the standardization of rail sections. The situation has been simplified in these countries because practically all of the city railway companies in each use grooved rails. But, of course, there is a very great difference in traffic in the different cities and this has necessarily required a large variety of sections and weights of rails. In both countries consequently a single general type of grooved rail has been adopted and this general form has been designed to be rolled in different weights of rails.

In England the work of standardizing rail sections has been part of a general scheme of engineering standards which was initiated by the Institution of Civil Engineers. Some nine years ago this organization recognized the economic waste of a lack of standards and appointed a committee to see what could be done. The co-operation of other technical organizations, such as the Mechanical Engineers, the Naval Architects, the Iron and Steel Institute and the Electrical Engineers, was solicited and later 12 sectional and 28 subcommittees were formed. These committees contained representatives from the Board of Trade, the War Office, prominent railway companies, large manufacturers and others interested.

The scope of the work accomplished by these committees was very broad, but so far as electric railway companies were concerned, centered in the question of rail sections. The variety of these in general use in Great Britain five years ago was probably larger than in this country, because of the greater tendency toward individual or separate operation of roads on account of municipal ownership. In consequence municipal engineers often had little difficulty in persuading tramway committees that a slight change in rail sections would be desirable, sometimes for the operation of cars, sometimes from the standpoint of the public. In spite of this handicap, however, the committee in charge of the standardization of rail sections was able to reduce the number of sections for which there was any real demand in tramway service from more than 70 to 5, varying from 90 to 110 lb. in weight. The work, however, did not terminate with the selection of these sections. To be of real value to the industry a campaign of education had to be conducted and it is very satisfactory to learn from a paper recently presented before the Institution of Civil Engineers that 80 per cent of the tramway rails now rolled in Great Britain are of these standard sections.

The experience in Great Britain has largely been duplicated in Germany, where four standard sections, varying in weight for straight track from 85 lb. to 122 lb. per yd., have been adopted. This work was undertaken by the German Street & Interurban Railway Association, which, under its constitution, has authority to make contracts in the name of the association with the rail mills for apparatus and equipment to be used by its members. It was consequently able to enter into arrangements with the mills by which rails of standard section can be purchased at a lower price per ton than other rails of the same weight.

The subject of standardization is as acute in this country as abroad, possibly more so because there are many conditions here which favor standardization. The roads are much larger and more numerous and there is a community of interest between different companies which does not exist to the same extent in Europe. The economic gain should be even larger and the foundation upon which the end sought can be obtained has been laid by the standardization committees of the association. But as yet there has been comparatively little progress in the second and more important part of the work of standardization, the adoption of standards. No company can be forced by other companies or by the association to fall in line in this matter, but there can be compulsion from within. Every company which adopts the association standards, either in whole or in part, aids in gaining the object sought. It would be of interest to know what roads use the association standards.

Rapid Transit Delayed in New York

According to executive proclamation, the residents of New York had many blessings for which they should have returned thanks on Nov. 25, but in that category very few, we believe, will include the present condition of the rapid transit situation. Up to within recently some of the more optimistic, among whom we include ourselves, were in hopes that some basis of agreement would be reached between the Interborough Rapid Transit Company and the Public Service Commission, so that construction could be begun upon the long-delayed rapid transit line on the east and west sides of New York and upon the third tracks on the Second and Third Avenue elevated railroads. But on the morning of Nov. 25 the immediate realization of these hopes was proved futile by the publication of the reply of the Public Service Commission to the proposal of President Shonts. The Interborough Company had agreed, under certain conditions, to build a subway on Seventh Avenue south from Times Square to the Battery, one on Madison Avenue north from Thirtieth Street to 160th Street, to extend its Westchester Avenue line to Pelham Bay Park, to complete a third track on the Second, Third and Ninth Avenue elevated lines, and to build an extension of its Eighth Avenue elevated line to 194th Street. It is generally admitted that these extensions would greatly relieve the present congestion on the existing subway and elevated lines. The subways could not be opened for from five to seven years, but the third tracks on the elevated lines could be completed very much more quickly and would constitute an improvement which we have long advocated, because express trains on these routes would compete in running time with the present subway between the Bronx and lower New York, and so would greatly relieve the existing congestion.

The chief objections raised by the commission to the granting of this permission are: (1) That in addition the company did not propose also to extend its lines in Brooklyn. (2) That under the guise of extensions permission would be granted to construct what is virtually a new system, to the detriment of other possible builders. (3) That the terms of payment to the city are inadequate.

The position of the commission on these matters is expressed in a very long communication, which is abstracted in our news columns this week. We realize that the commission is fighting for the best terms obtainable, and the company is undoubtedly doing the same, so far as it is concerned. But in the meantime the interests of the city are suffering greatly from lack of adequate transportation, and we believe that the actual loss of residents from inability to travel conveniently and quickly, and of the city itself from consequent lack of business efficiency and loss of increased real estate assessments which would follow such extensions, when added together, would far exceed annually the slight difference in terms of recompense which are now the center of contention between the commission and the company. It is true that most of the new work proposed by the company is in the congested portion of the city, which is sometimes characterized as the "fat" or the short-haul traffic territory, and that the extensions in the undeveloped regions of the city are comparatively small, but any improvement in the traffic facilities in the center of the city will necessarily be immediately reflected in the long-haul business, because it is in the region between 125th Street and downtown that most of the delays occur. The rapidity with which trains can be moved through this portion of the system and the traffic which can be carried there set the limit for the service which can be afforded the outer districts. The latter therefore gain with the improvements made to facilitate travel in the congested districts of the city.

Notes on Substation Design

In building substations for such railway and other high-tension plants as require them, there has been in the last few years a very considerable change in the ordinary practice, a change on the whole in the direction of better and more substantial construction in details, perhaps in the direction of large unnecessary expense. The old substation, as built 10 or 15 years ago, was commonly a mere housing for the converting apparatus, oftentimes of primitive character and nearly always of low cost. With the development in size of units and the elaboration in auxiliary apparatus that has now come to pass, the substation is taken much more seriously and is frequently a structure of more than ordinary excellence architecturally and representing an instrument which, so far as apparatus is concerned, is very much greater than would have been deemed permissible in earlier days.

Railway substations have frequently to be located in the comparatively densely populated parts of the city and hence some degree of structural propriety is important and the matter of possible noise to the detriment of one's neighbors must be looked out for; hence the practice in some recent substations of lighting entirely from the roof, leaving solid walls between the street and the noise of the converters. Beyond this with the growing use of higher voltages and multiplication of feeders, the substation switchboard, once of rudimentary simplicity, has grown to be an element of very serious cost, and requires, perhaps, more care than all the rest of the equipment. In a totally different direction there has been striking progress in the use of portable substations, on wheels so to speak, able to support any part of the large network. Now the substation on wheels has proved prodigiously useful and from its very limitations of dimension must be relatively simple. There is no room in such a portable substation for high-tension busbars laid in individual cement passages, nor for remote control switches carried in brick-work cells and serving high-tension lines, brought into the car through passages 6 ft. apart, insulated and fortified in the latest manner of the constructing engineer.

Durability and freedom from danger of accident are very important matters in substation design, and the question of noise too is one which should receive attention much more frequently than it does. Nevertheless, it is a question in our minds whether the same designing skill that produces a simple, effective and compact portable substation cannot also be brought to bear upon the design of a simple, efficient and compact permanent substation. As we have several times intimated of late, the modern station, be it a generating station or substation, has run to switch-

board in a way that is nothing less than sensational. It is an exceedingly good thing to provide ample switching facilities and a safe place for busbars, but it is open to very grave doubt whether the habits which have recently been acquired by some constructing engineers are not disastrously expensive to their clients, considering the actual good that is gained. It is a fact that so far as high-tension plants are concerned foreign practice is in the direction of simplicity, while American practice, save in the far West, has gone to every conceivable length in the matter of re-protecting over and over again safety precautions which are in themselves quite adequate. A few American plants are striking exceptions to this rule and we have yet to see any evidence that these are actually less safe or less practicable in every-day working than some plants in which the engineer and manufacturer have combined to accumulate a quantity of intricate and costly precautions, which have not always proved effective in averting disaster.

In one of the most striking individual and successful high-tension transmission plants in this country the fundamental conception seems to be for a generator and its transformers. In other words, a generating apparatus for the line is to be considered a unit to be connected and handled in the simplest possible way. Over against this one may set the switchboard structures, which are designed to work every possible computation and combination of all apparatus within the station, irrespective of first cost or of the difficulty of protecting the protecting device. Now between these two plans of design, that which records and treats the generating apparatus for a 100,000-volt line as a suitable unit and that which records the generating apparatus as an intricate series of machines and their accessories, all of which are to be independently protected and interchangeably connected to all possible units, it seems there must be a middle course which will lead, on the one hand to more conservative treatment than in the first case, and on the other hand to a very great reduction, both of expense and of danger of ultimate failure. Failure in this instance is not due to breaking down of the fundamental plant of the equipment, but failure due to casual insufficiency in some one of a train of devices interpolated between the really necessary parts of the equipment. A plant can be put down and out just as successfully by the failure of a cable connecting the seventh and eighth subordinate accessory safety devices as it can by a burning out in the generator itself, and the history of the art shows that the danger of the former accident is quite as great as the latter.

Substantial, durable construction is a good asset everywhere and always, and we are far from wishing a return of the old days when the substation was little more than a shanty put together anyhow. Upon the other hand, we would like to see a steady movement in the direction of that simplicity which makes a plant easy to handle in its daily use and frees it from a good many subordinate causes of danger. By all means let us have well-built and reliable switches, just as we wish efficient and reliable generators and converters, but let the connections and accessories be studied with a view to simplicity and individual reliability.

London Rapid Transit Facilities

In view of the present condition of rapid transit affairs in New York City, a great deal of interest attaches to the methods in which very similar problems have been worked out in other cities, especially in those three which are closest in size to New York: Berlin, Paris and London. The London situation has just been made the subject of an extended study by G. Kemmann, the author of an article on the Berlin rapid transit system in our issue of July 3, and his essay on London transportation is just available in pamphlet form. It is an excellent summary of a most important condition and is a commentary upon the unfortunate results which have followed a competitive and haphazard development of rapid transit routes.

The basis of Mr. Kemmann's article is the 1906 report of the Royal Commission on London traffic and a supplementary report, covering the subject to the end of the year 1907, which was prepared by Sir H. Herbert Jekyll for the Board of Trade. In his 62-page summary of this voluminous material, Mr. Kemmann first treats the territorial divisions of London as they affect transit conditions. Greater London is composed of 142 local governments in an area of about 680 sq. miles. The population of this district was 7,217,939 in 1907. According to estimate, it will rise to 7,537,194 by 1910, the latter figure corresponding to an increase of 14.09 per cent in a decade. Furthermore, Mr. Harper, city statistician of London, and the Royal Commission, respectively, have estimated that in 1931 the population will be 9,250,000 and 11,000,000. It seems almost incredible that there could be too many transit means for such an enormous mass of people, yet owing to the way in which the roads have been developed this condition actually has arisen in at least some portions of this territory, while others are very deficient in rapid transit facilities. In London, as in American cities, the growth of traffic is more rapid than the increase of population because the same man who walked to his work when he lived in town must ride when he becomes a suburbanite. The suburban trend in London is clearly shown by the fact that, while the population of the inner portion administered by the County Council has increased only 6.37 per cent in 10 years, the outer portion has increased fully 22.64 per cent for the same period.

The superabundance of transportation means in London cannot be ascribed to poor riding, for in 1907 the annual number of rides per capita, including cabs, etc., was 494 in the County of London, which then had a population of 4,750,000. For Greater London, with a population of 7,217,939, the corresponding figure was 312, and for the tube railways, street railways and omnibus lines was 177. An interesting parallel is afforded by Berlin and its contiguous built-up suburbs covering an area practically the same as that of London County. In the Berlin district, there were only 312 rides annually per capita in 1907 when the population was 3,100,000. It is difficult to compare these figures with those of New York, because of the lack of statistics of suburban travel, but the rides per capita in New York, on the surface, elevated and subway lines in 1907 were 397. The New York figures include transfers, but no allowance for the small amount of cab and auto-bus

riding. Mr. Kemmann believes that, although the London transit routes could be extended in some directions, enough suburban territory is now served to banish all fears that the city will cease growing.

In the second part of the report, it is pointed out that until very recently, little had been done to carry out the recommendations of the Royal Commission as to street widening. The few changes made in the older streets of London have been enormously expensive. Hence, Sir H. Herbert Jekyll recommends that it would be well to work out a uniform street plan for the suburbs, at least before such changes become too costly. The archaic condition of the London streets, of course, favors trackless vehicles, but in replacing their horse-drawn prototypes, the new vehicles have greatly extended the field of their predecessors. The bus has been less successful in South London, which is well supplied with tramways and it is bound to suffer in other parts of London when the public grows to appreciate the value of the trans-Thames connections made recently by the London County Council Tramways. The electrification of the street railways will be completed within the next four years and experience shows that the electrified lines will increase their business and largely at the expense of other transportation means.

The third section of the report discusses the fields which should be served by the various classes of transportation. While most of the traffic in the business districts of the city is carried by the buses, the rapid transit lines are securing a part of this patronage and can gain more if a fast and frequent schedule should be maintained and the accessibility of important points well advertised. The three tube lines of the London Underground Electric Railways have in this way attracted an unexpectedly large business. The excellent suburban service offered by the steam lines entering London is apparent from the fact that the 36-mile run between two individual stations, Southend and Fenchurch Street, is made in 50 minutes by express trains which carry over 4000 commuters daily. In general, even the laboring classes are willing to live at distances 18 to 19 miles from the heart of the city. A count made by Sir Herbert Jekyll in October, 1907, from Charing Cross as a center, showed that about 83 per cent of the travel comes from points less than 10 miles away, 8½ per cent from points between 10 and 12½ miles away and 8½ per cent from points farther distant. It is significant that in recent years the steam lines have lost a portion of their suburban traffic because of the fast service and shorter headway given by competing tubes and also by the cheap bus service. It is not believed that electrification would help many of the steam suburban roads because most of the traffic comes only during a few hours of the day.

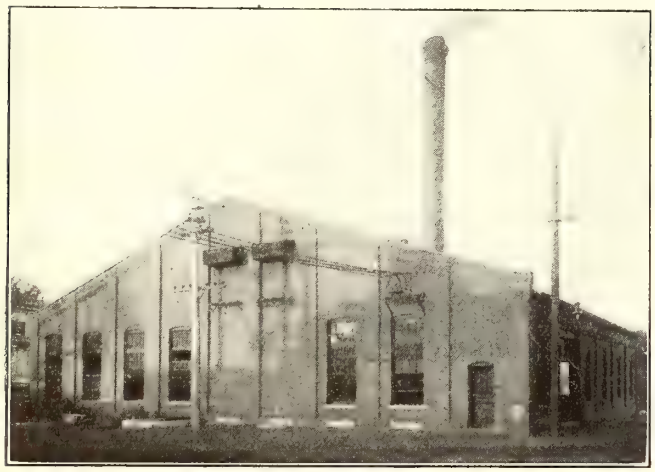
In the fourth division of the report Mr. Kemmann treats of the sphere of influence exerted by each class of transportation. While the Royal Commission believed that the buses and street railways would find their field to be short-haul traffic, they have actually proved strong competitors of the rapid transit lines up to a distance of 7 miles, and even up to 10 miles, because of the lower bus and tramway fares. Only two instances are presented of the tramways acting as feeders in the sense desired by the commission, namely, the single ticket service between the Metropolitan Electric Tramways at Highgate and Finsbury Park with the Piccadilly and Hampstead tubes of the London Underground Electric Railways.

Considering the financial aspect of the transit situation, it was found that the bus companies were losing money to such an extent that the three largest companies were combined in August, 1908, to eliminate wasteful competition, reduce administration costs and centralize maintenance. The future of the auto-bus is still doubtful, and it is questionable whether the bus business will ever be profitable once the government begins to impose upon it the kind of burdens now borne by the railways companies. According to Mr. Kemmann, the financial success of the tramways has not been particularly encouraging, but his accompanying tables show that only three lines, aggregating but 8 miles in length, had deficits, whereas the London County Council Tramway, operating about 120 miles of track, earned 6 per cent on the investment. None of the underground railway companies paid more than 4 per cent on its common stock, and several paid nothing. According to Mr. Kemman, there seemed to be little hope for improvement on the oldest lines on account of their high fixed charges, but recently a vigorous campaign of advertising the facilities for suburban and pleasure travel has greatly stimulated traffic.

As a result of their studies, both the Royal Commission and the Board of Trade concluded that Parliament should create a strong central body for the control of traffic affairs, with powers even greater than those of the New York Public Service Commissions. Such a body could prevent the construction of needless lines and eliminate destructive competition by permitting the consolidation of existing lines under certain conditions. Sir Herbert Jekyll believes that such a commission should also prevent the granting of ruinously low fares. He says that it does not follow that low fares always benefit the public, as the effect is to raise rentals in the favored territory. The Royal Commission states that a reasonable minimum fare would be 2 pence (4 cents) for rapid transit lines, with certain increases for the outer zones. The commission does not favor the operation of unprofitable trains, and feels that a certain amount of standing must be permitted in rush hours. It mentions the London Underground Electric Railways, which now operate four underground lines, as an example of the good results that can be accomplished by consolidation. Mr. Kemmann concludes that if there is to be any further growth of transit facilities in and around London, the only way to attract private capital will be to simplify the cumberous and expensive methods now necessary to secure franchises; to encourage the construction of the shallow instead of deep underground lines so as to reduce the operating expenses and time of transit; to relieve the companies of paying exorbitant prices for easements and property damages; and to reduce taxation. It is also suggested that new undertakings be assisted by the communities to be benefited through the purchase of low interest bonds issued by the companies, by the payment of subsidies or by the grant of land for stations and terminals. The railway companies might also be permitted to purchase land along the right-of-way or near their stations and gain in its advance in value.

POWER IMPROVEMENTS OF THE NEW JERSEY & PENNSYLVANIA TRACTION COMPANY

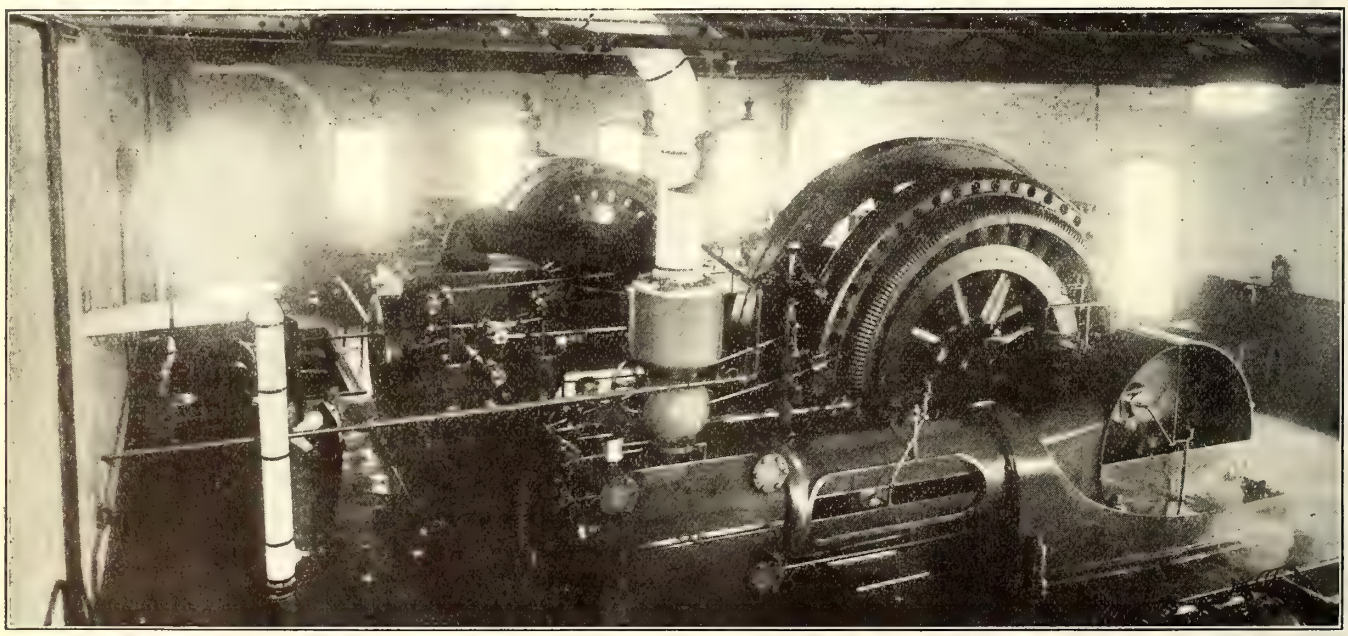
The power situation of the New Jersey & Pennsylvania Traction Company before its recent reorganization was like that of many another medium-size railway merger which finds that it has inherited from its predecessors a motley generating and transmission equipment dating from the earlier days of the art. Hence, when the combined roads entered other hands, it did not take long for the new management to conclude that it would be a profitable scheme to concentrate the power-generating apparatus and revise the transmission lines as well. The company operates a 40-mile city and interurban system, part of the trackage being on the New Jersey side and part on the Pennsylvania side of the Delaware River. The layout of the routes was shown on the map published in the article on the traffic features of this company in the issue of Nov. 20.



New Jersey & Pennsylvania Traction Company—Power Station at Yardley

The first portion of what is now the New Jersey & Pennsylvania Traction Company's system was built in 1901 between Trenton and Princeton with a power station near the former town. This plant consisted of single-cylinder engines belted to d.c. generators When the line to New Hope and Lambertville was constructed in 1905, a separate a.c. station was built at Yardley. The latter plant, however, was not large enough for both lines, as it contained only one 750-hp Belmont Corliss engine direct-connected to a 24-amp, 13,200-volt, 25-cycle, three-phase generator. The direct current for this second road was furnished by a 300-kw rotary in the Yardley station and a similar rotary at Brownsburg.

After careful study of all the factors involved, the company determined about two years ago to enlarge the a.c. plant at Yardley; give up the old d.c. plant at Trenton and replace it by a substation at Lawrenceville, about half-way between Trenton and Princeton; build a 7-mile 13,200-volt transmission line on a private right-of-way cut-off due east from Yardley to the proposed Lawrenceville substation; remove the substation at Brownsburg and rearrange the feeder circuits in accordance with the new distribution system. The changes as outlined required an expenditure of $100,000, but the investment has proved a most profitable one, as the power cost has been lowered fully $25,000 a year. For example, in August, 1908, before the improvements were completed, the cost for electrical energy was $4,105.88; in August, 1909, five months after the completed rebuilding of the Yardley station, the same item was $1,968.15—a difference of $2,137.73 for one month. In consequence of the power improvements as a whole, the operating expenses for September, 1909, were only 52 per cent. Another striking comparison is afforded by the daily coal consumption, which has been reduced from 41 tons to 12 tons a day for practically the same car-mileage. Incidentally, the rebuilt power plant is capable of an output some 45 per cent greater than the two old plants combined, due, in part, to the more efficient operation of the machinery and the lessened line losses. In fact, the company is now prepared to sell a portion of its power output.



New Jersey & Pennsylvania Traction Company—Interior of the Yardley Power Station

THE YARDLEY POWER STATION

The a.c. station at Yardley was retained in view of its central location from a transmission standpoint, both for the present lines and the future extension to Willow Grove, via Newtown, on the west. The structure, which is of brick, with a tile roof, is conveniently located along the canal of the Lehigh Coal Navigation Company. Coal is de-

livered by barges throughout the year, except from December to April, when navigation is closed. There is enough storage room, however, to tide over the winter months. The present method of handling coal from the canal barges to the boiler room by means of a derrick and scoop bucket is to be eliminated by the construction of an automatic railway and a concrete coal bin. Every pound of coal is carefully weighed when delivered, for, although the station is not a large one, as much attention is given to details as if it were of 10,000-kw capacity or more. Even in a plant of this size important economies in the coal pile have been achieved by spurring the night and day shifts on to compete for the best results; and it will be noted later that in such matters as lubrication and switchboard and high-tension connections the Yardley station is up to the latest power-plant practice.

The steam generating equipment at Yardley before the building was enlarged consisted of three 250-hp B. & W. boilers, to which were added afterward two 280-hp units of the same type, taken from the dismantled Trenton power house. However, only two of these boilers, delivering steam at 140 lb. pressure, are required for normal operation. Their efficiency is maintained by cleaning out the fire boxes, flues, combustion chambers and other parts once a month, without fail. The two boilers normally in operation use per day of 20½ hours, an average of 24,000 lb. of coal, which costs $3 per ton delivered.

The principal engine-room apparatus in the original plant comprised the following: One 750-hp Belmont-Corliss engine, with 28-in. x 36-in. cylinder, direct-connected to a General Electric A. T. B. generator, giving 13,200 volts, 24 amp, 25 cycles at 125 r.p.m.; one T. C. 300-kw rotary converter; three 110-kw type "H" transformers; one type "O. T." reactance and one 15-kw, 125-volt marine engine exciter set.

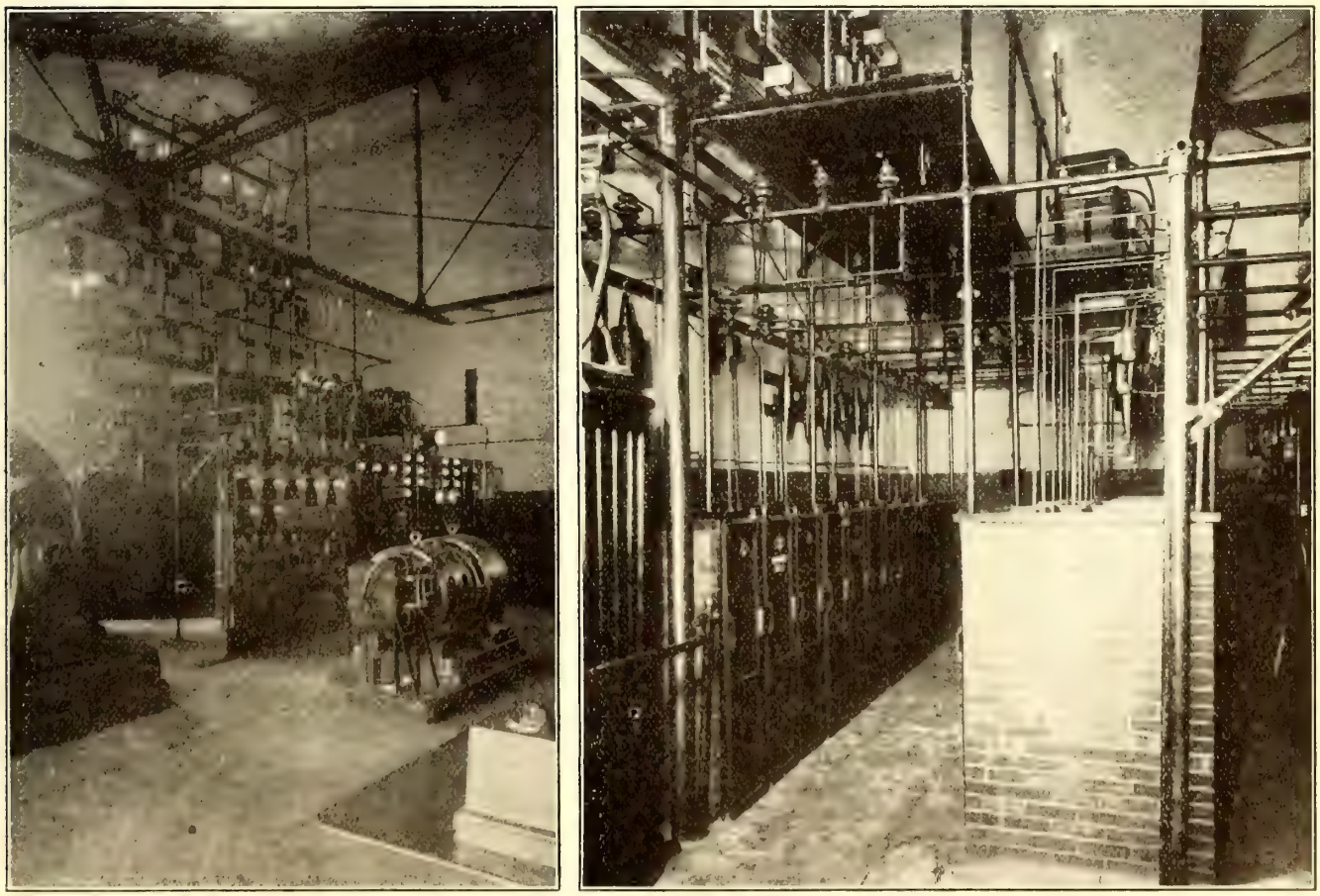
In 1908 the company purchased from the Allis-Chalmers Company a direct-connected set consisting of a horizontal compound engine running at 94 r.p.m. and a 13,200-volt, 35-amp generator; also a 54-hp exciter set made up of a 720 r.p.m., 350-volt, three-phase motor and a 120-volt generator. The General Electric Company supplied the following: One type "H" 500-kw, six-phase rotary converter with speed-limit device; three type "H" 185-kw transformers; switchboard equipment, including a Tirrill regulator; two sets of multi-gap lightning arresters with hour-glass choke coils, and one 35-kw, 120-volt, 3600 r.p.m. Curtis turbo-generator set, which is used for lighting and starting only. The marine engine unit previously mentioned is available as a substitute for the turbo-generator, as the old reciprocating set for which it serves as an exciter is now required only as reserve.

The station was also supplied with Cope boiler feed-water regulators, Cochrane oil separators and feed-water heaters and Worthington surface condenser and pumps.

LUBRICATION FEATURES

The efficient and economical lubrication of the power-house machinery is provided by an automatic engine oiling system, which includes two Burt unit type filter tanks in the basement and a Worthington pump, which sends the filtered oil back to two receivers of 100 gal. total capacity, located in the upper part of the engine room. The replenishment of this system requires only one quart of engine oil a day.

The daily supply of cylinder oil averages about 12 quarts.



New Jersey & Pennsylvania Traction Company—Switchboard and Copper Tube Oil-Switch Connections in the Yardley Power Station

This oil, with its entrained water, is reclaimed by means of Cochrane separators, and then flows, together with the oil from the engine drip pans, etc., to a basement sewer pipe drain, which is about 3 ft. high and 2 ft. in diameter. The oil which rises to the top of this drain is skimmed off every 24 hours, while the water flows away through a 6-in. sewer pipe at the side. Afterward, the skimmed oil is passed through a cloth filter and then is used to supply all the lubrication needed for the company's rolling stock. There is also installed for the reclamation of oily waste the Oil & Waste Saving Machine Company's turbo-cleaner.

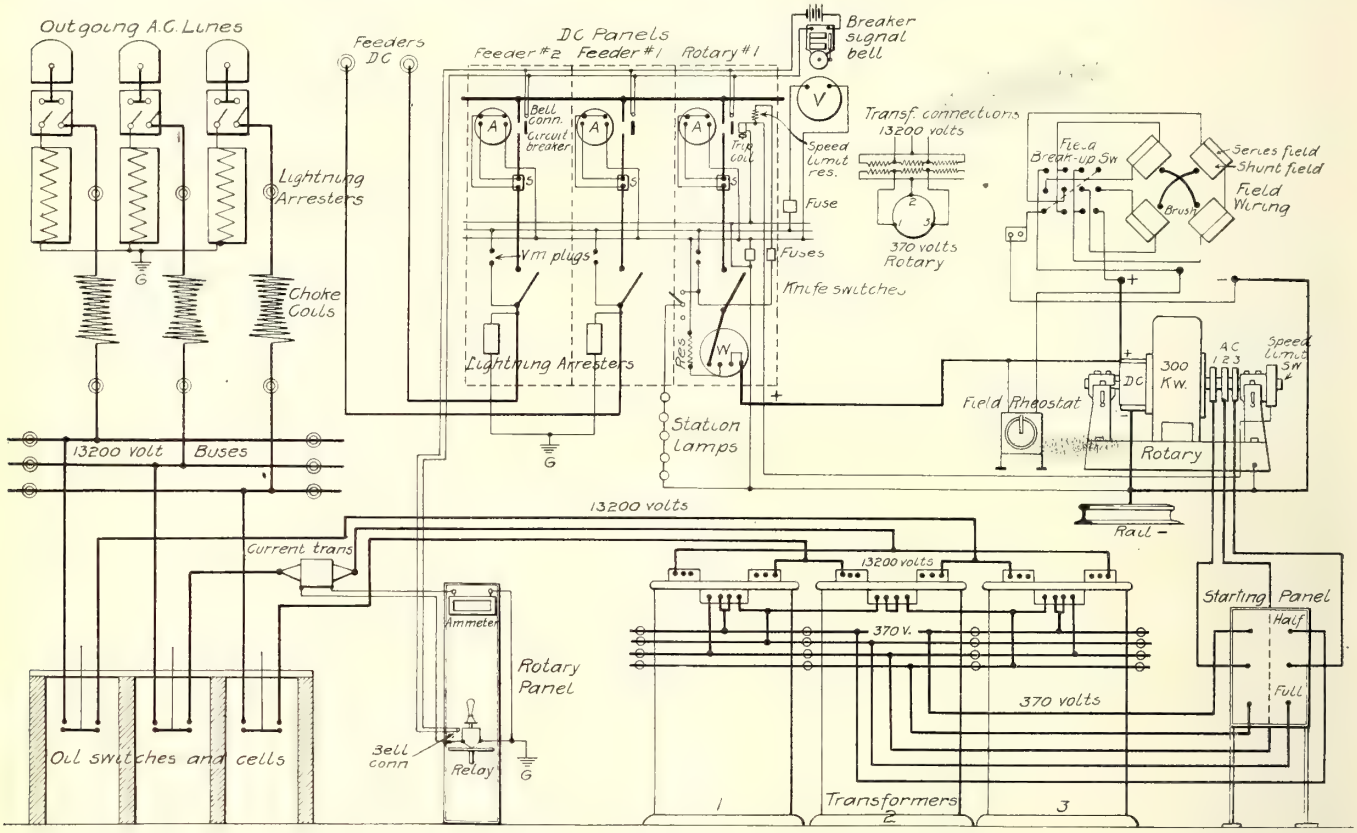
SOME ELECTRICAL FEATURES

To avoid the short-circuiting troubles that arise from the deposition of metal or carbon dust in undesirable places, all the electrical machines of this company are cleaned daily with compressed air, hollow outlets being provided under each unit for that purpose. In the power station a 7-hp compressor is used, while the rotary converter at Lawrenceville is cared for by a Christensen type AA compressor. The air pressure is limited to 75 lb. to avoid blowing the carbon dust into the leaf mica.

A most unusual feature for a station of such small capacity is the use of ⅜-in. copper tubing with elbows and tees for the high-tension busbars and oil switch connections. Aside from the fact that this tubing cost about one-third less than insulated wire for the same purpose, it is far superior to the latter material in stability and appearance. Insulated wires naturally tend to sag and become soiled after a time, whereas the tubing can be kept highly polished by the occasional application of an emery cloth. This copper tubing was quickly and easily installed in the following manner: After the threads were cut the threaded ends were dipped into the solder pot and tinned, the elbows and tees being subjected to the same process. When the pipes were set up in place the connections were heated with a torch to soften the solder, and thus permit the screwing together of the tubing. Before the piping had cooled off thoroughly the fittings were wiped with burlap to remove all traces of the surplus solder.

A great deal of care has been given to identify all electrical connections, so that even a new man would have little trouble in following out the circuits. The doors of the brick oil-switch compartments are numbered in accordance with the machines served by them, and all the transformer taps and switching circuits are marked right up to the brush-holders of the rotary converters. Similarly, the ammeter shunts and current transformers are numbered in accordance with their respective switchboard instruments.

The switchboard, which is composed of 17 black marble panels, carries a full complement of d.c. and a.c. instruments, including line wattmeters, a synchroscope and a Tirrill regulator. Two of the panels carry two d.c. feeders each with but one circuit-breaker per panel, in accordance with the General Electric Company's C. S. F. design. The



New Jersey & Pennsylvania Traction Company—Simplified Wiring Diagram of the Lawrenceville Substation

A most interesting characteristic of the board, however, is at the back. Instead of having a lot of long wires dangling at the rear, the connections from the instruments are led into conduits which are carried up from the floor to such a height that no dirt will enter the openings when the floor is swept. There has been no trouble behind this switchboard ever since its installation.

With regard to the lightning arresters, it may be mentioned that the company found it necessary to change the gap spacing. Naturally, these arresters were adjusted at the factory in accordance with a theoretical earth, but there is, of course, considerable variation in the grounding qualities of various soils, so what is a proper discharge gap in one locality does not give good results elsewhere. The 13,200-volt arresters of the New Jersey & Pennsylvania Traction Company have a discharge gap of ⅜ in.

LAWRENCEVILLE SUBSTATION

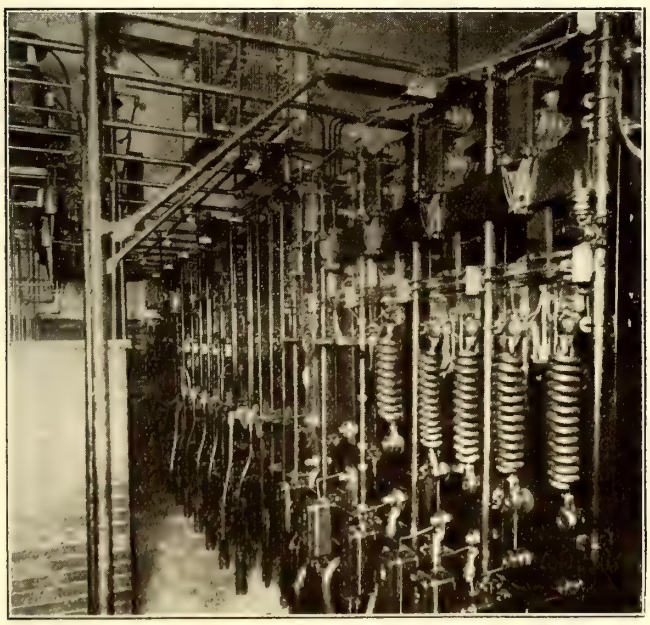
The Lawrenceville substation, which is shown in one of

the accompanying illustrations, is a two-story brick structure, containing a waiting room on the lower floor and the attendants' living quarters on the upper floor. The principal apparatus in the substation comprises three 110-kw type "H" transformers and a 300-kw, 750 r.p.m. General Electric rotary converter. Both the field rheostat and the speed-limit resistance of the rotary have been carefully insulated, and there has never been any trouble from lightning. The old 300-kw rotary from the abandoned substation at Brownsburg is available for a reserve at Lawrenceville. The accompanying wiring diagram of the substation wiring was prepared by the chief engineer of the company as an aid for attendants who cannot readily master the more complicated and symbolic diagrams furnished by the makers of electrical apparatus.

DISTRIBUTION SYSTEM, ETC.

The changes in the location of the direct-current distributing centers naturally resulted in considerable alterations in the feeder layouts. By placing a substation at Lawrenceville, which is practically half-way between Trenton and Princeton, it was not necessary to continue the use of three 500,000 circ. mil feeders between the last-named towns. One of the feeders was removed and installed for 8 miles between Yardley and Brownsburg to compensate for the removal of the Brownsburg substation. Another feeder was retained as a positive in its original position, and the third was also allowed to remain, except that it was converted to a negative feeder.

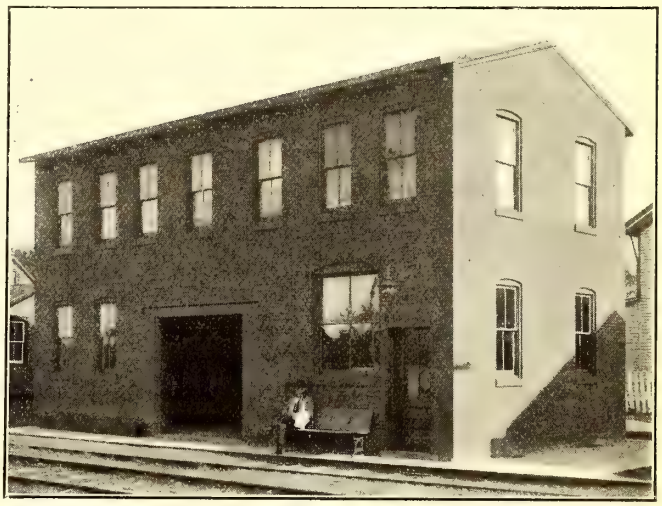
Shortly before the power improvements had been begun the management had started to rebond the Trenton-Princeton line. However, in view of the other changes it was



New Jersey & Pennsylvania Traction Company—High-Tension Tubing Connections and Conduits Behind the Power Plant Switchboard

found that further expense for this purpose could be avoided if the spare feeder were used to help out the return circuit. In accordance with this idea, the old feeder was tied in to the rails every 10 poles (1000 ft. on tangents and 800 ft. on curves) all the way to the Yardley station. The practical result of this unusual application of spare copper was to reduce the running time to Princeton by four minutes, or fully 10 per cent, besides producing a conspicuous improvement in the voltage throughout the line.

The complete feeder system on the Lambertville-Yardley-New Hope line consists of the former Yardley-Brownsburg 500,000 circ. mil feeder previously mentioned and a No. 0000 feeder throughout; the Yardley-Newtown section has a 500,000 circ. mil feeder half-way and a 300,000 circ. mil feeder on the balance of the route; from Yardley to a point just outside of Trenton there is a 500,000 circ. mil feeder and then as far as the site of the old Trenton power house a feeder of 1,000,000 circ. mil aluminum, pur-



New Jersey & Pennsylvania Traction Company—Lawrenceville Substation, with Waiting-Room and Living Quarters

chased by the original owners of the line. With few exceptions, the standard trolley wire is of No. 0000 gage.

The important power improvements described in the preceding paragraphs have been made under the direction of C. M. Bates, president of the company, and E. G. Daniels, chief engineer, formerly of the General Electric Company.

EQUIPMENT OF THE SHORE LINE ELECTRIC RAILWAY

The Shore Line Electric Railway, which is under construction from New Haven, Conn., to Ivoryton, through Saybrook and Guilford, a distance of approximately 52 miles, will be the first line to be put in operation east of the Allegheny Mountains using 1200-volt direct current. The power station, which is located on the Connecticut River, near Saybrook, is nearly completed. It will contain two 1500-kw, 25-cycle, 11,000-volt, three-phase Curtis steam turbo-generators. Provisions have been made for installing two additional units of the same size in the future. Power will be transmitted as three-phase current to two substations, one located in the car house at Saybrook and the other located at Guilford. Each of these substations will contain three 200-kw 600-1200-volt rotary converters. Two machines will be operated in series to supply current to the trolley at 1200 volts. The third unit will be used as a spare.

A considerable part of the route has been graded by the Aetna Construction Company which is building the line. It is expected that the first section will be opened for operation early in 1910. The company has ordered 12 cars from the Jewett Car Company, Newark, Ohio. These cars will be mounted on Baldwin trucks and will have side entrances. Each will be equipped with four GE-217, 600-1200-volt railway motors of 50 hp each and with Sprague-General Electric type M control. The motor and control equipment is arranged to operate on 500-volt and 1200-volt current.

The cars of the Short Line Electric Railway will enter New Haven over the tracks of the Connecticut Company.

ADVERTISING FOR TRAFFIC BY THE LONDON UNDERGROUND RAILWAYS

One of the first things to impress the stranger in London is the great variety of striking advertisements and guides prepared by the Underground Electric Railways Company to direct attention to the advantages of subway transportation to places of business and social importance in and near the city. Even the station sites are advertised because the ticket offices, stairways and elevator shafts are located in buildings or arcades. To assist in finding these stations easily, small guide signs are placed on buildings within a block or two in each direction, while the station itself is indicated by a great sign over the entrance bearing the catchword "Underground" and a variety of striking posters and maps. At night the station hallways are visible at a considerable distance, the word "Underground" then appearing on a large vertical or horizontal electric sign over the sidewalk. These signs are especially prominent in contrast with their surroundings owing to the fact that few London stores illuminate their windows after business hours.

MAP AND GUIDE ADVERTISING

A permanent feature at every station is a large map of the Metropolitan district on which are shown, by differently colored lines, the territories served by and the transfer sta-



London Traffic Advertising—The Famous Policeman Poster

tions of every underground railway in the city. Above one of these maps is a silhouette of the London skyline including the upper portions of such famous structures as Westminster Abbey, Parliament, St. Paul's and Tower Bridge. The lettering at the bottom of this poster bears the slogan: Underground to Anywhere—Quickest Way—Cheapest Fare. The map described has been distributed by millions in almost every conceivable size and form. In fact, it has become so well known in London as to have attained the honor of being cartooned in *Punch*, England's famous comic weekly. The cartoon shows a Londoner and his country cousin gazing at an exceedingly complicated map, while the city man cries out with admiration: "Perfectly simple, you see!"

A fac-simile of the large poster map recently has been printed on linen backing for pocket use. This map also indicates the connections with suburban lines at the terminals. A great many maps have been printed on a paper folder in connection with data on the principal places of interest, including the hotels, restaurants, hospitals and cemeteries. Another map folder of like size and appearance carries on the back a list of first and last trains, local journey times, the distances to the steam railroad terminals from the nearest subway stations, rules governing the transportation of passengers, etc. The same folder refers to the reduction obtained through purchasing tickets in strips of six. It may be noted here that every ticket shows the fare to be paid between the leaving and destination points indicated and usually the name of the interchange station when a transfer is necessary. The passenger has his ticket punched before reaching the departure platform and gives it up when he leaves the arrival platform. This system, which, of course, applies only with zone fares, eliminates all cheating and it has the further merit of preventing strangers from getting out into the street in case they should alight at the wrong station.

The map has also been employed as part of the accompanying comic poster, entitled "No Need to Ask a P'liceman," on which a London "bobby" with a jerk of this thumb indicates to a rustic couple that they will find all the information they want on the poster on the station building. The sentiment expressed by this design is typical of the company's determination to give intending patrons every opportunity to make their journeys with the greatest possible certitude. Every ticket agent is provided with a map showing all the streets, parks and important buildings in the vicinity of his station to enable him to give precise information to inquirers. Fac-similes of these sectional maps, together with a street index, have been printed in book form



London Traffic Advertising—Express Train at Platform

and are sold for the nominal price of two pence. For one penny the passenger can obtain a 54-page guide which gives a list of all places of sight-seeing interest, the theaters and principal clubs, schedules of first and last trains, the subway stations nearest the steam railroad terminals, the subway transfer points and a large map including the connections with suburban lines. Sunday traveling by religious Londoners is stimulated by the distribution of weekly folders which contain a list of the principal churches, the names of the ministers, the hours of service, etc. Of course, this publication contains a strong hint on how to reach the places of worship via the underground railways.

POSTERS

A good deal of holiday and Sunday travel has been worked up also by advertising the attractions of the public museums. Another poster among those reproduced refers to the Victoria and Albert museum and shows how effectively the artistic and practical features of a traffic advertisement can be combined. This poster not only gives an excellent conception of the beauty of the structure, but also of the time and cost involved in visiting this institution.

One of the most novel posters prepared by the company is a map of the theater district on which all the theaters are shown in red, the principal hotels, restaurants and public buildings in green, and the tube line in white. This design

has proved very effective in promoting the use of the subways for travel to and from London's pleasure section. The theater advertising is strongly reinforced by splendid train service for the crowds going and returning. For example, the late train schedules are so arranged that at Piccadilly Circus, where the Piccadilly and Bakerloo lines intersect, the last trains in each of the four directions meet at 1 a. m. Hence there is no danger that passengers on the last train of one line will be unable to transfer to the other. As the vicinity of the Piccadilly Circus station is quite a rendezvous for Continental visitors, the company has provided a uniformed linguist at that place. This interpreter is particularly valuable at the times when exhibitions are being held in London. The arrow poster reproduced shows some

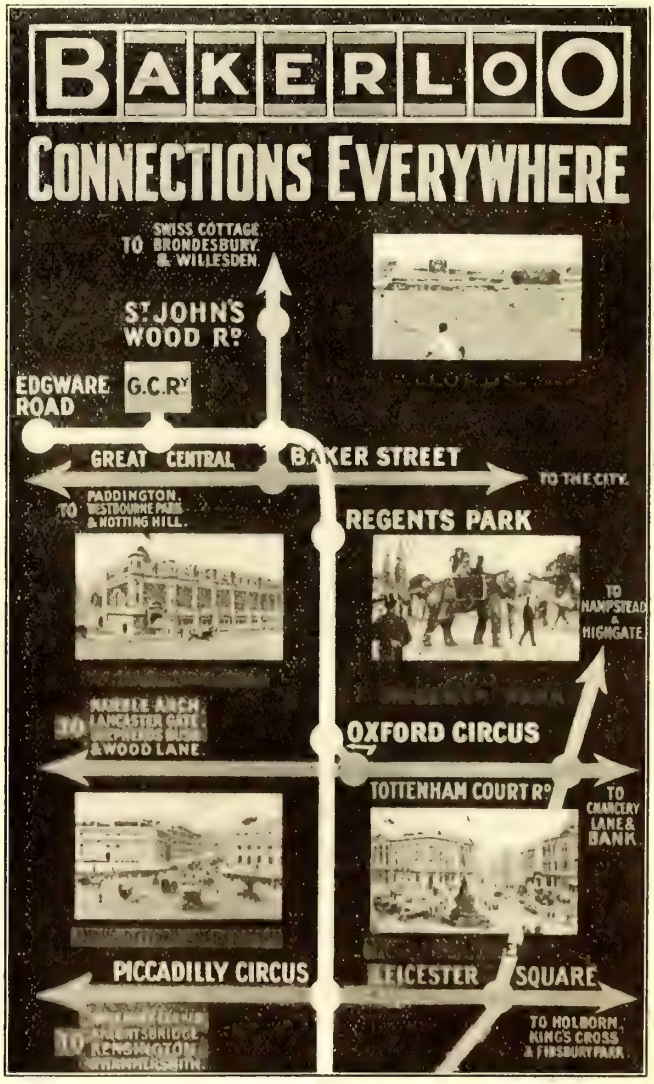


London Traffic Advertising—Art and Utility Combined in a Museum Poster

of the important connections that can be made and some of the places reached by the Bakerloo tube. While this is headed by the name of the particular line instead of "Underground" the general style is maintained by using boxed letters as on the other sheets.

Many fine posters have been prepared of London's beautiful suburbs which have been made more accessible by the underground railways. It is only practicable to reproduce a few of the designs, however. As they must be printed in black and white, it is impossible to convey an adequate idea of their artistic coloring. Many of the scenes, such as Hampstead Heath and Richmond Park proved so popular that they were lithographed in reduced size on coated paper for home decoration. The posters on the country and seashore resorts are reinforced by descriptive folders which are illustrated with excellent half-tones. On the occasions of great fairs or other extensive exhibitions, special posters are prepared to call attention to them. In the case of Earl's Court, London's Coney Island, the company sells at attractive reductions round-trip tickets, which include admission to the grounds.

Many small posters have been gotten out for display in the cars. One of these is a theater map with reference numbers; a second advertises the advantages of the suburbs of Osterley and Hounslow, and a third refers to Golder's Green, a rapidly growing suburb which was practically created through the opening of the Hampstead tube. On



London Traffic Advertising—A Poster Showing Some of the Prominent Places on the Bakerloo Route

Monday, Aug. 30, 1909, the company instituted an express or non-stop service to Golder's Green whereby a run of 4½ miles is made in only 11 minutes. At Golder's Green also the company has built a large shed where patrons coming in from the country can store their bicycles all day free of charge. It will be seen from this that the attractive advertising of the company is insured successful results by backing it up with fast train service and special accommodations.

STATION AND CAR DIRECTIONS

The desire of the railway company to keep its passengers on the right road is also shown in the station and car notices. Thus the subway elevators have an indicator which

lights up whenever the corresponding car is 10 ft. from the landing and remains so until the load has been discharged and a new load taken on. Hence, the passenger can place himself at once before the shaft of the car which will be available next. In many of the stations the elevators do not open directly to the railroad platforms and illuminated direction signs therefore have been installed in the passages which lead to them. Passengers desiring to alight at a given place have no difficulty in finding the station name as the latter is presented 10 to 12 times in 6-in. white letters on a blue ground backed by a red disk. They are placed high and low alternately without any distractive advertising nearby. At one end of the platforms the names of all the stations on the given line are printed on enameled tablets



London Traffic Advertising—Poster Which Proves the Accessibility of the Amusement District via the Underground Lines

and the terminal direction of the incoming trains appears on the wall opposite the platform.

The tube cars carry illuminated maps in the clerestory. These maps show the local stations on the route in green and the interchange stations in red. A rather novel card observed in the Piccadilly cars consists of a double barbed-arrow with the lettering of the station names so arranged that the passenger can immediately determine the direction in which he is travelling and read the names of the following stations in order.

RESULTS OF PUBLICITY CAMPAIGN

The active efforts which the Underground Electric Railways Company has made to advertise its service has been responsible for a greater growth in traffic than the normal increase which might otherwise have been expected from year to year. The results, from a traffic standpoint, on the three tube lines controlled by this company will be noted from the table on this page.

TRAFFIC STATISTICS ON THREE LONDON TUBES.

	Bakerloo Ry.		Piccadilly Ry.		Hampstead Ry.	
	Total No. of Passengers.	Gross Receipts.	Total No. of Passengers.	Gross Receipts.	Total No. of Passengers.	Gross Receipts.
Half-year: 16 weeks to						
June, 1906..	3,006,276	£23,490	.....	£	.....	£ .....
Dec., 1906..	6,799,895	44,580	.....	.....	.....	.....
June, 1907..	9,936,995	63,451	11,953,759	106,570	.....	.....
Dec., 1907..	10,662,876	69,249	13,914,779	119,271	9,881,357	74,328
June, 1908..	12,940,801	83,528	17,446,477	147,763	12,132,639	88,883
Dec., 1908..	13,337,126	86,355	16,990,501	143,234	13,015,363	94,066

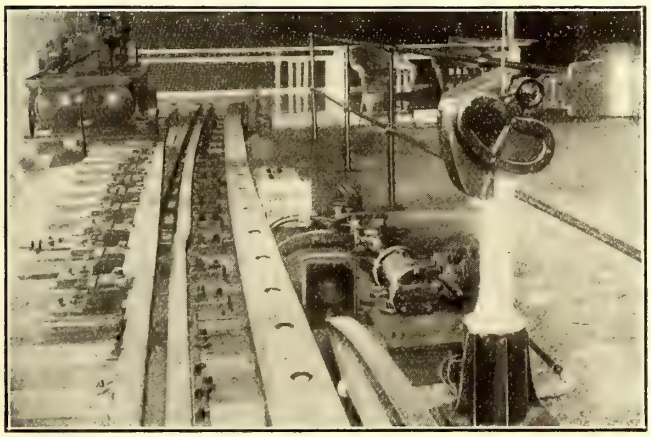


London Traffic Advertising—Map of the Underground Lines Incorporated in a Poster on Hampstead Heath, which is a Favorite Pleasure Ground

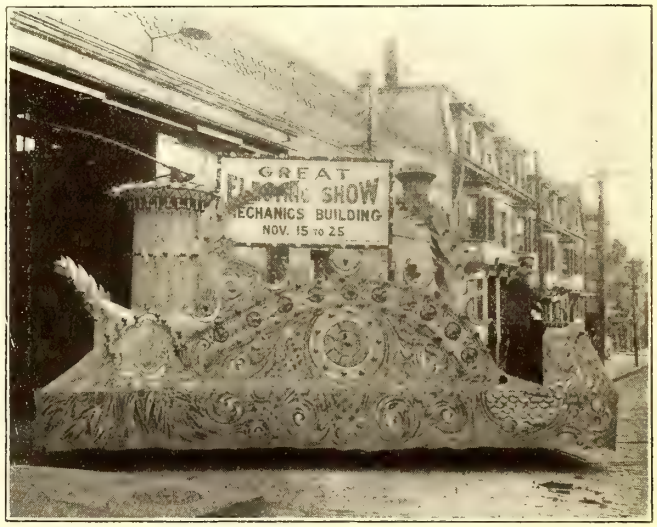
It is apparent from the experiences in London that a well-planned advertising campaign combined with good service can do much to develop the suburban business, increase the pleasure travel to outside resorts and even make the local public pay more attention than is customary to local museums and other places of public interest. Acknowledgment is due to Albert H. Stanley, general manager, and Frank Pick, publicity agent of the company, for the interesting examples of advertising matter illustrated or otherwise referred to in this article. The advertising material which has been prepared for the winter publicity campaign will be described in an early number.

EXHIBIT OF BOSTON ELEVATED RAILWAY COMPANY AT ELECTRICAL SHOW

At the first annual electrical show, held in Boston from Nov. 15 to 25, the Boston Elevated Railway Company installed several working exhibits of operating interest, illustrating the care taken on the elevated system to avoid accidents. Popular interest centered on a model of the elevated structure which was completely equipped for service, including track, third rail and signal system, with a model electric locomotive built as nearly as possible to duplicate



Boston Elevated Exhibit—Manganese Steel Switch and Dwarf Signal

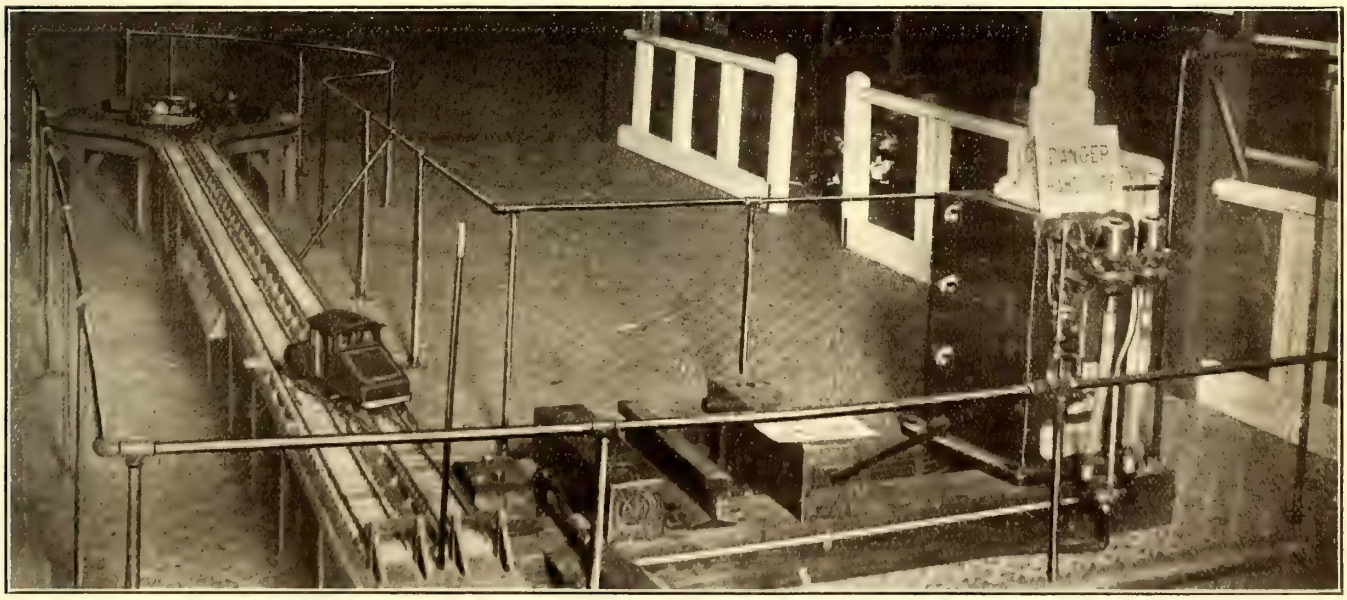


Boston Elevated Exhibit—One of the Illuminated Floats Used to Advertise the Electrical Show

the company's shifting locomotive, No. 0514, at its Sullivan Square yards.

The track was equipped with malleable iron service and third rails laid to a 2½-in. gage and located about 1 ft. above the floor level. About 40 ft. of track were installed in the form of a double line of rails with a loop at one end and a crossover with spring switch at the other. The track was laid on shellacked ties ⅜ in. x ⅜ in. x 4 in. in dimensions, spaced 1¼ in. apart on centers. Every fifth tie laid was longer than the others to carry the third-rail support as in actual service. The current was supplied to the track and third rail at 220 volts, with a lamp resistance in series with the load to protect the locomotive motor. The outside rail was divided into insulated sections as in regular practice, and a 15-volt signal service connected. A complete block with two Union Switch & Signal Company's electro-pneumatic automatic track circuit signals was installed, the signals being full-sized, operating on 80 lb. of air, with mechanism complete and exposed to examination when in operation. The automatic train-stop attachment used on all signals on the Boston Elevated system was also shown. The electric locomotive was built in 39 hours by the company. Its equipment includes a single motor geared to four 1¼-in. malleable-iron wheels, copper third-rail shoes, and model cab and housing. The locomotive is 14 in. overall and weighs 11 lb. It was designed to operate at a maximum speed of 7 1-3 m.p.h., and averaged from 8 to 10 miles running per day during the show.

The company also exhibited a two-motor truck and controller, with air-brake equipment mounted on a skeleton car frame, so that the public might obtain a closer idea of the method of driving a street car. Two GE-86 motors were installed, and the wheels were raised from the floor to permit the motors to be operated on 220-volt current in the exhibition space. Another exhibit consisted of a full-



Boston Elevated Exhibit—Model of Elevated Track and Signal System

sized manganese steel switch about 30 ft. long operated by compressed air with electro-magnetic control and including full-sized dwarf signal, guard rail, ties, timbers and bolts. Short third-rail lengths were also shown. The exhibit was completed by a cable rack showing every size of wire used on the system from bell conductors to 2,000,000 circ. mil feeders, and photographs and drawings of the company's signal towers, trainmen's school, power plants and car-cleaning devices. The exhibit was prepared by W. C. Smith, inspector of signals; H. M. Steward, roadmaster, and about 40 assistants in about one week.

CAR FLOATS USED TO ADVERTISE ELECTRICAL SHOW

The company arranged with the management of the electrical show to operate three floats nightly on its surface lines during the exhibition week. One float represented a diamond in its general scheme of decoration, the second an emerald and the third a chrysalite. Each float was built upon a single truck and equipped with a W. P. 50 motor and K-10 controller, operation being from one end only. About 940 colored incandescent lamps were used in the decoration of the floats, including sign lights advertising the show and its location. The floats were prepared at the Charlestown Neck car house and were started each night from the Bunker Hill car house, running from 7 p. m. until 10 p. m. In general the floats were operated from Bunker Hill through the city past the Mechanics Building, where the show was held, to a point in the Back Bay, where divergent routes to the suburbs were taken. One motorman and one conductor accompanied each float, and the three floats covered practically the 550 miles in six days.

HEARING ON COMPLETE VESTIBULES IN NEW YORK

The hearing before the Public Service Commission of the First District of New York on the complaint to compel the electric railways operating in Brooklyn and Queens Boroughs to equip their cars with a full vestibule was continued on Nov. 23, 1909. A. W. Williams represented the Brooklyn Rapid Transit Company as counsel; C. L. Addison, the Ocean Electric Railway; J. J. Kuhn, the Coney Island & Brooklyn Railroad and the Bush Terminal Company, and Arthur G. Peacock, the New York & Queens County Railway, New York & Long Island Traction Company and the Long Island Electric Railway. E. M. Bassett represented the commission, with G. H. Backus as counsel.

The attorney for the complainants had at the previous hearing promised to present witnesses who could testify to having operated cars in the metropolitan district so as to show the disadvantage of the present type of vestibule. He had been unable to do this, however, and it was decided to proceed with the case and to give the railway companies an opportunity to present witnesses.

William B. Gove, superintendent of equipment of the Brooklyn Rapid Transit Company, was called as the first witness. Mr. Gove said that the present vestibules in use on the cars of the Brooklyn Rapid Transit Company had been designed under his supervision, to comply with the act of the Legislature compelling cars to be partly vestibuled, and that they had all been installed within the time limit set by the act requiring them at a cost of $295,000. He did not think the design for the complete vestibule furnished by the complainants had been drawn by one familiar with the requirements. Moreover, it would be applicable to only about 452 cars. The cost of $27 or $28 for such a vestibule meant, in his opinion, only the actual cost of materials. Another thing, the stock specified was not suitable for car construction. Neither the paint nor the proposed window setting was adequate.

In accordance with the request of the commission, Mr. Gove had a plan prepared for a proposed folding vestibule applicable to cars of the Brooklyn Rapid Transit Company. He said that to equip 452 convertible cars with these doors would cost $196.65 per car, or $88,885, and to equip 1044 closed semi-convertible cars would cost $201.16 per car, or $230,149.92. Such vestibules would impair the efficiency of the cars for handling traffic by reducing the width of the opening and limiting the loading and unloading. It might even be necessary to relocate some of the equipment, and while it was thought that only the light switch would be interfered with, service requirements alone would determine this. These vestibules would also interfere materially should it be decided later to adopt some prepayment plan. Mr. Gove explained that his company has a very careful system of checking estimates of the cost of construction with the actual cost, and that they usually compared favorably, although in most cases the actual cost exceeded the estimated cost. His estimate of the cost of the vestibules was a very careful one, and he did not think the actual cost would be less than the estimated cost.

Mr. Huff, for the Coney Island & Brooklyn Railroad, said that he had had estimates prepared for equipping the cars of that company with full vestibules; that the estimate was about $200 per car, but that in the absence of counsel for the company he would prefer not to introduce the figures.

Mr. Williams, on behalf of the railroads, moved to have the commission dismiss the complaint on the ground that public necessity does not demand the vestibules; that there is no evidence that the employees desire a change, or that their health is endangered, and that the cost of reconstructing the vestibules is prohibitive. In refusing to dismiss the complaint, Commissioner Bassett said:

The commission desires when its attention has been called to a matter of this sort and a proceeding has been begun, to exhaust, so far as possible, the subject so that the same question will at least be decided for a time, or while circumstances remain the same. That is as much for the interest of one party as it is for the other. I will direct the counsel for the commission to have the transportation bureau during the next two or three months examine into the questions presented by actual observations of local conditions and appear at the hearing to which we will adjourn ready to make a report and be cross-examined on the subject. The commission will then take under consideration all that the complainant has produced and what the companies have produced and also what may be produced by further actual observation and experience during these months, part of which will run at least well into the winter and then the commission will be much better qualified, I think, to express a true opinion on this question than otherwise.

The hearing was adjourned until Feb. 10, 1910.

One of the most important interurban electric railways in France has recently been completed, and is officially to be put in operation on Dec. 4. This line extends from Lille to Roubaix and Tourcoing, and is known as the Electrique Lille-Roubaix-Tourcoing. The northeastern section of France in which it is located is one of the most densely populated industrial sections in Europe outside the large cities, and the new line will join Lille, the chief city of this industrial section, with two important manufacturing centers. An outline of some of the features of the concession was given on page 21 of the Street Railway Journal of Jan. 3, 1903.

HINTS ON INSPECTION AND MAINTENANCE OF CAR EQUIPMENT

BY H. A. LEONHAUSER, ASSISTANT SUPERINTENDENT OF SHOPS, UNITED RAILWAYS & ELECTRIC COMPANY, OF BALTIMORE, MD.

The car maintenance department of a street railway company should always be on the alert for apparatus that has reached the danger point, for if the policy is to let a car run "just a little longer," the company is sure to be involved in endless delays and expense for damages arising from the failure of equipment. It is important, also, if maintenance work is to be done thoroughly, that the best class of men should be attracted to the repair department, and the foreman in charge should keep an accurate record of each man's work. When the men learn that their advancement depends upon their skill, rather than on seniority, they are sure to take a deeper interest in their work. An accurate record of inspection and repairs is also of material benefit to the claim department, for if it can be proved that a car was carefully inspected and was in safe condition before it left the shops or car house it may relieve the company from liability in an accident damage suit.

Any proper system of inspection must be founded on a systematic mileage basis. There should be a reliable inspector assigned to the terminus of each line every day to examine all cars in the morning, or both in the morning and in the afternoon before the evening trippers are put out. Besides inspecting the equipment in general, as shown in his daily reports to the foreman, the inspector should also "take up" brakes and make any small repairs that are necessary from time to time. If it is impossible for the inspector to place a car in perfect condition at the end of the line or in the inspection depot, a shop sign should be attached to the brake handle immediately as a notice to the dispatcher. No matter how urgent the call for this car may be, the dispatcher should not be permitted to order it out on the road until it has been thoroughly repaired.

MISCELLANEOUS CARS

The inspection of miscellaneous cars is just as important as the inspection of those used for passenger service, but the average shop man, unless cautioned frequently, will show a tendency to slight them. Miscellaneous cars include those used by the maintenance of way department, such as sprinklers, sweepers, flat, dump and line cars. These cars are usually roughly handled and often overloaded, and the electrical equipment is exposed to snow, slush or mud. Whenever possible, shields should be installed on such cars to protect the electrical apparatus. The entire equipment should be inspected every week, besides receiving a casual daily inspection. Overhead line cars also are often abused, especially when responding to emergency calls. They should be inspected every day. Particular attention should be given to the suspension, protection and capacity of the resistances on line cars, owing to the fact that in stringing wire the resistance notches of the controller are used continuously. This condition, of course, leads to heating of the resistances and to the burning of the bottom of the car. Furthermore, linemen often will install upon the inside of these cars some temporary wiring which may be very unsafe.

SPRINKLERS

Sprinklers should be carefully inspected daily, owing to their excessive weight, the splashing of water, the loosening of bolts, and the fact that the waste water will wash off all lubrication, even the oil in the journal boxes.

SWEEPERS

A sweeper is the most important piece of apparatus owned by a street railway, and therefore should be in perfect order at all times. All parts of the electrical equipment should be placed inside the body except motor-leads and the ground connection for lighting circuit. The cables should be cleated to the rafters, and the resistances and other auxiliary equipment kept clear of the floor, and the side doors so as not to interfere with the removal of the broom motor in case of trouble. Any wear in the sprocket links and rivets, as well as any slack in the chain, should be taken up promptly; center bands should be on all brooms, and all bands should be kept tight. All bearings should be kept well greased, or oiled, and an extra trolley pole, controller fingers, lamps, carbons, links, rivets, trolley rope, jacks, jumpers, and other tools and parts placed on the sweeper for use in case of emergency.

TROLLEYS

A trolley pole about 12 ft. 6 in. long, weighting 22½ lb., with a 24-in. reinforcement, and made of hoop steel, will be found very elastic. This type of pole after a severe deflection will spring back to its normal shape, and only in rare instances will break off.

INSPECTION OF TROLLEYS

The inspector should see that the pole is straight, is well clamped in the socket, is not rusty, and that the wheel and bushing are in condition to run at least two days longer. The wheel must be properly washered and the contact springs in good order. The stem of the harp should be tight on the pole, and none of the rivets loose or worn. See that the spindle is not badly worn. The cotters should be examined to make sure that they are in good condition, of the proper diameter and length, and properly opened. All wearing parts of the base need occasional oiling, but the inspector should keep the hoods and roof of cars clean, and not allow oil and grease to accumulate, particularly around the trolley base.

LIGHTS

Lamps, sockets, electroliers and switches, including headlights and wiring, should be carefully gone over each inspection day. Nothing is more unsightly than a socket dangling from an electrolier. Each circuit should be fused with an enclosed fuse of proper carrying capacity.

CIRCUIT BREAKERS

As a circuit breaker is really abused more than a controller, and as it was designed to protect the equipment, the cover should be removed each inspection day, and after putting all parts in good order, the scale or adjusting spring should be examined to make sure that it has not been tampered with, and the breaker tested to insure that it will trip freely. The set screws should bear firmly on the trolley wire leads. If the breaker is of the type known as No. 11,303-B the inspector should see that the ends of the trolley wire leads do not touch each other. Guard against this by placing a piece of 1/16-in. fiber between the contacts, for if the ends of the trolley wire leads touch, the breaker is useless. In short, a circuit breaker is none too reliable even when it is in perfect order. The writer's opinion is that circuit breakers are not efficient for heavy two-motor or four-motor equipments, and that up to the present time the heavy equipments have not been supplied with a proper protecting device. This applies more par-

ticularly to cities where the cars run up steep grades. The breaker must be set to carry the heaviest car with the heaviest load with a greasy rail, or with snow on the rails up the steepest grades; sometimes the car is called upon to push another heavily loaded car, yet it is called a protective device. Is it any wonder that armatures and fields are burned up and controllers blown out?

A separate fuse box with a fuse of proper capacity and a simple breaker for each motor has been considered by the writer, but trouble with this arrangement would probably arise if a pair of motors was cut out. The fuses of the two remaining motors would not have sufficient capacity to carry the load thrown on the two motors, and the motorman would resort to using pieces of iron wire for fuses. The next thing that would happen would be a controller burnt out. If four small capacity circuit breakers were installed, one for each motor, the motorman would probably not be aware of the fact that one breaker had opened and that the car was running with only three motors, unless some kind of an annunciator was mounted on the platform. Protecting the motors is one phase of the problem; protecting the trolley circuit is another; and designing a strong, spacious and simple controller is still another. If circuit breakers must be used, the manufacturers should design and build an apparatus that will always open at a current value for which it is set. It should not be possible to find on an inspector's report a record of a breaker opening at 950 amp, when it should have opened at 400 or 450 amp. Breakers should be tested at least once a month, using a water rheostat and ammeter.

HOOD SWITCHES

Hood switches should be inspected carefully each regular inspection day and they should also be tried daily by the terminal inspectors. The old G.E. type of hood switch has an iron lever which rusts very easily, making it work stiff. This often deceives the motorman, with the result that contact springs burn off. The car must then be pushed to the terminal unless a repair man comes to the rescue.

CONTROLLERS

See that the handle is not badly worn, keep the water collars tight and the bearings well lubricated. Set the controller fingers with proper tension, see that they have full and perfect bearing on the contact plates, and that the arc is broken at the proper number of points, and not at one, as is very often the case. The ground connection should be tight, and in good order, and the controller bolted tight to both the knee-iron and dash. After an arc divider is burnt about one-third through do not destroy it, but fill the cavity with oil putty. Keep contact plates on the main cylinder properly lubricated; the contacts on the reverse cylinder should not be lubricated but should be kept bright and clean, and all reverse fingers maintained with a good tension. If the springs are weak, remove them promptly. Keep the connecting board and all parts clean, and see that the insulation upon all cables is in good condition, and that the screws in the binding posts are tight and locked with the lock-nuts. Inspect the magnet or blow-out coil carefully and keep the thumb-screws on the case well lubricated so that they will work freely.

Controller "explosions" can be caused by weak springs on the reverse fingers; cables not properly sweated, or loose in the clips that fasten them to the reverse fingers; cables loose in the binding posts; cut-out switches not having full, proper and firm bearing in contacts; arc dividers burnt clear through; carbonization, causing short-circuits; breaking arc at one point instead of four; ground connection loose or burnt off; magnet grounded; ground wires burned off either at motors or cables; reversing; dropping back the controller handle from parallel to series position; cutting out the current with brake on; weak fields; grounded brush-holder; brush-holder springs breaking off; tight carbons; weak springs; circuit breakers sticking or set too high; feeding controller too fast especially on slippery rail; bad bonding; high voltage; passing under breakers with current on or cutting down from parallel to series while passing under breakers, especially if the voltage is low on one side and high on the other; imperfect ground connections after reaching the motor frame due to the axle being dry and gummy or the pedestal and journal boxes rusty and loose. In short, in order to get good results from a controller, all connections should be bright and tight from the trolley wire to the rail.

The paint or shellac pot, although it helps to make the controller look pretty, amounts to little in keeping a con troller in first-class operating condition. For years the capacity of every part of the electrical equipment of cars was increased except that of the controllers. The platform controller is not now a complete success for heavy equipments. Auxiliary contractors have been thrown in the circuit to break the arc outside the controller, but in some cases have proved a failure. If the controller cylinder is thrown off quickly, the arc is broken in the controller, and not by the contactors. If the controller cylinder is thrown off slowly, however, the contactors will do the work for which they are intended.

CABLES

See that all cables are eleated clear of iron parts, bolts, rods, etc., as if they are kept clear there will be no danger of grounding. If they are exposed to water or oil, and cannot be placed to one side, put up a guard or shield made of galvanized iron to protect them. A fire-proof trough and conduit properly installed is recommended for new equipment. Conduit, however, should be put in such a manner that it may be easily replaced in case of collision or other damage to the car body.

RESISTANCES

Resistance grids should be tested to see that panels are not grounded to the frames and that the panels and the terminals are tight. Copper washers should be used between the panels instead of plates and screws. Grids should be protected from water splashing on them by guards or shields. They should also be suspended a safe distance from the floor and away from all wood-work. Any wood-work near the resistances should be protected with sheet iron and asbestos or transite board. Great care should be taken, especially on double-truck cars, in case a car jumps the track, or in rounding sharp curves, that the brake rods do not come in contact with the resistances, as this will burn the rods and chains and may cause a serious accident. Grids should be tightened up at least twice a year.

MOTORS

A street railway motor is a much-abused piece of machinery. The brush-holder to begin with is often looked upon merely as a chunk of brass and a spring or two with a slot to receive a carbon. Thousands of dollars worth of electrical apparatus has been thrown into the scrap-heap, lines have been tied up, controllers blown out, fuses blown and armatures and fields burned out time and again, simply because the brush-holders, or the support known as the wooden yoke, were at fault. Every yoke should be placed in a templet or jig to see that it is perfect before leaving the shop. The wood for the yoke should be thoroughly sea-

soned, and all castings, after being riveted to the yoke, should be finished by a competent machinist. He should begin to mill the center casting first, then strike the center of this casting, and from this point locate, mill and face the end casting in order to have the brush-holder set square and at the proper angle. The drilling and tapping of the holes of the center casting if not worked from the center will throw a brush-holder out of neutral, and will cause a variety of motor troubles. A proper templet or jig is absolutely necessary in order to make each and every yoke perfect.

Troubles to be looked for in inspecting brush-holders are bent or twisted holders, baked carbon dust, too much play for the carbon brushes, unequal pressures of the springs which should exert about 6½ lb. per square inch of brush contact, sluggish action of the springs, plungers twisted, rubbing or binding. The tension should be right when the carbon brush is nearly worn out as well as when the brush is first put in. When applying new brush-holders place them on a perfect templet or jig and see whether they fit exactly. Slight variations from a perfect fit mean no end of trouble. See that the shunts are in good order. The best way of making sure of perfect action of the brushes and holders is to examine the carbons from time to time. If they are worn so that one edge is as high as the other, are hollow in the center corresponding to the radius of the commutator and are also worn square across, the brush-holders as well as the yoke are perfect. On the other hand, if the brushes are worn bevel, no matter how slight or worn on the bias, the yoke or brush-holder requires attention. Until this defect is rectified armature and field troubles, flash-overs, blowing up of controllers, etc., will continue. The brush-holders and insulators should be kept clean. Painting the insulators with a good oil-repelling varnish is recommended. The plastering of motor cases with asbestos or other material is wrong. Remove the cause and there will be no flash-overs. In order to get good results, and not wear the brushes and commutator too rapidly, the following brush tensions will be found satisfactory: Westinghouse No. 3 motors, 4½ lb. per spring; GE No. 1000 motors, 5 lb. per spring; GE No. 80 motors, 5 lb. per spring; GE No. 90 motors, 5½ lb. to 6 lb. per spring; Westinghouse No. 12-A motors, 4½ lb. per spring; Westinghouse No. 49 motors, 5 lb. per spring; Westinghouse No. 56 motors, 6½ lb. per spring; Westinghouse No. 101-B motors, 5 lb. per spring; Westinghouse No. 101-D motors, 5½ lb. to 6 lb. per spring. All brush-holders should have springs that can be easily adjusted without removing the holder. An arrangement similar to the brush-holder of a Westinghouse No. 49 motor is recommended.

COMMUTATORS

Flat and rough commutators should be removed and turned promptly. The writer favors grooving commutators, although it is not necessary on motors up to 60 hp, providing the brushes have the proper carrying capacity, are just hard enough to trim down the mica, the commutator is made of the proper material and is properly bored out and turned. Commutators should be made of hard-drawn copper and the sofest grade of Canadian amber mica. Every segment of mica should be milled to gage so that each bar will be the proper distance apart, in order to give the proper commutation. The bars should be bored out perfectly in order that they may be screwed up tight, as loose or high bars quickly cause trouble. Slots should be tinned. The grooving of any rough or bad commutator is recommended. This point is discussed at length farther on.

CARBON BRUSHES

Brushes as a general rule are placed in the holders, the lid clamped down on the motors, the trap doors placed in position, and the car put out on the road to run until it breaks down. Who knows what is taking place inside of the motors? The only way in which a master mechanic can determine which type or grade of carbon brush is best suited for the service on each particular line is to get the pole pieces in proper position, see that the fields test properly and are tight, see that all connections are tight, test the armatures, fields and brush-holders for drop, try the yoke and brush-holders on a templet or jig, then make a thorough service test of the motors of each line separately. A cheap carbon brush in some instances will give almost as good results as a high-priced brush, but it should be borne in mind that the conditions must be studied very carefully and checked up occasionally. Where it is necessary to use high-priced brushes to get results, do not hesitate about buying them, but watch the men who handle them, and make them return brush for brush, noting whether they are sufficiently and properly worn and whether they are cutting the commutators. Cutting can be detected readily by the presence of very fine copper duct on the brush, providing carbon dust is not allowed to accumulate in the brush-holders. "Doped" brushes should never be used, and a soft brush that grinds away rapidly is a nuisance, as in a very short time all parts of the motor will be covered with carbon dust, which will cause trouble.

Select a brush with a safe carrying capacity, that will cut down the mica and not cut the copper and one that with proper tension will show a wear of ⅛ in. after having made about 2500 miles. The time the car is coasting and the time current is passing through the motors should be noted as coasting trims down the mica, and the results are entirely different with the same motors, weight of car, etc., on a fairly level road from the results on a hilly road. Fast feeding and forcing current through the motors is disastrous to brushes as nothing will break them quicker. The plungers of the brush-holders should be lowered carefully on the brushes. If allowed to strike the brushes with force, the carbons will break. Sluggish springs, inferior shunts, worn brush-holders, improper tension and worn armature bearings should also receive careful consideration. If the master mechanic has not the time to make a careful study of his conditions, the brush manufacturer can be relied upon usually to supply a satisfactory grade as the results of his long experience with conditions probably very similar to those involved.

It is a good plan to have the brush inspector mark with a piece of crayon the car number and the motor number on brushes that he removes from time to time and have him place them on the master mechanic's desk. The master mechanic will then know at all times whether brush-holder yokes and brush-holders are right or wrong, what results the brushes are giving and whether the commutators are being cut or damaged. It is also well to note in some cases the date the brushes were placed in service and when removed in order to get the mileage. The tension of the springs must be noted in making mileage tests and also whether the brush is getting a full contact against the brush-holder. Partial contact of the brushes in the holders may be caused by attempts to remove baked carbon dust. A repairman will rub a brush on the floor of the car, or on top of the motor, or will sandpaper it, while another man may use a file on the brush-holders. The manufacturer may have driven a broach through the brush holder, thus springing

the slot in the center, while at the ends of the slot the carbon will fit snugly. Brushes frequently have only about one-fourth of the proper bearing surface on the brush-holders. Use the micrometer on brushes occasionally, and it will be seen that the brush manufacturers are also sometimes at fault. Brushes of the same size will vary from 0.00 in. to 0.005 in. in thickness. Brushes should never be changed from one brush-holder to the other, nor from one side to the other in the same brush-holder, nor should they be reversed after they have once been placed in service. Before removing a brush mark it in some manner so that it can be put back in the same position.

ARMATURES

In making armature coils insulate them well and dip them in a good insulating varnish. Above all things, do not destroy the flexibility of the varnish by adding benzine or gasoline as a thinner. Place a steam coil of solid pipe, having no joints, in the bottom of the varnish tank, and heat the varnish to the proper temperature, using a hydrometer, and a thermometer in order to obtain the proper gravity and temperature. Bake the coils only a few hours, and let them air-dry. Too much baking after final dipping is wrong. Before the first dipping all coils should be placed in the oven for at least one hour, in order to remove all moisture, and then plunged hot in the melted varnish.

In winding an armature, before placing the first coil in the core use a piece of steel that will fit the slot of the armature core neatly and have the center of the point strike the center of the corresponding slot in the commutator. This is a very important aid to proper winding of the armature, as throwing the lead from the coil either one bar to the right or one bar to the left will seriously affect the commutation when running.

For banding armatures up to and including those for 60-hp motors the writer has found that No. 17 B. & S. gage steel banding wire 0.046 in. in diameter, with a tensile strength averaging 233 lb., an elastic limit of about the same amount, and showing no perceptible elongation by calipers in a 6-in. length, will give excellent results. No band wires should be used on the sloping surface between the core and the commutator.

The laminations forming the core of an armature should be built on a spider, the same as a commutator. This prevents any movement relative to each other. The spider also reinforces the shaft, and permits a shorter distance between bearings, preventing trouble with uneven wear of pinion and gear, due to the shaft springing under heavy load. The shaft should be designed to press out of the spider without disturbing the windings or the commutator.

For soldering the coil leads into the commutator use pure tin. For closing spaces between commutator bars or patching burned bars, litharge and glycerine mixed to the same consistency as putty, well worked into the space and then dried thoroughly in an oven has given excellent results. A mixture of stratena cement and talcum powder is also very good for this purpose. Spaces, however, must be sawed or scraped out thoroughly before applying this dope. Always see that the sleeve or quill of the commutator is tight on the shaft, as the burning and breaking off of leads are due in a great many instances to sleeves or quills being loose. At times loose sleeves are very hard to detect. Laminations loose on the shaft will produce the same result. Many defective armature shafts can be detected before winding by applying the same oil and hammer test as is used on axles.

BEARINGS

Bearing shells should be made of semi-steel and only the best grade of babbitt used, particularly for armature bearings. The fewer number of times an armature has to be removed from the motor for any cause the longer will be its life. If it has not failed before being removed, the puncture test which is generally applied before it is replaced will often break it down. The bearings, therefore, should be carefully made and lubricated. Every large street railway company should mix its own babbitt metal, using only the best tin, copper and antimony. The mixing and pouring should not be entrusted to an inexperienced man. Bearings should be poured almost to size, and then broached. The broaching has a tendency to compress the babbitt and also give it a bright and perfectly smooth surface. If the bearing is broached the babbitt still maintains a chilled surface, whereas if it is bored the chilled surface is removed.

Bearing housings are recommended, all bearings to be of the same diameter and pressed and keyed in the housings. Large openings should be provided in the side of the housings for the application of waste packing to the journal. A separate compartment should also be provided for free oil in large quantities, so that the supply of oil can be maintained by examining the depth in the well. An arrangement of this kind allows the lower portion of the waste to be continually submerged in the oil, thereby insuring uniform saturation of the waste at all times. The oil delivered to the journals is fed through capillary attraction, which at the same time filters the oil, preventing grit and dirt being carried into the bearings. The openings in the housings and bearings for the application of waste should be on the side opposite to that which is exerting pressure, due to the action between the pinion and gear, in order to prevent the oil being wiped off the journal under the effect of this pressure against the babbitt. The housings should be held firmly to the upper frames with two 1¼-in. cap screws, and tightly clamped by both the top and bottom frames, which are in turn held by four 1¼-in. turned machine bolts with crowned nuts and 3/16-in. cotter pins. These bolts should fit neatly in the holes in both the top and bottom motor frames, in order to prevent shifting of the frames and wear. The lugs of the frames at the points where the bolts pass through should be of ample strength and large enough to permit the use of a socket wrench to remove the nuts. The bearings should be made in one piece, not split, and should also be designed so as not to permit excessive oil being fed to the journals. Some commutator troubles are due to excessive oiling.

OILING

Oiling should be done on a mileage basis. The mileage per oiling will range from 550 miles to 3400 miles, according to the type of motor. The latter figure represents the armature bearings of a Westinghouse No. 101-B motor. The oil wells of the armature bearings are filled to a depth of 4 in. at each oiling. The axle bearings are oiled upon a 1700-mile basis, using ¾ gill per bearing. The reason for oiling the axle bearings on a shorter basis is that the axle bearing cap is not equipped with an oil receptacle. It must be borne in mind, however, that the waste must be kept up to the journals at all times.

Good results have been obtained in Baltimore with grease lubrication. The armature bearing caps of a GE-80 motor were packed with a wool waste and grease combination known as AA-4 Solidified Oil. This motor has made 10,000 miles in 70 days, or an average of 143 miles per day. During this time the motor was inspected three times, and at the last inspection the waste and solidified oil were removed and found to be in first-class condition. This preparation, while it is grease, can be placed on a parity with a heavy lubricating oil. The writer believes that it will only be

necessary to inspect motors lubricated in this way at intervals of 10,000 miles.

An interesting experiment has been tried with a Westinghouse No. 49 motor. Holes were drilled and tapped into the sides of the oil wells and ½-in. pipes placed in them, similar to the pipe and ell used for oiling the crankcase of a Westinghouse D-1-EG compressor. The bearing caps on the upper side of the bearings were packed with perfectly dry woolen waste. The lower wells were then filled with oil through the pipes, after the regular feeder had been soaked in oil for 48 hours, and the feeder spring set to the proper tension. The motor was placed in service and used about a half-gill of oil per bearing after having made 2500 miles in 23 days, or an average of 109 miles per day. The writer is satisfied that it will be possible eventually to fix the oiling period with this arrangement at 3000 miles, or about once a month. This experiment has shown that it is absolutely unnecessary to lubricate from the upper bearing cap.

MOTOR FRAMES

Motor frames should be made of cast steel, should have a milled seat and a 1-in. lip for the suspension bar, and should be secured with four machine bolts not less than 1⅛ in. in diameter, with 3/16-in. cotter pins close to the nuts. Ample ventilation and inspection holes should be provided. Motors should be given all the ventilation possible, even though it is necessary to redesign the lid over the commutator. Manufacturers of motors should be required to bevel the sides and ends on the inside of the bottom frame, and also to drill two 1-in. holes at either end of the frame, so that any oil, or especially water after a storm, will drain off. This is very important.

FIELD COILS

Field coils should be made of strap or ribbon copper covered with asbestos. The asbestos should not be less than 0.028 in. thick, and should be dried out and thoroughly impregnated. Under no circumstances should paper or cardboard be used at the corners, as no impregnating process can drive the compound through paper or cardboard when it is placed between the windings. After the fields have been properly impregnated they should then be well insulated with webbing, oiled linen and insulating tape, and then given several coats of good oil repellant paint. They should be repainted at each overhauling. In mounting they should be laid on an oiled canvas cushion, and a heavy flat spring placed between the cushion and motor frame, so that the coils will be held tightly at all times. The screws of the field terminals should have a brass nut to lock them. Carbon dust that has accumulated around the terminals should be thoroughly scraped away and the terminals repainted with a good oil repellant paint. This will eliminate burning and grounding of fields at the terminals. All field leads should be kept clear of the field frame and armature.

GROOVING COMMUTATORS

While grooving of commutators is not absolutely necessary on motors of less than 50 hp, the writer has found it to be very economical for motors of any size. The mica should not only be grooved out about 3/64 in., but care must be taken that no small pieces of mica or copper are left between the bars; the slots must be picked or scraped out thoroughly with a sharp blade. An old hacksaw blade pointed and shaped with a small hook at the end will do. The commutator should then be polished with fine sandpaper and the grooves carefully blown out with compressed air. If the proper brushes and brush-holder spring tension are used then there will be no more trouble from flat or rough commutators, no more high mica, and the motors will be kept clean and almost free of carbon dust. This means clean yokes and clean brush-holders, and much less miscellaneous motor trouble. The commutation will be good, and the life of a commutator will be prolonged at least eight to ten fold. A number of old, rough and almost worn-out commutators of various types that formerly were turned almost every two weeks were grooved and placed in service seven months ago. They are still giving splendid service and show no sign of wear, while the brushes are still in good condition, after making 18,000 miles. Several GE-90 armatures that were grooved seven months ago and have made 19,000 miles show absolutely no wear, and the brushes have not been renewed.

TRUCKS AND WHEELS

All trucks should be perfectly square, and all parts of both the body and truck bolsters should be of ample strength and machine fitted. Pedestal wear plates should be provided and properly secured. Transom bars should be very heavy and both bars should be tied together. If possible, they should be provided with wear plates, which should be well secured and easy to renew. The brakes should be inside hung. The axles should be perfectly straight, and the circumference of the wheels upon the same axle should be exactly the same. If this is done, and the weight is carried directly on the center bearing, with the car body balanced perfectly, there will be less turning of wheels and sharp flanges. The journal boxes should be large, and the opening in the front of the boxes kept as low as possible in order to permit insertion of the centers of a wheel grinder into the axle centers, and to allow for the packing of waste, removal of bearings, etc. The boxes should also be designed so that an inspector will know when enough oil has been poured in. The cap should be held down by a spring.

One of the most important features in the design of trucks is the suspension of the brake rigging. The rigging should be suspended from a frame, which in turn rests directly upon the journal boxes. This keeps the shoes in the same position, whether the car is light or loaded. In order to standardize, the distance from top of rail to center of brake beam should be specified when ordering new trucks. Having the brake shoes suspended from a fixed point produces even wear of the shoes, and results in a large saving in maintenance, because the shoes do not have to be reversed to wear them out. Chattering and other noises are also eliminated. Brakes should pull toward the center of the axle, and release by gravity, and not by springs. A steel-back interchangeable shoe supported by a strong malleable iron head will be found safe and very economical.

The use of crowned nuts with a substantial cotter key passed between the crowns is recommended where bolts do not have to be removed often, and at all points where absolute safety is required. Case-hardened pins of ample diameter with stout cotter pins will be found both economical and safe. The truck and body center plates should have a very large bearing surface, and should be so designed that they can be readily oiled without jacking up the body.

HAND BRAKES

The Ackley brake is quick and powerful, and has given good satisfaction. On account of its simple construction the maintenance is reduced to a minimum.

TEAM WORK

In conclusion, if the purchasing department and the transportation department will co-operate fully with the mechanical department, a very large saving in maintenance costs can be effected.

PROPOSALS FOR A CENTRAL INSPECTION BUREAU FOR ELECTRICAL RISKS

The organization of the Central Electric & Lighting Bureau, as mentioned in the issue of this paper for Nov. 13, has called renewed attention to the subject of the fire insurance of electric railway and lighting properties, and some interest has been expressed as to the attitude which the new bureau will assume toward the American Railway Insurance Company and the Electric Insurance Company. These companies were organized in Cleveland some four years ago to write risks on railway and lighting properties, and are sometimes grouped with the mutual companies. They are mutual only in the sense that they were organized and controlled largely by gentlemen connected with electric railway and lighting interests. Among the directors are Horace E. Andrews, C. Loomis Allen, G. L. Esterbrook, Henry A. Everett, H. J. Davies, C. G. Goodrich, J. C. Hutchins and R. E. Sheldon.

The subject of a central rating bureau is not a new one, and was mentioned in the report of the committee on insurance of the American Street & Interurban Railway Association read at Denver in one of the executive sessions. This report, with permission, is published below:

REPORT OF THE COMMITTEE ON INSURANCE READ AT DENVER MEETING OF THE AMERICAN ASSOCIATION

The principal subjects considered by your insurance committee in the past year have been:

(1) The proposed organization or establishment by the old-line or stock insurance companies of a central inspection bureau or department, and

(2) The advisability of the employment by the association of an insurance expert to represent it upon this bureau, or to appear before the bureau in behalf of association members in controversies or conferences between them and it.

The purpose of this plan is to secure a greater uniformity than now prevails in rates of insurance on traction properties, and a nearer approach to standards in car house construction and in devices and methods for the prevention and extinguishment of fires. This work is exactly in line with the recommendations made by this committee in its annual reports, and with the present practice of the most progressive street and interurban railway companies.

The average cost of insurance has been reduced in consequence of the committee's efforts, but many inequalities in rates exist. In some cases, properties of a single company, situated in different towns or counties, and of like construction and exposure, are assessed at varying rates. If members whose properties are inequitably or unequally rated will write to the insurance committee, their letters will aid in bringing about the establishment of this national department.

Your committee has not held a meeting within the association year, and therefore has taken no formal action upon this or any other subject. Three of the members of the committee met in Cincinnati in June, and attempts were made to get a later meeting in New York City, but without success. Learning that the old-line insurance companies were to meet in convention at Frontenac, N. Y., in September, to consider this, among many matters, and knowing that the American Railway Insurance Company had been invited to confer with committees of the old-line companies with a view to making an agreement to co-operate in the insurance of the immense properties owned by the traction companies, the chairman of your insurance committee, believing that a conference between the leading insurance men of the country and your committee would result in benefit to the members of the association, called a meeting of the committee at the same time and place, and invited the two governing boards of the insurance association, representatives of the American Railway Insurance Company, and several others, to attend and participate in the meeting. Unfortunately, five of the six members of your committee were unable to be present. The chairman, however, went to Frontenac, and met the insurance men, whose committees gave him an entire afternoon. Another conference is to be held later, provided you continue the insurance committee or appoint a special committee for the purpose.

The meeting was attended by C. G. Smith, New York, secretary and treasurer, German-American Insurance Company; E. G. Richards, New York, resident manager of the North British & Mercantile Insurance Company; Frank Lock, New York, United States manager of the Atlas Assurance Company; J. H. Lenahan, Chicago, manager of the Phenix Insurance Company of Brooklyn; George W. Law, Chicago, one of the managers of the Royal Insurance Company of Liverpool; A. G. Dugan, Chicago, assistant manager of the Hartford Insurance Company; W. E. Sage, Chicago, manager of the German-American Insurance Company; E. B. Hatch, Chicago, secretary of the Western Union, an association of about 70 leading insurance companies; H. E. Andrews, Cleveland, president of the American Railway Insurance Company, and Henry N. Staats, Cleveland, vice-president of the last-named company. These gentlemen are among the ablest and most influential men engaged in managing the insurance business.

The properties of the electric railway companies are desirable risks, and their value is great enough to justify the particular attention that these insurers propose to give them. The capitalization of the street and interurban railway companies of the United States exceeds four billion dollars. The value of their buildings, power plants, rolling stock and other property subject to destruction or damage by fire is probably from 15 to 25 per cent of this amount.

The risks are constantly improving. Since the appointment of your committee four years ago, more than $1,250,000 has been expended for automatic sprinkler equipments in car houses. Large amounts have also been spent for other means of preventing, retarding and extinguishing fires. New structures are generally as nearly fireproof as they can be made. Greater care is required by the companies of their employees than was required four years ago. Traction officials and directors are giving more attention to insurance.

These facts were stated to the insurance men as indicative of a disposition on the part of street railway companies to improve their buildings so as to entitle them to lower rates of insurance, and as reasons why street railway properties should receive special consideration by insurers, and should be rated and inspected by men familiar with them and their particular hazards and protections—by experts viewing the entire field, rather than by local rating agencies and inspectors more familiar with particular localities than with particular classes of property, although the central bureau will undoubtedly avail itself of the knowledge, experience and assistance of the local agents and inspectors.

The results of the discussion, by the insurance men among themselves and with your representative, will probably be a still more careful study and consideration of traction properties, their conditions and surroundings, by men specially qualified to determine the rates and forms to which they are entitled, and to advise the insured as to the best methods of construction and maintenance, and the most effective means of preventing destruction or damage by fire. The chairman of your committee asked that the association be given direct representation upon the bureau. This may not be practicable. The American Railway Insurance Company, organized in the interest of the traction companies, to write insurance at cost, will probably be represented, however. In either case, your insurance committee should be continued, and the committee suggests that you consider the advisability of employing also an insurance expert to aid it, and to represent the association, or any member company that may call for his services, in any negotiation or dispute with insurers, as well as to advise members on the subjects of insurance and the better protection of their property against loss by fire—a suggestion adopted, with good results, by the National Electric Light Association some years ago.

Respectfully submitted,

H. J. Davies, Chairman,
G. W. Brine,
G. L. Estabrook,
A. H. Ford,
P. G. Gossler,
Charles O. Kruger,
Insurance Committee.

More clearly to outline his proposed plan, Henry J. Davies, chairman of the insurance committee of the American Association, has recently sent to the executive committees of the American Street & Interurban Railway Association, the National Electric Light Association, the Associated Edison Illuminating Companies and the Central Electric Railway Association a copy of the tentative plan mentioned in the report, with a statement in regard to it prepared by H. N. Staats, vice-president and general manager of the American Railway Insurance Company and the Electric Insurance Company. In the Central Electric Railway Association the matter has been referred to a committee consisting of F. D. Carpenter, chairman, H. A. Nicholl and C. D. Emmons, who will report at the meeting of the association on Jan. 28, 1910. No action has yet been taken by the other associations. The report and tentative outline are given below:

REPORT FROM H. N. STAATS ON INSURANCE MATTERS

Complying with your request for a progress report relative to our negotiations for co-operation with the old-line stock insurance companies, on Feb. 25, 1909, I received an invitation to attend a meeting of the governing committee of the Western Union. The committee represents about 70 of the old-line stock fire insurance companies. Plans were discussed for co-operation with the American Railway Insurance Company and a meeting was arranged by the Western committee for March 11, in New York City, to confer with the governing committee of the Eastern Union. Unfortunately, Fred S. James, chairman of the traction committee, and myself were confined to our homes by sickness on March 11, and, therefore, the meeting was not held.

On Aug. 16, 1909, another meeting of the Western governing committee was held at their office in Chicago, at which the writer was present. Plans were outlined for the consideration of the Eastern and Western Unions and the meeting adjourned.

On Tuesday, Sept. 14, 1909, a meeting of the governing committee of the Eastern and Western Union was held at Frontenac, N. Y., and it was decided at that meeting that committees would be appointed to consider a plan for further co-operation. (See report of the insurance committee of the American Street & Interurban Railway Association enclosed herewith.) This report was read by Secretary Swenson in executive session, unanimously approved, and referred to the incoming executive committee with power to act.

On Oct. 2, 1909, the governing committee of the Western Union held a meeting at their offices in Chicago, at which the writer was present. This meeting resulted in outlining a plan of co-operation. (See copy of proposed plan herewith.)

On Oct. 7, 1909, this plan was submitted to the executive committee of the American Street & Interurban Railway Association at a meeting held in the Brown Palace Hotel, Denver, for their approval. I am in receipt of a communication from Hon. James F. Shaw, president of the association, advising that this plan will receive due consideration, and prompt action will be taken at an early day.

On Oct. 9, 1909, a meeting of the governing committee of the Western Union was called. Chairman Fred S. James, manager of the National Fire Insurance Company; A. G. Dugan, associate manager of the Hartford Insurance Company; E. B. Hatch, secretary of the Western Union, and the writer were present. The writer made a report to the committee of the action taken at the Denver convention of the American Street & Interurban Railway Association.

On Oct. 12, 1909, a meeting was held at the Belmont Hotel, New York, by the governing committees of the Eastern and Western Unions, at which the writer was present. The enclosed plan was given careful consideration, and steps were taken for the appointment of committees for the purpose of bringing about co-operation. The following members of the governing committees were present: Members of the governing committee of the Western Union, Fred S. James of Chicago, charman of traction committee and manager of the National Insurance Company of Hartford; J. G. W. Coffran, associate manager of the Hartford Insurance Company of Chicago; J. H. Lenehan, of Chicago, manager of the Phenix Insurance Company of Brooklyn. Members of governing committee of Eastern Union, R. M. Bissell, vice-president of the Hartford Insurance Company of Hartford; E. H. A. Correa, vice-president of the Home Insurance Company of New York; C. G. Smith, secretary and treasurer of the German-American Insurance Company of New York; Edward Milligan, vice-president of the Phœnix Insurance Company of Hartford; also Whitney Palache, of San Francisco, of the firm of Palache & Hewitt, general agents of the Hartford Insurance Company.

The enclosed plan of co-operation has been submitted for the approval of the executive committees of the National Electric Light Association, the Associated Edison Illuminating Companies and the Central Electric Railway Association for concurrence.

TENTATIVE PLAN OF CO-OPERATION SUBMITTED FOR A CENTRAL INSPECTION AND SURVEY BUREAU FOR THE PROPERTIES OF ELECTRIC RAILWAY AND LIGHTING COMPANIES

(1) The central bureau to be located in Cleveland, Ohio (this city being located midway between New York and Chicago, matters of business can be facilitated by the central committees).

(2) We recommend co-operation with the regular insurance agents as long as they can best promote the interests of the assured.

(3) We recommend eliminating the insurance broker. His services are unnecessary and add to the cost of the insurance.

(4) The old-line insurance companies to co-operate with the American Railway Insurance Company and the Electric Insurance Company.

(5) The American Railway Insurance Company to be the medium for negotiating business for electric railway properties. The Electric Insurance Company to be the medium for negotiating business of electric light and power properties.

(6) All railway and lighting insurance to be distributed by the central bureau.

(7) The Central Inspection & Survey Bureau to be used for the purpose its name indicates. All plans, specifications, inspections and reinspections to be under the supervision of this bureau.

(8) The old-line stock insurance companies, in conjunction with the American Railway Insurance Company and the Electric Insurance Company, to contribute to the maintenance of the central bureau, their contributions to be based on the gross premiums paid them by electric railway and lighting properties.

Co-operation

(9) Under this plan, the American Street & Interurban Railway Association, the Central Electric Railway Association, the National Electric Light Association and the Association of Edison Illuminating Companies can co-operate with the old-line stock insurance companies. Each association to employ one of its members as an insurance expert through whom all complaints shall be made, said expert to confer direct with the board of arbitration.

Board of Arbitration

(10) Two members of the Eastern Union and two members of the Western Union of the old-line stock insurance companies, with H. N. Staats, will constitute the board of arbitration.

(11) The percentage of insurance to be assumed by the American Railway Insurance Company and the Electric Insurance Company shall be 25 per cent of the total amount of these two classes of properties, 10 per cent of this amount to be assumed by said companies on or about Jan. 1, 1910, and the balance, 15 per cent, to be assumed by said companies on or about Jan. 1, 1911.

Insurance at Actual Cost

(12) The American Railway Insurance Company and the Electric Insurance Company will conduct their business at actual cost. No commissions will be paid or received.

We approve the plan as above outlined and will urge the hearty co-operation of every member company of this association and will also influence to the best of our abilities other electric associations and companies who are not members of the above-named associations.

WARNING SCHOOL CHILDREN AGAINST ACCIDENTS

For the last two years E. F. Schneider, secretary and purchasing agent of the Cleveland, Southwestern & Columbus Railway Company, of Cleveland, has been conducting a campaign of educating the employees of the company and the public in ways of avoiding accidents. First, he called the trainmen together and told them that the company ought to operate its system without casualties, and that if they would run the cars as they should he would be responsible for educating the public. Then followed a series of meetings, at which Mr. Schneider or some other official of the company would discuss different topics, while the men were encouraged to offer suggestions. The men took a great interest in the movement, and the results soon became apparent. Other meetings were held of the station agents, car house men, section men and others, who were told of the influence which they could exercise in the way of reducing accidents.

The company then decided to conduct the campaign of education among the school children. In this work Mr. Schneider was greatly assisted by C. E. McKisson, his assistant. Permission was secured from superintendents, principals and teachers of the public schools along the line of the company to address the pupils on the subject. In these speeches emphasis was laid upon the danger of crossing the track when a car was in sight no matter how far away; about playing near the tracks; about the importance of waiting until a car comes to a full stop before boarding or leaving it; about the correct way of boarding and alighting from a car, and about the dangers of touching any loose wire there might be along the line. About 175 addresses of this kind have been given during the past few years. No plan has yet been adopted by Mr. Schneider as to the best method of reaching adults, but several have been considered, such as illustrated lectures and moving pictures.

INTERBOROUGH EXHAUST STEAM TURBINE PRACTICE DISCUSSED AT BOSTON

At the regular monthly meeting of the American Society of Mechanical Engineers, New England section, held at Boston on Nov. 17, H. G. Stott, superintendent of motive power, Interborough Rapid Transit Company, New York, gave some of the results which have been secured at the Fifty-ninth Street power station of the company in the use of exhaust steam turbine equipment. Mr. Stott said that the first separator installed was found to be unsatisfactory and that the secret of success is to build a large receiver with horizontal baffles to protect the water as it is being trapped out and removed by the pump. With the turbine the separation of the oil from the steam is thoroughly successful. The fuel economy from the introduction of a 5000-kw exhaust turbine has been improved about 23 per cent. Including labor and maintenance, the net operating economy of the unit is improved about 30 per cent. The cooling surface of the condensers is used about 87 per cent more effectively than before. There is now a heat transference of 750 b.t.u. per square foot of condenser surface. The unit shows a consumption of about 1.5 lb. coal per kw-hour, including auxiliaries or an estimated steam consumption of under 9 lb. of steam per horsepower-hour. The plant capacity per unit has been increased 125 per cent. Particulars of this equipment were published in the Electric Railway Journal for Aug. 14, 1909.

RAILWAY DEPRECIATION ACCOUNTS*

BY WILLIAM J. MEYERS, STATISTICIAN, NEW YORK PUBLIC SERVICE COMMISSION, SECOND DISTRICT

In every business or undertaking involving any outlay preliminary to the rendition of services or other benefits, moneys or credits are required to be advanced. Such advances must come from prospective recipients of the services or benefits, or from others. In the case of the latter we clearly enough have investors whose interests have to be separately accounted for; in the case of the former, unless the advances are severally to be speedily repaid by means of the services or benefits to be rendered, practical convenience will require that a separate account be kept of advances thus received, and that they be distinguished in the accounts from the receipts later derived from the recipients of services and other benefits in payment for such benefits. Such separate account of advances is the credit side of the capital account.

On the other hand, the disbursement of the advances mentioned will secure a group of things which are necessary for the proper performance of the work of the undertaking, and which will ordinarily have an appreciable degree of permanence. Such being the case, it would be improper to charge the cost of them against the later receipts acquired through rendition of benefits faster than they are consumed. There thus becomes necessary a suspense account to which to charge such disbursements, and such suspense account is the debit side of the capital account.

The undertaking, being now on its feet, so to speak, and ready to begin fulfilling its purposes, begins to have receipts which are not advances, but are payments for benefits rendered. If the rendition of such benefits does not necessitate any consumption or deterioration or waste of the preliminary stock acquired by means of the advances before mentioned, and does not require any further outlay, either for materials or for labor, the receipt is pure profit. In ordinary cases, however, the rendition of the benefit not only necessitates a direct outlay for labor and materials, but also involves the partial consumption or deterioration or waste of the preliminary stock, so that before the profit involved in the transaction can be determined it is necessary to charge against the gross receipt for the benefit rendered, not only the outlay directly necessitated for labor and material consumed, but also a proper part of the preliminary outlay.

With regard to the outlays or disbursements for materials and labor and other services directly and currently consumed in the work of the business or undertaking, there is practical unanimity of opinion that they should be charged directly to the revenue, or income, account through the subaccount of operating expenses.

With regard to the preliminary outlays, the resultants of which are consumed only in part in the operations of the business during a specific limited period, say a year, the question is more difficult. It is usually difficult, and in some cases impracticable, to make any *accurate* determination of the proper proportion of such outlays to be charged over against the revenue account, and the temptation to omit such charging over and to overstate the profits of the business is frequently strong, particularly in the case of undertakings whose revenues are scant or whose managers desire to deceive themselves or their principals and to bask in a fictitious prosperity.

Other managers who have recognized and appreciated the necessity of accounting for capital consumed, but have thought that the cost of any tolerably accurate ascertainment of the extent of partial consumption is greater than the benefit to be had through the more exact accounting, have been content to let the capital wear and waste to the point where it begins to be inefficient, and then have made the necessary repairs and replacements, and have charged the cost thereof as a part of operating expenses.

CHARGING REPAIRS AND REPLACEMENTS AS MADE

It will be observed that the method of charging cost of repairs and replacements directly to operating expenses at

*Abstract of a paper read before the National Association of Railway Commissioners, Washington, D. C., Nov. 16, 1909.

the time the repairs and replacements are made defers the charge until the time when wear and tear of plant has reached such a point that it begins to be inefficient. Up to this time there has thus been a considerable consumption of capital that has not been charged to profit and loss. The accounts, therefore, overstate the actual profits by the amount of this undercharge. When repairs begin to be necessary they have to be executed piecemeal. It is impracticable to stop the operation of the plant and restore it to its pristine condition, and even if it were practicable it would be uneconomical, because unnecessary. The plant may be in efficient operating condition and yet be considerably short of its original condition.

About two years ago, in an important tax case, the chief engineer of one of the principal coal carrying railway companies testified that even though the railway and equipment with which he had to do were kept up to the point of highest efficiency, the structural value, i.e., the original cost, less deterioration to present condition, would not exceed about 85 or 86 per cent of original cost, cost of land being included. On the land there was, of course, no deterioration. If the structures and equipment were alone considered, the structural value was about 65 per cent of original cost, indicating that about one-third of the life of the structures and equipment would be consumed before it became economical to make repairs. The reported cost of road and equipment of the railways of the United States, as of June 30, 1907, is stated by the division of statistics and accounts of the Interstate Commerce Commission to be about $13,030,000,000. The reported book surplus as of the same date was a trifle less than $750,000,000, i.e., less than 6 per cent of the reported cost of road and equipment. If the conclusions of the above-mentioned chief engineer with regard to the railway with which he was connected were applicable to the railways of the entire country, they would indicate that if the depreciation of road and equipment to structural value were accounted for it would wipe out the book surplus and show on the other side of the account a deficit still larger. If the rest of the accounts could be accepted as correct, this would seem to indicate that the business has been conducted at a loss or that excessive appropriations for dividends and other like disbursements have been charged against income.

If the business of the carriers were purely competitive, if it had no monopolistic features, if it were not subject to public regulation of rates and practices, the accuracy or inaccuracy of the profit and loss account would concern only the stockholders, and so long as they were willing to have part of their investments paid back to them under the name of dividends it would, perhaps, be sufficient to shrug one's shoulders and remark that, "where ignorance is bliss 'tis folly to be wise." Perhaps things may take a turn and the managers may restore the balance through making improvements and charging the cost of them to operating expenses. Why insist on exact accounting between friends?

But the railway business is not purely private and competitive, it is largely monopolistic and it is subject to public regulation, both with regard to rates and practices; in all probability it will in the near future be still more completely subject to such regulation. If such regulation is to be just and fair to all the interests involved, it is essential that the revenues be charged with the full cost of maintenance and that they be ample to allow for adequate return of profit upon the actual investment reasonably and prudently made. It is also essential that if the revenues be greater than this and the excess revenues be disbursed in effecting improvements of the property the source of such improvements shall be declared. It certainly is absurd to permit a common carrier to tax a community for the use of what the community contributed to the preliminary stock or plant used in conducting the business; it seems equally absurd to permit it to tax the community upon the later contributions made by the community in excess of cost of maintenance and operation and a fair return to private investors on their actual investment reasonably and prudently made.

IMPORTANCE OF FORMAL DEPRECIATION ACCOUNT

As a constituent of the operating expense account a depreciation account can hardly be looked upon as other than an adjustment account, inserted for the purpose of reaching a truer statement of net earnings or profits. Where the enterprise has reached what may be called its permanent going condition, assuming for the moment that there is such a condition, and operating expenses are charged with the cost of repairs and replacements when they are made, if such repairs and replacements flowed in an even current and the plant were maintained to a uniform condition, it is obvious that the current consumption of capital would be fully cared for and that no depreciation or adjustment charge in the operating expense account would be necessary. There would be no give and take to adjust.

It needs, however, only a slight consideration of the facts to show that the current of repairs and replacements does not flow with absolute uniformity from day to day or from month to month. The operating plant is not homogeneous, but is made up of a variety of units of diverse size and importance. With the exception of minor running repairs, when the locomotive is repaired it has to be temporarily withdrawn from operation, put in shop and overhauled; such overhauling frequently discloses defects in addition to those for which it is sent to the shop, and it is most economical to put the machine in thorough repair. Such repairs may involve minor replacements of important parts. So with other repairs, as of bridges and other important structures; they are in most cases necessarily piecemeal and therefore can not flow evenly. Certain repairs of way can be much more economically made at some seasons of the year than at others. Repairs are necessarily more or less intermittent. This is still more true of replacements. The disbursements for them bear no very close relation to the revenues in earning which the wear and tear took place. In order to get the expense properly assigned against the earnings some adjustment is necessary with respect to the actual disbursements for repairs and replacements.

The foregoing assumes that repairs and replacements are made as fast as needed to keep the property in efficient operating condition. It is sometimes good policy, however, in the light of practical working conditions to defer repairs and replacements to a later date.

It may be objected that depreciation, being necessarily an estimate until the time when the property involved is exhausted or otherwise withdrawn from the plant, the accounting for it is likewise subject to manipulation, and the burden is upon the proponents of depreciation accounts to show that they are less liable to manipulation than are the operating expense accounts under the old methods.

Because of the provisions of the statute under which the Public Service Commission of the Second District of New York acts, the depreciation accounts adopted for the use of steam railway companies are identical with those prescribed by the Interstate Commerce Commission. Owing to the prominent position occupied by the last-named commission in the regulation of steam railway common carriers, the discussion of the depreciation accounts prescribed for the use of steam railway carriers may fitly be left in the hands of that commission and the carriers concerned; the remainder of this paper will be devoted to a brief discussion of the accounts prescribed by the Public Service Commission for the Second District of the State of New York.

It has seemed advisable to the Public Service Commission to pass replacements through the capital account in order that that account may represent the capital in service and may be cleared of capital exhausted and retired, or withdrawn through sale, etc. Our depreciation accounts are therefore adjustment accounts designed to cover the difference between current consumption of capital and the charges for repairs when and as made. The depreciation charges are thus influenced by the repair charges, and, assuming that they have been in force from the installation of the capital, they have to be sufficient to provide, by the time such capital is withdrawn or retired, a reserve against which to charge the cost (less salvage) of such capital withdrawn or retired, such cost being at the same time credited to, or written off from, the debit side of the capital account. It may happen, therefore, that during a period of great and extensive repairs the depreciation account will show a credit to operating expenses, indicating

that such repairs have more than maintained the property.

It is not expected that the rules governing depreciation charges will have established the kingdom of heaven so far as operating expense accounts are concerned or even that they will put depreciation accounts upon so firm a basis that they will need no further attention. To keep the depreciation account within bounds it will be necessary from time to time to view the property and inventory and appraise it in detail. The provision of depreciation accounts does not relieve in any wise from the necessity of distinguishing between maintenance and investment; on the other hand, such provision does not add to the difficulty of making such distinction. Boards of directors who profess to be fearful of their inability to make proper estimates of depreciation overlook the fact that under the old order of things whenever they passed upon the question of whether a certain charge should be made to capital or to revenue they necessarily were estimating whether depreciation had been fully provided for. It is to be feared that in passing on such questions they are sometimes unconsciously influenced by their anxiety regarding the possibility of payment of dividends, and that when money is plentiful they lean toward operating expenses and when it is scarce they lean toward capital charges. Their real fear seems to be in some cases that if they lay down a rule in advance regarding depreciation charges they may be in the position of the man who was called on to move before he had opportunity to see which way the cat was going to jump. To determine the line between capital and revenue disbursements by a consideration of the amount of cash on hand or in sight is a proceeding which no matter how frequently resorted to in practice must always remain unjustifiable.

CONSIDERATION OF DEPRECIATION BY COMPANIES AFFECTED

The depreciation accounts prescribed by the Public Servive Commission have not yet been long enough in force to make it proper to express an opinion with regard to the way in which they are practically and actually working. It is safe to say, however, that as a consequence of the action of the commission in this regard more thought and careful consideration has been given to this question during the past 18 months by the companies within its jurisdiction than was ever before given to it by those companies. Most of the larger companies are accepting the situation gracefully and in settling upon the rules for the determination of their charges are giving a careful consideration to their past experience, to the standard of maintenance exacted by their respective communities and to the physical conditions under which they operate. Doubtless most of them also have an eye on the money market and are carefully calculating what effect a more or less complete confession of their actual situation will have on the suspicions of bankers and investors. It will take several years of study and comparison of conditions before anything like a normal rule can be reached by which to determine the adequacy or inadequacy of charges for depreciation, and it will probably always be true that no single arithmetical rule or ratio can ever be reached that will be applicable in all cases. The question of standard of maintenance will always be one incapable of exact numerical expression. The community that requires its passenger cars to be revarnished and reupholstered every three months must necessarily submit to higher maintenance charges than one that is willing to let such matters run until the material of the cars begins to disintegrate. Despite the incompleteness and the unfinished condition of the structure at the present time, we feel that much has already been accomplished, and that thus far no defects in its plan have been developed and none need be feared.

It is confidently expected that substantial benefits will result from the establishment of formal depreciation accounts, and that among such benefits will be found the following:

Violent manipulation of monthly statements of earnings and expenses will be made much more difficult if not impossible. A corporation that should every month or two change its rule for estimating its depreciation charges would soon be laughed out of court.

The provision of normal depreciation accounts will pointedly call attention to the question of depreciation and secure for it a more careful and adequate consideration than it has heretofore received from investors. It will lead to comparison of different properties and a much more thorough study of the completeness with which they are maintained.

The provision of such accounts will also have a tendency to educate the consuming public and lead it to understand that depreciation is an element in operating expenses that cannot be overlooked; that the revenues of the carriers must be sufficient to cover this as well as the current outlays for labor and materials, and that any reduction of rates, whether through force of law or of unrestrained competition, below the point where the revenues are ample to cover, not only current expenses, but also depreciation and a fair return upon the actual investment reasonably and prudently made, must in the end be harmful to the entire community.

MEETING OF RAILWAY COMMISSIONERS

The twenty-first annual convention of the National Association of Railway Commissioners was held in Washington, D. C., on Nov. 16 to 19, inclusive

The report of the committee on construction and operating expenses of electric railways was presented by William Kilpatrick, secretary of the Railroad and Warehouse Commission of Illinois, and is as follows:

Owing to certain conditions, which will be briefly outlined, your committee submits the following report of progress, with a few recommendations, for adoption by the convention.

The members of the convention are doubtless well aware that there was prepared about a year ago a system of accounts which was adopted by the Interstate Commerce Commission, and by the two Public Service Commissions of the State of New York, with certain modifications. The system adopted by the Wisconsin Railroad Commission is similar to a considerable degree. A number of private corporations, operating electric railways which are not under the jurisdiction of the Interstate Commerce Commission or the commissions of New York and Wisconsin, have also put into effect, voluntarily, this uniform system.

Your committee has considered the advisability of recommending to this convention the approval of a uniform system. There seemed to be a general feeling, however, that as the systems adopted by the Interstate Commerce Commission and the commissions of New York and Wisconsin have been in operation only a comparatively short time, less than a year, and as their adaptability to actual conditions can only be determined by practical experience, it would be unwise at this time to recommend any specific system of accounts. By the time the next convention is held, however, the Interstate Commerce Commission and the commissions of some of the States, as well as many corporations, will have had an opportunity to see to what extent the system is workable, and it will then be possible to determine with certainty whether a uniform system is practicable, and whether, in general outline, the system that is being tried will serve as a basis for general adoption.

Your committee does not recommend at this time, therefore, the adoption or approval of any system, but does recommend that any State which is intending to adopt any system of accounts, in whole or in part, should adopt a plan which harmonizes or is in substantial agreement with the system in force under the jurisdiction of the Interstate Commerce Commission and in the State of New York and Wisconsin. Doubtless changes will need to be made in these systems, but these can easily be made, provided the fundamental features of the system in actual operation are not departed from to any great degree.

Your committee appreciates that, even though a single system may ultimately be adopted by all of the States, it will be necessary to provide some means by which questions of interpretation may be decided similarly by the various State commissions. It is impossible, as experience has shown, to cover every point which may arise in a system of accounts, even though the instructions and definitions are carefully prepared and in great detail. In actual operation, questions are bound to arise which are

susceptible of various answers, and it has even been found that the fundamental principle involved is not so clear or so important, but that different persons or different commissions might, with equal propriety, answer the questions differently. In many cases it is not so important that the answer should be of a certain character as that the same question should be answered in the same way by the various commissions; otherwise a term, an account, or a heading may indicate one group of facts in one State and another group of facts in another State, thus rendering impossible any proper comparison of statistics of results. As the principal object of uniform accounting is to enable such comparisons to be made, the primary purpose of uniformity would not be attained unless there is a substantial agreement as to the interpretation of the various rules, definitions and instructions which are a part of an adequate system of uniform accounting.

Although your committee has given some consideration to the method whereby this result may be brought about, we are not prepared at this time to recommend a plan. Indeed a plan is not necessary until a uniform system has been recommended for approval. We do believe, however, that this is one of the important matters which should be taken up in connection with the recommendations to be made at the next convention, and that the committee having this matter in charge should give it very careful and serious consideration.

Apparently there was referred to this committee only a part of a uniform system of accounts, namely, construction and operating expenses. Your committee believes that better results can be obtained if the scope of the committee's work for the coming year is somewhat enlarged so as to include all accounts and statistics for electric railways. There is at present a committee upon railroad statistics. It is our opinion that there should be, similarly, a committee upon the accounts and statistics of electric railways, for any committee which undertakes to prepare a report upon construction and operating expenses can, without great difficulty, prepare a report upon the remaining portion of the field, without which no system of accounts would be complete; but, before any intelligent action can be taken upon construction and operating expenses, one must know what the other features of the accounting system are to be and whether the system as a whole is logical and whether each part is in harmony with every other part.

We appreciate that naturally any system of accounts and statistics for electric railways must have a close relationship with those for steam railroads, and in order that each committee may be advised as to what is being done by the other, we recommend that the chairman of the committee upon railroad statistics for the coming year be made a member of the committee upon accounts and statistics of electric railways. We also recommend that the committee upon this subject for the coming year be composed of a representative from the Interstate Commerce Commission, the Public Service Commission for the First District of New York, the Public Service Commission for the Second District of New York, the Wisconsin Railroad Commission, the Massachusetts Railroad Commission, the American Street & Interurban Railway Accountants' Association, and such other commissions as are likely to adopt or are giving consideration to uniform accounting for electric railways.

Milo R. Maltbie, Chairman; Wm. F. Ham, Wm. Kilpatrick, Halford Erickson, F. M. Cockrell.

The report was ordered to be received and printed and its recommendations adopted.

The Allgemeine Elektricitäts Gesellschaft, the largest European manufacturer of electrical apparatus, has just published its report for the year ending June 30, 1909. The net earnings of the company were 16,384,572 marks ($4,096,142), of which $3,250,000 was paid as a 13 per cent dividend on the securities, $162,500 allowed for presents to employees and welfare work, and another $162,500 set aside for employees' pensions.

HEARING ON VALUATION OF CONEY ISLAND & BROOKLYN RAILROAD

The hearing of the case involving valuation of the Coney Island & Brooklyn Railroad was resumed by the New York Public Service Commission, First District, on Nov. 22. Commissioner Bassett presided, and Frank R. Ford, of Ford, Bacon & Davis, was recalled as a witness.

Resuming the direct examination, William M. Dykman, of counsel for the company, asked Mr. Ford what effect the increase in fare from 5 to 10 cents had had on fixed charges.

Mr. Ford replied that there had been an actual reduction of 12 cars in the maximum number of cars operated, and he thought that one-half of this reduction was attributable to the decreased riding to Coney Island; that is, the reduction of six in the peak load of cars was due to decreased Coney Island traffic, and of the other six to decreased riding in the city, due to other causes.

The release of those cars would mean a release of about $10,000 per car capital, covering the investment in the car itself and in the equivalent power house, car house and shop facilities, and also in the feeder system, giving a capitalization released of $60,000; if 12 per cent was allowed for fixed charges of interest, depreciation, taxes and insurance, it would mean $7,200 annual saving applicable to equipment and other facilities, which could be used for other business. By the release of this capital the facilities which it represented were made available for extensions or additional business.

CONEY ISLAND ISLAND & BROOKLYN RAILROAD—ANALYSIS OF INCOME ACCOUNT PER PASSENGER MILE OF MANHATTAN TO CONEY ISLAND BUSINESS, SUBMITTED BY MR. FORD.

	Cents if fare is 10 cents.	Cents if fare is 5 cents.
ON BASIS OF 4-MILE AVERAGE RIDE.		
Gross receipts, 11.278 miles	0.89	0.44
Operating expenses	0.68	0.68
Interest and taxes	0.22	0.22
Expenses, Interest and Taxes	0.90	0.90
Balance for capital stock and reserves (deficit)	0.01	0.46
ON BASIS OF 3-MILE AVERAGE RIDE.		
Gross receipts, 11.278 miles	0.89	0.44
Operating expenses	0.91	0.91
Interest and taxes	0.29	0.29
Expenses, Interest and Taxes	1.20	1.20
Balance for capital stock and reserves (deficit)	0.31	0.76

NOTE.—Above operating expenses, interest and taxes are based on actual operation for year ended Aug. 31, 1909, carrying 35,958,023 passengers.

Mr. Ford submitted the accompanying table, showing the income account per passenger mile of the business from Manhattan Borough to Coney Island, based on an average ride of 3 miles and 4 miles, respectively, per passenger. This is based on the proof that the average ride in Brooklyn is between these limits, as shown in the former fare case. [See ELECTRIC RAILWAY JOURNAL of May 30, 1908, page 888.—EDS.] It will be noted that for either length of ride the result at 10 cents fare shows a deficit of 0.01 cent and 0.31 cent per passenger mile, respectively, for capital stock and reserves, and much larger losses of 0.46 cent and 0.76 cent at the 5-cent rate of fare.

A statement was submitted by the witness showing expenditures of $39,549.66 by the company from Feb. 1, the date of the physical valuation, to Aug. 31, 1909, for additions and betterments which, in his judgment, should be capitalized.

The values placed upon the physical property of the company by Bion J. Arnold had been examined by Mr. Ford. The reasons that deterred him from going further with

the examination were that he was told that the examination and valuation would have to be made within 30 days, and he thought that time insufficient to make a careful estimate with a force of moderate size. The company did not feel justified in spending the amount of money necessary to collect a large force of experts to prepare such an estimate properly. Mr. Ford, as a director of the company, said that it did not have the money to employ the force that would be required. The experts of the commission gave Mr. Ford and his staff every facility for comparison of figures, and so far as the time allowed, he thought the examination was made carefully. His criticism was that a valuation of that character could be made better over a long period of time with a moderate number of men than in a short period with a large number of men. He thought that some of the values determined by the experts of the commission were not correct, but in the main the estimate was made fairly.

A statement of the extraordinary maintenance and renewal charges from Feb. 1 to Aug. 31, 1909, aggregating $69,619.46, was presented by the witness.

Taking the opinion of the commission in previous cases affecting the company. [See Electric Railway Journal of July 10, 1909, page 75.—Eds.] Mr. Ford said that the amount actually expended for maintenance, including depreciation, was 3.8 cents per car-mile, compared with 5 cents, estimated by the commission. In the year ended Aug. 31, 1909, operation of power plants and operation of cars, estimated in the opinion at 8.97 cents, actually cost 9.4 cents. General expenses, estimated by the commission at 3.13 cents, actually were 4.1 cents, so that the total operating expenses, estimated by the commission at 17.10 cents, actually were 17.3 cents. Taxes, estimated at 0.90 cent, actually were 1 cent, so that operating expenses and taxes, estimated at 18 cents, actually were 18.3 cents, and if the maintenance, including depreciation, should be properly charged at 5 cents, that would add 1.2 cents to the 18.3 cents, making a total for actual operation of 19.5 cents. The total revenue from operation in the year, estimated by the commission at $1,550,000, was really $1,485,116. Total operating expenses and taxes, estimated by the commission at $1,220,000, were, if taken at 19.5 cents per car-mile times 6,111,630 car-miles actually operated, $1,191,645. This leaves a net revenue of $293,471, compared with that estimated by the commission at $330,000. The actual result was $364,973, representing the amount of interest actually paid by the company, $251,417, added to the corrected balance for reserves, contingencies and capital stock of $113,556. The figure of $364,973 is reached by applying the actual charge of 3.8 cents per car-mile for maintenance and depreciation, instead of 5 cents, as suggested by the commission.

George M. Kirchmer, claim agent of the Coney Island & Brooklyn Railroad, testified that the total amount of claims outstanding in litigation against the company was $2,031,302. From 1901 to the present time the company had paid an average of about 10 per cent of claims in litigation for the settlement of judgments. That did not include the expenses of the claim department in the settlement of cases that were not litigated, but it did include counsel fees and the expenses of investigators and claim agents in settling cases in litigation.

About 4400 claims not litigated, less than three years old, were outstanding against the company. The average payment for claims that were not litigated was about $95. There were 26 extraordinary damage claims pending against the company, aggregating $290,000, resulting from an accident that occurred at Manhattan Crossing in August, 1907, when a collision occurred between a car of the Company and a dirt train of the Long Island Railroad.

The hearing was then postponed to Dec. 2.

A RAPID TRANSIT POLICY FOR GREATER NEW YORK*

BY MILO R. MALTBIE, MEMBER OF THE PUBLIC SERVICE COMMISSION, FIRST DISTRICT

As soon as the Public Service Commission was organized we began to redraft the rapid transit law. A bill that was somewhat crude and imperfect in certain respects was presented to the Legislature. The Legislature passed it, but not until several changes had been made that were very objectionable. Governor Hughes wisely vetoed the bill, and the matter went over until this year.

Between the two sessions, the statute was again carefully gone over, and the details of the proposed amendments revised and perfected, and several new features introduced. The bill was presented to the last Legislature, met with practically no opposition and was signed by the Governor, no amendments opposed by the commission this time having been made. The law needs still further amendments, and details must be perfected; but as it now stands, it represents a practically harmonious policy which is probably more modern and progressive than any heretofore formulated in law. It is believed to combine adequate protection of public interests and yet to allow reasonably free range to private initiative.

Probably the most important change in the law was the introduction of the indeterminate principle for franchises and operating leases. In all future franchises or operating contracts under this plan, the city will have the right to terminate the grant or contract at any time after 10 years and to take over whatever the company may have provided in the way of road or equipment upon paying an amount to be provided for in the contract, which shall not exceed the investment made by the company plus 15 per cent, and which amount shall decrease from year to year as the grant continues, until finally all the property in the street shall revert to the city free and clear without payment upon some date fixed in the grant. The date at which such reversion shall take place is to be fixed at the earliest time within which the investment made by the company in the road can be amortized out of earnings. In no case is any payment to be made to the company for the franchise or for the termination of the lease or the contract. If any rapid transit line is thus taken over, the city may operate the line itself or lease it to another company or transfer it directly from the old company to the new company.

The important points to be noted are the short minimum period (not more than 10 years), the limitation of the amount to be paid at any time (cost plus 15 per cent), the decreasing amount as time runs on, the fact that equipment will be paid for according to its then value, and the fact that the more profitable roads will revert to the city in a shorter time than the less profitable ones. The principal reason for differentiating equipment from roadway is that the former would doubtless be allowed to deteriorate as the date approaches at which the city is to receive it free. But if the payment is to be based upon its then value, it is likely that the equipment will be maintained in good condition.

The second important principle of the new law is the sharing of profits above a certain fixed minimum between the operating company and the city. The plan provides for the deduction from income of all operating expenses, taxes, payments to reserve and amortization funds and a return upon the investment not to exceed in any case 6 per cent. The remainder is to be divided equally between the company and the city.

Special attention should be called to the use which may be made of the profits thus accruing to the city. It has been customary to turn over to the general city treasury all such receipts from public utilities. As a result the users of such services as water, gas, electricity and transporta-

*Abstract of a paper read before the National Municipal League, Cincinnati, Ohio, on Nov. 18.

tion have paid an indirect tax, a sort of tax upon consumption. The commission considered that all receipts from the traveling public over and above cost should be used to improve, extend or multiply transportation facilities.

The commission's plan provides, therefore, that all funds received from such sources or from the rental of any rapid transit property or rights shall be used first to pay interest and sinking fund charges upon municipal bonds issued to build or equip rapid transit lines, and that the remainder shall go into "the rapid transit fund" to be used only for the construction, equipment or operation of rapid transit lines; it is not to be used to decrease taxation. In case the city's share of the profits shall be sufficient to warrant a reduction in fares, it may be utilized for this purpose.

In view of the imperative need of more rapid transit and of the various safeguards thrown about the grant, the commission believed that the public was ready to entrust to it the power to grant a franchise to a private company. The proposed amendments to the law provided for the restoration of that power, and it met with practically no opposition.

The most novel feature of the whole scheme is the construction of lines from funds raised by assessment of cost in part or in whole, upon the property benefited. It has been stated that the increase in land values in northern Manhattan and the Bronx, due to the construction of the present subway, would not only have built the entire line, but would have equipped it, provided rolling stock, built power-houses and paid every other capital expense, and left a margin.

If the construction of development rapid transit lines by special assessment is to be adopted in a few cases, it ought to be followed as uniformly as the facts will permit. Otherwise all localities will not be treated with equal justice.

Construction by special assessment also provides a method whereby all sections of the city may be provided with rapid transit upon a fair basis. Without it certain localities are given rapid transit at the expense of others. Take, for example, the present subway. Now the residents of northern Manhattan and the Bronx, who ride the entire length of the island, are carried at a loss normally. But this loss is more than offset by the profit made from carrying those who ride only a short distance in lower Manhattan. Eliminating the Brooklyn traffic, which is nearly if not quite self-supporting, this means that all of the profitable business in the heart of Manhattan is used for the benefit of two narrow areas. The property owners in these districts have seen their land increase enormously in value without an expenditure of one dollar upon their part. They have been given rapid transit for a 5-cent fare from the Bronx to lower Manhattan and Brooklyn. But because there is not a sufficient amount of short-distance riding in Manhattan to carry long lines in Brooklyn and the Bronx, Brooklyn has been deprived and the Bronx has been blessed abundantly.

It was felt that the provision in the State constitution limiting the city debt ought not to be allowed to continue to prevent the construction from public funds of lines which are self-supporting. Debts incurred for such purposes are not burdens upon the taxpayers, and there is no reason why the city should not be allowed to acquire revenue-producing property. Further, unless the city has the financial ability to build and equip its own lines, it is not in position to make a fair bargain with private companies. The city would be forced to accept what corporations may offer or do without the needed relief from present intolerable conditions. The city ought not to be limited to such alternatives. This view has just been endorsed by the people of the State at the last election, and the amendment will become effective when the Legislature passes an act creating the machinery for determining when an enterprise is self-sustaining.

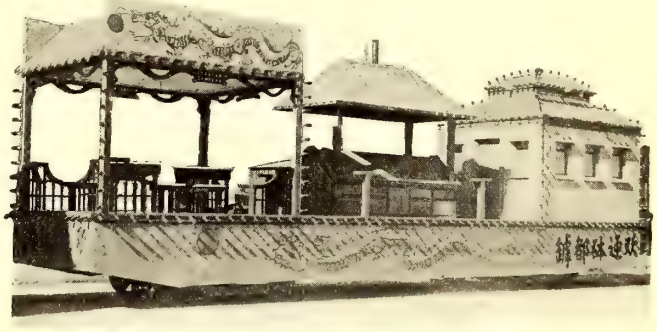
A few other provisions of the rapid transit law may be summarized without discussion. Previously to the enactment by the Legislature of our proposed amendments, the commission could not lease a rapid transit line for less than interest upon the bonds issued by the city for construction and equipment and a sinking fund payment of less than 1 per cent. If no one would pay such a rental, the commission had to operate the line. Now, there is no minimum rental; it may be much less than interest if it is thought necessary or desirable. The privilege of municipal operation remains as another alternative.

In the case of additional tracks on elevated roads and of extensions constructed by a company with its own funds, it was recognized that certain modifications must be made because of the peculiar conditions. In these cases, the system of profit sharing might not work, as it might not be possible to differentiate the receipts from the additional tracks or extensions from the receipts on the old lines. Consequently, the commission may fix a different compensation for a period not to exceed 25 years, and it is to be readjusted every 20 years thereafter. For similar reasons, the duration of the franchise may not exceed that for the existing line, so that all may terminate together.

No contract, franchise or grant may be let until bids have been invited by public advertisement, except in the few cases where only one party would bid if bids were invited. Everything has been done to increase the opportunity for competition where competition is possible. No important action may be taken hastily.

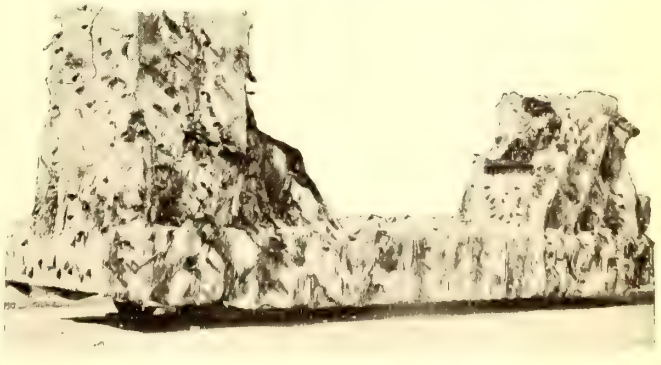
ILLUMINATED CARS IN SAN FRANCISCO

Through the courtesy of B. P. Legaré, engineer of maintenance of way and construction, the United Railways of San Francisco, this paper is enabled to present views of five



San Francisco Floats—Chinatown

of the seven illuminated floats designed by the Portola committee and used in one of the night parades in the Portola festival held in San Francisco the last week in October. As stated in this paper, the festival celebrated the discovery of the Bay of San Francisco by Portola, an early Spanish discoverer, and also the rehabilitation of the city after the great fire of 1906.



San Francisco Floats—Yosemite

A number of daylight and evening parades were held during the continuance of the festival, but one of the most striking was that on the last evening, Oct. 23. In this parade there were seven elaborate floats on flat cars contributed by the United Railroads Company, representing, re-

spectively, the "Fallen Monarch," "Chinatown," "Yosemite," "North Pole," "Shasta," "Old Mission Days" and "Miss San Francisco." The four first mentioned are illustrated. Each was mounted on a flat car carried on two double trucks, with the trolley pole concealed so as not to



San Francisco Floats—North Pole

be conspicuous. Each float was studded with between 500 and 1500 incandescent lights and carried a number of people in costumes appropriate to the subject illustrated. Thus the "Fallen Monarch," which represented one of the large California trees, was surrounded by a number of woodsmen. Eskimos were shown on the float representing the North Pole, and Oriental residents of San Francisco rode on the Chinatown float, and so on through the list. In addition, a band was carried on each float.

A very attractive feature of the floats representing the Yosemite and Shasta was a waterfall, which was supplied



San Francisco Floats—Fallen Monarch

with water from a 1000-gal. tank carried on the car. A 5-hp motor furnished the necessary power and the effect, surrounded as the cascade was with many incandescent lights, proved most effective.

The members of the Pacific Coast party of the Massachusetts Street Railway Association had an opportunity while in San Francisco, on Oct. 22, to see the floats in the car house of the company, where they were being decorated, but were unable to see them illuminated at night.

LIGHTING IN THE NEW YORK SUBWAY

Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, New York, N. Y., at a hearing before the Public Service Commission of the First District of New York, on Nov. 29, said that the wish of the company was to serve the public, and that whatever the commission deemed necessary for the health and comfort of the traveling public would be used. The company had taken out the 16-cp lamps four years ago because it believed the 10-cp ones afforded sufficient light for comfortable reading in the cars and stations. The unfrosted 10-cp lamps, he said, were more powerful than the frosted higher candle-power lamps. The variations in the voltage, Mr. Hedley explained, were due to the loads carried when starting the trains. He knew of no way of obviating such a condition. The hearing was adjourned until Dec. 3.

CONFERENCE ON RULES FOR OHIO INTERURBAN LINES

The Ohio Railroad Commission and the committee of Ohio interurban railway managers held another conference in Columbus, Ohio, on Nov. 29, at which the proposed changes in the standard code of rules to be adopted for use by the interurban roads in the State were given further consideration. A number of modifications of the changes first suggested were discussed, and the whole question was referred to Commissioner Sullivan and F. A. Davis, chairman of the committee of interurban managers, for final action.

As reported on page 1029 of the Electric Railway Journal for Nov. 13, a previous conference was held in Columbus on Oct. 28, at which a number of radical changes in the standard code of interurban rules as presented at the Denver convention were tentatively adopted. The most important of these were:

A change in rule 103, making the signal to back the car when standing still three strokes of the gong instead of four.

The proposed change in rule 110 was to provide that one or more red lights be displayed on the rear of every train at night and one or more red flags on the rear of every train of more than one car during the day. Rule 110 in the standard code provides that when a train is clear of the main track, green lights must be displayed to the front, side and rear.

Rules 111, 112 and 113 it was proposed to modify by requiring both flags and lamps to be displayed at night on the front end of the trains as marker signals instead of lamps only as prescribed in the standard code.

The committee recommended modifying rule 128 so that there would be no exchange of signals at a siding unless the siding is used for a scheduled or train order meeting point.

Rule 203 it was proposed to modify by the insertion of the words "which are of the same or superior class" after the words "all trains due." The last two paragraphs of this rule relating to train registers and calling the dispatcher it was proposed to eliminate entirely.

It was also proposed to eliminate entirely rule 203-a, which is an explanation of the term "protected by flag" as used in rule 203.

The committee recommended the substitution of a two-minute time interval under rule 210 in place of the 3000-ft. space interval between trains, as required in the code.

The elimination of rules 212 and 213 from the code was recommended, and it was also suggested that each road formulate rules covering the operation of trains in case of failure of telephone lines which would meet their own special requirements of safety.

It was proposed to make motormen jointly responsible with conductors for leaving switches in proper position, as required in rule 223.

The committee recommended that a form of train order should be adopted which would comply as nearly as possible with steam road practice.

When the committee of managers and the Railroad Commission have finally determined upon a satisfactory code, the commission intends to issue an order requiring that all interurban roads in the State which have no book of rules on file with the commission be required to prepare a rule book based on the revised code as finally adopted. A copy of this rule book must be filed with the commission within six months from the date of issuing the order.

GERMAN STREET RAILWAY STATISTICS

Recent statistics published in the *Zeitschrift fur Kleinbahn* show that on March 31, 1908, the number of street railways in existence or in course of construction in Prussia was 165 and in the other German States 72. The total for Germany was therefore 237, with 3850.5 km (2389 miles) aggregate track length. Of these there were in operation:

In Prussia	162 roads with a length of	2652.5 km (1645 miles)
In other German States	72 roads with a length of	1128.5 km (700 miles)
Total in Germany	234 roads with a length of	3781 km (2345 miles)

The increase in the number of roads over the previous year is four, two in Prussia and two in other German States. The motive power on street railways was as follows:

	In Prussia.	In other German States.
Steam locomotives	13 roads, or 7.9 per cent	.....
Electric motors	129 roads, or 78.2 per cent	60 roads, or 83.3 per cent
Horses	15 roads, or 9.1 per cent	7 roads, or 9.7 per cent
Steam locomotives and electric motors	1 road, or 0.6 per cent	1 road, or 1.4 per cent
Electric motors and horses	3 roads, or 1.8 per cent	.....
Cables	4 roads, or 2.4 per cent	4 roads, or 5.6 per cent

The roads using horse-power are for the most part small lines.

The rolling stock in Germany consisted in 1907 of 81 steam locomotives, 57 electric locomotives, 9,908 electric motor cars, 17,263 passenger cars (including motor cars and trailers), 69 package cars, 937 freight cars, 17 mail cars, and 1124 "special cars." The largest number of cars is owned by the Grosse Berliner Strassenbahn, which has 2544 cars, with capacity for 85,573 passengers. Hamburg is next, with 1269 cars with capacity for 36,693 passengers.

Most of the roads are owned by companies, although municipal ownership is slowly advancing. The figures show that 95 roads in Prussia (the same number as in 1906) and 42 roads in the other German States (against 43 in 1906) were owned by companies, while 61 roads in Prussia (against 57 in 1906) and 24 in other States (against 23 in 1906) were owned by municipalities or counties. Eight German roads are owned by private persons, and 3 roads are owned by the State of Saxony.

The gage is 1.435 m. (4 ft. 8½ in.) on 61 roads, 1 m. (3 1-2 ft.) on 148 roads, and less than 1 m. on 28 roads.

The capitalization in all German street railways was 904,630,453 marks (about $226,000,000), or 239,319 marks per kilometer (about $96,000 per mile) of track. In 1907 22 roads did not earn their operating expenses. The interest earned on the capital invested in 145 Prussian street railways, found by subtracting from receipts the operating expenses, including ordinary depreciation, but not interest and amortization on the funded and unfunded debt, was nothing in 18 roads, up to 1 per cent in 6 roads, up to 2 per cent in 14 roads, up to 3 per cent in 9 roads, up to 4 per cent in 14 roads, up to 5 per cent in 23 roads, from 5 to 10 per cent in 54 roads, and above 10 per cent in 7 roads.

The following figures on the length of track and the number of passengers per capita are interesting: For every 10,000 inhabitants there are 5.23 km (3.27 miles) of track in Hanover-Linden, 2.60 km (1.62 miles) in Dresden, 2.56 km (1.60 miles) in Essen-Ruhr, 2.30 km (1.44 miles) in Leipzig, and so on up to 1.22 km (0.76 mile) in Berlin. The rides per inhabitant were 197 in Cologne, 192 in Frankfort, 187 in Leipzig, 177 in Dresden, 171 in Hamburg-Altona, 166 in Berlin, 159 in Dusseldorf, etc. The average receipts per passenger varied between 7.9 pfennig (1.97 cent) in Breslau and 11.1 (2.77 cent) in Essen-Ruhr.

The total track length of all street and interurban or light railways in Germany was 12,277 km (7612 miles) in 1907, an increase of 3.7 per cent over the previous year. The capital invested in these roads was marks 1,510,354,116 (about $377,588,529) or marks 115,952 (about $28,988) per kilometer. A radical distinction is made in Germany between street railways (strassenbahnen) and interurban or light railways (kleinbahnen), and they are organized under different laws. While 63.6 per cent of all German street railways carry nothing but passengers, this is the case with only 1.9 per cent of the light railways, a number of which carry freight only. There is also a difference in motive power, 78.2 per cent of all street railways being operated electrically, while 91.2 per cent of the interurban light railways are operated by steam.

A TURBO-ELECTRIC LOCOMOTIVE

On Oct. 28 Hugh Reid, chief managing director of the North Bristol Locomotive Company, Glasgow, Scotland, delivered an address before the Glasgow University Engineering Society on the Reid-Ramsay turbo-electric locomotive now being built by his company. In describing the new locomotive he said that steam is generated in a locomotive boiler, which has a superheater, and the coal and water supplies are carried in the side bunkers and side water tanks at both sides of the boiler. The steam is led to a 3000-r.p.m. impulse turbine, to which is directly coupled a d.c. generator. The dynamo supplies current at from 200 to 600 volts to four series-wound traction motors, the armatures of which are built on the four driving axles of the locomotive. The exhaust steam from the turbine passes into an ejector condenser, and is, together with the circulating condensing water, delivered eventually to the hot well. As the steam turbine, unlike the reciprocating steam engine, requires no internal lubrication, the water of condensation is free from oil, and consequently is returned from the hot well direct to the boiler by a feed pump. This condensing water is circulated by centrifugal pumps driven by auxiliary steam turbines placed alongside the main turbine and dynamo. The cycle of the condensing water is from tanks through the first pump, then through the condenser, where it becomes heated in condensing the exhaust steam, then to the hot well. From the hot well it passes through the second pump to the cooler, situated in front of the locomotive, where the full benefit of the blast of air caused by the movement of the locomotive, aided by a fan, is utilized for cooling the hot circulating water.

The condensation of the exhaust steam deprives the locomotive boiler of the usual exhaust blast which induces the draft through the firebox and boiler tubes. In the experimental locomotive the induced draft is replaced by forced draft provided by a small turbine-driven fan. The fan is placed within the cooler, so that it will deliver hot air to the boiler fire, and at the same time assist the current of air through the cooler. The small switchboard and the instruments required, and the controller for the four motors are all placed on the motorman's platform within easy reach.

The main and auxiliary machinery of this experimental locomotive is mounted upon a strong underframe, which is carried upon two trucks, each of which carries two motors. As the engine is intended for express passenger main line work, it is hoped to obtain comparisons from its actual working with the performances of the reciprocating steam locomotives, especially as regards the relative consumption of fuel and water, the efficiency of transforming the energy of steam into drawbar pull, and also the relative rapidity of acceleration under the old and new systems.

COMMUNICATIONS

PROPOSED INTERURBAN RULES IN OHIO

Washington, Baltimore & Annapolis Electric Railway Company

Baltimore, Md., Nov. 27, 1909.

To the Editors:

It is with great regret that I note the action of the committee of the Ohio interurban operators appointed by the Ohio Railroad Commission to prepare a code of operating rules for use in that State.

If it be admitted, as I think it must be by every one, that it is desirable to formulate a code of rules which can be adopted as a standard for use on all interurban roads, not only in Ohio, but throughout this country, then the action of this committee in making changes of so radical a nature in the code adopted at Denver seems unwise.

After the adoption of the American Railway Association code by that association, it was made the basis of the rule book of practically every steam railroad in this country. The deviations from the standard code were of minor importance, and, so far as my knowledge of the matter goes, no changes of a radical nature were made by any of the companies.

The changes suggested by the Ohio committee were not offered at Denver, and no general discussion upon them has been had. I am perfectly convinced that the American Street & Interurban Railway Association desired to offer as its standard a code which is the best possible for general adoption. If it could be demonstrated that the changes made by the Ohio committee are wise, there is no doubt of the willingness of the American Association to incorporate them in its code. In view of this fact, would it not be wise for the Ohio State Railroad Commission to grant a hearing to the committee on interurban rules of the American Association, in order that the rules as drawn may be made perfectly clear to them? The Ohio Commission, of course, may resent a suggestion of this nature, but I cannot help feeling that they would be perfectly willing to consider any suggestions offered by such a committee before taking final action upon the subject.

J. N. Shannahan,

Chairman, Standing Committee on Interurban Rules, American Street & Interurban Railway Association.

ELECTRIC RAILWAY STATISTICS

Detroit, Mich., Nov. 5, 1909.

To the Editors:

I have been much interested in the statistical part of your big convention edition and especially so in the summary at the end of the last article, in which you give the miles of track of street railways for five years, as well as the number of cars, and capital invested. Curiosity led me to reduce these figures to a per mile and per car basis, and I herewith hand you a copy of the figures. I understand that the tables show the capitalization of the electric railway companies independent of whether they are engaged exclusively in the railway business or also supply other public utilities, such as electric lighting, gas, water, etc., so that the statistics given below for capital per mile of track do not show the capital engaged in railway undertakings per mile of track in different sections of the country. This is undoubtedly one reason why the figures for the Southern States are so large, because many of the New York companies in the South also carry on an electric lighting business and some conduct other public utilities. Another reason for the apparently high capitalization figures of the Southern States is undoubtedly the fact that there are comparatively few suburban and very few interurban roads among them.

CAPITAL PER MILE OF TRACK.

	1908.	1907.	1906.	1905.	1904.
New England States	$61,316	$64,516	$66,208	$55,017	$55,266
Eastern States	163,662	154,622	155,945	148,563	150,666
Central States	98,428	91,148	83,555	89,420	96,853
Southern States	128,773	124,739	108,425	111,595	111,503
Western States	90,043	84,857	80,044	80,200	86,995

CARS PER MILE OF TRACK.

	1908.	1907.	1906.	1905.	1904.
New England States	2.82	2.96	2.98	2.73	2.68
Eastern States	2.98	3.17	3.27	3.36	3.29
Central States	1.66	1.62	1.71	1.97	2.18
Southern States	1.91	1.91	1.84	1.90	1.95
Western States	1.63	1.60	1.54	1.41	1.62

Referring now to the table showing cars per mile of track, the New England States seem to be the only division in which the number of cars per mile of track has been increased over the early standard. The Southern and Western divisions are the only others maintaining their equipment up to the same standard as shown in 1904.

Using the census of 1900 as a basis and comparing the population per mile of track for the year 1904, New England still has the call, as will be seen by the following table:

POPULATION STATISTICS.

	Miles of track for each 10,000 population.	Population per mile of track.
New England States	8.23	1,210
Eastern States	5.95	1,680
Central States	6.81	1,470
Southern States	.655	15,300
Western States	2.55	3,930

It is safe to assume that the capitalization in New England furnishes but a small amount of profit for the promoter, and for this reason one would expect to find a very slow growth of facilities in that part of the country, yet the increase both in trackage and cars compares very well with that of the other divisions.

PERCENTAGES OF INCREASE IN CARS AND MILES OF TRACK IN LAST FIVE YEARS.

	Miles of track.	Cars.
New England States	17. per cent	23.8 per cent
Eastern States	29.7 per cent	17.5 per cent
Central States	35.5 per cent	2.6 per cent
Southern States	28. per cent	25.1 per cent
Western States	58. per cent	57.8 per cent

New England, where short cars are still quite generally used, shows a very considerable increase of rolling stock, while showing the smallest increase in track mileage. The Central States, where long cars are more popular, shows a very small increase of cars and a large increase in mileage, and the Southern and Western States show an even growth of both.

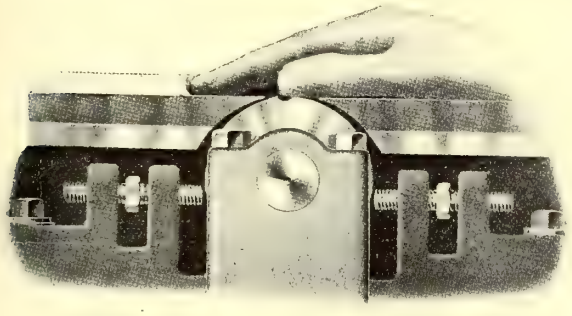
A Correspondent.

NEW SAFETY CUTTER HEAD

Any improvement in a machine which will increase the safety of the operator is surely of value, providing, of course, that the efficiency of the machine is not lessened by the change. In a woodworking shop the hand planer is probably the most dangerous of any machine tool, and the statement has been made that more fingers have been lost in hand planers than by any other single type of tool. A new cutter head for hand planers and jointers, which assures maximum safety to the operator by reason of its permitting the tables to be set very close together, has lately been introduced in the woodworking machine tools manufactured by the J. A. Fay & Egan Company, Cincinnati, Ohio. In the old-style cutter head with the square block and knives bolted to its sides, the square shape of the block

would neither permit the tables to be set close together nor did the head itself fill the opening between the tables. Thus with the slightest slip on the part of the operator his fingers might be drawn in between the tables and badly mutilated if not lost.

The new safety circular cutter head closely fills the opening between the tables so that the most severe accident that could possibly happen would be the scraping of a finger or



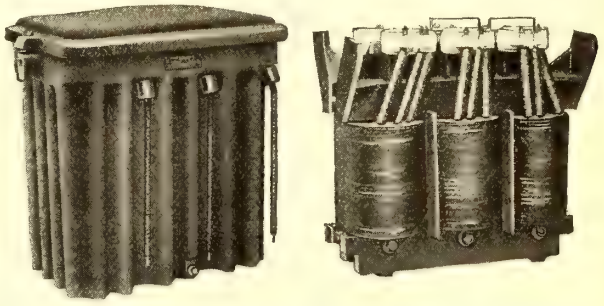
Safety Cutter Head

thumb. The new head is made from a solid piece of crucible steel, which is first roughed on a lathe to the desired circumference and then ground accurately to size. Afterward seats for the two knives are milled into the steel body. High-duty tungsten steel knives are used on this cutter head and are held in the milled slots by special blocking, which is wedged against them by sets of cup-head clamp screws. The design is such that the cutting edges of the knives protrude but slightly from the circumference of the cylindrical-shaped head and thus permit the tables to be set very close to the cutter. An illustration is presented which shows an end view of one of the new safety cutter heads which can be applied to machines not made by the manufacturer of this head and is applicable, not only to hand planers, but to surfacers, planers and matchers.

SMALL THREE-PHASE TRANSFORMERS

Recent marked inprovements have been made in Westinghouse type "C" three-phase transformers for small light and power service. It is stated that in these transformers the losses are reduced below those of any ordinary equivalent combination for transforming three-phase power, while experience in design and modern factory methods have produced a highly serviceable apparatus that can be sold for less than the equivalent single-phase transformer group. These transformers are made in sizes ranging from 5 kw to 75 kw capacity, and are said to give very high efficiency at all loads, as well as close regulation when operating on currents having low power factors. These properties, together with compactness and simplicity, make these transformers especially adaptable for supplying motor loads.

The accompanying illustrations show the appearance and construction of this apparatus. The cast-iron corrugated case employed is quite similar in design to that used in the Westinghouse type "S" transformer. The three high-tension leads enter from the front side of the transformer,



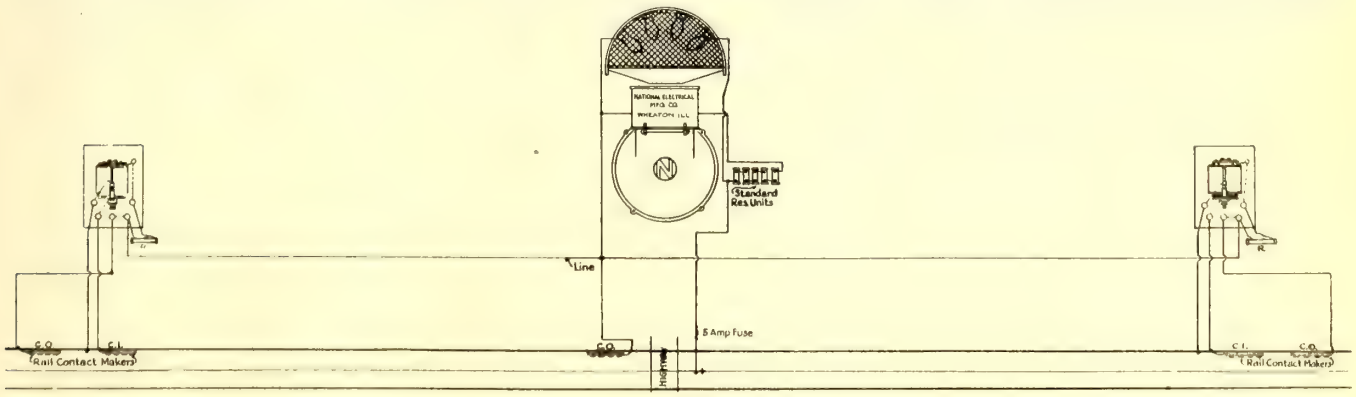
Coils and Casing of Small Three-Phase Transformer

the low-tension secondaries issuing from the pole side of the case. Provision has also been made for bringing out neutral leads, when desired, from both the high- and low-tension windings. Separate terminal blocks are provided for both the high- and low-tension leads of each of the three phases. Each low-tension winding comprises two coils which can be connected in parallel for 110 volts, or in series for 220 volts, the standard designs being for 2200 volts and the high-tension side.

AN IMPROVED CROSSING SIGNAL

The National Electrical Manufacturing Company, Wheaton, Ill., has recently been formed to make a highway crossing signal, the strong feature of which is its positive action on lines with fluctuating voltages. The signal in its original form was invented about four years ago by Joseph Sauer, now president of the new company, but who was then employed by the Aurora, Elgin & Chicago Electric Railway Company. The signal was installed at one of the highway crossings of the railway mentioned where practical operation made it easy to determine any possible weaknesses.

The "National" crossing signal is a visual as well as an audible system of simple construction. Each installation consists of a 12-in. bell and a bank of incandescent lamps, mounted on a crossing signal post as shown in one of the accompanying illustrations; a contact maker and a relay which governs the making and breaking of the circuit. This apparatus has been applied equally well on single and



Wiring Diagram of Crossing Signal for Single Track

double-track roads, having either third-rail or trolley contact makers. When rail contact makers are installed, the circuit which works the signal is closed by the flange or the tread of the car wheel coming in contact with a spring-supported contact maker which is clamped to the base of the running rail.

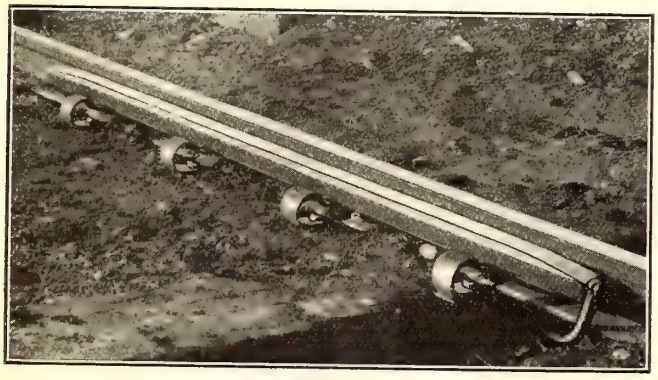
The bell on the crossing signal is of the continuous-current vibrating type and requires no delicate adjustment. The bell is efficient on circuits having a line pressure ranging from 500 volts to 800 volts. The usual arcing at the contact points is eliminated. The improved carbon holder provided allows the carbons to be changed quickly by the use of pliers, and is a decided improvement over other types.



Crossing Signal

The relay is non-arcing. It is wound and insulated for operation on from 500 volts to 800 volts. The circuit is made and broken between renewable hard-carbon blocks, flexibly mounted and so arranged as to have a very slight rubbing motion to insure perfect contact.

These signals are now in successful operation on such important electric railways as the Aurora, Elgin & Chicago, the Indiana Union Traction, Chicago & Milwaukee Electric, Ft. Wayne & Wabash Valley, Elgin & Belvedere, Louisville & Northern, and other electric railways. On each of these lines local conditions have been met, and in some cases serious fluctuations in the line voltages have been encountered and overcome.



Contact Maker

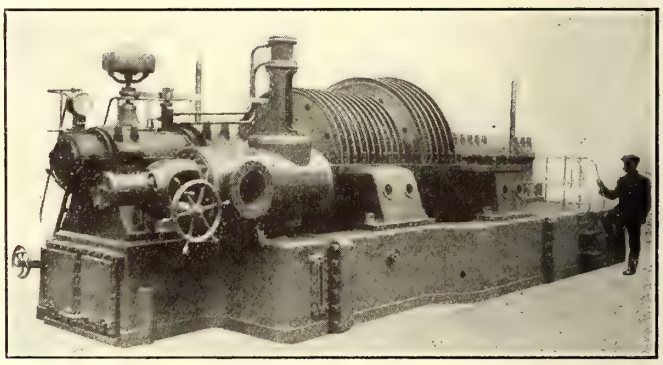
NEW FARE RECORDERS IN CHICAGO

The Board of Supervising Engineers, Chicago Traction, has authorized the adoption of Dayton fare recorders for use on all surface cars in the city of Chicago and the railway companies have ordered 2500 of these devices from the Dayton Fare Recorder Company, Dayton, Ohio. The street railway systems in Detroit and Buffalo have also ordered 1500 recorders to equip their cars. This new type of recorder is designed to greatly reduce the clerical labor in accounting for fares received and to provide a perfect check on the conductors' trip sheet reports and on the car-house receivers' count of money and tickets. All classes of fares are rung up by the conductor, but each class of fare, 5-cent, 3-cent, ticket, transfer or pass, is registered separately and plainly indicated by a shutter in the recorder at the time it is rung up. At the end of each trip the trip-totalizer record is printed on a strip of paper within the recorder. This record shows the trip number, total cash received, number of each class of fares collected in separate columns, total number of passengers and the conductor's number. At the end of each conductor's assignment he withdraws from the recorder the equivalent of a complete day card on which is printed the record of each trip and also a summarized record of the total number of trips he has made on the car. This total record shows the division number, line number, total number of trips, total cash collected, total number of each class of fares collected, total passengers carried and the final register reading. Each conductor who is in charge of the car removes such a day-card record and hands it in to the receiver with his receipts. At the end of the day an inspector inserts a special key in the recorder and removes a printed totalized record of the entire day's receipts and register readings which must check with the totals of the several conductor's records previously removed.

The Dayton recorders are made in types suitable for both city and interurban railways and are equally well adapted to the conditions existing on large and small systems, with pay-as-you-enter, pay-within and regular types of cars.

6000-KW TURBO-ALTERNATOR

The Manchester (Eng.) Corporation has just installed in its power station a 6000-kw steam turbine set of the Zoelly pattern, built by James Howden & Company, Limited, Glasgow, and the largest of its kind in Europe. It is designed on the multi-stage impulse principle, and comprises a cast-iron cylindrical casing divided along the horizontal center line and containing fixed guide wheels. These are in halves and arranged so that their upper portions can be easily removed along with the upper portion of the casing. The expansion of the steam takes place entirely in the guide blades fixed in the stationary diaphragms, no expansion taking place in the rotating vanes, so that the steam pressures on the entrance and exit sides of the wheels are about the same. This reduces end thrust and necessitates no special means of balancing. The rotors are made of forged Siemens-Martin steel, machined and polished all over. The blades are of 5 per cent nickel steel. Distance pieces, shaped by milling cutters, are placed be-

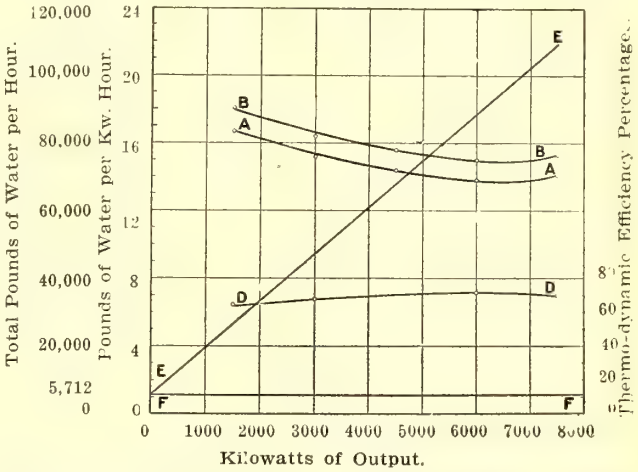


Turbine with Casing Removed

tween each pair of blades, and the whole is secured by a ring piece secured to the main wheel by rivets. The wheels are accurately balanced, and the radial clearance at the tips of the blades is 5 mm. (.2 in.) The shaft is bored throughout its length, and where it passes through the turbine casing is fitted with stuffing boxes and packings which are readily accessible for examination and adjustment when required.

The bearings are independent of the turbine casing, and are thus unaffected by the high temperature due to the steam. They are lubricated with oil under pressure, supplied from a rotary pump driven from the governor shaft. The bed-plate is of box section, provided with flanges and bolt holes for coupling to the generator bed-plate. The governor end of the bed-plate forms an oil reservoir and settling tank, a series of tubes with cold water circulation being provided inside the tank to keep the oil at a suitable temperature. The thrust block is fixed in the main bearing block at the low-pressure end, and consists of a number of collars turned on the turbine shaft working in white metal-lined grooves in the bush of the main bearing. A centrifugal governor driven by spiral gearing from the turbine shaft actuates a controlling valve, which in turn regulates a supply of oil under pressure to a piston, the latter being in direct communication with the throttle valve. The governor itself is thus relieved of the stress due to actuating the heavy throttle valve. The pressure of oil is supplied by a positive-action, valveless pump contained in the same chamber as the pump which furnishes the lubricant for the bearings. For the governor gear the oil pressure is 80 lb. per sq. in. By these means the variation of the speed of the rotor between full and no loads is approximately 1 per cent, and under no circumstances of load variation is there any tendency to hunt.

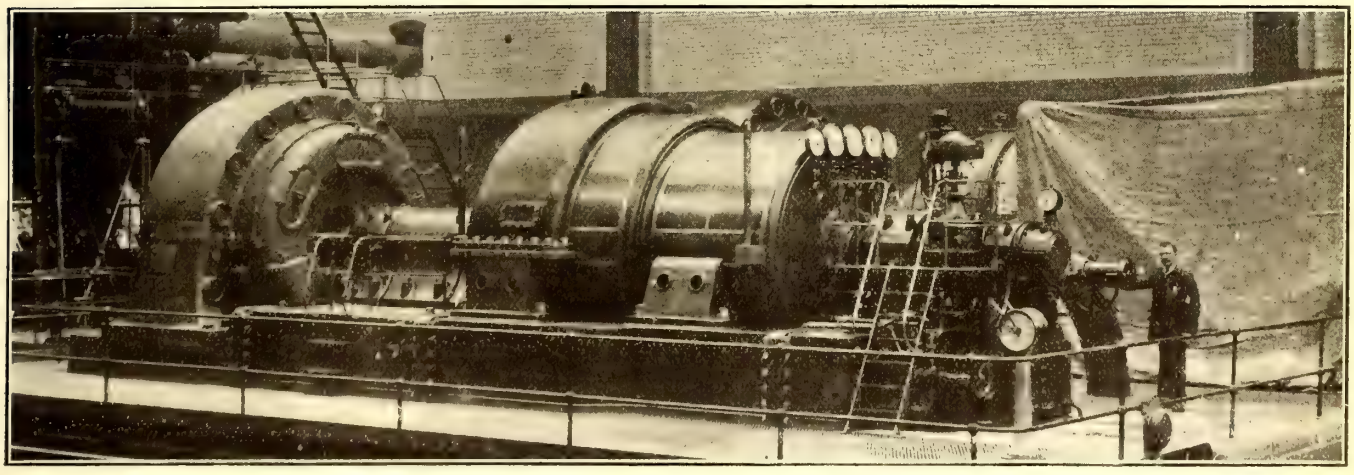
The machine drives a Siemens three-phase, 50-cycle alternator with six poles, the mean potential being 6500 volts. The turbine and generator are connected by a geared flexible coupling. The alternator is ventilated by a fan, which draws air by means of a duct through a special filtering arrangement situated in a chamber outside. Twenty-



A. Howden Consumption Curve, 28" Vac. Total Temp. of Steam, 523° F.
B. " " " 27" Vac. " "
483° F.
D. Howden Thermo-dynamic Efficiency Curve.
E. " Total Water Consumption.
F. " No Load Consumption.

Curves of Steam Consumption

one thousand cubic feet of air per minute are delivered at a pressure of 2½ in. of water to the rotor, returning through the stator frame to another duct, which carries it out of the building. The condensing plant has been supplied by Richardson, Westgarth & Company, Ltd., and consists of a Contraflo condenser with a surface of 10,500 sq.



General View of 6000-Kw Turbine as Installed in the Manchester Power Station

A speed-regulating gear is fitted to the throttle valve, which is actuated either by hand or by the small electric motor shown in the general view of the machine. The speed of the machine is 1000 r.p.m. A supplementary governor is provided, which shuts down the supply of steam should the speed rise to 10 per cent above the normal. This governor acts by means of a trip gear, and enables the main stop valve to be instantly closed by a powerful spring, the impact of the valve on its seating being cushioned by an air piston. A noteworthy feature in the running so far has been the very slight leakage of air into the turbine casing through the glands, thus facilitating the maintenance of a high vacuum even when using high temperature of circulating water.

ft. There is one set of electrically driven three-throw Edwards air pumps. The water has a static head of 30 ft., and is drawn, and not forced, through the condenser, the pump being attached to the discharge pipe.

The following results were obtained in the station tests made by S. L. Pearce, chief engineer of the Manchester Corporation:

Load. kw	Duration of test. hrs.	Water per kilowatt-hour	Mean efficiency. per cent.
7500	3	14.916	70.0
6000	6	14.598	71.8
4500	3	15.04	69.4
3000	3	15.927	67.8
1500	3	17.57	64.5

The rise in temperature after a six-hours' full-load test at 6000 kw was 72 deg. F. in both stator and rotor.

LONDON LETTER

(From Our Regular Correspondent.)

Until a year ago, all trains leaving the high level station of the North British Railway, Glasgow, had to be pulled through a tunnel from Queen Street Station to Cowlairs, as the grade between these points is 1 in 45. The North British Railway between Glasgow and Edinburgh was constructed before it was known that locomotives could operate on a grade, so that from Cowlairs to Edinburgh (Princes Street) the track is level. At the time of construction it seemed best to send all trains from Cowlairs to Glasgow over the grade and through the tunnel, braking them by heavy vans, and using the cable to assist the trains out of Glasgow. This system was costly and slow, and a year ago experiments were made with heavy locomotives, without the aid of the cable. With the sanction of the Board of Trade, the company has decided to abandon the cable system and use only the locomotives. It is interesting to note that the stationary engine at Cowlairs which worked the cable was in continuous use from Feb. 19, 1842, until a year ago, and from my own personal knowledge, which dates back many years, I am confident that many parts of the engine, so excellent was its original construction, had never even been renewed. Like all engines of its time, the one installed at Cowlairs was constructed on the old walking-beam principle.

The Bradford Tramways Committee is considering the question of providing a new and up-to-date house for the accommodation of its cars. At present there are nine depots in Bradford, most of them in outlying districts, with a total capacity of 275 cars. Mr. Spencer's idea is to provide a depot near the center of the city for all the cars. A suitable site has been procured for this purpose, and Mr. Spencer contends that a saving of nearly 57,000 car miles per annum of dead mileage could be effected if his plan, which would involve an expenditure of about £22,500, is carried out.

It is more than 15 years since the Glasgow Corporation took over the tramways and operated them municipally. At that time there were 670 drivers and conductors in the employ of the department, whereas there are now 2570 conductors and motormen. At a recent ceremony in the quadrangle of the Municipal Building nearly 200 members of the tramway department were presented with medals in recognition of their having completed 15 years' service. The recipients were congratulated by the convenor of the tramways committee, who assured them that by their conduct and service they reflected credit, not only on themselves and their department, but on the whole city.

At the half-yearly meeting of the Underground Electric Railways, of London, which operates the Metropolitan District Railway, the Bakerloo tube, the Piccadilly tube and the Hampstead and Highgate tube, Sir Edgar Speyer, chairman of the company, said that he was glad to be able to record material progress. As is well known, the financial condition of the company was affected for a time by the large amount of capital necessary to electrify the District Railway and to construct the various tubes. All of the lines now show satisfactory increases in traffic, and Mr. Stanley, the general manager, was commended for his extremely efficient management and for the very favorable results which he has achieved. The company has now moved from Hamilton House to new offices erected by the Metropolitan District Railway at its St. James' Park Station, where the officers of the three tube companies and the District Railway are also located. It is proposed to apply to Parliament for powers to consolidate the three tube railways as one company with a capital of about £16,000,000.

It has been decided by the City Corporation of London to build a new bridge over the Thames in accordance with plans submitted by the Bridge House Estates Committee. The structure will be erected between St. Paul's Cathedral, in the heart of London, and Southwark, on the south shore of the Thames, at a cost of £1,646,983. In addition, Southwark Bridge, which is in the vicinity of the proposed structure, will be reconstructed at a cost of £261,000. As already stated in this column, the new bridge will be constructed to accommodate tramways, and will afford another connection between the southern and northern portion of London where most required. The approaches to the new bridge will be commenced further back from the river bank than those of the existing bridges, with the exception, perhaps, of Waterloo Bridge, and as the bridge will span some of the east and west arteries confusion of cross traffic will be obviated. The structure will be called St. Paul's Bridge, and will have its northern approach from the junction of St. Paul's Churchyard and Cannon Street, crossing Queen Victoria Street and Upper Thames Street on a viaduct, and crossing other streets south of the Thames in the same way. It will finish at the junction of Southwark Street and Southwark Bridge Road. Though not yet sanctioned, part of the proposal is for the tramway lines after crossing the bridge, to continue in a subway under Cannon Street, the northern side of St. Paul's Churchyard, St. Martin's-le-Grand and Aldersgate Street, crossing to the surface in Goswell Road. The bridge and approaches, when completed, ought to be of invaluable assistance in solving the problem of transportation in London.

We reported about a year ago that the Manchester Corporation placed an order with James Howden & Company, Glasgow, for a 6000-kw steam turbine of the Zoelly type to be installed in the Stuart Street station. This turbine, which is the largest in England or on the Continent, under tests conducted recently, the contractors have earned a possible bonus as the steam consumption at full load, with 188-lb. pressure, 140 deg. Fahr. superheat, and 28 in. vacuum, was 13.9 lb. per kw-hour. At 25 per cent overload, 7500 kw, equivalent to 11,000 ihp, the steam consumption was 14.2 lb., obtained without the use of a bypass. It is claimed that these figures are unsurpassed.

At a recent meeting of the London County Council, various tramway schemes were passed for construction next year, which will involve an outlay of more than £400,000. This is in addition to work already authorized. Some of the work will be done in the southern portions of London, but most of it will be in the northern portions. One of the new tramways will be constructed in Maida Vale, which has hitherto been without tramway accommodations. This line will be equipped with the overhead system. The most important of the other systems will be built in the vicinity of Highgate Road and Seven Sisters Road. All of the work in the northeastern portion of the city will be on the conduit system. In view of the objection of the Astronomer Royal to the line on account of the possible disturbance of the Observatory instruments, it has been decided to equip the tramway from Woolwich to Eltham with the double overhead trolley, which it is contended will prevent the trouble feared by the Royal Observatory officials by supplying an overhead return.

As the magnitude of the tramways in London increases, the intricate nature of the business becomes more evident, and a special committee has now been appointed by the London County Council for the allocation of the cost of street widening, always a difficult problem. Many of the borough councils object to bearing any of the expense of street widening, claiming that the whole cost ought to be allocated to the tramways. The policy of conciliation boards has also now been definitely adopted by the Council to obviate any disputes between the management and the employees. The congestion of the tramways in London is also becoming very serious, and when it is considered that during the last year more than 400,000,000 passengers were carried, it is evident that at certain points the congestion is extreme. It is estimated that at the Elephant and Castle crossings nearly 6000 cars pass daily, six different roads radiating from this point. The solution of the problem will probably be found in the abolition of "dead ends" and the construction of more connecting links and loops.

The Dunfermline & District Tramway has posted notices that application will be made for permission to run tramways in Dunfermline, Inverkeithing, and Lochgelly and Dunfermline, Carnock Tarryburn, Inverkeithing, Auchterderron, Ballingry, and Kinglasse. When in operation the new line will, taken in conjunction with the line already laid, link up Rosyth with almost every community in the west of Fife.

The City Council of Sheffield has rejected the proposal that passengers should be allowed to take dogs on the tramcars. Sir Wm. Clegg, in bringing the matter forward, said that dogs were not to be allowed to ride on the car seats. The Council asked a large number of corporations what was their custom, and had received 57 replies. Of them 44 towns allowed dogs on the cars, 25 of that 44 allowed them on the top-decks only, 16 allowed them on the cars under special conditions, 10 towns allowed them on as passengers at special rates, and only 13 out of the 57 did not allow dogs on the car under any consideration whatever. So far as he knew, no complaints were made in the 44 towns of any inconvenience to passengers.

The London, Brighton & South Coast Railway proposed to commence the new electric service over the South London line between Victoria and London Bridge, via Peckham Rye, on Dec. 1. The new line is 9 miles long. At Victoria Station seven lines are equipped with overhead construction, giving access to five platforms, and there will be the same arrangement at London Bridge. The full journey will occupy 25 minutes, and it is intended to run a 10-minute service.

A. C. S.

News of Electric Railways

Meeting of Street Railway Association of the State of New York

J. H. Pardee, secretary of the Street Railway Association of the State of New York, has issued the following notice regarding the quarterly meeting of the association to be held at Albany, N. Y., on Dec. 7 and 8, as briefly announced in the ELECTRIC RAILWAY JOURNAL of Nov. 20, 1909, page 1078:

"The tenth quarterly meeting of the association will be held at Albany, N. Y., on the evening of Tuesday, Dec. 7, and Wednesday, Dec. 8, 1909.

"The Tuesday evening session will be an informal dinner at the Hotel Hampton, at 8 o'clock. After the dinner, the subject 'Relation of State Highways and Interurban Railways' will be discussed, and J. K. Choate, of the Otsego & Herkimer Railroad, will open the discussion.

"The Wednesday session will be convened at the Fort Orange Club at 10 a. m., when the remainder of the program will be taken up.

"Arrangements have been made with the Hotel Hampton for accommodations for those who apply directly to the hotel management prior to the date of the meeting.

"All questions and subjects will be open for general discussion, and all are invited to participate, particularly the legal representatives of the various member companies."

PROGRAM

REPORT OF COMMITTEE ON CLASSIFICATION OF ACCOUNTS

Committee—A. L. Linn, Jr., W. H. Davies, H. M. Beardsley.

QUESTIONS FOR DISCUSSION

To be presented by H. A. Benedict, mechanical and electrical engineer of the United Traction Company, Albany, N. Y.:

"Repair shop and car house tests of electric equipment of cars."

"The prevention of electrolysis on an electric railway with overhead trolley and ground return."

"The best type of roadbed construction for electric railways on paved streets."

To be presented by W. J. Harvie, chief engineer of Utica & Mohawk Valley Railway:

"How closely are the recommendations of fire insurance inspectors followed?"

"Has slotting commutators eliminated most of the commutator and brush troubles?"

"What is being done toward the elimination of protective cradles at high-tension crossings?"

To be presented by Charles R. Barnes, railway expert of the Public Service Commission:

"Block Signaling on Electric Railways."

GENERAL DISCUSSION

To be opened by J. W. Hinkley, Jr.:

"Remuneration for Handling U. S. Mail."

To be opened by J. K. Choate:

"Relation of State Highways and Interurban Railways."

Cleveland Traction Situation

William Barclay Parsons, New York, testified before Judge Tayler as referee on Nov. 22, 1909, that 40 per cent would be an adequate amount to set aside for overhead charges in reproducing a street railway. Mayor Johnson tried to induce Mr. Parsons to reduce his estimate by qualifications and Judge Tayler finally felt called upon to say that he understood the point which the witness had made without lengthy cross-examination. Mr. Parsons stated that 5 per cent bonds issued for the reproduction of the Cleveland Railway would not sell higher than 90 and that Mayor Johnson's plan of having the company carry out the reconstruction work would be much more expensive than if it was done under contract, a point upon which all the engineers have agreed.

On Nov. 23, 1909, Prof. M. E. Cooley, of the University of Michigan, testified at the request of the Cleveland Railway Company. His total valuation added several million dollars to the appraisal agreed upon by Messrs. Johnson and Goff in 1908. Mayor Johnson attacked the origin of some of the figures and said Professor Cooley could hardly be considered an impartial observer, as he had been employed by corporations elsewhere to work upon valuations. Judge Tayler said that every man who was qualified to speak in an investigation such as that under way had probably been employed by corporations and that such employment might affect his testimony, but he did not state to what degree such facts would be considered, if at all.

Following are the figures of Professor Cooley and Messrs. Goff and Johnson:

	Cooley.	Goff-Johnson.
Track construction	$3,992,501	$3,800,000
Cars, trucks, motors	2,634,563	2,634,563
Land	1,134,474	1,134,474
Buildings, except power houses	842,987	842,987
Overhead construction	1,123,474	1,007,958
Return circuits	95,713	95,409
Power stations	2,246,753	2,216,991
Storage batteries	287,910	289,863
Shop machinery and tools	69,442	63,130
Horses, wagons, autos, etc	83,279	62,200
Miscellaneous rolling stock	170,158	154,766
General office	35,000	20,650
Interest in Salt Company	34,406	34,406
General contingencies, 5 per cent	637,533	156,000
	$13,388,193	
Engineering	701,441	48,000
	$14,089,634	
Insurance, 1 per cent	182,375	47,000
	$14,272,009	
Organization and legal, 5 per cent	920,992	135,000
Pavement	1,721,000	1,721,000
	$16,914,001	
Interest and taxes, 9 per cent	1,938,289	
Total cost construction and equipment	$18,852,290	
Stores and supplies	423,164	363,944
Working capital	264,653	
Financing, 10 per cent	2,416,265	
	$21,956,372	$15,069,821

This is a readjustment of the schedules used in the Goff-Johnson settlement, Professor Cooley when first on the stand having said that they were incomplete. He added some items and changed the values in others to accord with his investigations in Cleveland and his experience elsewhere. Nothing had been considered in this valuation for the property of the Forest City Railway or for good will. A schedule is being prepared for the railways and the values found will be added to this. With an allowance for good will, Professor Cooley's valuation will be greatly in excess of the Goff-Johnson aggregate. In the cross-examination Professor Cooley gave reasons for his figures and told how he arrived at results. He recited his experience in valuing other properties and brought out the difference between a valuation of steam and electric railway properties.

On the morning of Nov. 24 City Solicitor Baker urged Judge Tayler to consider the loss sustained in operating in that village in valuing the franchises and contracts. The judge said that the contract between the company and the village would be considered with the other contracts and obligations of the company.

Mayor Johnson testified in relation to the values placed on the Detroit properties when Mayor Pingree was considering the question of taking over the Detroit lines in the interest of the city. City Engineer Hoffman testified later as to the value of the tracks in Cleveland and explained why he would deduct $212,313 from the Goff-Johnson valuation. His statements were made a portion of the evidence placed before the arbitrator.

Frederick T. Barcroft, who directed the valuation of the Detroit system recently, was introduced as a witness by Mayor Johnson on Nov. 26. He stated that he had spent three days making an examination of the tracks of the Cleveland system. He had taken 40 sections of track on various lines, representing the best and the worst, and by applying the average value thus secured to the entire lines examined had arrived at an average value for the system. From deductions of this nature he stated that the average value of the track per mile is $7,850 in comparison with $12,000 made during the Goff-Johnson valuation proceedings. He stated, however, that the value was greater a year ago than at present. He placed the average life of track at from 15 to 16 years. Judge Tayler questioned the witness closely regarding the manner in which he arrived at his conclusions.

Mr. Barcroft said that the Detroit system was equipped with electricity in 1894 and 1895. Twenty-seven miles of new rails have been laid since 1903 and 60 miles of the system rehabilitated.

A brief meeting was held in the forenoon of Nov. 27. Judge Tayler said that there would be no meeting on Nov. 29. Both President Andrews and Mayor Johnson sug-

gested that Nov. 27 be spent in preparation, on information from Judge Tayler that the question of franchises would be considered during the week commencing on Nov. 29.

At a special meeting of the City Council of Cleveland on Nov. 27 to consider the ordinance introduced for the Cleveland Underground Rapid Transit Company, J. H. Hidy announced that he was present as the representative of certain Cleveland men to propose the construction of a subway upon more favorable terms than had yet been offered, and that his principals were ready to begin the construction of the tubes within 18 months. Mayor Johnson stated that it would be unwise to take a proposition from others into consideration at this late date, especially as the Council had granted a franchise to the original company and was considering a new one.

Transit Affairs in New York

A letter from the Interborough Rapid Transit Company regarding proposed subway construction in New York and the third-tracking of some of the elevated lines of the company addressed to the Public Service Commission under date of Nov. 24, 1909, crossed in the mail a communication from the Public Service Commission to the Interborough Rapid Transit Company in which the commission rejected the program of the company previously submitted. The letter from the Interborough Rapid Transit Company to the commission refers to recent conferences between the officers of the company and the members of the commission at which rapid transit matters were considered. The communication of President T. P. Shonts of the company follows:

"The impression left upon my mind as a result of our conference on Nov. 19 is that we are in accord as to the physical features of the Interborough Rapid Transit Company's proposition for third-tracking the elevated lines, as well as the physical layout of the subway extensions except, possibly, the Pelham Bay Park extension out Westchester Avenue, which was included in our proposition in the belief that it was a line into new territory you were anxious to have occupied.

"This company's proposition of June 30, 1909, as amended Sept. 22, 1909, set forth the terms under which this company could finance and construct these lines. In view of your statement that it will probably cost double to build subways to-day, as compared with the conditions under which the present subway was built, and in view of the fact, which, I think, must also be admitted, that the cost of operation is at this time correspondingly higher than at the time of the opening of the present subway, the Interborough Rapid Transit Company's proposition to furnish its own money to build subways, and to operate them under the general terms of the contracts relating to the existing subway, should certainly be satisfactory to the city's interests, particularly in view of the fact that although at present the subway is giving more transportation of its kind than is given anywhere else in the world for 5 cents, it is proposed to double the amount of that transportation for the same fare.

"In so far as the third-tracking of the elevated lines is concerned, the Interborough Rapid Transit Company proposes the same terms as the old Rapid Transit Board offered the old Manhattan Elevated Railway 10 years ago; and when it is borne in mind that the same comparison as to costs in construction and operation as outlined above will apply to the elevated lines it would seem that these terms should also be satisfactory to the city.

"If I am correct in my understanding that we are practically agreed on physical lines, and correct in my further assumption that the terms should be satisfactory in view of the foregoing, do you not think that the time has come for you to take action on our proposition, as you have a right to do under the law as an extra under contract No. 1?"

The letter of the commission to the Interborough Rapid Transit Company, signed by W. R. Willcox, chairman of the commission, declares that the proposal of the Interborough Rapid Transit Company would prevent proper provision of traffic facilities for a large part of Brooklyn and that the company seeks terms too favorable with regard to construction, taxation and the third-tracking of the Second, Third and Ninth Avenue elevated railroads. The letter by the commission refers briefly to the original proposal of the company for new work and the subsequent modifications, and summarizes the proposed subway extensions as follows:

"Seventh Avenue Line—Extending from Times Square down Seventh Avenue, West Broadway and Greenwich Street to the Battery. This line would be a four-track subway from Times Square to Canal Street, two tracks extending to the Battery and two tracks via Canal Street, Manhattan Bridge and Flatbush Avenue extension to connect with your line in Brooklyn.

"Madison Avenue Line—Extending from Park Avenue and Thirtieth Street up Madison Avenue to connect with the present subway near 149th Street and with the Jerome Avenue elevated line near 160th Street.

"Westchester Avenue Line—To connect with your present line at Southern Boulevard and Westchester Avenue and to extend to Pelham Bay Park."

Reviewing the understanding of the commission in regard to the conditions which the Interborough Rapid Transit Company has sought to impose, Mr. Willcox said in part:

"You have stated that those lines must be built as 'extra work' under Contract 1, the original contract for the construction and operation of the present subway from City Hall north, except that you will obtain the money directly, instead of indirectly, by using the city's credit, the cost being amortized out of earnings as at present.

"You also insist that the city must provide the right of way and station sites, and assume all liability to abutting property owners, except such damage as may be negligently caused by you in construction work. This means that the city must defray the cost of all real estate taken for rights of way, stations, connections, etc. You further state that you must be allowed all the favorable construction privileges contained in the contract under which the present subway was built.

"As to the operating contract, you state that it shall be coterminate with your present contract (that it shall run for 45 years, or until 1954, with the privilege of renewal for 25 years more); that the city shall pay taxes upon the physical property and upon the franchises, if any are imposed, and that no rental shall be exacted by the city."

Seven reasons are then given by Mr. Willcox for rejecting the proposal of the company as the commission understands it. The reply is embodied in a letter containing 10 typewritten pages. A brief abstract of the reasons of the commission for rejecting the proposal follows:

"1. The fundamental objection to your proposition is that it does not deal with the rapid transit problem in a broad, metropolitan way. While you refuse to extend even 1 mile or 2 miles into the built-up portion of Brooklyn, requiring a haul of 3½ to 4½ miles to City Hall, Manhattan, you propose an extension in the Bronx over 4½ miles in length, the extreme terminus of which is 14¾ miles from the City Hall, Manhattan. It is manifest that if you can afford to build the Pelham Bay Park branch and carry passengers for a 5-cent fare from that point to the lower part of Manhattan you can afford to operate an extension in Brooklyn, running a much shorter distance east or south. It has not been suggested that your company should necessarily construct, equip and operate with your own money lines to distant points; but the commission does believe that you should be willing to make proper extensions in Brooklyn. An adequate system of transportation cannot be provided along such lines. Any plan which contemplates the utilization of a few thoroughfares in the lower part of Manhattan and of the short-haul traffic in the center of narrow Brooklyn and the lower part of Manhattan solely for the benefit of certain districts in the upper portion of Manhattan and in the Bronx is illogical, unmetropolitan and unjust to the whole city. For similar reasons the commission does not view with favor your offer to operate the Broadway-Lafayette Avenue loop without any obligation to extend further into Brooklyn.

"2. The law provides for the special treatment of extensions, but we do not believe that it was intended or that it would be right for this commission to nearly double the mileage of your lines as 'extra work' under Contract No. 1, and call these very important additions 'extensions,' when they really constitute a new system. Furthermore, public opinion has condemned the 75-year irrevocable, non-profit-sharing grant—Contract No. 1—as too unfavorable to the interests of the city. The Legislature has passed laws making the repetition of such grants impossible for independent lines. The Rapid Transit Commission did not follow them in Contract No. 2.

"3. Under Contract No. 1 you are required to pay interest and sinking fund upon the cost of construction, including land for subway purposes. Your present proposition is that the city shall pay for all land, easements and rights that are necessary, and allow you the use of such property without charge. Thus the city would have to pay annually by taxation the interest upon this cost.

"4. You also insist that such taxes as shall be levied upon your company in connection with the new lines shall be paid by the city. Thus, if the State of New York should change the system of taxation and levy a tax upon you and other common carriers, you would be exempt, according to the terms of your offer. We do not believe that the general

taxpayer should be burdened in this way, especially in view of the fact that the additional lines you desire will be very remunerative, especially the Seventh Avenue line, which will carry the larger portion of the traffic from the Pennsylvania Railroad station—a very profitable short-haul traffic.

"5. The commission considers that it would be unwise to give you a franchise under which there would be no sharing of profits with the city. The Rapid Transit act provides that in connection with new, independent lines the operators shall share profits with the city after the payment of all proper charges, including interest upon the cost. Your proposition contains no such provision.

"6. Viewed as operating lines, the proposed routes in Manhattan are largely satisfactory; but your refusal to build or operate route 18 in the Bronx, while at the same time proposing a branch connecting with your present line at Westchester Avenue and Southern Boulevard and extending to Pelham Bay Park, is open to criticism.

"7. We cannot believe that you are prepared to insist that you be allowed all of the construction privileges contained in the original subway contract. The methods there permissible aroused such widespread opposition that no contract since drawn has allowed such latitude, and this commission is not prepared to reverse recent policies and return to the methods practised 10 years ago. The welfare of the city will not permit it.

"Coming to the portion of your proposition relating to elevated tracks, we understand your proposition to include the following:

"Additional tracks upon the Second Avenue, Third Avenue and Ninth Avenue lines, with such crossovers, approaches and stations as may be necessary to operate the additional tracks as express lines.

"Extension of Eighth Avenue elevated road across McComb's Dam Bridge easterly to River Avenue and northerly by River and Jerome Avenues to 194th Street.

"You propose that a franchise be given you for these additional tracks and that the terms of such franchise shall not exceed the terms proposed by the Rapid Transit Commission early in 1898.

"You have indicated that you consider a payment equivalent to 2 per cent of the additional gross receipts which accrue after the additional tracks are added as the compensation which you are willing to pay. If this is your last word upon the subject we are ready to state that it is inadequate. Under the State law the minimum compensation required of street railways is 3 per cent of gross receipts for the first five years and 5 per cent thereafter. The third-tracking of the elevated roads is probably the most valuable right which the city can give to any company when compared with the expense involved, and we do not believe that your offer could be considered adequate when viewed in any light.

"In view of the entire dissimilarity between the engineering features of your recent proposal and the proposal of the Rapid Transit Commission in 1898, it is the opinion of the commission that the two are not comparable, and that the compensation provided for third-tracking alone is quite inadequate. We believe that more progress would be made if you would do as has been suggested, viz., present a new proposition based upon conditions as they exist to-day. As you insist that the proposition you had made in writing should be accepted or rejected as a whole, we have no alternative but to reject your proposal, and suggest that a new proposal be made or that you indicate your willingness to modify the terms proposed."

Unofficial reports are being returned of the vote on the four proposed amendments to the constitution of the State of New York at the election on Nov. 2. One amendment, known as the "debt limit amendment," is designed chiefly to extend the borrowing powers of the City of New York by permitting the city, under control to be prescribed by the Legislature, to exclude from the computation of the debt limit bonds issued exclusively for rapid transit and dock improvements so long as such bonds are self-sustaining and self-extinguishing. The tabulation of the rate so far prepared shows that less than 35 per cent of the electors in Manhattan and the Bronx expressed any opinion on the proposed changes in the law, and that 60 per cent of those who did record their opinions voted in favor of all the amendments. It is very evident that all were carried, although the official count will not be made public for several weeks.

An extension of the system of the Brooklyn Rapid Transit Company into Manhattan to connect Coney Island and the North River by means of the Manhattan Bridge and a subway under Canal Street has been tentatively proposed by the company to the Public Service Commission. The proposal is as yet indefinite. It includes the operation of cars over the Manhattan Bridge and under Manhattan, the building of an elevated line between Coney Island and Brighton Beach, the operation of cars under lease from the city through a new subway to be built between the Prospect Park station and Fourth Avenue and the laying of two additional tracks between Church Avenue and Prospect Park station.

The Public Service Commission has sent a letter to the New York Central & Hudson River Railroad notifying the company of the commission's belief that the Rapid Transit act as it is now amended is adequate to provide a solution of the removal of surface tracks from Eleventh Avenue. If the New York Central & Hudson River Railroad is disposed to act under the provision which enabled the Pennsylvania Railroad to receive a franchise to build its tunnels under the streets of Manhattan, and will make proper application to the Public Service Commission, the commission is convinced that the Eleventh Avenue situation can be cured. Officers of the New York Central & Hudson River Railroad have been quoted recently as saying that the company is ready to spend $60,000,000 in removing its tracks from the surface of the streets on the west side and only awaits additional legislation before going ahead with its plans. A bill passed by the last Legislature which had to do with the case in question was vetoed by the Governor as inadequate.

Annual Report of Boston Transit Commission

The 15th annual report of the Boston Transit Commission, covering the fiscal year ending June 30, has been published by the board. The first part of the report consists of the usual résumé of the year's work of the commission, including appreciative comments upon the services of Howard A. Carson, lately chief engineer of the board; the opening of the Washington Street tunnel in November, 1908; legislative reference of Boston transportation matters to the Massachusetts Railroad Commission and the Boston Transit Commission sitting as a joint board; location of the Boston terminus of the Cambridge subway; construction of an additional subpassage at the Boylston Street subway station by the Boston Elevated Railway to prevent the making of round trips for a single fare; receipts and expenditures.

The net toll receipts of the East Boston tunnel at 1 cent per passenger for the year were $107,663.85, the additional cost of collection being $17,825.56, including wages, cost of exit tickets, cost of entrance tickets, power for lighting and heating, cost of accounting, proportion of indemnity insurance premiums on bonds of collectors, toll collectors and ticket sellers. The total cost since organization of the commission's work to June 30, 1909, was about $17,167,000, of which the Tremont Street subway required $4,125,068; Charlestown bridge, $1,570,197; East Boston tunnel, $3,225,437; Washington Street tunnel, $7,962,463.

The report of Chief Engineer Carson reviews the final work leading up to the opening of the Washington Street tunnel, improvements at Haymarket Square, interior finish of stations, methods of supporting the Boston City Hospital Relief Station, contracts for subway work, progress on the Beacon Hill tunnel work, pipe changes and leakage in the East Boston tunnel. Special effort was made in the work at Haymarket Square to determine whether the steel used in the Tremont Street subway about 14 years ago had deteriorated on account of rust. In the alteration of the station about 200 columns, 70 beams and 150 knee braces were removed, and portions of other steel members were uncovered. Practically all of this steel was found to be substantially free from rust, but rust was found on the bottom of some large base plates and columns. The coating was thin, but had local swellings, in some cases ¼ in. thick. It was thought to have been caused by a slight settling or shrinking away of some of the finer portions of the concrete under the plates, leaving the latter resting on the coarser portions. The smaller base plates were practically free from rust. In this reconstruction work the concrete was removed by drilling holes about 6 in. apart through it with air drills and breaking it out with hammers and wedges. The leakage in the East Boston tunnel has been reduced from 8 gal. per minute in 1907 to 6 gals. per minute in 1909.

Long Island Railroad Electrification Work

Ralph Peters, president of the Long Island Railroad, has issued a very interesting statement regarding the work done by the company in electrifying its lines and preparing for tunnel service into New York.

By Dec. 31, 1909, the electrification of 40 miles of track, on which work was begun this year, will have been com-

pleted, and more than 140 miles of road will be ready for electric operation. Contracts have been placed for 130 new steel cars, the first of which are to be delivered by Jan. 1, 1910, and the last by May 1, 1910. The completion of these contracts will furnish the company with 400 steel passenger cars for operation between Manhattan and Brooklyn and the sections reached by the third-rail lines.

On June 1, 1910, the lines will be in full operation, and by that time work will be well advanced on the electrification and double tracking of the entire North Shore division of the road from Winfield Junction to Flushing, Whitestone, Malba and Whitestone Landing, and from Whitestone Junction to Port Washington. A site for a substation to supply power for this division has been secured at Winfield. Before the end of next summer the road will be carrying passengers from the entire North Shore territory direct to Manhattan.

It is estimated that the opening of improved transportation service through the Pennsylvania tubes will effect a saving in traveling time of about 25 minutes each way, as compared with the present trolley and ferry service. The estimated running time from Manhattan to Jamaica will be 18 minutes; to Flushing, 16 minutes; to Malba, 18 minutes, and to Fort Washington and Whitestone Landing, 32 and 22 minutes, respectively.

The most important of the projects nearing completion are the construction of two additional running tracks, the reduction of grades and the elimination of grade crossings between Winfield and Jamaica. With this new trackage there will be eight running tracks between the tunnel entrance and Whitfield and four to the Jamaica terminal. The Glendale cut-off, from Glendale to Woodhaven Junction, will furnish a double-track connection with the Far Rockaway and Rockaway Beach branches.

As far as possible the company will divert its freight trains from passenger tracks, and to this end one of the most important improvements has been practically completed by the construction of the Montauk freight cut-off between the North Shore freight yards at Long Island City and the Montauk division at Dutch Kills Creek. On Feb. 1, 1910, the company hopes to operate its first regular passenger trains from Manhattan and Brooklyn to Jamaica.

Forest Hills Elevated Extension Opened in Boston

The Boston (Mass.) Elevated Railway opened the Forest Hills extension of its elevated system for traffic at 5:16 a. m. on Nov. 22, 1909. The line is a double-track third-rail route about 26 miles long, and extends southward from the Guild Street car house of the company through Egleston Square to Forest Hills, where surface car lines transfer passengers to and from West Roxbury and suburban points in somewhat the same manner that has prevailed at Dudley Street and Sullivan Square since the opening of the elevated train service in 1901. At Forest Hills, however, the surface cars are kept at the street level, and transfer is by stairways and an escalator between the upper and the lower levels.

The running time between Forest Hills and Dudley Street has been reduced about 9 minutes by the new line, and it is now possible for a passenger to travel from Forest Hills to Sullivan Square via the Washington Street tunnel in 25 minutes, compared with from 50 to 60 minutes before the elevated train service was inaugurated eight years ago. The distance is about 7.5 miles, and 18 minutes are saved in the round trip between the West Roxbury district and the center of the city, the running time from Milk Street station in the Washington Street tunnel to Forest Hills being 18 minutes, as against 27 minutes before the opening of the extension. The actual train running time between Forest Hills and the South station, via the Atlantic Avenue division of the elevated system, is now about 15 minutes, against about 25 minutes under the former arrangements. The company will undoubtedly secure a large amount of patronage which formerly went to the steam railroad lines running to the south of Boston.

The physical features of the new line have been described in the Electric Railway Journal. The most noteworthy characteristics are the use of reinforced concrete in the station platforms at Egleston Square and Forest Hills, and the extensive application of this material where the line crosses the Arborway, and also in the structure of the Forest Hills station itself. Provision has been made in the new line for the easier removal of ties compared with the difficulties of withdrawing and replacing them on the earlier elevated lines. Sheet copper has been extensively used in the architectural design of the stations, and a liberal window-glass surface provided at the Forest Hills terminus. A substation is now under construction near Egleston Square for supplying current to the trains. The line is signaled with automatic blocks, and in some cases home and distant signals are installed on the same post. Sharp curves and heavy grades are absent and high-speed running for upward of a mile at a time is possible. In the use of a single station between Dudley Street and Forest Hills, with surface car transfer facilities between the elevated and the street below, the company adheres to its plan of providing express train service between the center of the city and the outer distributing points, leaving the local travel to surface cars as at Sullivan Square and Dudley Street. By the opening of the new line Dudley Street has become in part a way station, although a liberal surface car service is still operated between that station and the intermediate suburban districts between it and Brookline and Dorchester.

Two More Articles on the New York Subway

The two final articles in the series which have appeared in the *Evening Post* of New York, on the New York rapid transit situation, were published on Nov. 24 and Nov. 27. That on Nov. 24 was entitled "Five-Cent Fare Practicable." The first requisite for future rapid transit in New York, according to the author of the articles, is that the city should grow in a westerly direction rather than north and south. This can be done by constructing east and west transit lines, and they would develop considerable territory close to the City Hall not now fully utilized. A part of the cost of such a rapid transit line could be raised by assessment on the land to be benefited. Instances were cited of the increase of land value due to the construction of the present subway.

The final article declared that the city was not dependent upon either the Interborough Rapid Transit Company or the Brooklyn Rapid Transit Company for the construction of further subways. Among the possible builders of future subways the article mentioned the Bradley, Gaffney, Steers Company, which has already submitted a proposition to build and operate what is known as the Broadway-Lexington Avenue line; the New York, New Haven & Hartford Railroad which, at great expense, is now completing a six-track railway from New Rochelle to the Harlem River; the New York Central & Hudson River Railroad, with whom the city is discussing the construction of a modern rapid transit line on Eleventh Avenue; the Hudson & Manhattan Railroad and the Amsterdam Corporation, of which W. J. Wilgus is president. The latter company has proposed the construction of a belt line railroad on the east and west sides of the city.

Committee on Subjects of Claim Agents' Association

E. C. Carpenter, president of the American Street & Interurban Railway Claim Agents' Association, has announced the appointment of the committee on subjects of that association to report at the January meeting of the executive committee. This committee is as follows:

H. V. Brown, claim agent, Public Service Railway Company, Newark, N. J.

C. B. Hardin, claim agent, United Railways Company of St. Louis, St. Louis, Mo.

M. P. Spillane, claim agent, Boston Elevated Railway Company, Boston, Mass.

Association Meetings

Street Railway Association of the State of New York.—Albany, N. Y., Dec. 7 and 8.

Central Electric Accounting Conference.—Dayton, Ohio, Dec. 11.

Central Electric Railway Association.—Columbus, Ohio, Jan. 27, 1910.

Conference on Electrification in Chicago.—The transportation committee of the City Council of Chicago has invited the railroads operating into Chicago to send one representative each for a private conference on electrification.

Appraisal of St. Louis Properties.—The Public Service Commission of St. Louis has decided to make an appraisal of the property of the United Railways of that city, following a similar valuation of the property of the Union Electric Light & Power Company. The appraisal of the property of the Union Electric Light & Power Company has not yet been completed.

Electrification of Columbus & Lake Michigan Railroad.—The Ohio Electric Railway, Cincinnati, Ohio, which several years ago acquired the Columbus & Lake Michigan Railroad between Lima and Defiance and reballasted and reconstructed the roadbed, has begun the work of equipping the line for operation by electricity. It is proposed to handle all passenger traffic by electricity, but to continue

the steam locomotives in use for hauling freight for the present at least. It is expected that the work of equipping the line with electricity will be completed by Dec. 18, 1909.

Accident to Winnipeg Plant.—One of the penstocks at the Lac du Bonnet generating station of the Winnipeg (Man.) Electric Railway, 50 miles from Winnipeg, burst on Nov. 23 and the power house was flooded, with the result that power, lighting and street railway service in Winnipeg had to be suspended temporarily. The company placed its reserve steam plant in Winnipeg in operation, but the capacity of this station is only 8000 hp as compared with 20,000 hp received from Lac du Bonnet and it was only possible on several days partially to meet the requirements of the street railway and lighting service.

Track Elevation Ordinance Passed in Chicago.—The Council of Chicago has passed an ordinance which prohibits the Chicago & Oak Park Elevated Railway from running trains west of North Fifty-second Avenue until it raises its tracks from the surface. The ordinance becomes effective with the Mayor's signature and the police are ordered to forbid the trains to operate on the surface, through Austin and Oak Park. The ordinance provides a penalty of $25 a day for each car operated over the surface in Austin six months after the passage of the ordinance, unless the company has by that time submitted plans for elevation which meet the approval of the city. Clarence A. Knight, president of the company, intimated that an injunction would be asked prohibiting the enforcement of the ordinance.

Complaint About Horse Railway Rails in New York City.—The Public Service Commission of the First District of New York on Nov. 23, 1909, adopted a complaint order against the Dry Dock, East Broadway & Battery Railroad, directing it to answer in 10 days a complaint filed with the commission by business concerns of North Moore Street, New York, and vicinity, alleging that the tracks of the company in North Moore Street, between West Broadway and Washington Street, over which horse cars are operated, consist of old-fashioned strap rails so laid that wagons, trucks and other vehicles, when loaded, are unable to turn out of the tracks without delay and inconvenience and that the congestion resulting renders it impossible for fire apparatus to get through the streets at times. The petitioners ask that the company be directed to repair its tracks in North Moore Street by replacing the present rails with rails such as are used by other companies generally throughout the city.

Canadian Company Arranges for Power from Municipality.—Failure on the part of the Kingston, Portsmouth & Cataraqui Electric Railway and the City Council of Kingston, Ont., to agree upon the terms of a contract whereby the railway was to receive power from the municipal plant resulted in the company suspending operation on Nov. 23 and 24, 1909. The company wanted a 5-year contract at 1.20 cents per kw-hour, but the City Council would not consent to a contract for more than three years at this rate, claiming that it might be necessary to increase the capacity of its plant before the expiration of the 5-year contract on account of increased demands for power. On Nov. 25 an agreement was reached between the company and the representatives of the city whereby the company will be supplied with power for five years at the rate previously mentioned on condition that the company pay $500 interest and depreciation if new boilers should be required during the period of the contract. The Council was to ratify the agreement on Nov. 30, 1909.

Report on Proposed Municipal Lines for Toronto.—The report on the municipal subway proposed by H. C. Hocken, Controller of Toronto, has been submitted by J. W. Moyes, who was especially engaged to make the report. Mr. Moyes recommends the construction of 3¾ miles of underground lines and about 18 miles of surface lines at an estimated cost of $4,885,000. The route suggested for the underground lines is Front Street, from St. Lawrence Market to the site of the new Union Station; Yonge Street, from Front Street to St. Clair Avenue, and Bloor Street east from Yonge Street to the corner of Broadview and Danforth Avenues. The report states that construction of the lines would solve the radial railway problem by providing an entrance to the center of the city and St. Lawrence Market for the railways projected by the Toronto & York Radial Railway from Hamilton, the one from London and the one from Cobourg. The special committee of the City Council to which the report was referred has passed a resolution recommending that the City Council submit a referendum at the municipal elections on Jan. 1, 1910, as follows: "Are you in favor of the Legislature of Ontario giving Toronto the power to construct and operate a municipal system of subways and surface street railways if approved by the property owners?"

Financial and Corporate

New York Stock and Money Market

November 30, 1909.

Although there was considerable activity and a pointed effort toward recovery in the stock market to-day, the result was unsatisfactory. Ever since the announcement of the decision adverse to the Standard Oil Company Wall Street has been nervous and timid. The fear that the principles laid down in that decision would reach other industrial combinations and would prevent the proposed copper merger caused widespread liquidation and prices are many points lower.

Otherwise the conditions favor a strong market. The money market is not in a condition to force selling. Rates for money have not been advanced for a month and the situation of the foreign banks has been vastly improved. Local rates to-day were: Call, 4 to 5 per cent; 90 days, 4¾ to 5 per cent.

Other Markets

Rumors concerning receivership proceedings have caused renewed weakness in Chicago Subway stock, and this is the principal feature of the market of that city. Under active selling to-day the price went as low as 4⅛ and buyers were hard to find. Other tractions were not in the market.

In Philadelphia there has been moderate activity in Rapid Transit, but the price has been inclined to sag. There has been little doing in other issues and prices have remained about stationary.

In the Boston market, Massachusetts Electric shares have been practically the only tractions that have been dealt in. The preferred has been the more active, and each issue has sustained fractional losses during the week. There have been a few sales of Boston Suburban during the week at 15.

United Railways bonds continue to sell in Baltimore at figures that are slightly higher. There are few transactions in traction stocks.

Quotations of various traction securities as compared with last week follow:

	Nov. 22.	Nov. 30.
American Railways Company	a45½	a45¼
Aurora, Elgin & Chicago Railroad (common)	a50	a49¾
Aurora, Elgin & Chicago Railroad (preferred)	a92	*92
Boston Elevated Railway	130	a131
Boston & Suburban Electric Companies	15	a18
Boston & Suburban Electric Companies (preferred)	77	a76¾
Boston & Worcester Electric Companies (common)	a12	a12
Boston & Worcester Electric Companies (preferred)	a52	a50
Brooklyn Rapid Transit Company	77¾	77½
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	86¼	85⅞
Capital Traction Company, Washington	a135	a133½
Chicago City Railway	*190	a190
Chicago & Oak Park Elevated Railroad (common)	*2	*2
Chicago & Oak Park Elevated Railroad (preferred)	*10	*10
Chicago Railways, ptcptg., ctf. 1	a101	a100
Chicago Railways, ptcptg., ctf. 2	a32½	a32¾
Chicago Railways, ptcptg., ctf. 3	a20	a20
Chicago Railways, ptcptg., ctf. 4s	*10	*10
Cleveland Railways	*84	*84
Consolidated Traction of New Jersey	a77½	a77½
Consolidated Traction of New Jersey, 5 per cent bonds	a107	a107
Detroit United Railway	*60¼	*60¼
General Electric Company	162	159¼
Georgia Railway & Electric Company (common)	a103	100
Georgia Railway & Electric Company (preferred)	a88	87
Interborough-Metropolitan Company (common)	22½	22¾
Interborough-Metropolitan Company (preferred)	54¾	54¾
Interborough-Metropolitan Company (4½s)	82⅝	82⅞
Kansas City Railway & Light Company (common)	a39	a38½
Kansas City Railway & Light Company (preferred)	*82	*82
Manhattan Railway	140	139½
Massachusetts Electric Companies (common)	a16½	a16
Massachusetts Electric Companies (preferred)	a80	a78⅞
Metropolitan West Side, Chicago (common)	a17	a17
Metropolitan West Side, Chicago (preferred)	a53	a52½
Metropolitan Street Railway	a25	a24
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	79	78
Northwestern Elevated Railroad (common)	a18	a18
Northwestern Elevated Railroad (preferred)	a68	a68
Philadelphia Company, Pittsburg (common)	a48¾	a48¾
Philadelphia Company, Pittsburg (preferred)	a44½	a44½
Philadelphia Rapid Transit Company	a26⅝	25⅞
Philadelphia Traction Company	a89	89
Public Service Corporation, 5 per cent col. notes	*100⅛	*100⅛
Public Service Corporation, ctfs.	a101	a105
Seattle Electric Company (common)	117	a117
Seattle Electric Company (preferred)	103½	a104
South Side Elevated Railroad (Chicago)	a56	a53
Toledo Railways & Light Company	*8	*8
Third Avenue Railroad, New York	19½	18¾
Twin City Rapid Transit, Minneapolis (common)	*109	109½
Union Traction Company, Philadelphia	52½	52¼
United Rys. & Electric Company, Baltimore	a13½	a14
United Rys. Inv. Co. (common)	*42	40
United Rys. Inv. Co. (preferred)	*72½	*72½
Washington Ry. & Electric Company (common)	a44	a44
Washington Ry. & Electric Company (preferred)	a91	a91
West End Street Railway, Boston (common)	92½	93
West End Street Railway, Boston (preferred)	105	104¼
Westinghouse Electric & Manufacturing Company	85⅞	83
Westinghouse Elec. & Mfg. Company (1st pref.)	*140	*140

a Asked. * Last Sale.

Chicago Railways Company's Earnings for October

The income statement of the Chicago (Ill.) Railways Company for September, 1909, compares with September, 1908, as follows:

Income—	1909.	1908.
Passengers	$1,039,025	$939,048
Chartered cars	304	346
Mail	2,892	2,629
Advertising	5,250	2,916
Rent of land and buildings	1,033	1,277
Rent of equipment	2,541	3,120
Sale of power	1,688	1,397
Interest on deposits	4,695	3,044
Miscellaneous income	8,624	6,788
Gross	$1,066,056	$960,567
Expenses—		
Maintenance of way and structures	$47,782	$93,548
Maintenance equipment	65,009	83,577
Renewals	8,782	1,300
Operation power plants	117,023	73,858
Operation card	327,641	295,582
General expenses	116,710	110,904
Expense acct. investment real estate	4,268	3,477
Taxes (estimated)	30,982	176,558
Total	$718,201	$788,808
Balance (actual)	$347,854	$171,759
Balance (based on 70 per cent operation)	319 816	288,170
Deduct interest, 5 per cent on valuation	198,324	146,447
Net income	$121,492	$141,722
City of Chicago, 55 per cent	66,820	77,947
Chicago Railways Co., 45 per cent	54,671	63,775

The following table shows the monthly gross income of the company from February to October, 1908 and 1909:

	1909.	1908.
February	$870,720	$758,942
March	985,927	2,857,732
April	997,347	865,434
May	1,055,160	902,482
June	1,047,639	933,467
July	1,077,693	962 558
August	1,088,209	980,166
September	1,066,056	960,567
October	1,110,000	968,542
Total	$9,298,751	$8,189,890

Annual Report of Christchurch Tramway Board

The annual report of the Christchurch (New Zealand) Tramway Board for the year ended March 31, 1909, shows that gross earnings from operation were £86,182, as compared with £81,296 in the previous year. Operating expenses were £50,397, as compared with £52,701, leaving net earnings from operation of £35,785 in the last year, as compared with £28,595 in 1907-08. After other adjustments and provision for interest and sinking fund requirements, the net income was £18,574, as compared with £11,958. The deductions from net income aggregated £12,279 in the last year and £11,312 in the previous year and consisted of appropriations for the depreciation reserve fund, renewals fund, fire reserve fund and public accident reserve fund. Of the surplus of £6,294 remaining last year, after provision for these funds, comparing with £645 in the preceding year, £500 was transferred to the employees' accident reserve fund and £5,794 was written off preliminary expenses.

Herbert Pearce, chairman of the board, in discussing the subject of depreciation in his review of the operations of the year, said:

"The board's policy is to transfer to a renewal fund 1½ per cent of the loan moneys, which fund is invested for the time being in the board's own undertaking without interest, and to pay over a like amount as depreciation reserve fund to special commissioners, with instructions to invest in interest-bearing securities. In addition to the renewals fund mentioned, ordinary maintenance and repairs are charged to each year's revenue account.

"After the tramways have been in operation for 25 years, the position of the present lines will be approximately as follows:

Owing to debenture holders	£437,000
The sinking fund (½ per cent) assuming it has been invested at 4 per cent without breaks for the whole period, will have amounted to	90,996
Leaving a liability still to be provided for of	£346,004
The depreciation reserve fund if invested continuously at 4 per cent. will have amounted to	£277,299

"Assuming for the sake of argument that the undertaking was then going to be wound up, this depreciation fund being in liquid form could be used to pay off debentures, which if done would reduce the total liability to £68,705.

"I hold that it is not the duty of the present ratepayers to hand over to the next generation the tramway undertaking absolutely free of debt. Our duty is complied with if we provide that the actual value of the undertaking, after allowing for the depreciation which must take place, is not less than the amount of liabilities at the time.

"Given, then, that the liability will in 25 years be £68,705, what will be the actual value of the undertaking?

"The solution of the question depends upon the 'life' of the various portions of the undertaking. It is at this point that so much difference of opinion exists.

"In England the 'life' of rails is estimated at from 10 to 20 years. On the Continent the experts' estimates for rails on straight lines with light traffic vary from 10 to 30 years. There are equally different opinions with regard to other items.

"Bearing in mind the fact that, in addition to repairs and maintenance being charged to each year's revenue account, a sum of £153,950 will have been available during the 25 years for renewals, I therefore think it is fair to assume, taking all matters into consideration, that the undertaking—costing initially £443,900—will be worth £68,000 in 25 years' time, assuming that no great revolution in passenger locomotion methods takes place in the interval."

Annual Report of the Glasgow Corporation Tramways

The fifteenth annual report of the tramways committee of the Corporation of Glasgow, relating to the year ended May 31, 1909, shows that the gross revenue amounted to £892,750 and the working expenses, excluding depreciation, to £505,617, leaving a balance of £387,133. As compared with the previous year, the gross revenue decreased £17,567, which is attributed to the general depression in trade. Working expenses in the year ended May 31, 1908, were £509,894. Reduced to a car mileage basis, the working expenses showed a decrease of .06d. Less was expended on repairs and maintenance of permanent way and of electrical equipment of the line. The saving in this and other features of the expenses, however, was partly overcome by an increase of £17,856 in the rates and taxes, due to the fact that the tramway lines within the city were assessed for various purposes by the corporation on the full valuation instead of on one-fourth, as formerly.

The balance at the credit of the depreciation and permanent way renewals fund at the close of the last year was £1,383,289. The amount at the credit of this fund one year previous was £1,224,051, but from this amount there was deducted for expenditures throughout the year £36,560 and there was added from the revenue of the year the sum of £195,798 to meet depreciation and renewals.

The corporation operated 189.5 miles of single track. It expended during the year on the upkeep of the track, in ordinary repairs, the sum of £41,120. In addition, £90,261 was set aside from the year's revenue to meet the cost of renewal of track. This figure was calculated at the rate of £500 per mile of single track. The number of passengers carried was 221,744,569. as compared with 226,948,290 in the preceding year. The number of car-miles run last year was 20,802,797, and in the year ended May 31, 1908, 20,766,722. The number of car-hours was 2,795,942, as compared with 2,808,711. The proportion of total receipts required for working expenses was 56.6 per cent, as compared with 56 per cent in the preceding year.

Annual Report of the Melbourne Tramway & Omnibus Company, Ltd.

The thirty-sixth report of the directors of the Melbourne Tramway & Omnibus Company, Ltd., shows the operations for the year ended June 30, 1909. The traffic receipts amounted to £578,231, an increase of £20,793. The total number of passengers carried was 68,194,052, an increase of 2,626,932.

The digest of proceedings at the annual meeting of the shareholders of the company on Aug. 10 contains an explanation of the report and balance sheet made by F. B. Clapp, chairman of the directors. The chairman said in part:

"The shareholders will be pleased to note the continued increase in the traffic receipts, which have been going up for several years, but lately at a decreasing ratio, the rate of increase this year being only 3.73 per cent, against 7.50 per cent last year and 8.25 per cent the year before; and this year would have been less still but for the visit of the American fleet to Melbourne in September last.

"The increase in revenue has been considerably offset by the increase in working expenses, totaling £18,923, but I am sure it will be apparent to every one that we cannot carry a steadily enlarging traffic and keep tracks, rolling stock and buildings in good order without more expense for labor, motive power and repairs."

Farmington Street Railway, Hartford, Conn.—A special meeting of the stockholders of the Farmington Street Railway has been called for Dec. 20, 1909, to vote on the proposal to sell the property of the company to the New York, New Haven & Hartford Railroad.

Holmesburg, Tacony & Frankford Electric Railway.—A second committee has been formed in the interests of the first mortgage bondholders of the Holmesburg, Tacony & Frankford Electric Railway, which defaulted on the interest on $400,000 bonds due Nov. 1, 1909. The committee is composed of Joseph McMorris, secretary of the Fidelity Trust Company, Philadelphia; L. A. Baltz, vice-president of the Pennsylvania Company for Insurances on Lives and Granting Annuities; Edwin L. Blabon, of Geo. C. Blabon & Company, and W. L. Haehnlen, of Charles Fearon & Company. The Fidelity Trust Company will be the depository for bonds. Jacob S. Disston is chairman of the first committee, mention of which was made in the ELECTRIC RAILWAY JOURNAL of Nov. 20, 1909, page 1081.

Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Ind.—The report of H. J. Milligan, receiver for the Indianapolis, Crawfordsville & Western Traction Company, for October, 1909, filed in the Federal Court, shows gross earnings of $14,897, operating expenses of $8,270 and the net earnings of $6,627. The net surplus for the month was $1,288 and the balance on hand on Nov. 1 was $18,917. Of the total earnings, $13,064 constituted passenger earnings and $1,285 the freight earnings.

International Traction Company, Buffalo, N. Y.—Morris Cohn, Jr., and Porter Norton have been elected directors of the International Traction Company to succeed Henry J. Pierce and Arthur Robinson.

Johnstown (Pa.) Passenger Railway.—Spencer Trask & Company, New York, N. Y., offer for sale, at a price to yield 5 per cent refunding mortgage 4 per cent gold bonds of the Johnstown Passenger Railway. The bonds are dated Dec. 1, 1901, and due Dec. 1, 1931, interest being payable June 1 and Dec. 1 of each year. They are redeemable at 105 and interest on six weeks' notice and are also tax exempt in Pennsylvania.

Los Angeles-Pacific Company, Los Angeles, Cal.—A meeting of the stockholders of the Los Angeles-Pacific Company has been called for Jan. 6, 1909, to vote on the question of issuing $20,000,000 of bonds, $10,000,000 of which approximately will be used to defray the expense of building a 4-mile subway from Fourth and Hill Streets to Western Avenue, Los Angeles, and the remainder to be used to retire outstanding bonds of the company.

Massachusetts Electric Companies, Boston, Mass.—The trustees of the Massachusetts Electric Companies declared a semi-annual dividend of 1¾ per cent. This is at the rate of 3½ per cent per annum, an increase of ½ per cent per annum ab ve the rate previously in force. The dividend is payable Jan. 1, 1910.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—The New York Stock Exchange has listed $6,347,000 of refunding and extension mortgage 4½ per cent bonds of the Milwaukee Electric Railway & Light Company, due in 1931.

New York Central & Hudson River Railroad, New York, N. Y.—The New York Central & Hudson River Railroad has been granted permission by the Public Service Commission, Second District, New York, to subscribe for 4208 1/3 shares of additional stock of the New York, New Haven & Hartford Railroad for $526,042. The company stated in its petition that it owns 11,248 shares of stock of the New York, New Haven & Hartford Railroad, and 206,300 par value of the 3½ per cent convertible debentures and $4,000 par value of the 6 per cent convertible debentures of that company. The New York Central & Hudson River Railroad has the right as a stockholder, under the resolution recently passed by the New York, New Haven & Hartford Railroad, to subscribe for increased stock of that company at $125 per share to the amount asked for in the petition. The New York Central & Hudson River Railroad stated that it was of the opinion that because of the relations between it and the New York, New Haven & Hartford Railroad, especially in view of the mutual interests which they have in the Grand Central Terminal, New York City, it is to the advantage of the New York Central that it should maintain a substantial interest in the stock of the New York, New Haven & Hartford Railroad, and that it should retain its present proportionate holding by availing itself of the right to subscribe for additional stock.

West End Street Railway, Boston, Mass.—At the annual meeting of the stockholders of the West End Street Railway recently the directors were all re-elected.

Traffic and Transportation

Order on Heating Cars in Greater New York

The Public Service Commission of the First District of New York has served upon all the street railways in Greater New York an order requiring the observance of certain heating regulations in cars operated between Oct. 15 and April 15. The form of the proposed order was published in the ELECTRIC RAILWAY JOURNAL of Oct. 30, 1909, page 955, together with a report of the first hearing on the order, and the reports of the subsequent hearings were published in the issues of the ELECTRIC RAILWAY JOURNAL of Nov. 13, 1909, page 1018, and Nov. 20, 1909, page 1082. Section 3 of the proposed order, requiring thermometers to be placed in cars, was opposed by all the companies as inexpedient, as was also the proposal to make the minimum temperature 45 deg. Fahr. The order adopted by the commission does not require the use of thermometers and fixes the minimum temperature at 40 deg. Fahr. It follows:

"ELECTRIC CARS

"1. All closed cars in service for the transportation of passengers between Oct. 15 and April 15 in each year shall be equipped with suitable apparatus for heating by electricity.

"2. Every company shall during the period above named, whenever the outside temperature is less than 40 deg. Fahr., maintain in all closed cars in service for the transportation of passengers a temperature of not less than 40 deg. nor more than 65 deg. above zero Fahr., unless the company is temporarily prevented from doing so by storm, accident or other controlling emergency for which it is not responsible and which is not due to any negligence on its part.

"HORSE CARS

"1. All closed cars in service for the transportation of passengers between Oct. 15 and April 15 in each year shall be equipped with suitable apparatus for heating.

"2. Every company during the period above named, whenever the outside temperature is less than 40 deg. Fahr., shall maintain in all closed cars in service for the transportation of passengers a temperature of not less than 40 deg. nor more than 65 deg. above zero Fahr., unless the company is temporarily prevented from doing so by storm, accident or other controlling emergency for which it is not responsible and which is not due to any negligence on its part. And it is further

"Ordered, that a copy of such regulations relating to electric cars with the added words 'By Order of the Public Service Commission for the First District' be displayed conspicuously in each of said closed electric cars, and that a copy of such regulations relating to horse cars with the like addition be displayed conspicuously in each of said horse cars, both of such notices to be in a form approved by the commission."

The Public Service Commission announced the receipt of letters on Nov. 30 from the Metropolitan Street Railway, Brooklyn Rapid Transit Company, Interborough Rapid Transit Company, New York City Railway, Long Island Electric Railway, New York & Long Island Traction Company and the New York & Queens County Railway, objecting to the requirement of the order that a notice be posted in their respective cars with regard to the heating regulations, and set Dec. 2, 1909, as a date for hearing the companies' objections.

Through Routes and Joint Rates in Michigan

Negotiations are being conducted between the Michigan State Railroad Commission, the Detroit (Mich.) United Railway and the Michigan Central Railway to establish a heavy steam freight service over 25 miles of the Detroit United Railway between Oxford and Flint, Mich. Several large automobile and carriage factories are located at Flint, so that Flint is an attractive objective point for the Michigan Central Railway. At present the Père Marquette Railroad and the Grand Trunk system are the only steam railroads which serve Flint. On the electric railway between Oxford and Flint the freight service has not included the handling of much through business in carload lots. This has required transfer and delivery by steam roads.

The residents of the towns on this section of the Detroit United Railway some time ago petitioned the Michigan Railroad Commission to provide them with freight service which would not require the transfer of shipments from electric to steam cars or vice versa. The petition stated that such transfer of freight to and from electric and steam cars imposed increased transportation and transfer charges upon shippers. The commission took up the complaint.

and the Detroit United Railway agreed to reconstruct certain parts of the electric railway so that steam locomotives and freight trains could be handled over the route, if the residents desiring the service arranged to secure the right of way necessary for straightening the line and otherwise preparing for steam railroad operation. This feature has been taken care of by the several towns affected, and the reconstruction work is so far completed that steam railroad trains may be handled before Jan. 1, 1910.

The Detroit United Railway in improving the line is building water tanks and a roundhouse for a new Brooks locomotive which will be attached to the freight train. The through rates have not yet been arranged and the traffic agreement between the Michigan Central Railroad and the Detroit United Railway, which will require the exchange of equipment, is still under consideration. The Detroit United Railway, through the Rapid Railway, with tracks between Chesterfield and Marine City, Mich., connecting with the Grand Trunk Railway system at Chesterfield, is operating a steam-drawn freight service over this line in accordance with through interchange rates agreed upon by the companies and a tariff approved by the Michigan State Railroad Commission and the Interstate Commerce Commission.

Transfer Talks in Chicago

In the Electric Railway Journal of Nov. 27, 1909, page 1119, brief mention was made of the campaign of education started by the Chicago (Ill.) City Railway through the medium of transfer slips, with the idea of minimizing accidents and of putting a stop to the illegal use of transfers. The advice and warnings are printed on the backs of the transfers. The following are four examples of talks already addressed to the public on the transfers:

"Coroner Hoffman says: 'It is imperative that the traveling public conform to existing rules of traffic and transportation. No amount of legislation or of care on the part of the transportation companies can eliminate reckless deaths. This must be done by the people themselves. Fifty per cent of our fatal accidents last year were caused by people taking chances while crossing the street.'

"Before getting off this car: 1. Wait till the car actually stops. 2. Look to see there is a safe alighting place. 3. Look out for autos or other vehicles which might strike you in passing."

"Never step from behind a street car or other vehicle without being certain—absolutely certain—there is not a car or other vehicle passing in the other direction. Serious accidents happen frequently from this cause."

"The conductor is the only person who can legally issue a transfer. The person who paid a cash fare in the first place is the only person who can legally use a transfer. The city ordinances prohibit the misuse of transfers and provide a penalty therefor—a fine of not less than $5 and not more than $100."

Meeting of the Central Electric Traffic Association.—A meeting of the Central Electric Traffic Association was held at Fort Wayne, Ind., on Nov. 29, to complete the compilation of divisions of the through passenger rates shown in Joint Passenger Traffic No. 3, and correct any mistakes which may have been discovered in the tariff. It was thought that the session would last four of five days.

Discrimination in Fares Alleged in Indiana.—The Citizens' Industrial Club, of Shelbyville, Ind., charges that the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., is discriminating against Shelbyville in the schedule recently put into effect which fixes the fare between Indianapolis and Acton, which is equidistant between Indianapolis and Shelbyville, at 10 cents less than the fare between Acton and Shelbyville. The club charges that this will turn the volume of trade to Indianapolis.

Traffic Agreement Between New York Suburban Lines.—Judge Lacombe of the United States Circuit Court, has granted the application of the receiver of the Union Railway, New York, for authority to enter into an agreement with the receiver of the Westchester Electric Railroad, by which cars of the two companies will be run over the same tracks from the Bronx to Mount Vernon. Passengers traveling from the northern end of the Bronx to Mount Vernon have previously been obliged to change cars at the boundary line and pay an additional fare. If the agreement is perfected, a continuous trip will be given for one fare.

Injunction to Restrain Carrying of Freight in Montreal Refused.—The action brought on behalf of the City of Montreal to secure an injunction to restrain the Montreal (Que.) Street Railway from operating freight cars in the city was dismissed by Judge Fortin on Nov. 23, 1909. The city had ordered the company to carry stone for it and the company built cars for that purpose, and the city paid for the services rendered by the company and collected a percentage of the freight earnings. Outlying municipalities contended that if the company was prevented from carrying freight it would cause them loss by preventing them from carrying out important improvement programs. The judge held that the city failed to prove that it suffered any damage by the carrying of freight.

Service in Pittsburgh.—Having concluded the hearings at Harrisburg, regarding street railway service in Pittsburgh, the State Railroad Commission adjourned to Pittsburgh where several days during the fore part of the week beginning Nov. 29, 1909, were spent in considering complaints. At the request of the commission, Mayor Magee of Pittsburgh filed a supplementary complaint setting forth more specifically data gathered by his agents concerning the manner in which the Pittsburgh Railways has operated its lines. The company has been sustained by the commission in its defense of the rate of fare charged between Pittsburgh and Carnegie, complaint having been made to the commission by the Borough of Carnegie that the fare was excessive. The commission held that the ordinance gave the company the right to charge even more than the prevailing rate of fare.

Vest Pocket Time Table.—The Winona Interurban Railway, Winona Lake, Ind., has issued a time table in vest pocket form which, when folded, has eight pages 2 in. x 3 in. in size. The name of the road and the catch phrase, "How to go and when," followed by a request that complaints be made at the general office in Warsaw, appear on the first page, followed by complete time tables for week day and Sunday trains on the four interior pages. The time of connecting steam railroad trains at the principal towns served is shown on two pages, which also announce that limited service between Warsaw and South Bend is operated in connection with the local cars of the Northern Indiana Railway and through freight service between Chicago and Warsaw twice daily via the Graham & Morton Transportation Company's lines from Chicago to St. Joseph and the Indiana Transportation Company's lines from Chicago to Michigan City, and from either of these ports to way points by the electric railway.

Supreme Court Orders Modification of Transfer Case.—The Appellate Division of the Supreme Court of New York has ordered the Public Service Commission of the First District of New York to strike out 250 pages of printed matter in its answer to the receivers of the Metropolitan Street Railway in connection with the case involved in the issuance of transfers between the Metropolitan Street Railway and the Fifty-ninth Street Railway. The receivers obtained a writ of certiorari to review the order of the commission establishing through routes and joint rates with the Metropolitan Street Railway and the Fifty-ninth Street line. This order of the Public Service Commission was made on Oct. 30, 1908, after a hearing before it, ordering the roads to exchange transfers for a single fare, and apportioning the proportion of the rate to be borne by the roads within the transfer zone so designated. On Nov. 11, 1908, the receivers of the Metropolitan Street Railway obtained the writ of certiorari to review the action. A motion of the Public Service Commission to quash the writ was denied by the Appellate Division. The Court of Appeals affirmed this decision.

Clean Accident Record of Southern Michigan Railway.—Through the courtesy of J. McM. Smith, vice-president and general manager of the Southern Michigan Railway, South Bend, Ind., the Electric Railway Journal is able to present the remarkable operating record made by that company during the last 16 months. The Southern Michigan Railway operates 12 interurban motor cars and two express cars on a well-built 35-mile line connecting South Bend, Ind., with St. Joseph, Mich. During the last 16 months more than 800,000 car-miles have been run and more than 1,280,000 passengers carried without an accident to a passenger and without an accident of any character for which the company could be held liable. Such minor accidents as have occurred during that period have resulted from trespass or from teams pulling across the track in front of the cars. No suits for damages have been brought against the company for more than a year and a half. This record may rightly be attributed to the thorough discipline of employees and to the careful operation of cars. No dispatching system is used on the Southern Michigan Railway. Every car is operated according to a fixed schedule and the routing and passing of cars are made with systematic regularity. Extra cars are invariably put on a "double-head" schedule. All crews are notified daily between what points the work train will operate and each work train must be on the nearest side-track at least five minutes before the schedule time of any car.

Personal Mention

Mr. J. F. Goodwin has been appointed superintendent of the Sherbrooke (Que.) Street Railway to succeed Mr. P. J. Slattery, resigned.

Mr. P. J. Slattery has resigned as superintendent of the Sherbrooke (Que.) Street Railway and Mr. J. F. Goodwin has been appointed to succeed him.

Mr. F. E. Pritchard, who resigned recently as superintendent of the Rochester & Manitou Railroad, Charlotte, N. Y., has been appointed general manager of the Indiana County Street Railway, Indiana, Pa.

Mr. W. J. Sheldon has resigned as vice-president and a director of the Waynesboro & Monongahela Street Railway, Waynesboro, Pa., and will become connected with a railroad construction firm now being formed which will have offices in Waynesboro.

Mr. C. H. Kretz has recently been appointed general manager, purchasing agent and electrical engineer of the Beaumont (Tex.) Traction Company to succeed Mr. N. B. Rhoads. From 1898 until 1904 Mr. Kretz was assistant professor of mechanical engineering in charge of the mechanical engineering department in the Louisiana State University. During 1904 and 1905 he was president and manager of the Capital Light & Power Company, Baton Rouge, La., and from 1905 until recently he was manager of the Baton Rouge Electric & Gas Company.

Mr. George H. Gall has resigned as general passenger agent of the Washington, Baltimore & Annapolis Electric Railway, Washington, D. C., to act as the special representative at Washington of a number of railroads and interstate electric railways. Mr. Gall became connected with the Washington, Baltimore & Annapolis Electric Railway soon after the opening of the line about two years ago in the capacity of publicity manager. He was soon promoted to be general passenger agent and given full charge of passenger traffic, still retaining his duties pertaining to general publicity.

Mr. F. R. Newman has resigned as general superintendent and master mechanic of the York (Pa.) Railways to become connected with the Southern Cambria Electric Railway, Johnstown, Pa., as general manager. Mr. Newman has been connected with the York Railways for the last four and a half years. He entered electric railway work in 1895 as a conductor on the Lowell, Lawrence & Haverhill Street Railway and from 1896 until 1900 was connected with several electric railways in New England as motorman, conductor and inspector. From 1900 until 1902 he was assistant superintendent and master mechanic of the Citizens' Electric Street Railway, Newburyport, Mass. In 1902 Mr. Newman accepted the position of superintendent of the railway department of the San Juan Light & Transit Company, San Juan, Porto Rico, and remained at San Juan until 1905, when he accepted the appointment to the York Railways as general superintendent and master mechanic.

Mr. P. A. Freeman, who for the last 14 years has been chief engineer of the Halifax (N. S.) Electric Tramway, has been given the title of superintendent and master mechanic and has had his jurisdiction extended to the car house and all real estate of the company. Mr. Freeman was born in Newcastle-on-Tyne, and served an apprenticeship of six years with R. & W. Hanothrones. He left England for Boston in 1887 and entered the employ of the Hinkley Locomotive Works. The property of these works was taken over by the West End Street Railway, Boston, and Mr. Freeman subsequently became connected with the Boston Elevated Railway, the successor to the West End Street Railway, as foreman machinist during the erection of a temporary plant for the company in which high-speed engines were installed. Mr. Freeman was later appointed assistant chief engineer of the company and served in this capacity until September, 1895, when he accepted the position of chief engineer of the Halifax Electric Tramway, which was then installing electricity. Since then the Halifax Electric Tramway has taken over the Halifax Illuminating Company and the Halifax Gas Works.

Mr. C. E. Lenhart has resigned as master mechanic of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., effective on Dec. 1, 1909. Mr. Lenhart was born in Auburn, Pa., in 1867, and is the eldest son of a family of prominent steam railroad operating officials. He began railway work on the Philadelphia & Reading Railroad as a water boy under his father. He was promoted repeatedly, and after serving about three years in the machine, locomotive and car shops of the Philadelphia & Reading Railroad, he was transferred to the engineering department, where he advanced to transit man and assisted in mountain surveys in the anthracite coal regions which resulted in the building of several steam and electric railways. In November, 1888, Mr. Lenhart resigned from the Philadelphia & Reading Railroad to enter electric railway work as a conductor and motorman for the East Reading Electric Railway, Reading, Pa. He advanced rapidly through the shops and was subsequently made accountant and later assistant superintendent of this company. When the East Reading Electric Railway was acquired by the United Traction Company, Reading, Pa., Mr. Lenhart was appointed dispatcher of the East Reading division. Soon thereafter, however, he accepted the position of superintendent of the Buffalo, Gardenville & Ebeneyer Electric Railway, Gardenville, N. Y. He subsequently returned to Reading, however, as chief dispatcher for the United Traction Company, and on May 1, 1904, was appointed master mechanic of the company and continued in this capacity until May 1, 1906, when he was appointed master mechanic of the Buffalo & Lake Erie Traction Company, which had then been recently organized. As master mechanic of this company, the work of standardizing the equipment of the constituent companies devolved upon Mr. Lenhart, also the work of specifying the new equipment for through service between Buffalo and Erie. Mr. Lenhart is a member of several engineering societies and is an associate member of the American Street & Interurban Railway Engineering Association. He proposes to take a short vacation before re-entering electric railway work.

OBITUARY

Robert M. Van Arsdale, proprieter of the *American Engineer and Railroad Journal,* died suddenly at his home in New York on Nov. 23, 1909, as the result of a stroke of apoplexy. Mr. Van Arsdale was a member of the American Trade Press Association.

Albert V. Porter, who for many years was consulting architect for the Metropolitan Street Railway, New York, N. Y., is dead. Mr. Porter was a fellow of the American Institute of Architects and drew the plans for most of the recent car houses of the Metropolitan Street Railway system.

O. R. Fyler, of the Railroad Commission of Connecticut, died at his home in Torrington on Nov. 22, 1909. Mr. Fyler was formerly chairman of the Republican State central committee. He was born in Torrington in 1840, served in the Civil War and has been prominent in public life since that time.

Irvin Belford, Clerk of the United States Circuit Court at Cleveland, Ohio, is dead. Mr. Belford served the court many years, and acted as special master in taking testimony on the claims against the Municipal Traction Company at Cleveland and classified them so that the court has been able to discharge all that were considered preferred and take up others which will be paid later.

Isadore Newman, of Isadore Newman & Sons, New York, N. Y., died in New Orleans, La., on Nov. 30, 1909, at the age of 72 years. Mr. Newman was a native of Germany. He came to America in 1860 and settled at Harrisonburg, La. In 1868 he removed to New Orleans and engaged in business as a banker and broker. He became interested in the Carrollton Railroad, New Orleans, and subsequently entered the lighting field. He afterward relinquished his interest in these properties and became interested financially in street railway properties in Nashville, Memphis, Birmingham, Little Rock and Knoxville, which are controlled by the American Cities Railway & Light Company, of which Mr. J. K. Newman, his son, is president. Mr. Newman was the principal owner of one of the largest department stores in New Orleans.

John Caldwell, treasurer of the Westinghouse Air Brake Company, was stricken with heart disease and died in his office in Pittsburgh on Nov. 23, 1909. Mr. Caldwell had been associated with Mr. George Westinghouse since the inception of the Westinghouse Air Brake Company, and was well known in financial circles. He was also one of the trustees of the Carnegie Institute from its foundation. He was born in the north of Ireland about 70 years ago, and went to Pittsburgh when 12 years old. For several years he followed mercantile pursuits, but with the organization of the Air Brake Company in 1869 he became bookkeeper of the company, a position he retained for 10 years. He was then elected treasurer, a position he held for the rest of his life. When the Westinghouse Electric & Manufacturing Company was organized Mr. Caldwell was made treasurer of that company; but he resigned in 1892 to give his entire time to the Air Brake Company. He was also elected treasurer of the Philadelphia Company when this company was organized, but resigned in 1899. At the outbreak of the civil war Mr. Caldwell enlisted as a private in Company E, 61st Pennsylvania Volunteers, and was mustered out as a second lieutenant at the close of the war.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Irwinton (Ga.) Railway.**—Chartered to build an electric railway from McIntyre to Irwinton, 3¾ miles. Capital stock, $15,000. Incorporators: J. L. Byington, J. W. Lindsey, G. H. Carswell, I. B. Stinson and I. E. Burkett.

***Iowa City, Ottumwa & South-Eastern Electric Railway, Iowa City, Ia.**—Incorporated in South Dakota for the purpose of building an electric railway from Iowa City to Ottumwa, in the same State, a distance of 80 miles. The new company has nominal headquarters at Pierre, S. D., with a business office in Iowa City. Capital stock, $2,500,000. Incorporators: S. J. Smith, Roscoe Wilson, Frank Farmer, Iowa City, and G. P. Peterson, Pierre, S. D.

***McKeesport Belt Line Street Railway, McKeesport, Pa.**—Chartered to build a 2-mile street railway on the outskirts of McKeesport. Capital stock, $12,000. Directors: S. D. Foster, president; D. A. Foster, A. D. Foster and W. E. Hartman.

***Wilkes-Barre (Pa.) Railway.**—Chartered to construct and operate street railways by electric and cable power. Capital stock, $10,000.

FRANCHISES

Burnaby, B. C.—At the last meeting of the Burnaby Council, the solicitors of the British Columbia Electric Railway sent a letter asking that the company be allowed the option to build a tramway north of Burnaby Lake.

Bristol, Ind.—The Trustees have granted a franchise to the St. Joseph Valley Traction Company, Elkhart, to construct an electric railway through the town. H. E. Bucklen, president.

Covington, Ky.—The Cincinnati, Louisville, Lexington & Maysville Traction Company has applied to the City Council for a 100-year franchise over the streets necessary to secure an entrance through the town to the river. The application specifies that the company wants exemption from taxes for five years, and that it proposes to use the tracks of the Louisville & Nashville Railroad and the Chesapeake & Ohio Railroad for several miles just out of Covington. The company will erect a station at Covington and will have a purchasing depot near the river, where they will buy their coal. [E. R. J., Nov. 20, '09.]

Covington, Ky.—The Covington & Big Bone Railway has applied to the City Council for a franchise giving it the right to lay tracks in a number of streets for interurban service. The same company asks for the right to operate a trunk line over other streets which will give it an entrance for its line connecting Covington and Big Bone Springs, 22 miles. [E. R. J., Nov. 20, '09.]

Lincoln, Neb.—The Omaha, Lincoln & Beatrice Railway has applied to the City Council for a 99-year franchise over a number of city streets of Lincoln. The company has been using the local company's trackage from Twelfth to Eleventh on P, south on Eleventh to N, and east to Fourteenth Street. The Lincoln Traction Company has served notice that when the contract expires next August the company will be expected to find another way to a terminal.

Auburn, N. Y.—The City Council has granted a perpetual franchise to the Auburn & Syracuse Electric Railroad Company, Syracuse, which gives it the right to maintain and operate a double track east through Genesee Street from Hooper Avenue under the same time schedule as the rest of the streets.

Sherbrooke, Ont.—B. W. Hibbard, who represents a syndicate which is arranging to purchase the property of the Sherbrooke Street Railway and extend and improve the railway, has asked the Council for a new 60-year franchise, during the first 30 years of which no taxes would be exacted and for the remainder of which the company would pay the city a percentage of the profits. It was intimated that extensions would be built to Magog, Bromptonville and Windsor Mills and that 8 miles of railway could be constructed within the city limits. Mr. Hibbard is desirous of obtaining possession of the water power at Westbury, owned by the city, and it has been offered to him for $22,200, which includes $4,200 paid for plans.

Milwaukee, Wis.—The City Council has granted a franchise to the Milwaukee Electric Railway & Light Company to operate cars over the Sixteenth Street viaduct.

TRACK AND ROADWAY

***Globe, Ariz.**—Press reports state that J. B. Girand is interested in a proposition to establish an electric street railway in Globe and also a line from Globe to Miami.

British Columbia Electric Railway, Vancouver, B. C.—The New Westminster-Eburne line, recently completed by this company, was placed in operation on Nov. 15. At Eburne connection is made with the cars running to Vancouver.

Vallejo & Northern Railroad, Vallejo, Cal.—T. T. C. Gregory, president of this company, which is the successor to the Vallejo & Northern Railway, advises that construction of the line will be begun next year. It will extend from Sacramento to Woodland, Davis, Suisun, Vacaville, Fairfield, Dixon, Winters and Vallejo, at which point steamboat connection will be made for San Francisco. The line will be 110 miles in length. The overhead trolley will be installed on the city lines and it is the intention to use the third rail on the interurban lines. Capital stock, authorized, $2,500,000. Officers: T. T. C. Gregory, Fairfield, president and general manager; W. R. Madden, Fairfield, vice-president; Wm. Pierce, Suisun, secretary; E. D. Holly, Suisun, treasurer. [E. R. J., Nov. 6, '09.]

Greeley (Col.) Street Railway.—This company which is being to a great extent fathered by the Colorado & Southern Railway, has completed about 3 miles of double track in Greeley, having about 1 mile of double track still to lay. The line is disposed in a loop taking in the principal parts of Greeley and the intention is to run cars both ways. The track is standard gage, curves are long radius, rails and overhead construction are exceptionally heavy and the idea prevails that ultimately the proposed Colorado & Southern Railway interurban service from Denver to Greeley will have an inlet to Greeley over these tracks.

Washington, Spa Springs & Gretta Railroad, Washington, D. C.—Announcement is made that this company will soon be ready to take up the work of building the first section of the line which embraces the territory between Fifteenth and H Streets and the Baltimore Pike and Bladensburg Road, in Bladensburg. It is stated that the interests which have been working to finance the railway have been in communication with the firm of Henry A. Allen & Co., consulting engineers, First National Bank Building, Chicago, the prospective builders of the road. A tentative contract between the firm and the company stipulates that the cost of building the first section is not to exceed $107,000.

Bluffton, Geneva & Celina Traction Company, Bluffton, Ind.—The directors of this company have decided to install the overhead trolley system. The use of self-contained moror cars received serious consideration, but the directors at last concluded that this system is not feasible. The first passenger cars over the line between Bluffton and Vera Cruz were handled by a construction engine on Nov. 13. [E. R. J., March 6, '09.]

The Ft. Wayne & Springfield Railway, Decatur, Ind.—This company advises that it expects to build 28 miles of track during the coming year. W. H. Fledderjohann, general manager.

St. Joseph Valley Traction Company, Elkhart, Ind.—This company is pushing the construction of the first section of its railway between Elkhart and Bristol. Work on the construction of the line from Bristol to Middlebury will begin early in the spring and the entire line when completed will be 60 miles long. A contract has been entered into between this company and the Northern Indiana Traction Company, by which St. Joseph Valley Traction Company will have the use of the Northern Indiana Traction Company's tracks for a city entrance and the Northern Indiana Traction Company will have these tracks for city use.

Evansville (Ind.) Railways.—It is semi-officially announced that this company, operating traction lines from Evansville to Newburg and Rockport, Ind., will extend its lines across the Ohio River to Henderson and Owensboro, Ky. It is proposed to use the bridge of the Louisville & Nashville Railroad at Henderson.

Davenport & Manchester Interurban Railway, Davenport, Ia.—A special meeting of the stockholders of this company will be held at Monticello on Dec. 14 to vote on an amendment to increase the capital stock to $650,000. The company proposes to build an electric railway between Davenport and Manchester. [E. R. J., Oct. 23, '09.]

Iowa City (Ia.) Electric Company.—It is stated that this company has succeeded in financing its 4-mile street railway in Iowa City. Officers: S. A. Swisher, president; J. O. Schultze, vice-president and manager; D. A. Reese, secretary; Lovall Swisher, treasurer. [E. R. J., April 24, '09.]

***Oskaloosa, Ia.**—It is stated that Col. T. P. Spillman, Ottumwa, is interested in the construction of an electric railway between Ottumwa and Oskaloosa. It is said that the promoters have secured most of the right of way between Ottumwa and Eddyville, via Kirkville.

Lexington (Ky.) Railway.—This company has just built 12 miles of new interurban track between Lexington and Nicholasville and has also reconstructed in brick and concrete, 3 miles of city track. I. L. Oppenheimer, general superintendent.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.—This company has decided to electrify that portion of the steam division lying between South Main Street, Gloversville, and the fair grounds crossing in Johnstown.

Hornell-Bath Interurban Railway, Hornell, N. Y.—This company has applied to the Public Service Commission of the Second District for authority to construct an electric railway between Hornell and Bath, a distance of 23 miles, passing through the towns of Hornellsville, Fremont, Howard, Avoca and Bath. The company, which is capitalized at $250,000, has also asked permission to issue its common stock to the amount of $250,000 and bonds to the amount of $550,000. Charles Adsit and John M. Finch, Hornell, are interested. [E. R. J., July 31, '09.]

***Asheville, N. C.**—It is stated that M. L. McCormick, St. Paul, Minn., is considering a plan to build an electric railway from Asheville to Waynesville.

North Carolina Traction Company, Danbury, N. C.—E. Hillman, president of this company, which is the successor to the Crescent Electric Railway, advises that contracts will be placed within 60 days for the construction of 80 miles of new line, including switches and side tracks. The company will build three bridges, one over the Dan River to be 100 ft. long and two double-track bridges each 80 ft. in length. [E. R. J., Nov. 27, '09.]

Ohio Electric Railway, Cincinnati, Ohio.—This company has begun construction work on the ove head system on the old Columbus & Lake Michigan Railroad between Lima and Defiance. The company states that steam will be used for hauling freight, but as soon as the overhead work is installed hourly passenger service will be inaugurated. All the cars are to be operated by electricity. The Ohio Electric Railway purchased the Columbus and Lake Michigan Railroad more than two years ago and it has been operated as a steam road since that time.

***Fostoria, Ohio.**—Charles A. Bliss, Toledo, representing the Toledo Promoting & Developing Company, is said to be securing a preliminary right of way for an electric railway which the company is planning to build from Fostoria to Paulding and eventually to Defiance.

Montreal (Que.) Street Railway.—The Dominion Railway Commission has ordered the Montreal Street Railway to pay $15,000 towards the cost of the subway under the Canadian Pacific Railway at St. Lawrence Boulevard in St. Louis de Mile End, adjoining Montreal. The total cost is about $200,000.

Oklahoma (Okla.) Railway.—This company has awarded a contract to John Alley, Oklahoma City, for the grading and bridge work on its proposed extension between Capital Hill and Moore, a distance of 7 miles.

Citizens' Traction Company, Oklahoma City, Okla.—W. F. Harn advises that this company, which has recently been incorporated, is a consolidation of the Oklahoma Interurban Company and the line being constructed by the Oklahoma City Land & Development Company. About 7 miles are completed and in operation and an additional 4 miles are under construction. The line now in operation and that under construction is to be operated as a city and suburban system and also terminus of an interurban line between Oklahoma City and Shawnee. Power is being rented from the Oklahoma City Gas & Electric Company. Three cars are being operated over the completed section of the line. Capital stock, authorized and issued, $300,000. Bonds, authorized, $175,000. Officers: L. E. Patterson, president; W. F. Harn, P. O. Box 573, Oklahoma City; J. F. Winans, secretary and treasurer; Alfred Hare, general manager and purchasing agent; H. S. Hurst, general counsel. [E. R. J., Nov. 20, '09.]

Duquesne & Dravosburg Street Railway, Duquesne, Pa.—This company advises that it has grading over half done to the Duquesne Borough line. Several cars of rails are on the ground. The entire route has been surveyed and begins at Duquesne, passing through Duquesne Annex, Mifflin Township, to Dravosburg, 3 miles. All contracts have been let excepting those for overhead material. Power will be purchased for the present. The principal contractors are R. D. Hunter & Company, Beaver, and J. W. Spering, Duquesne. Fred W. Scott, Duquesne, president; Douglass-McKnight, Pittsburgh, chief engineers. [E. R. J., Nov. 20, '09.]

Slippery Rock & Grove City Street Railway, Grove City, Pa.—S. L. McClure, general manager, advises that this company plans to begin work about the first of the year on the proposed 9-mile railway between Grove City and Slippery Rock. It is the plan to operate gasoline motor cars. Capital stock, authorized, $55,000. Application will be made at once to increase the capital to $250,000. H. B. Graves, Butler, chief engineer. [E. R. J., Oct. 16, '09.]

Philadelphia & Suburban Elevated Railroad, Philadelphia, Pa.—The State Charter Board will meet shortly to consider the amended application of this company which has withdrawn its application for a charter for an elevated line on Twelfth and Thirteenth Streets and substituted an application providing for both overhead and underground lines. The most important underground line is on Broad Street from Filbert to Cumberland. S. S. Neff, president. [E. R. J., Sept. 18, '09.]

***Phœnixville, Pa.**—Thomas E. O'Connell, of West Chester, Pa., is promoting an electric railway from Phœnixville to Strafford, 10 miles.

Anderson (S. C.) Traction Company.—It is stated that the new owners of this company have secured an option on the Union & Glenn Springs Railroad, which extends from Union to Price on the Seaboard Air Line, a distance of 19 miles, and from Union to Buffalo Mills, a distance of 3 miles. It is said to be the intention of the syndicate to build from Buffalo to Glenn Springs and from Union to Clinton and from Clinton to Laurens or to Greenwood or Abbeville to connect with the line from Anderson.

Aberdeen (S. D.) Street Railway.—This company advises that it will probably be ready to award contracts during this winter for the construction of its local street railway. Work is scheduled to begin early next spring. This line will be 4 miles in length. Four cars will be operated. No definite arrangements have yet been made regarding the source for obtaining power to operate the line. Officers: C. N. Herreid, president; A. L. Ward, vice-president; C. F. Easton, secretary; Charles A. Howard, treasurer, all of Aberdeen. [E. R. J., Nov. 20, '09.]

Lake View Traction Company, Memphis, Tenn.—This company has just awarded contracts for material for the construction of the first section of its extension from Memphis to Lakeview, 11 miles. The contract for the steel bridge work was let to the Joliet Bridge Company, Joliet, Ill. The Illinois Steel Company was awarded the contract for 1,320 tons of steel rails, including fastenings. The contract for cross ties has not been closed but will likely be awarded to John S. Foster, New Albany, Miss. Other divisions will be completed in the following order, it is announced: Memphis to Lakeview, Lakeview to Clarksdale, Miss; Memphis to Collierville, and Memphis to Jackson, via Covington and Brownsville, Tenn.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—This company, which is building a 5 1/3 mile belt line in Corpus Christi, has completed 2 miles of track and has also half of the overhead work done. Power to operate the line will be rented from the People's Light Company, which is now enlarging its plant to accommodate the proposed street railway. The company expects to purchase six cars. Capital stock, authorized and issued, $100,000. Officers: Daniel Hewitt, Corpus Christi, president; Earl C. Heinly, Colorado City, Col., vice-president; V. S. Heinly, Corpus Christi, secretary and treasurer. [E. R. J., Nov. 20, '09.]

***East Texas Traction Company, Dallas, Tex.**—At a meeting recently held in Dallas a preliminary organization was perfected for the building of an interurban railway between Dallas and Terrell. Schuyler Marshall, Dallas, was elected president, and C. L. Wakefield, Dallas, secretary.

Colonial Beach, Va.—E. T. Benton, Jr., of Capers & Wright, Evans Building, Washington, D. C., writes that a franchise has been granted to Hon. John G. Capers for an electric railway from Colonial Beach to Quantico, a distance of 22 miles. A company will be incorporated in the near future to build this line. [E. R. J., Oct. 30, '09.]

Whatcom County Railway & Light Company, Bellingham, Wash.—A proposition has been submitted to the citizens of Bellingham by L. H. Bean, local manager of the Whatcom County Railway & Light Company, and R. T. Laffin, district manager of Puget Sound, in behalf of the Stone & Webster interests, assuring the construction of Bellingham-Skagit County Interurban Railway immediately by Stone & Webster, provided that the citizens of Whatcom and Skagit Counties raise $400,000 of the $1,500,000, the estimated cost

of the proposed railway. In consideration of the $400,000 raised preferred cumulative stock of the Whatcom Railway & Light Company will be issued. The railway will be about 30 miles in length and will connect Bellingham, Burlington, Mount Vernon and Sedro Woolley.

Spokane & Inland Empire Railroad, Spokane, Wash.—This company on Nov. 13 formally opened its new Opportunity-Vera branch, 11 miles long.

Morgantown & Southern Railway, Morgantown, W. Va.—This company advises that it will need material and equipment for the construction of 4 miles of track during 1910.

***Appleton, Wis.**—J. P. Barnes, vice-president of the Chicago & Wisconsin Valley Railway, Madison, has advanced a proposition to the Appleton and Outagamie County business interests for the construction of an interurban railway from Appleton northward through Hortonville, New London, Waupaca and to Hancock, Waushara County, where the proposed line will connect with the line of the Chicago & Wisconsin Valley Railway.

SHOPS AND BUILDINGS

Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.—It is stated that this company has decided to build its new car house and repair shops at Lafayette, the western terminus of the line. It is also the intention to improve and enlarge the car house at Huntingdon.

Ohio Electric Railway, Cincinnati, Ohio.—Plans which have been completed for this company by architects for the freight and passenger stations which are to be constructed at Columbus call for four buildings to be located in the plot of land bounded by Town, Rich and Third Streets. The main passenger station, to be located at the corner of Rich and Third Streets, will be two stories high, with a ground area 150 ft. x 87 ft. The large waiting rooms and train shed will take up a good part of the ground floor space. The foundations will be of such strength that the building may be increased to eight stories in height. The freight depot, north of the passenger station, will be 200 ft. x 45 ft., with a drive 32 ft. wide on the east side. On the opposite side of the tracks an express building, 200 ft. x 25 ft., will be erected, and south of it an extra freight depot, 187 ft. x 32 ft.

Montreal (Que.) Street Railway.—This company is about to begin the construction of its new shops north of St. Denis Street in the northern part of Montreal. The buildings will consist of a general electric repair shop 200 ft. x 200 ft.; car building shop, 200 ft. x 200 ft.; machine shop, 200 ft. x 200 ft.; blacksmith shop, 200 ft. x 200 ft.; paint shop, 200 ft. x 200 ft.; store shed, 100 ft. x 100 ft., and an oil room 75 ft. x 75 ft. The total cost is estimated at $1,000,000, and the buildings will be laid out so that they can be extended from time to time.

POWER HOUSES AND SUBSTATIONS

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company has just installed and placed in operation in its power station a 2500-kw turbine.

Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.—Announcement is made that this company expects to erect a new power station at Lafayette and enlarge the old plant at Huntingdon.

Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind.—This company has begun work at Shirley on the first of three combination substations and passenger stations which are to be located at Shirley, Maxwell and one at a point 4 miles out of Indianapolis on the line toward New Castle. These buildings will be two stories high and will contain a waiting room, ticket office, freight room and a substation.

Mason City & Clear Lake Railway, Mason City, Ia.—This company expects to place during the next three weeks orders for a 500 or 600-kw, 2300-volt, 60-cycle, three-phase generator. Simple Corliss engine and a 500-kw, 600-volt rotary converter.

New York & North Shore Traction Company, Mineola, N. Y.—This company recently purchased a site for a power station at Bayside Meadows, and has placed an order with the Westinghouse Electric & Manufacturing Company for the following apparatus to be installed in the plant: two 1000-kw turbo-generators, two 25-kw turbine exciters, four 300-kw rotary converters, four 333-k.v.a, three-phase transformers, one nine-panel switchboard and a five-panel switchboard.

Sandwich, Windsor & Amherstburg Railway, Windsor, Ont.—This company advises that it expects to place contracts during the next two weeks for two 500-kw, three-phase, direct-connected alternators, and also two 750-hp engines. James Anderson, general manager.

Manufactures & Supplies

ROLLING STOCK

Athens (Ga.) Electric Railway will buy three or four convertible or semi-convertible cars in 1910.

People's Gas & Electric Company, Burlington, Iowa, will be in the market for five open cars during 1910.

Alton, Jacksonville & Peoria Railway, Jerseyville, Ill., will buy four new 52-ft. interurban passenger cars early next year.

Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo., expects to buy two sets of trucks and motors next year.

Oklahoma Railway, Oklahoma City, Okla., has drawn specifications for 10 20-ft. closed cars, which will be ordered at once.

Baltimore & Ohio Railroad, Baltimore, Md., recently purchased two 90-ton electric locomotives from the General Electric Company.

Dixon, Rock Falls & Southwestern Electric Railway Company, Tampico, Ill., will order two passenger and one express cars next year.

Peekskill Lighting & Railroad Company, Peekskill, N. Y., advises that it contemplates purchasing one sprinkler for next season.

Seattle, Renton & Southern Railway, Seattle, Wash., expects to order six steel cars, one locomotive, and four double-truck flat cars during 1910.

Wichita Railroad & Light Company, Wichita, Kan., expects to buy some Brill trucks, International registers, General Electric motors, and Chicago fenders next year.

Oklahoma, Kansas & Missouri Interurban Railway, Miami, Okla., expects to purchase 30 box cars, 10 gondolas, 2 locomotives and 3 gasoline motor cars during the coming year.

Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C., will close a contract for four single-truck and six double-truck passenger cars within the next eight weeks.

Rockland, South Thomaston & St. George Railway, Rockland, Me., will buy one construction and two freight cars during 1910, also one fare register, controllers, and other equipment for new cars.

Northern Ohio Traction Company, Akron, Ohio, is about to add more cars to its line, and has placed an order with Allis-Chalmers Company for five double A-6 single-end straight-air brake equipments.

Central Pennsylvania Traction Company, Harrisburg, Pa., mentioned in the Electric Railway Journal of Aug. 28, 1909, as being in the market for a sweeper, has ordered one from The J. G. Brill Company.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia., has ordered a combined straight and automatic air brake equipment from Allis-Chalmers Company for use on a new electric locomotive.

Pittsburgh Railways, Pittsburgh, Pa., has recently placed an order with Allis-Chalmers Company for 49 semi-automatic double-end air brake equipments, to be used on the new cars which the company is now having built.

Joseph E. Bowen, Bank of Commerce, Norfolk, Va., is in the market for one combination passenger, baggage and mail car, equipped with electric trucks for standard-gage track and with 50-hp motors. The car is to have a seating capacity of 25.

North Carolina Traction Company, Danbury, N. C., a road under construction, contemplates buying within 60 days motor cars for freight and passenger service entirely equipped, and also trailers to be run in conjunction with the motor cars.

Beaumont (Tex.) Traction Company, mentioned in the Electric Railway Journal of Oct. 30, 1909, as being in the market for three or four double-truck semi-convertible cars, advises they will purchase three cars of this type with 25-ft. bodies before the end of the year.

Port Arthur (Ont.) Electric Street Railway, mentioned in the Electric Railway Journal of Oct. 23, 1909, as contemplating the purchase of some new cars, it is learned, will order four more cars 42 ft. long for city service during 1910. They will be of the pay-as-you-enter type.

Chicago & Joliet Electric Railway, Joliet, Ill., mentioned in the Electric Railway Journal of Nov. 6, 1909, as being in the market for two double-truck and two single-truck cars, will order at once two single-truck and four double-truck cars complete with trucks and equipment. The com-

pany will also purchase one set of double trucks for motor equipment.

Pennsylvania & Ohio Railway, Ashtabula, Ohio, ordered five quadruple equipments of No. 306 600-volt, direct-current interpole railway motors arranged for single-end control with one K-35-B controller from the Westinghouse Electric & Manufacturing Company. These equipments will be installed on the company's interurban cars which are now operating double-end equipment.

Oregon Electric Railway, Portland, Ore., is in the market for early delivery of three observation trailer cars 62 ft. 6 in. long, including buffet, smoking room, toilet, lavatory, etc.; also three 59-ft. combination smoking and baggage cars and one 50-ton electric locomotive. All this material will be bought through W. S. Barstow & Company, New York. The company contemplates closing the order within 10 days for four Rodger convertible ballast cars and one double-truck, 12-ton locomotive crane.

TRADE NOTES

Osceold Construction Company, Lincoln, Neb., recently organized with a capital of $300,000, will build, equip and develop electric railways.

Buckeye Jack Manufacturing Company, Louisvile, Ohio, expects to remove its business about the first of the year to Alliance, Ohio, where it has purchased a large factory.

Transportation Equipment Company, New York, N. Y., has placed 30 of its new T. E. C. fare boxes in service on cars of the Metropolitan Street Railway in New York City.

Allis-Chalmers Company, Milwaukee, Wis., has let a contract to the Worden-Allen Construction Company, of Milwaukee, for the erection of a new machine shop at its Washtenaw Avenue plant.

Buda Foundry & Manufacturing Company, Chicago, Ill., announces that hereafter the company will be known as the Buda Company. There will be no change in the organization or policy of the company.

Standard Paint Company, New York, N. Y., has appointed J. H. Thomas, general manager of sales, with headquarters at the company's main office. Mr. Thomas has been connected with the sales department for a number of years.

T. H. Symington Company, Baltimore, Md., will hereafter make and sell in connection with its other specialties the draft gears formerly made by the Farlow Draft Gear Company, Baltimore, the property of which company it has purchased.

Sherwin-Williams Company, Cleveland, Ohio, has called a special meeting of its stockholders for Dec. 20, 1909, to vote on increasing its capital to such an amount as the stockholders may determine. The present capital consists of $4,000,000 common and $2,000,000 preferred stock.

Simmen Automatic Railway Signal Company, Toronto, Ont., reports that in the operation of its signal and dispatching system on the Toronto & York Radial Railway during October a total of 73,410 signal indications were made, showing an efficiency of 99.995 per cent.

National Brake & Electric Company, Milwaukee, Wis., has appointed Sydney F. Weston, district manager for the territory around New York to succeed Sidney I. Wailes, resigned. Mr. Weston was formerly department agent for the International Sprinkler Company, Philadelphia, with headquarters in New York.

Electric Storage Battery Company, Philadelphia, Pa., announces a change in the management of its Southern sales office. H. H. Seaman, the former manager, having resigned, A. N. Bentley has been appointed to take charge of this office. Mr. Bentley has had a comprehensive storage battery experience as the engineer of the company's Cleveland office.

Wellington G. Sickel, formerly interested in the United & Globe Rubber Manufacturing Companies, has become associated with C. M. Hewitt and H. H. Hewitt, and will hereafter represent their interests in connection with the Hewitt Rubber Company, Magnus Metal Company, National Brake Shoe Company and Hewitt Supply Company, the New York offices of which are at 111 Broadway, and the main offices at 303 Railway Exchange Building, Chicago, Ill.

Harry D. Bayne, for many years manager of the Canadian branch of the Westinghouse Electric & Manufacturing Company, has acquired an interest in the General Electric Company of Sweden, and has opened an office for the transaction of the business of the company at Montreal. The Swedish Company has been doing business in Canada for some time, but in a somewhat limited way. Application will be made for incorporation in Canada, and under Mr. Bayne's management the business of the company will be vigorously pushed throughout the Dominion.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., announces the following changes in personnel: S. L. Nicholson, industrial and power sales manager for the last five years, advanced to general sales manager; Charles Robbins, sales engineer for three years in the industrial and power sales department, advanced to the management of the same; G. Brewer Griffin, advanced after six years' service as assistant manager of the detail and supply sales department to the management of the same; Samuel A. Chase, resigned as New York special detail and supply salesman to become manager of the Chicago office of the White Investing Company.

ADVERTISING LITERATURE

J. G. Brill Company, Philadelphia, Pa., has issued a 24-page catalog, known as No. 184, in which Brill fare boxes are described and illustrated.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., describes portable direct-current ammeters and voltmeters in Circular No. 1181.

Automatic Lock Nut Company, Rockford, Ill., is distributing a card illustrating and describing its patent spiral spring steel automatic lock nut.

Buckeye Electric Company, Cleveland, Ohio, is distributing a folder in which its achievements in developing the incandescent lamp are set forth.

Hayes Track Appliance Company, Geneva, N. Y., has issued Bulletin No. 58, dated November, 1909, in which various types of Hayes derails installed in the vicinity of Chicago are illustrated.

Johns-Streeter Company, New York, N. Y., has issued a 4-page circular describing the Streeter flexible steel-back and steel-lug brake shoe of the M. C. B. standard type for steam and electric railways.

American Ship Windlass Company, Providence, R. I., has issued a pamphlet entitled "Mechanical Control of Air and Coal," which describes construction and operation of the Taylor gravity underfeed stoker.

Northwestern Expanded Metal Company, Chicago, Ill., has published a small pamphlet with the title "Overcoated Houses," which contains instructions for applying "Knoburn" expanded metal lath for stucco finish of buildings.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has issued Pamphlets Nos. A2176, A4656, A5326, A5550 and A5569, in which the company's private exchange switchboards are described and illustrated.

Beaver Dam Malleable Iron Company, Beaver Dam, Wis., has issued an 18-page publication in which attention is called to the increasing use of malleable iron as an economical material from which to make tie plates and third-rail brackets.

United States Aluminium Company. Pittsburgh, Pa., has reprinted in pamphlet form an article by E. K. Davis which appeared in *Engineering News*, entitled "Bimetallic Condenser Tubes," which describes the properties of aluminium-copper tubes made by this company.

Duplex Metals Company, New York, N. Y., in a recently published folder demonstrates the economy of using a No. 0 copper-clad trolley wire in connection with a No. 1 copper feeder instead of a No. 0000 copper trolley wire having about the same conductivity.

C. A. Wood Preserver Company, Austin, Tex., has reprinted a very interesting chart prepared by Benjamin Nickels in the form of a tree showing the more important compounds existing in and derived from coal tar by distillation. C. A. wood preserver is prepared from many of these compounds.

Under Feed Stoker Company, Chicago, Ill., has published the report of the boiler tests made at the plant of the Union Gas & Electric Company, Cincinnati, Ohio, by W. H. Groverman, M. E., under the direction of John W. Hill & Sons, Cincinnati, Ohio, consulting engineers. The boilers in the equipment under test were fitted with Jones stokers.

Electric Renovator Sales Company, Pittsburgh, Pa., has issued two publications, one entitled, "It Eats Dirt," and the other, "Would You Hang a Man on Circumstantial Evidence?" "It Eats Dirt" contains a description of the company's Invincible electric renovator and shows the application of the machine to the household, the shop and the office building. This publication is concluded with a long list of public buildings, offices, buildings, churches, theaters, residences, banks, schools, colleges, etc., which are using the Invincible cleaners. The publication, "Would You Hang a Man on Circumstantial Evidence?" contains letters from various users of Invincible cleaners, testifying to their efficiency.

TABLE OF MONTHLY EARNINGS

Notice:—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including Taxes. †Deficit.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Oct '09	184,815	100,800	84,015	44,114	39,907
	1 " " '08	157,532	90,258	67,274	43,779	23,496
	10 " " '09	1,818,987	988,530	830,457	437,456	393,000
	10 " " '08	1,578,085	912,300	665,785	438,521	227,263
BELLINGHAM, WASH. Whatcom Co. Ry. & Lt. Co.	1m., Sept. '09	34,836	18,957	15,879	8,069	7,809
	1 " " '08	28,381	17,363	11,018	8,945	2,072
	12 " " '09	397,272	223,798	173,474	101,026	72,448
	12 " " '08	359,087	205,581	153,506	95,293	58,213
CHAMPAIGN, ILL. Illinois Tr. System.	1m., Sept. '09	*373,252	*212,510	160,741	3,585	157,156
	1 " " '08	357,508	*196,009	161,499	.....	161,499
	9 " " '09	3,174,845	*1,857,957	1,316,908	30,444	1,286,464
	9 " " '08	2,973,051	*1,721,452	1,251,599	.....	1,251,599
CHARLESTON, S. C. Charleston Con. Ry., Gas & Elec. Co.	1m., Oct. '09	63,764	44,613	19,150	13,917	5,233
	1 " " '08	60,655	41,693	18,961	13,817	5,145
	8 " " '09	515,189	329,908	185,280	111,333	73,947
	8 " " '08	505,751	327,664	178,087	110,358	67,728
CHICAGO, ILL. Aurora, Elgin & Chicago Railroad.	1m., Sept. '09	149,141	74,468	74,673	29,413	45,260
	1 " " '08	137,387	70,804	66,583	27,624	38,958
	3 " " '09	480,453	228,811	251,643	87,663	163,979
	3 " " '08	440,030	214,188	225,842	83,027	142,815
Chicago Railways.	1m., Sept. '09	1,066,056	718,201	347,855	.....	.....
	1 " " '08	960,568	788,808	171,760	.....	.....
	9 " " '09	9,134,608	5,978,927	3,155,681	.....	.....
	9 " " '08	8,034,622	.....	.....	.....	.....
CLEVELAND, O. Cleveland, Painesville & Eastern R.R.	1m., Oct. '09	29,467	*15,880	13,587	8,793	4,794
	1 " " '08	25,223	*15,728	9,495	7,977	1,518
	10 " " '09	271,673	*136,461	135,212	84,398	50,814
	10 " " '08	250,452	*142,304	108,148	80,371	27,776
Cleveland, Southwestern & Columbus Ry.	1m., Oct. '09	81,523	51,393	30,130	26,358	3,772
	1 " " '08	69,427	41,540	27,887	20,561	7,326
	10 " " '09	748,517	458,613	289,904	248,141	41,763
	10 " " '08	648,625	418,352	230,273	201,997	28,276
Lake Shore El. Ry.	1m., Oct. '09	94,255	*49,754	44,501	35,453	9,047
	1 " " '08	87,678	*47,418	40,260	34,290	5,970
	10 " " '09	929,310	*489,445	439,871	344,547	95,325
	10 " " '08	874,888	*486,915	387,972	322,010	65,963
DALLAS, TEX. Dallas Electric Corporation.	1m., Sept. '09	107,570	74,512	33,058	25,109	7,949
	1 " " '08	95,842	63,080	32,763	27,957	4,806
	12 " " '09	1,277,466	803,271	474,195	338,863	135,332
	12 " " '08	1,152,235	776,604	375,631	353,411	22,220
DETROIT, MICH. Detroit United Railway.	1m., Oct. '09	724,791	471,499	253,292	*155,972	97,320
	1 " " '08	619,490	*412,650	206,840	133,379	73,461
	10 " " '09	6,796,430	4,174,032	2,622,398	*1,565,480	1,056,918
	10 " " '08	5,989,402	*3,807,903	2,181,499	1,352,239	829,260
EAST ST. LOUIS, ILL. East St. Louis & Suburban Co.	1m., Sept. '09	176,402	87,324	89,077	.....	.....
	1 " " '08	170,027	87,161	82,866	.....	.....
	9 " " '09	1,481,078	818,006	663,072	.....	.....
	9 " " '08	1,487,855	781,239	706,617	.....	.....
EL PASO, TEX. El Paso Elec. Co.	1m., Sept. '09	50,501	29,874	20,627	8,185	12,442
	1 " " '08	43,828	33,337	10,490	7,133	3,357
	12 " " '09	574,578	366,077	208,501	94,377	114,123
	12 " " '08	530,215	375,030	155,185	82,817	72,368
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., Sept. '09	132,736	71,064	61,672	.....	.....
	1 " " '08	122,443	60,973	61,469	.....	.....
	9 " " '09	1,038,350	608,539	429,811	.....	.....
	9 " " '08	978,700	553,469	425,231	.....	.....
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Sept. '09	104,829	57,786	47,043	17,190	29,853
	1 " " '08	88,190	49,316	38,874	15,216	23,658
	12 " " '09	1,220,147	676,071	544,076	199,971	344,105
	12 " " '08	1,052,922	616,171	436,750	184,562	252,189
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Sept. '09	100,837	56,363	44,474	22,824	21,650
	1 " " '08	91,790	46,620	45,170	20,121	25,050
	12 " " '09	1,190,398	692,020	498,378	257,198	241,180
	12 " " '08	1,060,003	620,378	439,624	241,240	198,385
GRAND RAPIDS, MICH. Grand Rapids Railway.	1m., Oct. '09	82,520	41,509	41,011	19,315	21,696
	1 " " '08	76,003	37,357	38,646	18,611	20,035
	10 " " '09	858,541	404,470	454,071	190,085	263,986
	10 " " '08	784,570	394,342	390,228	184,907	205,321
HARRISBURG, PA. Central Penn. Trac. Co.	1m., Oct. '09	62,773	44,555	18,218	.....	.....
	1 " " '08	58,096	44,303	13,793	.....	.....
	10 " " '09	627,520	463,194	164,326	.....	.....
	10 " " '08	591,214	466,902	124,312	.....	.....
HOUGHTON, MICH. Houghton County Tr. Co.	1m., Sept. '09	28,732	14,029	14,703	6,216	8,487
	1 " " '08	23,934	11,801	12,133	4,963	7,170
	12 " " '09	310,504	168,003	142,501	70,809	71,692
	12 " " '08	257,707	148,422	109,284	57,042	52,243
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., Sept. '09	38,375	20,808	17,568	9,522	8,046
	1 " " '08	34,017	18,372	15,645	9,032	6,613
	12 " " '09	464,945	264,792	200,153	111,859	88,294
	12 " " '08	414,592	249,893	164,699	108,009	56,690
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Oct. '09	382,395	188,897	193,498	112 764	80,734
	1 " " '08	338,442	165,955	172,487	100,560	71,928
	10 " " '09	3,536,497	1,726,069	1,810,428	1,065,605	744,824
	10 " " '08	3,248,392	1,652,570	1,595,822	994,230	601,592
Milwaukee Lt., Ht. & Trac. Co.	1m., Oct. '09	122,801	32,977	89,825	65,386	24,440
	1 " " '08	112,675	30,560	82,115	58,858	23,258
	10 " " '09	1,235,009	324,901	910,108	646,236	263,872
	10 " " '08	1,180,739	311,018	869,721	597,154	272,568
MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., Sept. '09	645,197	270,035	375,162	140,251	234,911
	1 " " '08	583,876	276,589	307,288	138,667	168,621
	9 " " '09	5,176,420	2,432,567	2,743,852	1,248,510	1,495,342
	9 " " '08	4,765,802	2,372,025	2,373,777	1,145,122	1,248,655
MONTREAL, CAN. Montreal St. Ry.	1m., Oct. '09	354,007	174,735	179,272	31,079	148,193
	1 " " '08	328,608	165,424	163,184	30,180	133,004
NASHVILLE, TENN. Nashville Railway & Light Co.	1m., Oct. '09	148,992	89,193	59,799	33,023	26,776
	1 " " '08	141,815	82,888	58,927	32 829	26,098
	10 " " '09	1,415,675	836,322	579,353	328,306	251,047
	10 " " '08	1,309,348	786,279	523,069	319,620	203,449
PADUCAH, KY. Paducah Traction & Light Co.	1m., Sept. '09	19,096	10,895	8,201	6,613	1,588
	1 " " '08	18,694	10,488	8,206	6,750	1,456
	12 " " '09	223,390	130,742	92,648	81,791	10,856
	12 " " '08	230,882	138,305	92,577	83,474	9,103
PENSACOLA, FLA. Pensacola Electric Co.	1m., Sept '09	21,649	12,828	8,821	4,335	4,486
	1 " " '08	17,417	12,036	5,381	4,352	1,030
	12 " " '09	239,858	137,181	102,677	51,865	50,813
	12 " " '08	211,288	152,718	58,570	51,551	7,018
PHILADELPHIA, PA. American Rys. Co.	1m., Oct. '09	247,827	.....	.....	.....	.....
	1 " " '08	231,126	.....	.....	.....	.....
	4 " " '09	1,075,463	.....	.....	.....	.....
	4 " " '08	1,016,221	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., Sept. '09	12,833	9,359	3,474	1,641	1,833
	1 " " '08	12,603	6,678	5,925	1,833	4,092
	12 " " '09	129 964	90,935	39,029	22,771	16,258
	12 " " '08	120,716	90,003	30,713	27,101	3,612
PORTLAND, ORE. Portland Ry., Lt. & Pwr. Co.	1m., Oct. '09	426,707	188,721	237,986	126,873	111,113
	1 " " '08	372,398	182,111	190,287	113,462	76,825
	10 " " '09	3,974,354	1,839,940	2,134,405	1,238,208	896,197
	10 " " '08	3,594,501	1,779,232	1,815,269	1,151,897	663,372
ST. JOSEPH, MO. St. Joseph Ry., Lt., Heat & Pwr. Co.	1m., Oct. '09	82,363	43,167	39,196	21,521	17,675
	1 " " '08	78,512	39,503	39,009	20,760	18,249
	10 " " '09	805,170	417,697	387,473	213,601	173,872
	10 " " '08	750,743	382,281	368,462	205 302	163,160
ST. LOUIS, MO. United Railways Co. of St. Louis.	1m., Oct. '09	1,039,267	627,968	411,299	232,267	179,032
	1 " " '08	949,914	572,326	377,588	233,845	143,743
	10 " " '09	9,265,653	5,845,673	3,419,980	2,333,899	1,086,081
	10 " " '08	8,810,539	5,645,394	3,165,145	2,331,178	833,967
SAN FRANCISCO, CAL. United Railroads of San Francisco.	1m., Sept. '09	624,261	342,730	281,531	.....	.....
	1 " " '08	581,392	322,927	258,465	.....	.....
	9 " " '09	5,457,039	3,148,239	2,308,800	.....	.....
	9 " " '08	5,079,336	3,246,531	1,832,805	.....	.....
SAVANNAH, GA. Savannah Elec. Co.	1m., Sept. '09	49,523	32,031	17,493	17,445	48
	1 " " '08	48,404	27,662	20,742	17,554	3,188
	12 " " '09	611,840	391,412	220,428	209,138	11,289
	12 " " '08	591,798	397,202	194,596	205,922	†11,327
SEATTLE, WASH. Seattle Elec. Co.	1m., Sept. '09	568,494	305,341	263,153	106,944	156,209
	1 " " '08	385,946	209,952	175,994	93,345	82,649
	12 " " '09	5,592,481	3,238,318	2,354,162	1,220,797	1,133,366
	12 " " '08	4,425,521	2,606,946	1,818,575	1,054,338	764,237
SYDNEY, N. S. Cape Breton Elec. Co., Ltd.	1m., Sept. '09	22,000	11,410	10,590	5,062	5,528
	1 " " '08	22,006	11,706	10,301	4,961	5,339
	12 " " '09	236,111	142,384	93,727	60,077	33,650
	12 " " '08	252,890	145,012	107,878	59,251	48,627
TACOMA, WASH. Puget Sound Elec. Railway.	1m., Sept. '09	179,956	107,605	72,351	48,552	23,799
	1 " " '08	143,121	90,243	52,878	43,372	9,506
	12 " " '09	1,822,449	1,208,142	614,307	553,272	61,035
	12 " " '08	1,625,846	1,021,649	604,197	510,955	93,242
TAMPA, FLA. Tampa Elec. Co.	1m., Sept. '09	47,108	27,253	19,855	4,615	15,240
	1 " " '08	43,356	26,705	16,652	4,538	12,114
	12 " " '09	582,847	352,488	230,360	55,939	174,420
	12 " " '08	543,185	365,614	177,570	28,530	149,040
TOLEDO, O. Toledo Rys. & Lt. Co.	1m., Sept. '09	218,095	121,779	96,316	75,483	20,833
	1 " " '08	222,953	111,900	111,053	71,977	39,076
	9 " " '09	1,983,633	1,134 049	849,584	652,202	197,382
	9 " " '08	1,867,894	1,019,823	848,071	635,743	212,328
WASHINGTON, D.C. Wash., Baltimore & Annapolis Elec. Ry.	1m., Sept. '09	58,789	33,160	25,629	29,079	†3,450
	1 " " '08	55,938	31,899	24,039	25,169	†1,130
	3 " " '09	172,505	99,818	72 687	88,134	†15,447
	3 " " '08	151,545	100,667	50,878	75,270	†24,392

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TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.

L. E. GOULD, Western Editor. RODNEY HITT, Associate Editor.

FREDERIC NICHOLAS, Associate Editor.

CHICAGO OFFICE.....590 Old Colony Building

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Changes in Mountain Divisions Possible Through Electricity

One of the points brought out by Dr. Hutchinson in his Institute paper last month was that the limiting length of railroad tunnels, so far as operating conditions are concerned, is greatly increased by the use of electricity, and that it is about as easy to operate a tunnel 12 miles in length as one of 1 mile. The conditions in the Great Northern tunnel under steam traction were graphically described by the speaker, and as every one knows who has traveled through long tunnels behind a steam locomotive, when the tunnel is more than, say, 3 miles in length, and often when the distance is less, the atmospheric conditions in the train are uncomfortable, to say the least. Besides increasing the possible length of tunnel, electric locomotives and the multiple-unit system change for the better the limiting grade and possible length of train, so that for a mountain road built for the use of electric locomotives the cost of track location should be greatly reduced over that of a line designed for steam operation. No one can cross any of the long mountain passes in the Alleghanies or Rockies without being impressed with the inevitable deficiencies of the steam locomotive for such service, and the pronounced advantages of the electric locomotive, especially in localities where water-power for generating electricity is available.

A Novel Employees' Committee

In dealing with a large but widely separated body of men, such as is employed in the service of an urban transportation company, it is seldom possible for the management to learn directly of all the little individual grievances, or, on the other hand, to get the benefit of suggestions from the men for improvements in the service which might promote the comfort and convenience of travel. The general officers cannot spare the time to listen to every man with an idea or a kick, and the men themselves hesitate a long time before going to the office voluntarily; yet it is of great value to receive suggestions from the men and to smooth out their petty troubles before they are magnified into a spirit of general discontent. The channel through which both complaints and suggestions are heard by the general superintendent of the Hudson & Manhattan Railroad is a committee of employees from each branch of the service, who are selected not by the men themselves but by the trainmaster. It is an honor to serve on this committee, the appointments being made each month from among the men having the best records. When the committee meets each week with the general superintendent and his assistants, grievances are as carefully considered as are suggestions for betterments in the service. The informal nature of the

meetings induces the employees to state their complaints without reserve, and if there are good reasons why the conditions objected to cannot be modified they are fully explained. The suggestions for improvements received at these meetings are frequently very valuable. The members of the committee are in close daily contact with the traveling public, and they hear many comments of dissatisfied passengers which would reach the management in no other way. It is an interesting fact concerning these conferences with the committee of employees that the suggestions for improvements has far outnumbered the grievances presented. The method used on the Hudson & Manhattan Railroad is not unlike the practice on the street railway system of Berlin, Germany. In the latter case the men themselves select a committee, appropriately called "trusted men" (Vertrauensmaenner), which is also the company's medium for the voluntary explanation of changes in operation.

Retiring Old Cars from Service

Worn and obsolete cars must inevitably be replaced by new and modern equipments, and the plan followed by a large Eastern street railway system of retiring old cars according to a fixed program covering a number of years has many advantages. This company, like many other large city systems, was formed by the consolidation of a number of smaller properties, each of which contributed its share of more or less antiquated rolling stock. Shortly after the new company took charge, a survey was made of all the cars then owned and their general condition, suitability for the present and future service and probable life was determined. From these data a program of retirements was drawn up which will extend through 1914. At the end of the period all the old cars will have been replaced by new cars, and then it is planned to prepare a new program of the same kind to cover succeeding years. The old cars were divided into classes, and plans were made to withdraw a certain number of cars from each class during each year. The selection of the specific cars to be retired is left to the discretion of the master mechanic, who bases his decision on the condition of the cars as they come into the shop for repairs. Those cars in each class which are in the worst condition are the first to go, but the total number to be retired is made up at the end of the year, regardless of their condition, good or bad. Along with this program of renewals the company has adhered closely to a uniform yearly increase in its total equipment to meet the needs of a steady growth in traffic. This systematic planning has enabled the company to meet the expense for new cars largely out of its earnings from year to year without carrying an undue burden in any one year. It has saved in expenditures for maintenance of old cars by serving as an accurate guide as to how much could be profitably spent in painting or repairing cars destined to be withdrawn from service within a year or two. The company has been able to foresee its requirements for car storage far into the future, to buy property and design new car houses just sufficient to meet its present needs and capable of being enlarged as the number of cars is increased. A new shop is now being planned, based on an accurate knowledge of the future rolling stock to be cared for. These advantages should commend the idea to other managements facing a similar problem.

The Proposed Ohio Interurban Rules

The Ohio Railroad Commission, on the recommendation of a committee of electric railway managers, has expressed its approval of a code of operating rules for the interurban roads of that State which departs from the standard code of the American Street & Interurban Railway Association in a number of important details of practice. As stated editorially in this paper last week in discussing this subject, radical changes in the standard code should not be made by the authorities of any State except for overpowering reasons, and the changes recommended by the Ohio Railroad Commission must be backed up by very strong arguments in their favor in order to justify what is practically repudiation of the association's long-continued effort to bring about uniformity in this regard. Elsewhere in this issue will be found a signed statement by John C. Sullivan for the railroad commission and Frank A. Davis for the committee of railway managers, outlining the reasons which influenced the commission to make the changes which it has approved. The reasons given were not urged upon the committee on interurban rules prior to the convention in Denver, when the standard code was adopted by the American Association, nor were they voiced by any of the Ohio delegates in the meeting at which the code was discussed and voted upon. They do not prove convincingly that the procedure given in the standard code is fundamentally wrong in theory or impossible to carry out in practice. For each reason advanced in favor of the changes there are one or more equally good, or better, reasons for retaining the wording of the rules as they appear in the standard code.

The change in Rule 103 is defended on the ground that the signal of three bells to back a car when standing conforms to a long-established steam railroad practice. It may be interesting to point out that in the code of rules presented at the 1908 convention, rule 103 was precisely the same as that which the Ohio Railroad Commission has now adopted. The attention of the rules committee of the American Association, shortly after the 1908 convention, was called to at least one fatal accident due primarily to the practice of using three bells as a signal to back. The committee, therefore, changed the signal to four bells in order to eliminate the possibility of a similar accident occurring. Furthermore, by this change the committee made the signals between a conductor and motorman correspond to those in the standard code of city rules, and also made Rules 103 and 104 harmonious. In Rule 104 the signal of four bells from the motorman to the conductor is the signal to back, and must be answered by the conductor before the train is started. Inasmuch as the interurban cars operate generally over city tracks, it is better practice to harmonize the interurban rules with the city rules than with steam railroad practice.

The change in Rule 110, to quote the words of one manager in commenting on these rules, consists in "the substitution of a practice in marker signals which was discarded years ago by most interurban roads, and for which was substituted the standard practice of the steam roads." No provision is made in the revised rule for extinguishing the red lights on the rear of the train when it has cleared the main track. When approaching a passing siding, the mo-

torman of a superior train must either be prepared to stop or else take the chance of finding the inferior train on the main track. He has no means of knowing from the marker lamps displayed whether or not the train is clear of the main track. This practice, we believe, will be condemned by many railway managers. It is defended on the ground that there is not sufficient clearance at the sides of interurban cars to permit the use of lamps which will display lights to the front, side and rear. This ignores the fundamental principle involved of displaying confusing signals on a car which is clear of the main track.

The commission does not approve of Rule 128 as it appears in the standard code, the objection being that it requires too much work on the part of the conductor. This rule has been in use on a number of interurban roads for a long time. No better safeguard could be provided against that common cause of serious accidents, "running past a meeting point." Rule 323 makes motormen and conductors jointly responsible for the safe operation of their trains. It is, therefore, the conductor's duty, as much as the motorman's, to see that no meeting or reporting point is passed, and it is more important to make sure that he does this than that he collects every fare.

The commission has eliminated Rule 203-a and Rules 203 and 230 have been modified accordingly. No railway manager will deny that there are times when it is absolutely necessary to get cars over the road in emergencies when every means of communication between the crew of one car and the dispatcher or the crews of other cars has failed. Rule 203-a outlines a method which, if rigidly adhered to, should be safe to use. If no such rule is provided, one of two things must occur; either the road must be tied up indefinitely or the men will follow a procedure of their own creation. The second course is vicious, and yet it is encouraged by the railway company which thus evades responsibility. It is argued that it would be unwise to send one of the crew ahead with a flag, and thus leave to the other member of the crew the entire responsibility for protecting the passengers and also the rear of the car. The protection of a train by torpedoes in such a case is provided for in Rule 101, and it rarely would be necessary for both members of the train crew to leave their car for any length of time. We believe that Rule 203-a, or a similar rule definitely stating a safe procedure, is both desirable and essential.

The change in Rule 210 is a reversion to the principle, but not to the practice, of the American Railway Association's standard code of rules, which requires a time interval of five minutes instead of two minutes. The principal objection to the use of a time interval on an electric road is the fact that agents and operators who can note the passing time of trains are on duty only at a few stations. The crews of following trains must depend for the most part on the exact observance of schedule times by the trains ahead, while the space interval is frequently estimated by combining distance and speed into terms of time. Still a rule fixing a minimum distance between trains is based on the only correct thing, that trains cannot collide if they are separated by space.

Changes in Rules 212 and 213 are not discussed by Messrs. Sullivan and Davis. They have been omitted entirely, and the commission thus places the responsibility on each company operating in the State of formulating its own rules covering the operation of trains in case of failure of the telephone lines. If the committee on interurban rules was not able to draft a rule which would be satisfactory, it is reasonable to suppose that individual managers, if left to their own resources, will make rules which certainly will be no better than those in the standard code, and may be positively dangerous. The action taken on these two rules is destructive, and not constructive in any sense.

It is to be hoped that these changes in the standard code will not be issued by the commission as final without a rehearing. The promulgation of the Ohio rules in their present form would be detrimental to the interests of the interurban roads in that State and of the industry as a whole. Finally, we have no doubt that the committee on interurban rules of the American Association, if requested, would be willing and glad to take up the entire subject of the wording and procedure in the standard code with the commission, if this testimony was necessary, in order to show the inadvisability of adopting the proposed code.

Training Motormen in the Hudson Tunnels

The selection and training of motormen to operate a fast and frequent service such as that given by the Hudson & Manhattan Railroad in the North River tubes requires special precautions. An interesting feature of the employment methods of this company, which are described elsewhere in this issue, is the establishment of an intermediate grade in which all candidates for the position of motorman must serve for a considerable period of time before being placed in charge of regular trains. This grade, which is that of switchman, corresponds in some respects to that of fireman on the steam roads. It provides a means of training the men in every phase of their future duties much more thoroughly than would be possible by a short course of instruction in the shops or schoolroom and no danger to passengers is incurred through trusting an inexperienced man with the operation of a regular train even under the guidance of an instructor. While serving as a switchman the new man has an opportunity of learning first hand the operation and construction of the equipment, how to locate and find trouble, the meaning of signal indications and the actual "feeling" of a car or train in motion. In the meanwhile he is earning a living wage and doing necessary work incident to the operation of the regular trains. Only the best men are willing to undertake a switchman's work as a step toward promotion to the coveted position of motorman. Another meritorious feature of the plan is that the list of extra motormen is kept down to a minimum since there are always available switchmen who are qualified to operate trains when required in emergencies. A significant feature of this company's employment practice is the fact that it prefers to engage as motormen men who have held similar positions on high-speed electric railways or who have been employed on steam railroads. Many railways pursue the opposite policy, on the supposition that it is easier to train men who enter the service without preconceived operating notions; but the tunnel company evidently believes that the veteran railroad man's sense of responsibility outweighs the disadvantages of working under new rules.

TRACK AND LINE IMPROVEMENTS OF THE CONEY ISLAND & BROOKLYN RAILROAD COMPANY

As a part of its general rehabilitation work during the past year, the Coney Island & Brooklyn Railroad has made extensive improvements in the track and line departments. The new work and the broader reconstruction have been done by Ford, Bacon & Davis, as consulting and contracting engineers, while the general overhauling has been in the hands of E. L. Matthews, the company's superintendent of roadways, and P. J. Murphy, lately superintendent of power stations. All work was subject to the approval of S. W. Huff, president and manager of the Coney Island & Brooklyn Railroad. The roadway contract of the engineering firm mentioned covered a double-track section 1100 ft. long on Smith Street from Fulton Street to Atlantic Avenue and a section 5500 ft. long on DeKalb Avenue from Reid to Wyckoff Avenues. The Smith Street work called for the use of the original rails with additional joints and tie-rods, laid on new foundation, prepared before the repaving of this thoroughfare by the city. Most of the DeKalb Avenue work (3300 ft.), however, was for entirely new construction and so gave the engineers an opportunity to apply improved methods which could serve as standards in the future.

The most striking feature of the DeKalb Avenue installation was the design of the new 102-lb. girder rail shown in one of the accompanying drawings. This rail was designed after conference with R. W. Creuzbaur, consulting engineer to the president of the Borough of Brooklyn. It will be observed that the height of this rail is only 7 in.; the width of the head, 2½ in., and the depth of the groove, 1¼ in. The short lip is designed to give the same bearing for paving blocks as rails with longer lips and yet expose a smaller steel surface to street wear. Some long-lipped



Coney Island & Brooklyn Track Improvements—Roller in Use on Sub-Grade

rails, for instance, expose 5 in. to 5½ in. of steel in the street. This new rail section is rolled both by the Lorain Steel Company and the Pennsylvania Steel Company.

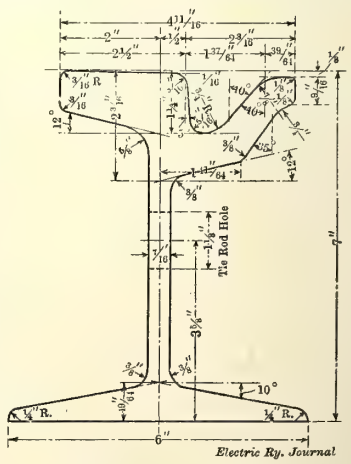
The new track is fitted with eight-hole Continuous joints and double-bonded with a combination No. 0000 plug and soldered bond specially designed by the engineers and made by the Lord Electric Company. The joints were drilled ⅛ in. small, the holes being reamed in position for the driving in of 1⅛-in. diameter turned bolts. The ties, which are spaced 2 ft. 3 in. centers, are 6 in. x 8 in. face and 7 ft. 6 in. long. They are of long-leaf yellow pine and were creosoted with 12 lb. of oil per cubic foot. It is expected that the treated ties will last from 20 to 25 years, especially in view of the employment of screw spikes and ⅜-in. tie plates.



Coney Island & Brooklyn Track Improvements—Tie-Plate Construction at DeKalb and Evergreen Avenues

The spike holes were bored before the ties were creosoted, and for convenience in installation, the tie-plates and four of the six spikes were put in at the track yard.

The cross-section on page 1177 illustrates the details of the track foundations, while the appearance of the work at various stages is shown in several half-tones. One of the latter is of particular interest as it shows the track completed on one side, different foundation layers on the other side and the 10-ton steam roller, which was used to roll the subgrade as well as the ballast. Considerable economy was effected in the repaving of the DeKalb Avenue work by splitting and dressing the old granite blocks which had been worn down on the top surface. The joints between the blocks were filled with cement grout. All of the special work is of the hard steel center type made by the Wharton and Lorain companies.



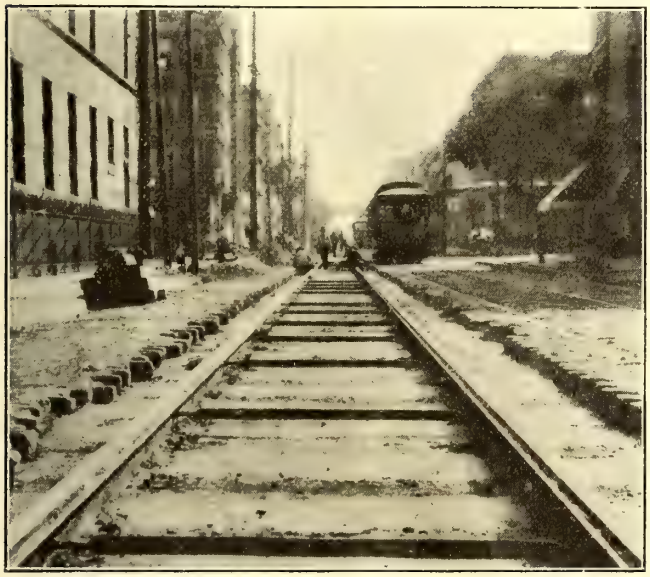
Standard 102-lb. Section

The general overhauling carried out directly by the railway company during the fiscal year 1908-1909 may be summarized as follows: 2752 rail joints were repaired and resurfaced, which if contiguous would represent 7.82 miles of track overhauled; track was resurfaced and tie rods installed for a distance equal to 5.45 miles; 2527 joints were bonded, which if contiguous would represent 7.18 miles;

jumper cables were installed around 33 pieces of special work; 230 pieces of rail were cut in where joints were so bad as to make it necessary to cut out the joint entirely and substitute a piece of new rail. All special work of the system as a whole was gone over thoroughly, renewed where necessary and put in good operating condition.

LINE IMPROVEMENTS

Coincident with the track improvements, the company



Coney Island & Brooklyn Track Improvements—Construction at DeKalb and Hamburg Avenues

began the thorough overhauling of its overhead lines, including the placing of feeders underground in certain districts. In all 15.16 miles of trolley wire or about 32½ per cent of the entire system were renewed with phono-electric wire, which is expected to wear from five to six years and have less breaks than hard-drawn copper. The sections renewed were made up of the following lengths and wire gages: 2.44 miles with No. 0; 11.62 miles of No. 00, replacing No. 0; 1.10 miles of No. 0000, replacing No. 0. A large portion of the span wires was found badly rusted, thus requiring the installation of 15.23 miles of 5/16-in. galvanized iron wire. Practically all of the overhead special work and about 75 per cent of the wood strain and other insulators were renewed, largely with General Electric equipment. Other improvements during the fiscal year were the installation of 45 new iron and 37 new wooden poles and the renewal of over 10 per cent of the underground lead-covered cables.

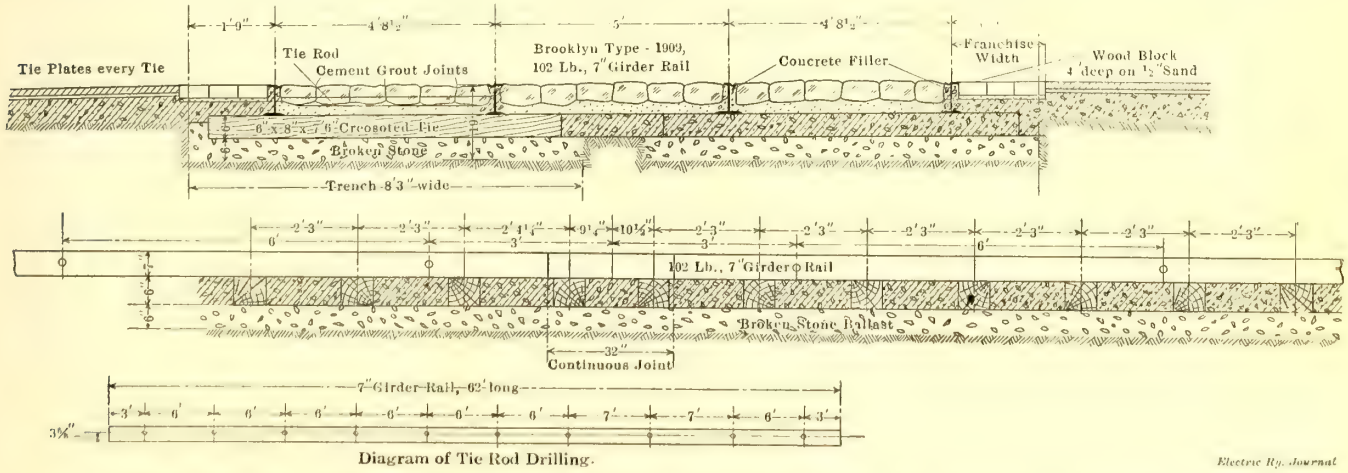
THE WIESENTAL SINGLE-PHASE RAILWAY IN BADEN, GERMANY

The Wiesental Railway, owned by the Grand Duchy of Baden, Germany, has recently been electrified for 10,000-volt, 15-cycle, single-phase operation. The main line extends from Basel to Schopfheim, 13.4 miles, with branches at Säckingen and Zell, which are respectively 25.6 miles and 17.8 miles from Basel. A significant feature in connection with the choice of the voltage and frequency is the fact that the current is purchased from a hydroelectric plant at 6800 volts, 50 cycles. The overhead work is of the Siemens-Schuckert multiple catenary type, with 240-ft. span.

Twelve through trains, 51 local passenger trains and 15 to 21 freight trains are operated daily. As all cars are of the standard steam design, only electric locomotives are used. The 10 machines which the Siemens-Schuckert Company is building are intended to haul both passenger and freight trains. The maximum weight of a standard passenger train (exclusive of the locomotive) is 230 metric tons, and of freight trains 500 metric tons. The average grade on the line is 0.57 per cent and the highest 1 per cent. The locomotives will have five axles, of which two are free and the other three are driven from two series motors mounted in the upper part of the locomotive. Each motor will have a continuous rating of 390 hp, an hour rating of 525 hp and a maximum output of 800 hp at 300 volts.

At first, the converter station in Basel will have two converter sets, each consisting of a 2100-kva (continuous rating), single-phase generator coupled to a polyphase asynchronous motor and a d.c. machine. The latter is in circuit with a storage battery. When the load on the line is heavy, the d.c. machine will act as a motor and deliver the necessary additional power to run the single-phase generator; on light loads it will become a d.c. generator and charge the battery, thus securing the same desirable equalization of loads as on a purely direct-current line.

The narrow-gage electric railway between Glion and Montreux, in Switzerland, has recently been extended and equipped with electric locomotives of a novel type, as they are of 220 hp on a road with a gage of only 31½ in. The



Coney Island & Brooklyn Track Improvements—Longitudinal and Cross Sections of Standard Track

motors, of which there are two to each locomotive, have necessarily to be mounted on the locomotive frame, and are connected by double reduction gearing and then by crank rods to the driving wheels. Electrically, the motors are always in series. The line is operated by 600-volt direct current.

COMPARISON OF OPERATION OF THE NEW YORK AND PARIS SUBWAY SYSTEMS

BY ROBERT H. WHITTEN, LIBRARIAN-STATISTICIAN, NEW YORK PUBLIC SERVICE COMMISSION, FIRST DISTRICT

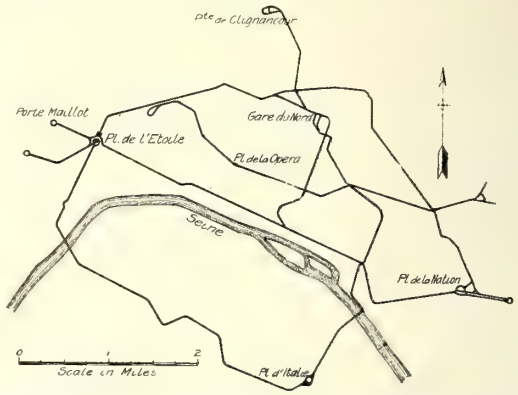
While the Paris and New York subway systems have a sufficient similarity to make comparison of their operations practicable they have enough points of divergence to make the results of the comparison especially instructive. The statistics used are for the year ending June 30, 1908, in the case of the New York subway, and for the year ending Dec. 31, 1908, for the Paris subway.

Both the Paris and the New York subways have been built and are owned by the city and leased for a term of years to an operating company. Both subways are mainly of the "shallow" rather than the tunnel type, running as near the surface as the topography of the district and other difficulties render practicable. The length of the two systems in miles of single track operated was in 1908 very nearly equal. The Paris system, however, forms a network of lines covering a district having a radius of three or four miles from the business or traffic center. The New York system has a single main stem terminating in two long forks at the upper end and extending 14 miles from the Brooklyn Bridge or chief traffic center. The New York subway has four tracks permitting of both express and local service for 6½ miles through the most congested district. The Paris subway is two-track throughout and has no express service. The number of passengers carried is greater in Paris than in New York, both as to total and as to number per mile of track and per car-mile. The congestion of traffic is, however, much less in Paris than in New York, owing to the more advantageous distribution of traffic, both as to time and as to direction and the shorter average length of ride.

AREA AND POPULATION

The Paris metropolitan district had in 1908 an estimated population of 3,960,000 as compared with 4,340,000 for New York City. The district served by the Paris subway, however, is that of the municipality proper or the portion of the city within the walls. The district served by the New York subway is assumed to be the boroughs of Manhattan and the Bronx. The local traffic on the subway in the borough of Brooklyn was so slight for the year under consideration that it may be disregarded.

The population of the district served by the subway system was 2,570,000 for New York subway and 2,790,000 for Paris. Paris is roughly circular in shape, its boundary wall forms roughly a circle having a 3-mile radius and a center that coincides with the center of the business district. The area of the city proper is 31 square miles. Outside of the city boundary wall there is a large population that should be considered a part of the Paris metropolitan district. Greater Paris may be said to cover the entire department of the Seine, which has an area of 185 square miles. The area of New York City is 327 square miles, and that of Manhattan and the Bronx, the district served by the subway, 62 square miles. The population of the district served by the Paris subway is more than twice as dense as that of the district served by the New York subway. Manhattan and the Bronx have a population of 41,400 per square mile, while the city of Paris has a population of 90,000 per square mile.

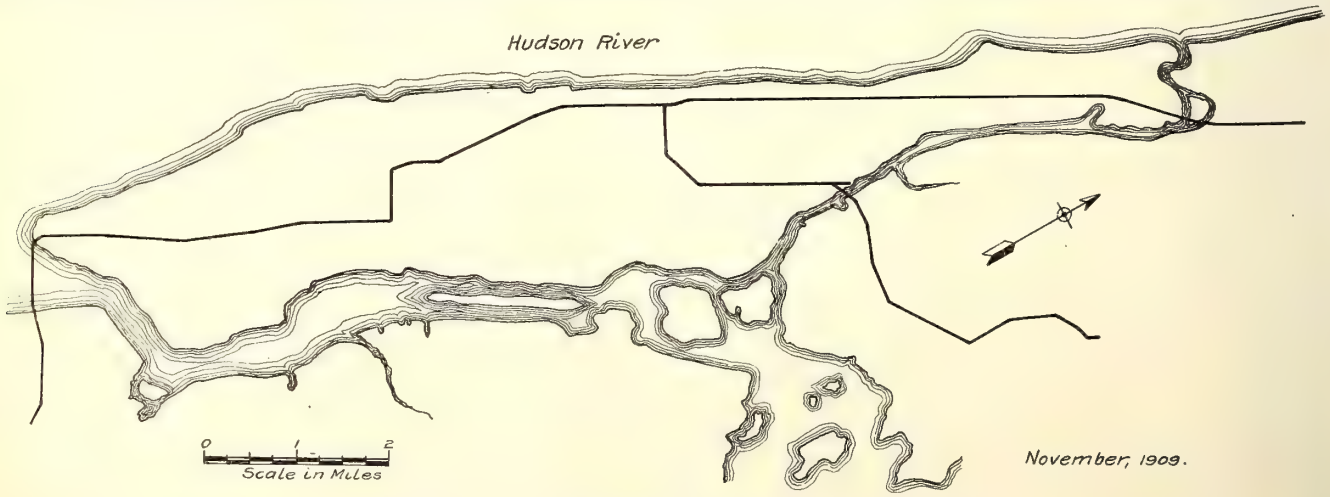


Paris and New York Subways—Map of Paris System

COMPETING LINES

In New York the subway must compete for public favor with an extensive system of surface and elevated lines. In Paris there are no elevated lines and the surface lines are undeveloped.

Most of the surface franchises in Paris expire in 1910 and the reorganization and development of the system have been long delayed through failure to reach an agreement as to the extension of the franchises. The omnibuses and cabs, however, carry a large traffic. The subway system when completed will be in the hands of a single company (Chemin de fer Metropolitain de Paris), with the exception of a line across the city from north to south, which is being constructed by an independent company. The two companies are, however, required to grant free transfers at intersecting points.



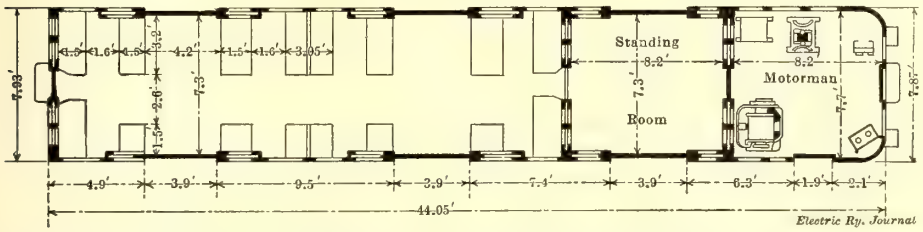
Paris and New York Subways—Map of New York System

LINES AND ROUTES

At the end of 1908 31 miles of double-track line of the Paris subway system were in operation. The system is

divided into five separate operating lines, the longest of which is a semi-circular line 9 1/3 miles in length and the shortest 3½ miles. Another line, semi-circular in form, is 7½ miles in length, and another, running straight across the city, 6½ miles.

Each line is independent and self-contained. The trains run back and forth from one end of the line to the other, usually turning at each end by means of a short loop.



Paris and New York Subways—Plan of New Type Paris Motor Car Seating 25 and Having 45 Standing Places

The New York subway had a total length in June, 1908, of 24.6 miles. For the transportation of passengers two tracks are used from the Atlantic Avenue station in Brooklyn to the Brooklyn Bridge; four tracks from the Brooklyn Bridge to Ninety-sixth Street; two tracks from Ninety-sixth Street to 180th Street on the Lenox Avenue line and two tracks from Ninety-sixth Street to 242d Street on the Broadway line. In addition, a third track is operated on the Broadway line between 103d Street and 137th Street.

This makes a total of 64.6 miles of single track in New York used for transporting passengers. This total does not include sidings, turnouts or tracks used for car storage only. The total length of track operated for the Paris subway was 62.2 miles. In both cases, however, a portion of this track was completed and put in operation within the year. A better basis of comparison is therefore found in the average miles of single track operated during the year, which is 61.4 miles for New York and 60.3 miles for Paris.

The accompanying cuts show on the same scale the two systems as operated in 1908. In Paris, in addition to the lines shown, the lines now under construction and those definitely agreed on form a complete network within a very small area as compared with the New York system.

TRAINS

On the Paris subway the trains do not run between 1 a. m. and 5:30 a. m. During 1908 the least headway during rush hours was 2 minutes and 33 seconds on line No. 3. The greatest headway on any of the five lines in operation was 7½ minutes during the period of least traffic from 8 p. m. to 1 a. m. As shown by the comparative chart the New York schedule for express trains on the four-track portion of the line called for a train headway of two minutes and under during rush hours and for a four-minute headway in the late evening hours.

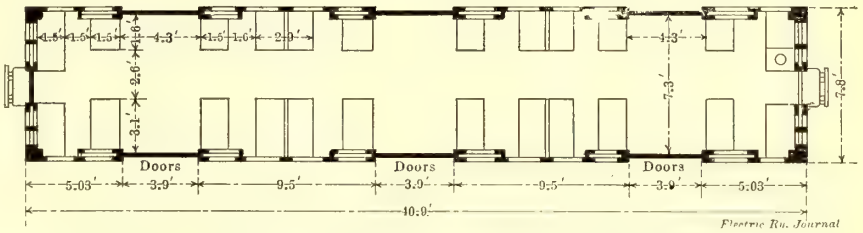
The Paris subway station platforms are 246 ft. long and the maximum length of trains as prescribed by the Government is 236 ft. In New York the station platforms are 350 ft. in length, except at exclusively local stations where they are 200 ft. Eight-car trains 411 ft. in length are operated on the express tracks and five-car trains 257 ft. in length on the local tracks.

SPEED

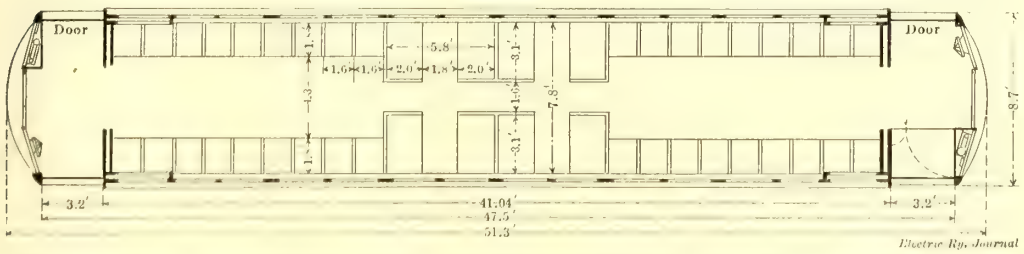
The average schedule speed on the Paris subway is about 12 m.p.h. The maximum speed allowed under the police ordinance is 21.7 m.p.h. The average schedule speed on the New York subway for both express and local trains was a little more than 18 m.p.h. The average schedule speed of express trains between Brooklyn Bridge and Ninety-sixth Street was about 24 m.p.h., and for the entire route traveled by the express train about 20 m.p.h. The average speed of local trains for the entire route was a little more than 15 m.p.h. The maximum speed was about 40 m.p.h.

It is thus seen that the average schedule speed on the Paris subway was about half that of the express trains on the New York subway between Brooklyn Bridge and Ninety-sixth Street, and about two-thirds of that of the average schedule speed of all trains operated on the New York subway. The value of the greater speed attained by the New York system can scarcely be overestimated. From the public viewpoint, fare and speed are the two prime considerations with regard to any transit system. The relative importance to the public of speed and rate of fare has never been studied statistically. It seems probable however, that a decrease of 50 per cent in time required for transportation is at least as important as a 50 per cent decrease in rate of fare.

From the public viewpoint the greatest benefit of rapid and cheap transportation comes from the spreading out of population and the consequent relief of congested sections. Land values and rents in outlying districts can be, and often are, fixed at such a rate as to induce people to settle, regardless of a higher fare charged for transportation. It is not nearly so feasible, however, to so reduce land values and rents in an outlying district as to make it attractive for residence if the time



Paris and New York Subways—Plan of New Type Paris Trailer Car Seating 37 and Having 45 Standing Places



Paris and New York Subways—Plan of New York Motor Car Seating 52 and Carrying at Times a Total of 170 Passengers. Seating Arrangement and Dimensions the Same for Trailer Cars

required for transportation exceeds 40 to 50 minutes. People cannot afford the time, regardless of whatever inducements may be offered in the way of rent. The spread of the population of the various cities over a wider and wider area has been produced chiefly by the greater and greater speed attained by their transit systems. By doubling the radius of a circle its area is quadrupled, and by doubling the speed of city transit the area available for settlement is increased fourfold.

In attaining a high rate of speed the distance between stations or the number of stops is of prime importance. On the Paris subway the average distance between stations is 1640 ft. and all the trains stop at all the stations. On the New York subway the average distance between stations is 2280 ft., while on the express tracks between Brooklyn Bridge and Ninety-sixth Street the average distance between the stations is about 1¼ miles.

FARES

The concession granted the Paris company fixes the following rates of fare: First-class, 25 centimes (4.8 cents); second-class, 15 centimes (2.9 cents); round-trip tickets, second-class, good for return at any time on day of purchase are sold up to 9 o'clock in the morning for 20 centimes (3.8 cents). Pupils of the communal schools of the city of Paris are transported for 5 centimes when traveling in groups accompanied by a teacher. For a single fare the passenger has a right to travel from any one point on the entire system to any other point. Free transfers are allowed at all crossings and junctions. The average fare received was 2.7 cents.

On the New York subway there is a uniform fare of 5 cents with the exception of a comparatively small number of joint fares of 8 cents from which the subway's portion is 4 cents. The average receipts from fares per passenger for the year ending June 30, 1908, was 4.99 cents. Cost of subway construction and equipment was one-half greater in New York than in Paris, as explained later. We would therefore look for a similar difference in the charge for transportation. On this basis a fare of 2.7 cents in Paris would be the equivalent of a 4-cent fare in New York. While the fare in New York is 5 cents the average length of ride per passenger is from 2 to 2½ times that in Paris. Allowing for difference in purchasing power of money as indicated by cost of construction and equipment and for difference in length of average ride for a single fare, the charge per mile for subway transportation is 1½ to 2 times as great in Paris as in New York.

CARS

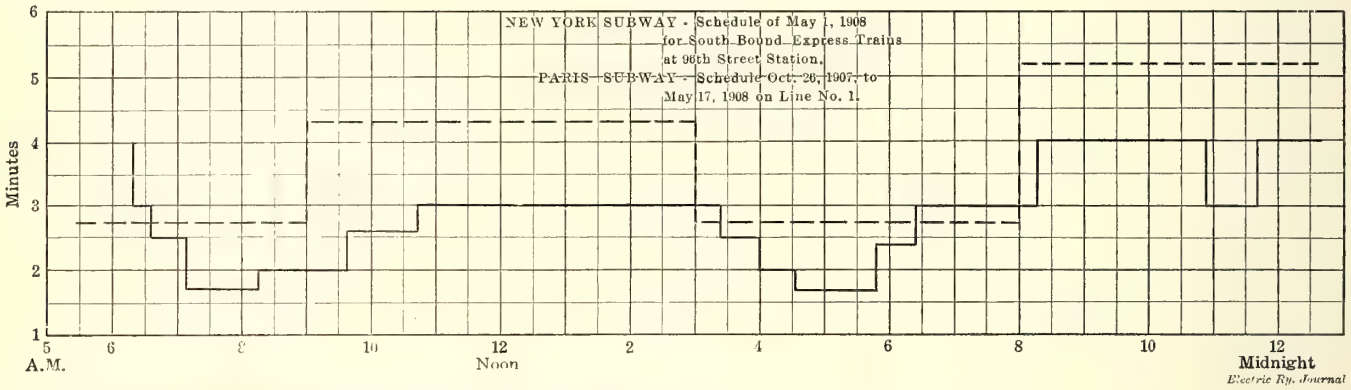
In Paris the maximum capacity of each type of car is determined by the Government. Government regulations contemplate that each passenger, whether standing or sitting, shall have a minimum floor area about 1½ ft. x 2 ft., or 3 sq. ft. This allowance, together with necessary allowance for exits and fixtures, gives in practice one passenger place for approximately each 3½ sq. ft. of floor area. Various types of cars are in use in Paris, from the small, old type motor car, with 20 seats and 15 standing places, to the modern second-class trailer car, with 37 seats and 45 standing places. A large proportion of the cars have 26 seats and 30 standing places. For all cars in use in 1908 the average number of seats was 28 and the average number of passenger places (seats and standing room) was 64. The Government regulations limiting the standing load are not always enforced.

Of the New York cars in use in 1908, 800 had 52 seats each and 37 had 48 seats each. The New York cars are longer and broader than even the largest of the Paris cars. Allowing the same floor area per passenger as is allowed by Government regulation in Paris, the New York car would have a total passenger capacity of 103. Often 150 and sometimes 170 passengers crowd into a New York car. This discussion has reference to the New York car in use in 1908. The recent adoption of the center side door has materially changed the seating arrangement.

TRAFFIC DENSITY

The number of passenger car-miles operated on the New York subway was 44,000,000 or 710,000 per mile of single track. On the Paris subway 34,600,000 passenger car miles were operated, an average of 570,000 per mile of single track. (See Table I.) A comparison on the basis of car-miles is, however, rather misleading. The New York subway car has an average of a little less than 52 seats while the cars used in the Paris subway have from 20 to 37 seats; the average for all cars in use being 28. A better basis on which to compare the service rendered by the two systems is therefore the number of seat-miles instead of car-miles. But the seating arrangements of the New York and Paris cars differ materially and, moreover, in neither city is the capacity of a car measured in practice by the number of seats provided.

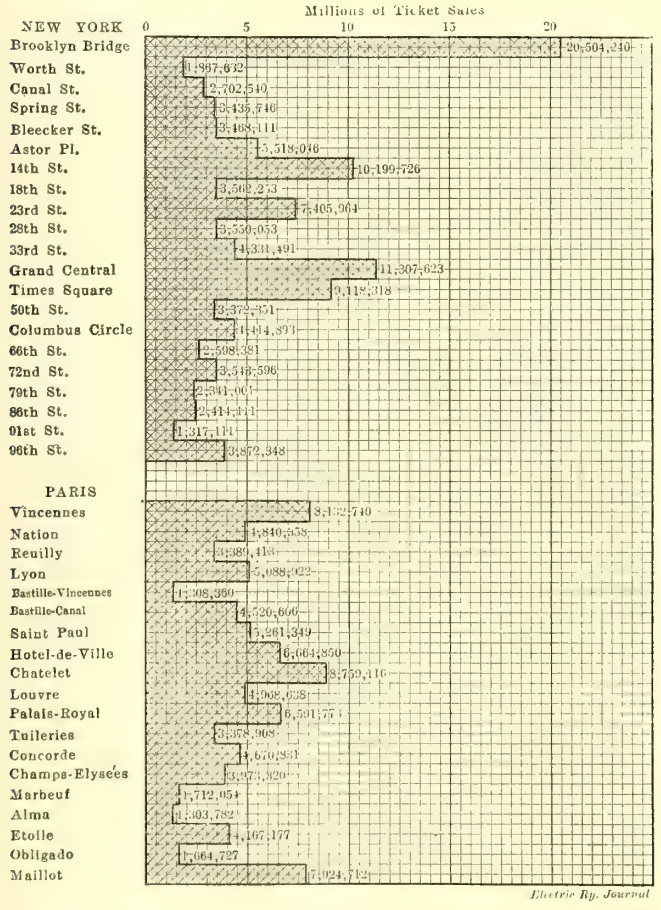
In Paris the number of "standing places" in each car is fixed by the Government and the number of seats plus "standing places" is the capacity of the car. The average number of places per car is 64. There is no limit to the standing load in New York, but allowing the same amount of floor space per passenger as in Paris the capacity of a New York subway car would be 103. In comparing the service rendered by the two systems the number of "passenger place miles" is preferable to either car-miles or seat-miles. While 103 passengers may or may not be a reason-



Solid Line Shows New York Headway; Dotted Line Shows Paris Headway.

Paris and New York Subways—Comparison of Train Headway

able load for a New York car, for comparison with Paris 103 places per car should be used in figuring the number of "passenger place miles" operated. The New York subway operated 4.5 billion passenger place miles while the Paris subway operated but 2.2 billion passenger place miles. The number of passenger place miles per mile of track was 73,000,000 for the New York system and 36,000,000 for the Paris system. Nevertheless, the New York subway carried only 200,000,000 passengers as against 282,000,000 carried by the Paris subway. The Paris subway carried 4,600,000 passengers per mile of single track as against 3,200,000 on the New York subway. The Paris subway carried .127 passenger per passenger place mile operated while the New York subway carried only 044. Every passenger place mile operated on the Paris subway served 2.9 times as many persons as on the New York subway.



Paris and New York Subways—Comparison of Yearly Ticket Sales on 6 1-2-Mile Stretch of Greatest Density

This result is doubtless due to a number of causes including better distribution of traffic throughout the hours of the day, currents of traffic moving in both directions during rush hours and a shorter average ride per passenger.

1. *Better distribution of traffic in Paris throughout the hours of the day.* As will be seen from the comparative chart showing a car schedule on the New York and Paris subways, the peak of the load is not so marked in the case of the Paris subway. The rush hours extend over a somewhat longer period and the difference between the rush hour schedule and that for other hours of the day is not quite so great as in New York.

2. *Currents of traffic in Paris moving in both directions during the rush hours.* Most of the Paris subway lines are planned so as to run from one residence district through the commercial or traffic center and out into another residence district on the other side of the city. In this way the mileage of empty cars is reduced. During the morning rush hour the trains have a load not only to but into and through the congested district. Returning from the other end of the route they again have a load into and through the congested district. Instead of running empty for one-half of their round trip mileage the trains have a load for perhaps two-thirds of their round trip mileage.

Through operation:

Loaded. Empty.

Congested district.

Empty. Loaded.

Lines terminating at center:

Loaded. Empty.

Congested district.

Empty. Loaded.

The New York subway, with the opening of the Brooklyn extension, also runs into and through the congested district, though it does not secure the maximum advantage of such operation by extending into the residence district on the other side.

3. *Shorter average ride per passenger in Paris.* On the New York subway the longest possible ride is from Atlantic Avenue in Brooklyn to 242d Street, a distance of 17½ miles. On the Paris subway the longest continuous ride without change of route is about 9 1/3 miles and this is upon a semi-circular route upon which no one would probably desire to travel the full distance. The longest direct route is 6½ miles. Even when the entire Paris system is complete the passenger in traveling from any one part of the system to any other part will not go more than 7 or 8 miles. The terminus of no line is more than 3 or 4 miles from the business or traffic center. Even for the comparatively long homeward and workward rides, therefore, the average length of ride must be under 2½ miles. In New York the average length of ride on northbound trains during the homeward rush hour is estimated at 5 miles to 5½ miles. In addition, the Paris system is so planned as to secure a very large local or short haul traffic throughout the day. It furnishes a convenient means of transportation from one part of the congested district to another, thus serving the demand for rapid transit to satisfy business and commercial needs. The New York subway also secures a large short haul traffic, especially between Brooklyn Bridge and Forty-second Street. An important factor in increasing the average ride in New York is the greater speed of the trains. The length of ride tends to increase with the speed attained. People will not travel far on a horse-car line, they will go much further on an electric surface line, still further on a 12-m.p.h. rapid transit line and further still on a 20 to 24-m.p.h. express service such as is maintained on the New York subway.

It has been noted that every passenger place mile operated on the Paris subway served 2.9 times as many persons as on the New York subway. This is equivalent to an increase of 190 per cent in transportation facilities per passenger in New York as compared with Paris. It is clear that this great difference cannot be due solely to the first two causes above mentioned, *i. e.*, better distribution of traffic throughout the hours of the day and currents of traffic moving in both directions during rush hours. While it is conceivable that these causes might be sufficient under certain circumstances to produce a difference of 100 per cent in transportation facilities required, it

seems that under the known conditions 50 per cent would be a liberal allowance for increase in facilities due to these two causes. This would leave 140 per cent to be accounted for by shorter average ride per passenger, which would mean that the average ride in New York was 2.4 times as long as the average ride in Paris. We have seen above some reason for thinking that the average ride in New York was at least two times that of the average ride in Paris.

Table I.—Traffic Density.

	New York subway. Year ending June 30, 1908.	Paris subway. Year ending Dec. 31, 1908.
Passenger cars	837	951
Average seats per car	52	28
Total number of seats	43,524	27,579
Average passenger places per car	103	64
Total number of passenger places	82,211	60,751
Passenger car-miles	44,005,213	34,629,014
Per mile of line (aver. operated)	1,910,777	1,147,986
Per mile of single track (av. oper.)	716,697	573,993
Per fare passenger	.2195	.1226
Seat miles	2,288,271,000	959,612,000
Per mile of line (aver. operated)	99,360,000	31,812,000
Per mile of single track (av. oper.)	37,268,000	15,906,000
Per fare passenger	11.41	3.397
Passenger place miles	4,532,536,000	2,216,256,000
Per mile of line (aver. operated)	196,810,000	73,471,000
Per mile of single track (av. oper.)	73,819,000	36,735,000
Per fare passenger	22.61	7.84
Fare passengers	200,439,776	282,427,235
Per mile of line (aver. operated)	8,703,420	9,362,752
Per mile of single track (av. oper.)	3,264,491	4,681,376
Per car-mile	4.555	8.15
Per seat-mile	.0875	.293
Per passenger-place-mile	.044	.127

Ticket Sales

A comparison of ticket sales on the most congested portions of the New York and Paris subways shows a greater average per mile of line in New York than in Paris (17,053,000 and 13,587,000). However, the New York line is four-track while the Paris line is two-track and the ticket sales in Paris per mile of single track (7,793,000) exceed those of new York (4,263,000) by more than 50 per cent. This result seems strange to anyone who has seen the two systems and noted the longer and more frequent trains and greater crowding on the New York system. Comparative ticket sales show the comparative amount of traffic originating in the districts compared, but taken alone give little indication of actual density of cars or passengers. On two lines with the same average of ticket sales the comparative traffic density will depend on the distribution of sales as to time and direction of travel and even more markedly on the average length of ride. A line with the same average of ticket sales per mile, but with double the average length of ride will have double the traffic density. For the portions of route in question, the comparative density of traffic in New York is also increased by the fact that this four-track portion forms a funnel through which flows not only the traffic entering at its own stations but a large proportion of all traffic entering at all other stations on the entire system. In December, 1908, the schedule of line No. 1 on the Paris subway called for 607 trains daily in each direction, thus placing at the disposition of the public 228,500 places. At the same time the schedule on the four-track portion of the New York subway called for 5281 cars daily in each direction. Counting 103 passenger places to the car this gives 1,087,000 passenger places per day.

In the comparison of yearly ticket sales on the two systems, shown in an accompanying illustration, the actual number of ticket sales on line No. 1 of the Paris subway has been increased by the estimated number of round-trip tickets sold, based on the percentage of round-trip tickets for the entire system. This increase has been apportioned among the middle stations of the line, Saint-Paul to Champs-Elysees. As the round-trip tickets are only sold before 9 a. m., it is assumed that they are used to go to the central business district and that stations in that district should be credited with the return half of the ticket. The number of tickets sold at Etoile, Chatelet, Bastile and Nation includes the tickets sold for the intersecting lines of the system as well as those sold for use on line No. 1. This error is offset by the fact that the figures for the Brooklyn Bridge and Ninety-sixth Street stations on the New York subway include sales in both directions, and by the further fact that on the Paris subway many round-trip tickets are purchased on other lines to reach stations on line No. 1 and that, therefore, the return half of the ticket is not properly credited to line No. 1.

Revenue from Transportation

The New York subway's revenue from transportation amounted to $10,000,000 while that of the Paris subway was but $7,700,000. The earnings per mile of single track were $163,000 for the New York subway and $127,000 for the Paris subway. In spite of the great difference in average fare on the two systems, the earnings per car-mile were substantially the same and the earnings per passenger place mile were 0.34 cent in the case of the Paris subway as against 0.22 cent in the case of the New York subway. The much lower fare charged on the Paris subway was much more than made up by a more advantageous distribution of traffic and by shorter average rides per passenger. (See Table II.)

Apportionment of Gross Revenue

The gross revenue received from operation in New York amounted to $166,000 per mile of single track operated as against $130,000 for Paris. (See Table III.) Of the gross revenue of the New York subway 43 per cent was used for operating expenses while in the case of the Paris subway but 38½ per cent was required for operating expenses. Operating expenses amounted to $72,000 per mile of single track in the case of the New York subway as against $50,000 for the Paris subway. Operating expenses per passenger place mile were 0.13 cent for Paris as against only 0.09 cent for New York. That operating expenses per passenger place mile should be 40 per cent greater in Paris than in New York is rather surprising. Cost of both subway construction and equipment was almost one-half greater in New York than in Paris. A somewhat similar result would be expected in operating expense per passenger place mile. The actual result is doubtless partially explained by the larger car and train units used in New York, thus requiring a smaller expenditure for wages of motormen, conductors and guards. Labor expense in New York is also reduced by the greater average speed of the trains. Two trains running at an average speed of 18 m.p.h. will do the work of three trains running at an average speed of 12 m.p.h. Under these conditions two cars and two train crews do the work of three cars and three train crews. The Paris company's labor expense was also greatly increased by franchise requirements for the insurance and pensioning of employees. Moreover, operating expenses per passenger place mile decrease somewhat with the number of passenger place miles operated (See B. J. Arnold's report on the

Table II.—Revenue from Transportation.

	New York, Year ending June 30, 1908.	Paris, Year ending Dec. 31, 1908.
Earnings from transportation	$10,020,538	$7,708,390
Per mile of line (average operated)	435,108	255,583
Per mile of single track (aver. operated)	163,200	127,770
Per passenger, cents	4.996	2.729
Per car-mile, cents	22.77	22.26
Per seat-mile, cents	.437	.767
Per passenger-place-mile, cents	.221	.347

Return on the Investment in the Subway) and as the number of passenger place miles operated was very much greater in New York than in Paris the relative cost per passenger place mile would be less for New York. Difference in cost of power, however, accounts for the larger share of the difference in total cost of operating a passenger place mile. Cost of power per passenger place mile amounts to 0.022 cent in New York and 0.043 cent in Paris, a difference of .021 cent. The difference in total operating cost of a passenger place mile is 0.039 cent, so that difference in cost of power alone accounts for 54 per cent of this difference. The fewer train stops in New York would account for a portion of the lower power cost. In Paris, moreover, the company purchases a portion of its power, and thus pays a profit to the producer.

But although the operating expense per passenger place mile was 0.13 cent for Paris as compared with 0.09 cent for New York the operating expense per fare passenger was twice as great in New York as in Paris, being 2.2 cents for New York and 1.07 cents for Paris. As this difference cannot be due to increased cost of operating a passenger place mile it must be due to the greater number of passenger place miles that must be operated to secure one fare passenger. There were 22.6 passenger place miles per fare passenger in New York and but 7.8 in Paris.

As to taxes the New York subway fared much better than the Paris subway. The New York company paid but $900 per mile of single track as against $4,300 per mile for the Paris subway. The taxes of the New York subway were but 0.58 per cent of its gross revenue, while in the case of the Paris subway taxes were 3.34 per cent. The New York company paid 19 per cent of its gross receipts to the city in the form of a rental for the use of the subway while the Paris company paid 32 per cent of its gross receipts to the city for this purpose. Although the cost of the subway to the city was $830,000 per mile of single track in New York and only $590,000 in Paris, the New York company pays but $32,000 per mile as rental while the Paris company pays $42,000 per mile. After deducting operating expenses, taxes and rental, the New York company has available for interest, dividends and reserves 36.8 per cent of its gross revenue, or $61,000 per mile of single track while the Paris company has but 25.3 per cent of its gross revenue and $33,000 per mile of single track. Owing to lower tax and rental payments the New York company, with an operating expense ratio exceeding that of the Paris subway by 4½ points, has a ratio of net earnings available for interest, dividends and reserves 11½ points in excess of that of the Paris company. The net earnings per passenger place mile operated were nearly the same for both systems, but the net earnings per fare passenger were 2.7 times as great in New York as in Paris.

It has been predicted by some critics of the Paris system that as the subway mileage increased the profits from operation would decrease. Thus far this prediction has not been verified. The net profits per mile of line operated show an almost continuous upward trend. There was a decline in 1906 and 1907, but the net profits per mile of line in 1908 are greater than for any previous year.

COST OF SUBWAY CONSTRUCTION AND EQUIPMENT

The total cost of the New York subway and its equipment has been estimated at $87,938,000. This amount is made up of $51,290,000 actually paid by the city for the construction of the subway and of $36,648,000 that the company reports that it has expended for both equipment and construction. The cost to the company includes an item of $10,048000 that the company claims to have spent on the construction of the subway from Brooklyn Bridge to Atlantic Avenue, Brooklyn, in excess of the amount paid by the city for this work. The cost of construction paid by the city, $51,290,000, does not include an item of $6,225,000 claimed by the construction company and now the subject of arbitration proceedings. (See Table IV.)

The total cost of the construction and equipment of the Paris subway is estimated at $62,252,000. This amount is made up of $25,552,000 which the company states that it has expended for equipment and construction and of the estimated cost of construction paid by the city of $36,700,000. This latter estimate is based on the estimated cost of the completed subway system including portions as yet unconstructed as made by the city authorities in 1907. In New York the total estimated cost of construction and equipment per mile of single track used in operation is $1,432,000, while for Paris it is $1,000,000. The cost of construction paid by the city is $835,000 per mile of single track in New York and $590,000 in Paris. The reported cost of equipment and of construction paid by the company is $596,000 per mile of single track in New York and $410,000 in Paris.

The relative proportion of the total cost paid by the city and the company, respectively, is almost identical for both cities. Construction paid by the city and equipment or construction paid by the company do not, however, represent the same things in both cities. In New York the cost of equipment or construction paid by the company includes, as stated, an item of $10,048,000 for the work of subway construction proper. Deducting this amount from the cost of equipment and adding it to the cost of construction, we have for the New York subway a cost of construction of $61,338,000 and a cost of equipment amounting to $26,600,000 or $999,000 per mile for construction and $433,000 for equipment. While in New York the cost of subway tracks was included in the original contract and paid for by the city, in Paris the tracks were considered a part of the equipment and were paid for by the company. In Paris also, the station entrances, ticket booths and, in fact, the

TABLE III.—GROSS REVENUE FROM OPERATION AND ITS APPORTIONMENT.

	Amount.	Per cent of gross revenue from operation. Per cent.	Per mile of single track operated. Dollars.	Per passenger car-mile. Cents.	Per passenger place-mile. Cents.	Per fare passenger. Cents.
Gross revenue from operation:						
New York subway	$10,253,337	100	166,992	23.3	.226	5.11
Paris subway	7,847,954	100	130,083	22.66	.354	2.77
Operating expenses (taxes excepted):						
New York subway	4,423,313	43.14	72,040	10.05	.097	2.20
Paris subway	3,035,797	38.68	50,319	8.76	.136	1.07
Taxes:						
New York subway	59,540	.58	969	.13	.001	.02
Paris subway	262,141	3.34	4,345	.75	.011	.09
Rental to city for use of subway:						
New York subway	1,991,984	19.42	32,442	4.52	.043	.99
Paris subway	2,560,854	32.63	42,447	7.39	.116	.90
Net earnings, less taxes and rental:						
New York subway	3,778,498	36.85	61,539	8.58	.083	1.88
Paris subway	1,989,161	25.34	32,971	5.74	.089	.70

entire station with the exception of the platform was constructed at the expense of the company. For purposes of comparison, therefore, the cost of tracks and stations has been deducted from the cost of equipment as reported by the Paris Company and added to cost of construction. This gives for the Paris subway a total cost of construction of $42,100,000, or $676,000 per mile of single track and a cost of equipment of $20,152,000 or $324,000 per mile of single track.

The relative cost of construction and equipment estimated on this basis remains nearly equal for the two systems. In New York the estimated cost of construction is about 69 per cent of the total cost of construction and equipment, while in Paris it is about 67 per cent. The average cost per mile in New York is reduced by the fact that some 5 miles of elevated line are included. There are also in the Paris system numerous short stretches of elevated road or viaduct, but these are built on such an expensive plan as to increase rather than reduce the average cost per mile. The cost of equipment in Paris is somewhat reduced by the fact that the operating company buys a portion of the electric power used. The cost of power plant and substations is reported as $11,600,000 for New York and $5,200,271 for Paris. Information is not available as to the amount of power purchased by the Paris company.

RATE OF RETURN ON INVESTMENT

For the year ending June 30, 1908, the net earnings of the New York subway after deducting taxes, amounted to 6.9 per cent on the total estimated investment of both the city and the operating company. The net earnings, after deducting taxes and the rental paid by the operating company to the city amounted to 10.8 per cent on the company's reported investment for equipment and for construction. The subway considered as an economic undertaking earned about 7 per cent on the capital invested. The operating company earned about 11 per cent upon its reported investment. This result was obtained in spite of the fact that the year ending June 30, 1908, was one of general economic depression. In this estimate no allowance has been made for depreciation. For the year ending Dec. 31, 1908, the Paris subway earned 7½ per cent on the total estimated cost of construction and equipment, and the operating company earned 8 per cent on its reported investment for equipment and construction. A portion of the total mileage of both the New York and Paris systems was not operated for the entire year. In estimating return on investment, therefore, such proportion of the entire cost of construction and equipment was taken as the average length of track operated during the year bore to the total length of track at the end of the year.

The Paris Company has issued $14,475,000 shares and $9,167,000 bonds, making a total capitalization of $23,642,000. One-half of the bonds paid 3½ per cent interest and the other half paid 4 per cent. A first dividend of 3 per cent was paid on the entire capital with the exception of 6030 shares that have been amortized. A second dividend of 5 per cent was paid on the entire capital, including the shares that have been amortized. These amortized shares are called "actions de jouissance," and apparently participate until the end of the lease in all dividends declared in excess of 3 per cent. The company paid $80,582 into its legal reserve fund as required by law, or 5 per cent on its net profits. The company used $200,720 of its profits to amortize shares. It also devoted $57,900 to the amortization of its bonds. It paid a bonus of $72,385 to the managing officers and directors, equivalent to 8 per cent on certain excess net profits. The company also devoted $193,000 to a fund for the benefit of the employees of the company.

The Interborough Rapid Transit Company had a capital of $70,000,000; $35,000,000 in shares on which 9 per cent dividends were paid and $35,000,000 in short-time bonds on which 5 and 6 per cent interest was paid. As this capital represents property and numerous interests in addition to property used in the operation of the subway, it is impossible to compare it with the capitalization of the Paris company.

ADVANTAGES OF THE PARIS SUBWAY SYSTEM

(1) The average fare is 2.7 cents as compared with 5 cents on the New York system. A minimum fare of 1.9 cents is charged for certain hours during the day.

(2) The Paris system offers universal transfers over a complicated net-work of lines.

(3) The net-work of subways will form when completed a comprehensive system of rapid transit for the entire municipality. A passenger may travel by it from any quarter of the city proper to any other quarter. A person may enter any subway station with the assurance that for a single fare he can be transported to within walking distance of whatever place he may wish to go within the walls of the city. This is a great convenience to the public and greatly increases subway travel.

ADVANTAGES OF NEW YORK SUBWAY SYSTEM

(1) While the fare charged is much higher the average and possible ride is much longer in New York than in Paris. Allowing for difference in purchasing power of money as indicated by cost of construction and equipment and for difference in length of average ride the charge per mile for subway transportation is 1½ to 2 times as great in Paris as in New York.

(2) The lines extend far into the undeveloped areas. They extend 14 miles from the traffic center as compared with 3 or 4 miles in the case of the Paris subways. They have aided immensely in securing a better distribution of the population.

(3) The combination of express and local service is of great convenience and value. The average speed including stops, on the Paris subway is about 12 miles per hour, while on the express tracks of the New York subway between Brooklyn Bridge and Ninety-sixth Street the schedule speed, including stops, is about 24 miles per hour, and the average speed for both express and local trains for the entire system is about 18 miles per hour. A saving in time of urban transportation is at least as important as a decrease in the amount of fare charged.

Table IV.—Total Cost of Subway and Apportionment between City and Company, and between Construction and Equipment, 1908

	New York subway			Paris subway		
	Amount.	Per mile of single track.	Per cent of total cost.	Amount.	Per mile of single track.	Per cent of total cost.
Total cost of subway and equipment	$87,938,000	$1,432,000	100	$62,252,000	$1,000,000	100
Cost of construction paid by city	51,290,000	835,000	58.3	36,700,000	590,000	59
Cost of equipment and construction paid by company	36,648,000	596,000	41.7	25,552,000	410,000	41
Total cost of construction	61,338,000	999,000	69.8	42,100,000	676,000	67.6
Total cost of equipment	26,600,000	433,000	30.2	20,152,000	324,000	32.4

EMPLOYMENT METHODS OF THE HUDSON & MANHATTAN RAILROAD

When the Jersey City and Cortlandt Street river tunnels of the Hudson & Manhattan Railroad were put in operation it was necessary within a short period nearly to quadruple the force of men originally employed in the train service of the uptown tunnels. As the traffic of the entire system has increased rapidly since through operation was begun, it has been necessary to continue to employ and break in large numbers of new men each month. At the present time about 20 applicants for positions in the train service are accepted each week. The selection and training of such a large body of men for employment in a service requiring trains carrying very heavy traffic to be run close together at high speed must be conducted with great care and thoroughness. The methods of this company, therefore, present a number of interesting features.

APPLICATION FOR EMPLOYMENT

Applications for employment in train, station or platform service are received in person at the trainmaster's office on Christopher Street, New York, Thursday of each week at 11 a. m. After filling out an application blank in duplicate, a new man is interrogated by the trainmaster, who makes a point of ascertaining fully the applicant's past record, his experience in railway work, his mental qualifications and his apparent physical fitness. The trainmaster sizes up each man and makes a notation on the application blank in cipher, indicating his decision, as unfit, doubtful or acceptable. Those who are considered by the trainmaster as unfit are rejected at once, but doubtful or acceptable candidates are ordered to report to the office of the general superintendent, in the Hudson Terminal Buildings, on the following morning at 11 o'clock. One copy of the application blank is retained in the trainmaster's office, and the second copy, with the trainmaster's notation of acceptable or doubtful, is sent to the general superintendent's office early Friday morning.

Applicants who have wholly or partially satisfied the trainmaster are examined singly by the general superintendent, who goes over their record of previous employment carefully and pays particular attention to the man's appearance, manner and attitude toward his prospective position. The general superintendent reserves the right to reject summarily any applicant for any cause without stating his reasons. If he is satisfied he indorses the application blank and orders the new man to report to the company surgeon for physical examination, and later to the trainmaster for assignment to practice work. Ticket agents are referred to a surety company for examination and preparation of a suitable indemnity bond.

REQUIREMENTS OF EMPLOYEES

Employees in all branches of the service must be over 21 years and under 45 years of age, able to read and write the English language. They must be in full possession of every faculty, sound in every member, in good health, and able to pass a searching physical examination. It is held to be essential for the good of the service that they be familiar with the streets, transit facilities and points of interest in New York City, and with the steam railroad terminals, ferries and surface car lines in Jersey City and Hoboken. The physical examination, which is made by the company's surgeon without charge to the new employees, includes tests for acuteness of vision and hearing and color sense. The standard of acuteness of vision is 20:20 in both eyes, and the surgeon will not pass any candidate with a vision of 20:30 or worse in one or both eyes. Applicants who have only slight defects in hearing or vision are referred back to the general superintendent for a final decision based on their other qualifications.

APPLICATION BLANK

The application blank contains 19 questions which must be answered, spaces for the names of three references to whom the applicant refers for information regarding his character, habits and associations, and space for entering a complete detailed record of previous employment for 10 years previously. Among the questions to be answered are the following: "Are there any unsatisfied judgments against you?" "Have you ever been arrested or accused in a civil or criminal court of any infraction of the law?" "Are you engaged in any outside business producing income other than your salary?"

In one corner of the blank are spaces for entering a record of identification, including age, height, weight, color of eyes and hair, moustache, complexion and other characteristics. On the back of the blank is printed an agreement of employment binding the applicant to familiarize himself with and to obey the rules of the company and any future amendments thereto. This agreement, which is brief, concludes with two following clauses which are in effect a release of liability to the company for failure to observe due caution while at work:

I hereby acknowledge that I have been informed of the character of the employment I am about to undertake, and the duties connected therewith; that I have been notified that it is of a hazardous nature; that there are structures and obstructions now located, and others may be constructed from time to time which will endanger my life and limb; that there is not sufficient clearance between cars and the sides of tunnels, platforms and benches for a man to stand in safety, and that there are safety ladders along the sides of tunnels which are provided for persons to use while trains are passing.

I hereby accept notice from said railroad company that there is a third-rail along its tracks which is charged with electric current, and that it is dangerous to life and limb to come in contact therewith in any manner whatsoever.

INVESTIGATING REFERENCES

The Hudson & Manhattan Railroad prefers for its train service, and especially for the position of motorman, men who have had previous experience, either on steam railroads or high-speed electric railroads. A large proportion of its men have been recruited from the steam railroad service, as the character of the work, the hours of labor, rate of pay and liberal treatment by the company attract good men from this source. Numerous applications are also received from men formerly employed on the elevated and subway lines, both in New York and Brooklyn. The employment office of the company is in close touch with the employment offices of all the steam railroads entering Jersey City, and also those of the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company. If a new man states on his application blank that he has ever been employed by any of these companies the telephone is used to get an immediate verbal report on his previous record. Letters are also sent to all previous employers and character references living out of the city. Personal investigations are seldom made, as unless a man has a good and well-authenticated previous record he is rejected without further delay.

PRELIMINARY TRAINING

After passing the physical examination all train service recruits report to the trainmaster for instructions as to their duties and responsibilities. They then receive a copy of the rules and a badge, and are assigned for duty under the

direction of an experienced guard. All new men must begin work as guards, and after a few days of breaking in, followed by an examination on the rules by the trainmaster, are given places on the middle cars of the morning and evening rush-hour trains. The conductor in charge of the train rides on the front car and an experienced guard is always placed on the rear car. Guards are urged to qualify for promotion as quickly as possible after entering the service. A guard may qualify for advancement to the grade of conductor or to the position of switchman, leading to the position of motorman. After qualifying as a conductor a guard is given one of the regular conductor's runs on Sundays and at other times when regular conductors are off duty. As the men having regular runs are all off one day each week, the qualified conductors have frequent opportunities of serving in the higher grade for short periods, thus becoming familiar wih tthe duties of conductors before being promoted to the position. When a vacancy occurs in the grade of conductor the senior qualified conductor is eligible for promotion.

TRAINING OF MOTORMEN

Men who enter the service with the intention of becoming motormen must begin as guards, no matter what their previous experience has been. When they have demonstrated their knowledge of the duties of this grade and have had time to learn the road thoroughly, they are transferred to the grade of switchman. A number of men are required in this grade to make up and switch trains in the yards and to cut out or add cars during the rush hours. These men must be able to operate single cars or trains, make couplings, disconnect brake hose and train line jumpers, do light emergency repair work, such as replacing brake shoes and tightening brakes, and in general know the construction and operation of all the details of the car equipment. On entering this grade the new man is given a thorough instruction in the operation of all the electrical and brake apparatus on the cars by the motor inspector who has charge of the instruction room which has been fitted up in the basement of the Terminal Buildings. This car is fitted with complete air brake and electrical equipments and is mounted so high above the floor that the prospective motorman can see the apparatus from below. The man is then sent out as a helper to an experienced switchman, who teaches him the actual operation of cars about the yards.

When the first switchman is satisfied that his helper is competent to work alone the new man is turned over as a helper to a second experienced switchman, and finally to a third switchman. These three men are held responsible for the efficiency of the student, and until they are satisfied as to his ability to run a car and do any other work likely to be required of him he must continue to work as a helper.

All motormen are promoted from the switchmen in the order of their seniority. As in the case of promotion from guard, all switchmen are urged by the company to qualify as motormen by taking the necessary examination as quickly as possible. Switchmen who have qualified as motormen, but have not been advanced to that grade, are called on to operate trains in the absence of regular motormen, who are all given one day off each week. The extra list of regular motormen is thus kept down to a very small number of men. In promoting from switchman to motorman the candidate is required to pass a very thorough oral examination on the rules and his knowledge of the equipment by the trainmaster, motor inspector and superintendent of car equipment. It is the intention in the future to require all motormen to have served at least one year as a switchman. This rule, of course, has been waived during the past few months while it was necessary to train a large number of men to operate the increased train service required by the opening of the downtown tunnels. Conductors may become motormen by starting as switchmen in the same manner as guards who have risen to the grade of conductor.

COURTESY OF TRAINMEN

Courteous treatment of the patrons of the road is insisted upon. The ability to smile and keep smiling when answering questions or attending to any other duty is considered a requisite in every employee who comes in contact with the public. This point is driven home on all occasions by the general officers. The general superintendent makes frequent use of the bulletin board to impress the men with the importance of courtesy. One of the letters to employees is reprinted here:

Hudson & Manhattan Railroad Company
New York, Nov. 9, '09.

To All Employees:

Every day I have patrons of our road tell me what a splendid lot of men you are, and I can assure you that I believe it, and am proud of it.

I regret that I also have some complaints, which are properly made, that some of our men are not as courteous as they might be.

Did you ever stop to think that a guard is constantly observed by the people in two cars? If this guard is happy, courteous and pleasant, they go away with a good impression of the road; if he is surly, they are generally surly to him, he is constantly in trouble and the day seems very long.

A railroad must be run, not to suit the employees or the management, but its patrons. You have the opportunity of building an asset that will be worth a great deal to the road in time to come.

The interests of the road and men are identical. If the road is a paying one and makes money, it can afford to pay you good wages, but if it is not making money, where is the money for you coming from?

Remember that a single discourteous act may drive away patrons and make enemies for a corporation which needs all the friends it can get.

Strive at all times to make friends for yourself and the road, and you can rest assured you will find the days shorter and your troubles less.

E. T. Munger,
General Superintendent.

COMPLAINTS AND SUGGESTIONS

The company has inaugurated a unique plan of receiving complaints and suggestions from its employees. At the beginning of each month the trainmaster selects one motorman, one conductor and one station agent to act as a committee of the men to receive complaints and suggestions for the betterment of the service. The names of these men are posted on the bulletin board and all employees are requested to present to some member of the committee any grievances or ideas which he may have. These men serve for one month, and are not eligible to serve again on the committee for another year. On Thursday of each week this committee meets with the general superintendent, the trainmaster and the motor inspector in the general offices, and the members present any matters which have been brought to their notice by other employees or any points which they have themselves noted. The conference is informal, and a full discussion is allowed on each point raised. Just grievances are remedied at once, and explanations are given for refusing any unreasonable demands. The members of the committee draw full pay for the time spent at these conferences, and they consider it an honor to serve their fellow-employees in this manner.

INSTALLATION OF WATER BACKS AT ANDERSON PLANT OF INDIANA UNION TRACTION COMPANY

The Indiana Union Traction Company is installing water backs in the furnaces of the Anderson (Ind.) power station, which supplies power for a large part of its interurban railway system. The new water backs will serve to raise the efficiency of the furnaces by stopping the leakage of air around the ends of the chain grates and by retarding the dumping of the coal and ashes until the maximum amount of heat has been obtained from them.

Chain grates are used under each boiler, and these are set in the usual manner, which provides for an air space about 8 in. wide at the rear end of the grates. This space is necessary for the discharge of the ashes into the pits below. In those boiler settings without water backs there has been a considerable leakage of air from the ash pit up between the end of the grate and the back wall of the fire-box. After a study of fuel-burning conditions by G. H. Kelsay, superintendent of power, it was decided to put a water back in each boiler so that the economy of the furnaces might be increased. The work of installing these backs is now under way, and Mr. Kelsay says that considerable improvement in firing is noted on those boilers now equipped.

The water backs as installed consist of a section of 4-in. extra heavy pipe extending across the width of the grates and about 8 in. from their rear ends. The pipe is supported so that its lower side is 3½ in. above the tops of the grates and the center of the pipe is about 10 in. from the rear fire-box wall. A row of fire bricks is placed, one end of the bricks resting on the water back and the other end set in the firewall. This row of bricks prevents the passage of any air from the ashpit up behind the water back to the flues. The narrow space below the water back permits the ashes to fall over the ends of the grates in the usual way, but retards the movement of the unconsumed fuel, so that coking takes place in front of the water back, and the body of the fire tends to pile up on the brick shelf above the water back, rather than fall through. This body of ashes and coke, in connection with the narrow discharge space for the grates, effectually serves to prevent the leakage of air, and thus assists in raising the temperature of the furnaces.

The 4-in. extra heavy pipe which forms the shell of the water back carries within it a 1-in. wrought-iron pipe, through which the cold water is introduced. This intake pipe extends the full length of the water back, so that the cold water empties into the shell at the opposite end from the discharge point. A steady flow of water is maintained at such a rate that the temperature of the discharge is just below the boiling point. The discharge is open to the air to permit easy inspection of the flow. A header under the boiler-house floor collects the hot water discharged from the water backs in the several boilers and carries it to the hot well, from whence it is fed to a feed-water heater, or to the supply tank outside the building. A new hot well has recently been built and a new motor-operated feed pump installed. This pump, taking its suction direct from the well, is piped to discharge normally to the heater, but there is a check valve in the connection between the pump and the heater, so that the excess water automatically is turned to the large supply tank.

Two McDonough automatic regulators have recently been installed for controlling the speed of the stoker engines and the stack draft according to the steam pressure. There are two stacks and two subdivisions in the regulator governing each half of the plant. Electric lamps placed in the engine and boiler rooms operate in connection with the regulator and indicate whether the stack dampers are open or closed.

PRELIMINARIES IN THE ORGANIZATION OF AN ELECTRIC RAILWAY COMPANY

J. W. Billingsley, manager of the Fred A. Jones Company, of New Orleans, recently presented a paper before the Louisiana Engineering Society on interurban railway development in the South, and, among other points, gave some interesting suggestions on the preliminary organization of electric railway companies. The speaker said that the poor financial condition of many interurban electric railways was due in some cases to poor judgment in location or construction, or to unfortunate management, but in most instances to lack of sufficient traffic to justify their construction. It is owing to these failures that bond houses require a report on a new proposition of this kind to be prepared in a thoroughly business-like manner. The following is an abstract of Mr. Billingsley's remarks upon the preliminaries requisite in the organization of an electric railway company:

The usual method of procedure in building an interurban railway is for the local people who are interested in its construction to form an association and put up sufficient money, first, to make a preliminary report, and, second, if that is available, to make surveys, financial and engineering reports, properly to present the proposition to the outside investor. As a rule, this association provides sufficient money for securing rights-of-way and of defraying the general expenses attendant upon the underwriting of the bonds. The bond underwriters usually require that at least 20 per cent to 25 per cent of the money required for construction be secured from stock subscription, usually placed locally, and that all or part of the money so obtained shall be spent on construction work before any is advanced by the bond underwriters. After the latter have been called for, say, about 20 per cent of their underwriting, it is generally possible to secure a loan on the bond underwriting to carry on the work to completion. Of course, in some instances the money for construction is furnished directly by private interests, and the line is built without stock subscription or underwriting. In this case the financing is much simplified.

As the outside investor, usually a bondholder, must be assured of a safe return on his investment within a period of, say, at least one year after commencement of operation. The vital point to determine in considering an interurban railway is, first: How much will the property earn and how soon? The reports necessary for properly considering this question are:

(1) The preliminary report.

(2) The engineering, financial and statistical reports.

Engineers, in making preliminary reports on interurban railways, often make the mistake of giving undue importance to the item of cost of construction and to the physical feature of the line. The object of the preliminary report is to satisfy the promoters and other parties interested that the interurban will be a paying proposition. Hence only those matters should be considered that will affect to a considerable degree the question of net earnings. The object of the preliminary report should be to gather sufficient data as regards existing and probable traffic conditions between

the termini of the road and to prepare construction and operating estimates, in sufficient detail only, to ascertain whether or not the net earnings will be enough to justify the making of surveys and of the financial and engineering reports proper. It is interesting to note that a difference in estimates of cost of construction of $100,000 would make a difference in the net earnings of approximately, say, $5,000, whereas a difference of only about $8,000 in an estimate of gross earnings would change the net earnings by practically the same amount. Hence it is evident that a report of this character should deal more particularly with the estimate of revenue than with the detail cost of construction.

It is of value in a report of this character to check up estimates by comparing the proposed line with other lines operating under as nearly similar conditions as possible, but too much reliance should not be placed on such a check unless the lines are located in the same section of the country and serve similar traffic conditions. For instance, the travel in a somewhat undeveloped country which is rapidly growing is in some cases 40 per cent to 50 per cent greater per capita than in old and more settled communities. This is true, for instance, in Texas and Oklahoma. Erroneous conclusions may also be reached by estimating earnings on a basis of so much tributary population per mile of track. Examination of 10 interurban lines at random in the Middle West shows earnings ranging from $2.30 per capita up to $11 per capita, so it is evident that an erroneous result might be reached by using such a method alone in estimating gross receipts. As this question of estimating gross earnings is by far the most difficult and important part of a report of this character, it is necessary to study very carefully the local conditions, such as the habits and occupations of the people. This can be done by counting passengers handled by parallel steam lines, wagon and pedestrian traffic, and estimating the express business. Each local condition must be studied.

If the preliminary report should be favorable, the next step is to make surveys of the right-of-way that will be required and detail estimates showing the cost of construction and cost of operation. A statistical report should then be prepared, showing in detail the business conditions in the tributary territory, the data and information being supplemented by photographs.

In discussing location Mr. Billingsley said that the interurban railway should be built as far as possible on private right-of-way and should have a short entrance into the termini of the line. Although it is generally desirable to reach the heart of the terminal cities, it is not always necessary to do so in the small intermediate towns. If the center of some of the smaller intermediate towns can be reached only by a slow trip through the main street, it is usually better to build through the edge of the town instead. People in a small town are willing to go to more inconvenience to get to an interurban waiting station than they would be in a larger city, especially where the main station of the competing steam line is located close to the heart of the city. It is more easy in the Middle West and Southwest to secure private rights-of-way than in the hilly and built-up sections in the Eastern States, where, as a consequence, many of the interurban lines follow the highways to avoid heavy cuts and fills and the expense of obtaining private right-of-way. The result is a line with a crooked alignment, slower speed, and more risk of accidents. An interurban road should be located on private right-of-way as much as possible.

HEARING ON VALUATION OF THE CONEY ISLAND & BROOKLYN RAILROAD

Frank R. Ford, of Ford, Bacon & Davis, was the sole witness at the hearing before the New York Public Service Commission, First District, on Dec. 2 in the case involving the valuation of the Coney Island & Brooklyn Railroad.

In response to a question from William N. Dykman, of counsel for the company, it was stated by Mr. Ford that the cost of operation as measured in percentage of gross earnings had increased from 1900 to 1908. An exhibit presented by Mr. Ford gave the figures submitted by him on this subject in the case concerning through routes and joint rates between the Metropolitan Street Railway and the Central Park, North & East River Railroad of New York, as published in the Electric Railway Journal of Oct. 24, 1908, page 1252, with the addition, however, of the data for 1908.

Mr. Dykman asked Mr. Ford to give his opinion as to the manner in which the tendency of net earnings to decrease should be considered in a rate-making case like that involved in the hearing. Mr. Ford thought that in a rate-making case any tendency of a business to become less profitable should be considered if the rate was to last any appreciable length of time. The gross earnings of the company were decreasing in this case and the properties were subject to the same tendency toward increasing operating expenses as the companies indicated in the statement, namely, the roads in Chicago, Philadelphia, St. Louis, Boston and Brooklyn; consequently the tendency of the net earnings would be to decrease. The statement and an accompanying illustrated diagram showed that the tendency toward decreasing net earnings was apparently slightly interrupted in 1908. It was of interest to show that this was the effect of the panic in business conditions, as all of the companies economized wherever possible, especially in maintenance expenditures, and a slightly larger showing was thus made possible.

The tendency of street railway rides was to increase in distance, Mr. Ford declared. It was a matter of common knowledge that as the city increased in size and area, the length of ride increased. An increase in the length of ride per passenger meant more car service for the same fare; that is, it increased the proportion of gross earnings required for operating expenses.

It was testified by the witness that in order to determine what was called the reproduction value of real estate there should be added to the cost of acquiring the property overhead charges for brokerage, title insurance, legal expenses and other charges of that character. Five per cent should be added to cover these charges for real estate used for car house, power house, etc., but the right of way should have added to it a contiguity factor, which Mr. Ford thought should be one and one-half times the sales value.

Testifying in relation to the exclusion by Bion J. Arnold of an allowance of 10 per cent for contractor's profit on rolling stock, Mr. Ford expressed the opinion that this should have been included for the following reasons:

1. While the company would usually buy the rolling stock direct from a number of manufacturers, it is sometimes included in the general contract.
2. If the completely equipped car is bought from the car builder he would charge the company a contractor's profit on all articles not manufactured by him.
3. If the company buys direct there are always various charges of handling and assembling and risk which would otherwise be borne by a general contractor which should be allowed for.
4. In the case of the cost of the Chicago street railways

reconstruction, as agreed to by the city in accordance with the terms of the traction settlement ordinances, under which Mr. Arnold is chief engineer, 10 per cent contractor's profit is allowed on actual cost of rolling stock, such actual cost including all of the company's overhead charges of engineering, incidentals and administration.

Mr. Dykman asked whether, in Mr. Ford's opinion, a charge for depreciation should be made against the reproduction value in a rate case. The witness thought that the present value, meaning the depreciated value of the physical property, had no place in a rate case. The original cash investment upon which a reasonable return should be allowed was never fully represented in the value of physical property after the first car began to operate. The physical properties of the average street railway would represent from about 60 per cent of first cost to 100 per cent for a new road. It had been stated that a reserve fund should represent the amount of depreciation, but with a newly constructed property it was usually impossible to provide this even at high rates of fare.

The Coney Island company paid no dividends during the first 18 years as a horse system and in some years it did not earn bond interest. Although the rate of fare from New York to Coney Island was from 20 to 26 cents, the ability to provide a fund for physical depreciation did not exist. From the standpoint of service to the public the authority of the commission could compel proper maintenance and renewals in the more prosperous later period, even when no physical depreciation fund had been accumulated. This was one of the responsibilities of stockholders and bondholders which had been exhibited strikingly in the last two years in the case of this company and those in Manhattan.

In 1907 the stockholders of the Coney Island & Brooklyn company had to raise $1,000,000 cash for additions and improvements by increasing the stock 50 per cent and since Feb. 1, 1907, they had had to forego dividends on the $3,000,000 of outstanding stock for the purpose of returning all the net earnings to the property. If the stockholders must now be penalized for the depreciation which was present in every operating property and their right to a return limited by the principal value of the property less physical depreciation, the power to give proper service and provide for the upkeep was taken away together with a large part of the original cash investment.

Mr. Ford testified that in his opinion the items of obsolescence, inadequacy and age could not be separated from normal wear. He would not care to testify on the subject of depreciation without having it recorded that this question should not be concerned in a rate case. The witness thought the cost of reproduction new was the proper basis if a physical valuation was used for figuring the return. It was the valuation upon which a newly constructed line would have to earn a return, and if the rate was based on the depreciated value of the property it would tend to prevent competition or new construction, because no new property could have as low a rate as an existing road.

No expert, Mr. Ford thought, could divide depreciation according to (1) obsolescence, inadequacy and age, and (2) normal wear. There was no definite and accepted standard of obsolescence or inadequacy. As Mr. Ford understood the testimony on this subject by the engineers of the commission, they said that they had never before endeavored to separate depreciation into these constituents.

Age of course was merely a kind of normal wear due to deterioration from the action of the elements. Normal wear consisted of mechanical action and also the action of the elements.

Obsolescence was not a proportional or comparative term. An article was either obsolete or a proper standard; it could not be 50 per cent obsolete. The fact of whether or not an article was obsolete must be determined from a business standard as to whether or not it was economical to operate. This was the determining factor in the change from the horse car to the cable and then to electricity. The horse-car system reached a point where it was entirely obsolete, but until that point was reached it could not have been considered a certain percentage obsolete. To an extent the term adequacy was of the same nature as obsolescence.

While normal wear could be measured and estimated with accuracy an estimate of the life of any given item dependent on the approach of obsolescence or inadequacy was in the nature of a prophecy and whether a given power generator or electric car would be of economical value two or 20 years from date could not be foretold accurately. The prescribed charge against net earnings for renewal of an obsolete article or system while not yet worn out, as proposed by the New York and the Interstate commissions, would tend to render any change uneconomical, thus reducing the liability of obsolescence and lengthening the business life of the article.

Mr. Ford discussed various items which had been classified by Mr. Arnold in the appraisal as obsolete. Out of a total of $1,031,000 stated by the experts of the commission as depreciation due to obsolescence, inadequacy and age only one item of $150,000 in power machinery was obsolete from a technical standpoint, and this not from a business standpoint, as it was in operating condition and capable of good service as reserve capacity in the case of breakdown of a new plant. Its retention had obviated the necessity of a reserve turbine unit.

Of the remaining $881,000 of so-called obsolescence, Mr. Ford testified that $353,000 should be transferred to the heading of normal wear and $528,000 should be eliminated entirely for reasons stated by him. In the item of cars, semi-convertible cars used all the year had in the Chicago valuation been depreciated at 3 per cent per year, while the Coney Island cars forming a complete duplicate equipment of summer and winter cars, one part used five months and the other seven months in the year, had both been depreciated 5 per cent per year, although these cars were of the two standard types that would still be purchased new by the company to-day.

With regard to the theory which the commission's experts had applied for the first time in ascertaining the depreciation of the Coney Island company's track, special work, paving, overhead trolley construction, feeders, underground cable, etc., by which the normal wear was estimated at one-half the total cost of one complete renewal on the assumption that the average condition of all the parts is midway between the point of complete repair and entire disrepair, Mr. Ford stated that, while this might be a quick method of estimating physical condition, it would give the correct result only in accidental cases, except possibly for large systems in the cases of horses and special work. Track, paving and overhead line were usually built, worn out and renewed by entire lines or as a complete system. There were never enough separately built units to give this 50 per cent average, and an accurate estimate of condition must be based upon careful inspection of the separate parts, as had always been done in similar investigations.

At the close of this testimony an adjournment of the hearing until Dec. 9 was announced.

MEETING OF ENGINEERING EXECUTIVE COMMITTEE

A meeting of the executive committee of the American Street & Interurban Railway Engineering Association was held in New York on Dec. 5 and 6. Those present were President F. H. Lincoln, of Philadelphia; First Vice-President W. J. Harvie, of Syracuse; Second Vice-President E. O. Ackerman, of Columbus; Third Vice-President J. S. Doyle, of New York; Secretary and Treasurer John W. Corning, of Boston; Martin Schreiber and John Lindall. Past Presidents H. H. Adams, of New York, and Paul Winsor, of Boston, were also present.

The object of the meeting was to plan the work of the committees for the coming year and assign the subjects which these committees will consider. At present the association has six committees as follows: Power generating committee, power distribution committee, equipment committee, way matters committee, standardization committee and co-committee on a uniform form of station, way and shop accounts to work in conjunction with the Accountants' Association. It was decided to continue these committees and also to establish a special committee, of which J. S. Doyle will be chairman, to be known as the heavy electric traction committee. This committee will take up the problems connected with the heaviest class of electric transportation, including those of the electrified steam lines. There was some discussion about establishing another new committee, to be entitled committee on buildings and structures, to take up questions relating to the design of car houses, stations and structures of all kinds, including bridges. These subjects are now a part of the work assigned to the way committee, whose scope, if the plan should be adopted, would be confined to track. It was decided, however, not to appoint this committee at present, but to hold the matter over until the next meeting.

The subjects tentatively assigned to the different committees were as follows:

Power generation committee, to continue the subject of steam meters and low-pressure turbines and also to take up the subject of forced draft and condensers.

Power distribution committee, economical maintenance and standardization of overhead equipment, bonds and bonding methods, and the joint use of poles.

Equipment committee, standard gears and pinions, standard taper for pinions, gage for mounting wheels and the economical reduction of the weights of cars. The subject of specifications for heat treated-steel axles, which Mr. Doyle as a subcommittee of this committee initiated last year, has been transferred to the committee on heavy electric traction.

Way matters committee, economical maintenance of track, specifications for open hearth and manganese steel rails, rail joints, rail grooves and track gages for curved tracks and clearance between street surfaces and car equipment.

Standardization committee, rolled-steel wheels, flanges and treads and rails, the consideration of rail standards to be based upon the recommendations contained in the report of the way committee last year.

Co-committee on a standard form of station, way and shop accounts; the committee appointed last year was continued. It consists of W. G. Gove, co-chairman, Charles Hewitt and John Lindall.

Another point considered by the executive committee was that of issuing special instructions as a guide to the committees in preparing its reports. The following set of rules, suggested by Mr. Schreiber, was adopted:

INSTRUCTIONS TO COMMITTEES

(1) The executive committee has assigned subjects to the various committees only as a guide. It is not the purpose that all these subjects be reported upon this year or completed now. The number to be acted upon and completed should be determined after a thorough estimate of the importance of each subject, the length of the report and the time necessary by the convention for its careful consideration.

(2) Each report should refer briefly to all specifications or standards recommended by the committee on the same subject for the previous year and to the action taken by the association upon these recommendations. Where no final action has been taken, the subject should be submitted to the association again either in the same or a revised form and the committee should point out exactly what action is desired. It will not be necessary to repeat the text of a previous report; a reference to it will be enough unless extensive changes in the former publication have to be made.

(3) Committees are at liberty to obtain data or information in any proper way, and if they desire, the secretary of the association will issue inquiry circulars, but the questions in these circulars should be specific, pertinent to the subject being discussed, and of such character as to simplify the work of replying to them. The compilation of data and their subsequent analysis in the form of criticism and arguments form a valuable preliminary part of the committee work. All reasonable criticisms that have or may be offered to recommendations made by the committee should also be considered.

(4) All committees should make an earnest endeavor to secure written discussions of their reports for consideration at the convention. It is very important that all conclusions and recommendations of standards or practice should be expressed in clear, comprehensive and concise language and be grouped in regular order and that all plans, definitions, specifications, tables and formulas, embodied in the recommendations should be definitely indicated. Only that portion of the text of the report which is absolutely essential to a clear interpretation of the conclusions and recommendations made should be included in the body of the report; the remainder of the data should appear as an appendix or appendices.

(5) Committee reports should be submitted to the secretary not later than Aug. 1 of each year.

The names of the gentlemen appointed on the different committees will be announced in an early issue.

HEARING ON MODIFICATION OF CAR HEATING ORDER IN NEW YORK

The application of the street railways within the jurisdiction of the Public Service Commission of the First District of New York for a modification of the car-heating order published in the Electric Railway Journal of Dec. 4, 1909, page 1165, by the elimination of the clause requiring the posting of the order in the cars was held on Dec. 2, 1909. J. L. Quackenbush, for the Interborough, Metropolitan, New York & Queens County and other companies, made a strong argument against the posting of the order. He stated that the present inspectors of the commission were amply equipped and qualified to determine whether the order was being obeyed, but if the notice was posted many passengers would consider they had authority to interpret and enforce immediate compliance with the regulations, and there would be serious altercations between them and the conductors. Moreover, while the commission had power to make reasonable rules, he doubted its authority to invade the property of the company for the purpose of promulgating its rules. Moreover, if this order was posted, the companies might eventually be required to placard their cars with orders of all kinds. Mr. Menden, from the Brooklyn Rapid Transit Company, also protested against the posting of the order. Decision was reserved.

COMMUNICATIONS

CALCULATION OF LOCOMOTIVE CAPACITY

CHICAGO, Dec. 1, 1909.

To the Editors:

Will you kindly answer the following questions:

1. Theoretically, how many tons should an electric locomotive of the following description pull by direct current (A) on a 1¾ per cent grade 1 mile long? (B) On a 1 per cent grade? (C) On level track?

2. How heavy should an electric locomotive be to pull the maximum tonnage with 800 hp?

3. If an 800-hp electric locomotive had its proper weight, how many tons could it pull on a 1 per cent and a 1¾ per cent grade? And on level track?

4. How do you determine the pulling power of an electric locomotive?

LOCOMOTIVE DATA

Weight (all on drivers)	57 tons
Diameter of driving wheels	37 in.
Type of motor	West. 50-B
Gear ratio	15:54
Number of motors	4
Rated horse-power, total	600
Rated amperes, total	1080
Voltage	550

A SUBSCRIBER.

[The determination of the weight of train which an electric locomotive should, under given conditions, be expected to haul, resolves itself into two parts, namely, the pull or tractive effort the locomotive can exert, and the weight of train which a tractive effort of this magnitude will haul.

If, as is usually the case in electric locomotives, the motors are sufficiently powerful to slip the wheels, the tractive effort for short periods is limited only by the adhesion of the locomotive to the rails. For pulls of longer duration, the heating of the motors must be taken into account and the duty of the locomotive limited so as to keep the temperature of the motors within a safe limit. The maximum tractive effort is the product of the weight on drivers, multiplied by the coefficient of adhesion. The Standard Handbook for Electrical Engineers, page 809, gives the following values for this coefficient: On clean dry rail, 30 per cent; on wet rail, without sand, 18 per cent; wet rail sanded, 22 per cent. A safe value is 20 per cent.

The tractive effort of a locomotive is used to overcome three principal opposing forces, of which two are capable of exact determination. (1) The grade resistance of a train is equal to its weight multiplied by the decimal representing the grade. Thus the grade resistance per ton on a 1¾ per cent grade is $2000 \times .0175 = 35$ lb. per ton. (2) The tractive effort required for acceleration, per ton of train, is equal to the rate of acceleration expressed in miles per hour per second, multiplied by the constant 91.3. Thus the tractive effort required for acceleration at the rate of one-eighth of 1 m.p.h. per second is $\frac{1}{8} \times 91.3 = 11.4$ lb. per ton. (3) Train resistance is made up of the various frictions, wind resistance, etc. There are many formulas in use, giving widely diverse results. We may without serious error take a value of 5 lb. per ton for low speeds. For starting cars from a state of rest, three times this value may be required. The weight of train which can be hauled is obviously the quotient obtained by dividing the tractive effort of the locomotive by the amount of tractive effort required per ton of train, the sum of the three values found as just described.

We can now apply the principles outlined above to our correspondent's first case, a 57-ton locomotive on a 1¾-per cent grade. The tractive effort at the slipping point of the drivers is $57 \times 2000 \times .20 = 22{,}800$ lbs. Assuming that the train is required to accelerate at the rate of ⅛ of 1 m.p.h. per second, the tractive effort required per ton is $35 + 11.4 + 5 = 51.4$ lb. per ton, and the weight of train, including locomotive, is $22{,}800 \div 51.4 = 444$ tons. Similarly, on the 1 per cent grade the tractive effort required per ton is $20 + 11.4 + 5 = 36.4$ lb. per ton, and the weight of train $22{,}800 \div 36.4 = 626$ tons. On level track the grade resistance becomes zero, the tractive effort 16.4 lb. per ton and the train weight 1390 tons.

Up to this point we have not considered the capacity of the motors. By reference to the characteristic curves supplied by the manufacturers of the motors, we may ascertain the amount of current taken when the motor is exerting any given tractive effort. The curves as issued apply to only one particular wheel diameter and gear ratio, and care must be taken to make the necessary changes in the curves before applying them to other wheel and gear conditions. These current values for the three trains, whose weights were calculated in the preceding paragraph, are tabulated below (lettered A, B and C, to correspond with the three parts of question 1). Trains A and B, the maximum trains which the locomotive can haul on the given grades, require much less current after passing off of the grades onto the level track, and these values are also given

	Lbs. per Ton.	Tons.	T. E.	Amps.
Train A (Maximum train on 1¾ per cent grade)	51.4	444	22,800	1,560
Train A on level	16.4	444	7,280	650
Train B (Maximum train on 1 per cent grade)	36.4	626	22,800	1,560
Train B on level	16.4	626	10,280	850
Train C (Maximum train on level)	16.4	1,390	22,800	1,560

Considering, now, the values in the ampere column, and comparing them with the one-hour rated current as given by our correspondent, it will be seen that train A, when accelerating on the grade, takes a current 45 per cent in excess of the rated current. If already heated to a normal service temperature, the motors will take a current of this magnitude for only a very few minutes without injurious overheating. The ascent of the 1-mile grade, starting from rest at the bottom and accelerating at the rate specified, will take about five minutes. Unless the ascent is to be followed very shortly by a long stop or by a period of coasting, affording the motors an opportunity to cool, a train of this weight should not be hauled on the 1¾ per cent grade. Train B takes the same current on the grade as train A, and the reduction in current when it runs onto level track is less than in the case of A. It will require either a reduction in weight or a period of rest after ascending the grade. If the locomotive in either of these cases starts with its motors cool, their temperature after the ascent will be such as to allow a long period of level-track running without overheating; but this condition of starting cool is one which can occur only a very few times in a day, and cannot in most cases be counted upon. In the case of train C, the only reduction in current will be due to increase of speed and the ending of acceleration, after about three minutes. If the train resistance at the maximum speed be taken as 8 lb. per ton, the total tractive effort will then be $8 \times 1390 = 11{,}120$ lb., and the current will be about 900 amp, 83 per cent of rated current. This is too high for continuous running, though even when the motor has become heated from previous service it may be continued for probably half an hour before reaching the maximum permissible temperature.

It will be apparent from the foregoing that the schedule—the degree of continuity of service and the frequency and duration of opportunities for cooling—are of the greatest

importance in determining the loads a locomotive can handle, or the adequacy of a given motor equipment for any given service. Our correspondent has furnished us no data in this direction, and, accordingly, no more definite answer can be made to his questions.

The remaining questions can be answered very briefly:

(2) It has been shown that the 600-hp locomotive has sufficient weight to develop a tractive effort which taxes its motors (assuming a schedule of only average severity) to their capacity. A proportionate weight for the 800-hp locomotive would accordingly be very ample.

(3) If the weight is proportionate to that of the 600-hp locomotive and the motors have similar characteristics, the train weights also will be proportionate.

(4) "Pulling power" or tractive effort is found as already explained, by multiplying the weight on drivers by the coefficient of adhesion. It should be noted that "tractive effort" and "drawbar pull" are not synonymous terms. Tractive effort includes the effort used in propelling the locomotive itself, and train weights obtained by the use of the value of tractive effort include the weight of the locomotive, whereas drawbar pull is the force applied to the cars alone.—Eds.]

OPERATING RULES FOR OHIO INTERURBAN RAILWAYS

Railroad Commission of Ohio,
Columbus, Ohio, Nov. 29, 1909.

To the Editors:

The following statement gives the reasons which influenced the Railroad Commission of Ohio to make certain changes in the standard code of rules of the American Street & Interurban Railway Association in order to adapt these rules for use as a standard by the interurban railways in the State of Ohio. We are signing this statement jointly as the opinion of the committee of electric railway officials and of the commission as finally agreed upon and issued by these organizations in one statement to the public and interurban operatives.

The change in Rule 103 for the signal to back from a standing position is made that the signal (three bells) may conform to a long-established steam railroad practice which has been almost universally followed by the interurban railways of this State because of the fact that a large proportion of their trainmen had received previous training on the steam lines.

Rule 110 was modified because it is impossible to display a light on a traction car that will show green to the front and side and red to the rear for the reason that in city operation there is not sufficient space for cars to pass without disturbing such lamps. Nearly every interurban line in the State of Ohio operates through some city with more or less double track.

The objection to Rule 128 is that it puts too much work on the conductor; it would keep him answering bells all the time and would give no opportunity for the collection of fares. The committee thought it entirely safe for the exchange of signals to be required only when the siding was to be used as a meeting point.

The commission was actuated by the following reasons when it modified Rule 203: The members feel very strongly that it would not be safe for a train to leave a junction, initial point, etc., until it had been ascertained that all trains which might have rights against them had arrived, but left the method of ascertaining such information to the different companies. Some roads use registers and some depend upon the train dispatchers. The committee felt satisfied that if it had a positive rule which would prohibit a train from leaving until it had been ascertained that all trains which might have running rights against them had arrived, it would afford a safe basis of operation, but the detail as to whether there should be train registers or information obtained from dispatchers was left with each company to determine for itself.

The committee could not see how a train could have "time-table rights" under circumstances which would require any flagging, but assuming that the words "time-table rights" in Rule 203 meant only that the train had a right to proceed on its time-table schedule, protecting itself against opposing trains, it was thought to be impractical considering the fact that interurban trains usually have but two in the crew. If one man was ahead flagging, there would be but one remaining on the car, and if circumstances should arise requiring a flag to be sent to the rear, the car and its passengers would be left without any protection whatever from the train employees.

The modification of Rule 203 made Rule 203-a non-essential. This rule was only an explanation of protection by flagging and the provision for protecting by a flag under such circumstances has been stricken out. Further, we did not consider Rule 203-a a proper rule for the reason that if the conductor was ahead flagging, say around a curve, and anything should happen which would require protection to be sent out to the rear, the car would be left entirely unattended with none of the crew to operate it or look after the passengers.

With regard to our modification of Rule 210, we felt that two minutes would require a greater interval between cars than 3000 ft., in that the distance between cars would increase as the speed increased, thereby affording better protection for trains scheduled at a high rate of speed. The committee also felt that an interval of two minutes could be definitely ascertained by trains leaving an initial point and could be definitely determined if the leading train was running on its scheduled time, whereas the matter of distance could not be ascertained except on straight track and then only approximated.

The matter touched upon by Rule 226 is covered by Section 3443-6, Sec. 2 of the Revised Statues of Ohio, which reads as follows:

(3443-6) Sec. 2. (Street cars must come to full stop when approaching intersecting steam railway, etc.) That whenever the tracks of any street railroads in this State cross the tracks of any steam railway at grade, the street railway company operating said line of cars shall cause their street cars to come to a full stop not nearer than 10 ft. nor further than 50 ft. from the crossing, and before proceeding to cross said steam railway tracks, shall cause some person in their employ to go ahead of said car or cars and ascertain if the way is clear and free from danger for the passage of said street cars, and said street railroad cars shall not proceed to cross until signaled so to do by such person so employed as aforesaid, or said way is clear for their passage over said tracks.

Regarding the objection of the committee to the forms of orders shown in the standard code, the committee did not have any specific objection to the forms used, but did believe it was better to use the steam railroad practice of having the orders written out in full than to use a form and have certain blank spaces in the printed form filled in with the necessary data. We feel that the practice of having the orders written out in full is less liable to cause mistakes and more apt to fix the order in the minds of the train crew.

It will be understood that the book of rules which has been prepared by us is not a standard code of rules in the sense that it will have to be adopted by the interurban roads of Ohio; it was a suggestion for a code of rules. It is not the idea of the commission that each interurban road in Ohio shall take these rules and file them with it in this form. They must submit a satisfactory set of rules in some form to the commission, and this is to be sent to them as a basis to be used in the preparation of their codes.

JOHN C. SULLIVAN, Commissioner,
For the Railroad Commission of Ohio.
FRANK A. DAVIS, Chairman,
Committee of Electric Railway Operating Officials.

MEETING OF NATIONAL ASSOCIATION OF RAILWAY COMMISSIONERS

At the twenty-first annual meeting of the National Association of Railway Commissioners held in Washington, D. C., Nov. 16 to 19, a number of committee reports were presented. A few of the reports of interest to electric railway managers are briefly abstracted below.

The report of the committee on railroad taxes and plans for ascertaining the fair valuation of railroad property contained a communication from B. H. Meyer, chairman of the Wisconsin Railroad Commission, discussing the relation of the tax and rate value of public service corporations.

The report of the committee on powers, duties and work of the State railway commissions contains an appendix in relation to the affairs of the various commissions.

The report of the committee on grade crossings and trespassing on railroads, signed by William J. Wood, of Indiana, reiterates the conclusions of the same committee in 1907 and 1908, that highway grade crossings should be abolished where practical and that these crossings should be put under the control of the railroad commissions. The association is urged to continue its efforts to secure adequate legislation and to cultivate public opinion against grade crossings and trespassing on the tracks of railroads. Appended to the report is the full text of the Wisconsin law empowering the railroad commission to order gates or alarm bells to be installed at road crossings and to order the separation of grades when required for the public safety, the cost of the separation to be borne jointly by the railroads, the municipality and the State. Two bills introduced at the last session of the Indiana Legislature, but which failed of passage, are also appended. One was intended to give the railroad commission of that State powers similar to those conferred by the Wisconsin act in the matter of ordering separation of grades at highway crossings. The other bill would make it a misdemeanor, punishable by fine or imprisonment, to trespass on a railroad right-of-way. The provisions of both bills included all the steam and electric railways within the State.

The report of the committee on safety appliances calls attention to the very large number of casualties to trespassers on railroad rights-of-way, and recommends that measures should be taken in all the States to reduce the number of such casualties. Any practicable means of accomplishing this would receive the hearty support and cooperation of the railroads. The number of persons killed at highway crossings is small compared with the number of persons killed along the track, being less than one-fourth. Referring to the use of telephones for train dispatching and for communicating between manual block signal stations, the report states that the telephone is rapidly displacing the telegraph, and that "the question of safety seems to hinge almost entirely upon the personnel and methods in the operation of the apparatus."

The committee recommends an amendment to the safety appliance law, making it compulsory for the railroads to adopt all of the various appliances intended for the protection of trainmen which are included in the standards and recommended practice of the Master Car Builders' Association. It also recommends the passage of uniform State laws supplementing the Federal laws covering safety appliances, hours of service and employers' liability. The following resolution was presented to the convention for adoption:

Be it Resolved, That this convention express its approval of the Esch bill (H. R. 17979) of the Sixtieth Congress, providing for government investigation of railroad accidents, passed by the House of Representatives on May 27, 1908; also the Watson bill (H. R. 26725) of the Sixtieth Congress, providing that the safety-appliance law be extended to include the various appliances enumerated in the Master Car Builders' standard for the protection of trainmen and giving the Interstate Commerce Commission power to designate proper methods of location and application for such appliances, which bill passed the House of Representatives on February 15, 1909; and it is recommended to Congress that the measures expressed in these bills be speedily enacted into law.

The report was signed by Edward A. Moseley, James E. Sague and Joseph E. Willard.

The next meeting will be held in Washington on Nov. 15, 1910.

HEARING ON FENDERS AND WHEEL GUARDS IN NEW YORK

A hearing was held before Commissioner Maltbie of the Public Service Commission of the First District of New York on Dec. 1, 1909, on the question of fenders and wheel guards and safety devices in use on the cars operated in the Boroughs of Brooklyn and Queens. The hearing reopened case No. 1048 in so far as the Coney Island & Brooklyn Railroad and the Brooklyn Rapid Transit Company were concerned.

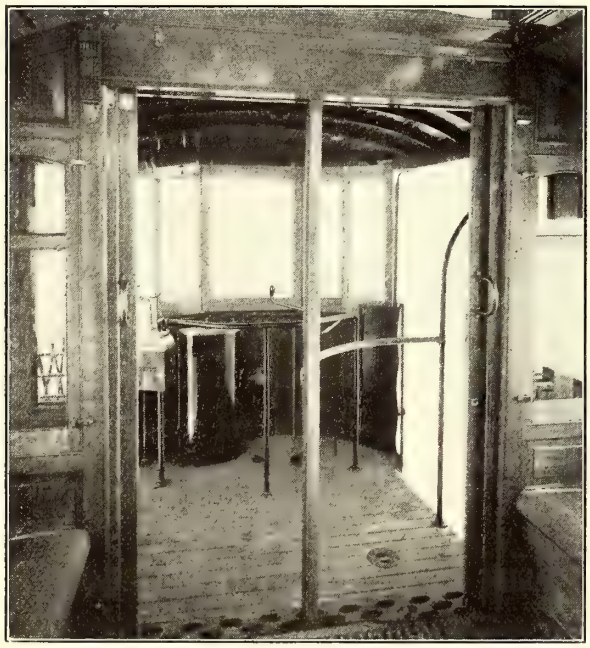
W. S. Menden, assistant general manager of the Brooklyn Rapid Transit Company, testified that wheel guards attached to the car body suffered less damage from accidental tripping due to bad track or pavement than wheel guards attached to the trucks. It would cost from $50 to $100 per car to reconstruct 250 of the company's 500 open cars in order to make it possible to apply wheel guards satisfactorily. During the nine months ended Oct. 31, 1909, 573 persons had been struck by cars and in only 32 cases would a wheel guard have been a factor in preventing serious injuries. The witness did not think it fair to compel the Brooklyn Rapid Transit Company to equip its cars with wheel guards of doubtful efficiency after it had only recently equipped all of its cars with projecting fenders. He did not know what it had cost to maintain the wheel guards now in use, but offered to equip 50 cars with wheel guards only and about 120 cars on two trunk lines with both fenders and wheel guards for the purpose of experimenting further and ascertaining the comparative maintenance cost and efficiency.

S. W. Huff, president of the Coney Island & Brooklyn Railroad, said his company, which operated 190 cars, had also had trouble with accidental tripping of wheel guards due to bad track or street pavement.

Decision was reserved.

A ONE-MAN PAY-AS-YOU-ENTER CAR

The J. G. Brill Company recently has completed for the Chatham Construction Company, Brunswick, Ga., four double-end, single-truck cars, the unusual feature of which is that they are to be operated as pay-as-you-enter cars without a conductor. The passengers will be permitted to enter the car only by way of the front platform where they will deposit the fare in a cash box under the eye of the motorman. The platform and entrance-exit designs, with sliding end-body doors, provided for this purpose

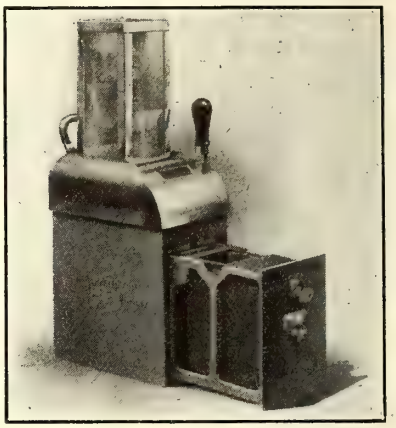


Entrance and Exit Platform of the One-Man Pay-as-You-Enter Car for Brunswick, Ga.

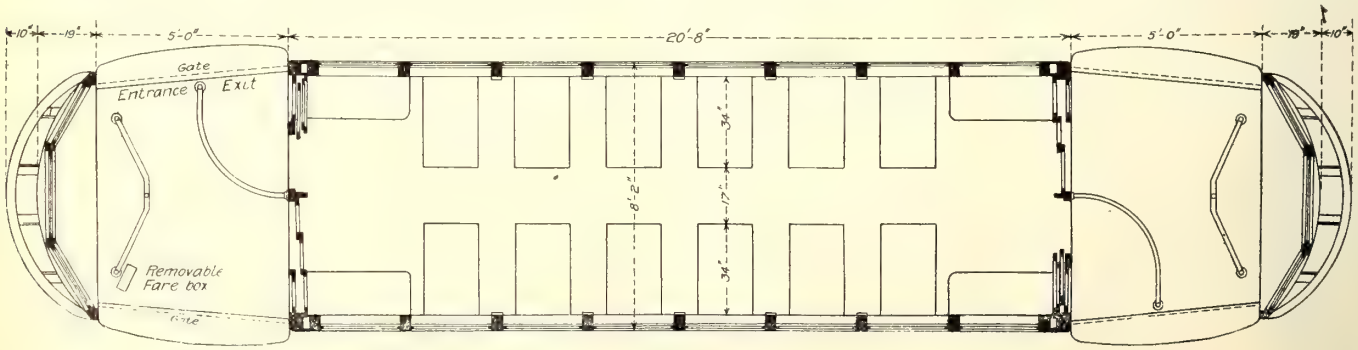
are shown on the accompanying car plan. It will be observed that the cash box is placed on the far side of the platform, this position having been selected to increase the freedom of movement. If the fare box had been set on the other side of the platform near the step, the first person to enter the vestibule would have had to stop to deposit his fare and thus prevent others from boarding the car immediately.

The Brunswick car has two similar platforms, each 6 ft. 7 in. long with opening and step at both sides for double-end operation. The car body, which has longitudinal seating at the ends, is 20 ft. 8 in. over the end panels at the sills and 33 ft. 10 in. over the platform crown pieces. The car has an interior finish of three-ply bird's-eye maple veneer and is supplied with bronze car trimmings, wired ventilator sash and Forsyth curtain fixtures. Among the car builder's specialties installed are the draw-bars, "Dumpit" sand boxes, "Dedenda" gongs and "Walkover" seating. The truck is of the Brill No. 21 type and carries two Westinghouse No. 12-A motors.

Not the least interesting feature of these cars is the new No. 4-A portable fare box shown in one of the illustrations. The over-all dimensions are 6 in. x 9¼ in. x 20½ in. The cash till is 3 in. x 6 in. x 7 in. The weight of the box complete is 35 lb. The main case is of steel and the cash receiver of bronze, including the portion above the rectangular case. The box has two projections which engage lugs on the platform rail or support. This arrangement is such that the handle must be pulled, thereby dropping the coin or tickets from the tilting plate into the locked cash box, before the box can be removed from its support. Should the box be turned upside down a device for disconnecting the handle from the tilting plate by gravity completely secures the contents during the change from one end of the car to the other. The tilting plate at the base of the glass cash receiver covers an opening and permits coins and tickets to be inspected before they are dropped into the till by operating the handle located beside the receiver. The handle can also be arranged to operate a fare-counting machine or totalizer. The tilting plate has a curved follower plate which prevents fares that have been placed in the receiver after the handle has been pulled from passing uninspected through the opening. The follower plate provides an additional bar to attempts at gaining access with wire or string to the contents of the till through the receiver. The drawer containing the cash till can only be drawn out, after it is unlocked, by pulling back the handle which operates the tilting plate, thereby preventing fares from being left in the cash receiver. The act of drawing out the cash drawer closes and securely locks the lid of the cash till. The drawer cannot be closed again except when another cash till with the lid wide open for receiving fares is placed in position.



Cash Box for Brunswick Car



Seating and Platform Plan of One-Man Pay-as-You-Enter Car for Brunswick, Ga.

Five accumulator cars have been in operation on the Belgium State Railways since 1899, between Antwerp and Lierre, distant apart about 10 miles. Each car weighs about 40 tons and carries 66 people. The Government will buy more cars to operate between Antwerp and Malines.

QUARTERLY MEETING OF THE STREET RAILWAY ASSOCIATION OF THE STATE OF NEW YORK

A quarterly meeting of the Street Railway Association of the State of New York was held in Albany, Dec. 7 and 8. An informal dinner at the Hotel Hampton on Tuesday evening was attended by about 75 members and guests. E. F. Peck, president of the association, presided at the dinner. Over the coffee and cigars the subject "Relation of State Highways and Interurban Railways" was discussed by J. W. Hinkley, Jr., president and general manager, Poughkeepsie City & Wappingers Falls Electric Railway; S. Percy Hooker, chairman, State Highway Commission, and Joseph K. Choate, general manager, Otsego & Herkimer Railroad.

Mr. Hinkley said that he had made a close study of the new State highway law, the Public Service Commission law and the general railroad law of New York, and had found in the highway act a number of sections which affected, directly or indirectly, the status of electric railways occupying the highways within the State. Section 52 gave the Highway Commission the right to order the removal of poles and other structures from the highway when they obstructed the roadway. There was no provision in the highway act requiring the railway company to remove weeds growing in its roadbed, but this duty devolved upon the abutting property owners. His company, however, cut down the weeds to protect its track and ties.

Sections 135 and 136 provided for the construction of new roads and included a provision for payment of damages by the towns to abutting property owners for changes in grade or location of the highway after an appraisal. Mr. Hinkley thought that a railway occupying a highway was also entitled to damages when the construction of a new State road involved a change of location or considerable grading to bring the track on a level with the roadway surface.

Sections 333 and 334 gave the town superintendent of highways control over trimming shade trees along a State road, and the speaker thought this control should be exercised in causing to be removed shade trees which obstructed the view of an intersecting road by the motorman of a trolley car running on or along a State road. Trees could not be trimmed, however, without the consent of the owner.

Section 77 of the highway law gives the district engineer the right to close a highway to traffic while constructing or repairing a State road. In one case a contractor had attempted to close a road near Poughkeepsie along which a trolley line operated. The contractor tried to stop the cars as well as other vehicles, and was only prevented by an injunction. The law did not contemplate any such action, which was unwarranted. Another point in this connection was that a railway company was not relieved from liability for accidents to vehicles or pedestrians trespassing on its track during the construction or repairing of the roadway, nor could it recover any damages from the road contractor or the State for incidental damages to its ties, bonds, joints or switches.

Section 137 covered the construction of a State highway through a village. The State Highway Commission had adopted a policy of continuing the macadam roads through villages, and a railway occupying the center of the highway through a village must conform to the provisions of general railroad law covering paving between and for 2 ft. outside of its rails. The Highway Commission is paving with macadam a strip 8 ft. wide outside of the brick pavement between tracks, leaving to the village the pavement of a gutter strip 3½ ft. wide on each side and the setting of the curb. The railway company must either pave its track with brick, if it is to remain in the center of the roadway, or consent to its removal to the side of the road. This policy is entailing a great hardship on some companies.

The point has been raised that there is no provision in the highway act compelling a railway already in operation and holding a franchise to move its tracks to accommodate the plans for road improvement of the State Highway Commission. The Attorney-General of the State has rendered such an opinion, but has pointed out that Section 50 of the Public Service Commission law gives the Public Service Commission power to order a change in the location of tracks if demanded by public necessity or convenience. Messrs. Stephens and Sague, of the Public Service Commission, Second District, have informally stated that they interpret this provision to apply only to the use by the public of the railway, and that it cannot be made to apply to a change in highway location.

Mr. Hooker stated the views of the State Highway Commission on some of the points raised by Mr. Hinkley. A railway company's right to the use of any highway or street is subsidiary to the rights of those who use the highway for vehicles or foot traffic. A franchise to operate a railway on a highway does not carry with it any fee or ownership in the ground on which the highway is built. When necessary for highway improvement a railway should move its tracks to the side of the roadway, or even to private right-of-way, and it could not expect to recover damages. There had been no decision on such a question by the courts, but the speaker believed it would be wise to bring a friendly suit and settle the points of law involved at once. As to closing highways against the operation of cars during construction or repairs, the commission had no authority or desire to make such an order under any conditions. The commission's attitude toward the railways in the matter of removing poles or tracks was entirely friendly, and it did not intend to inflict any hardship or inconvenience if it could be avoided. No more powers than it already has were asked by the State Highway Commission, but it would be very desirable to have an interpretation by the courts of the commission's rights and jurisdiction under the present law. The speaker assured those present that he would do all in his power, personally, to expedite the settlement of any questions or complaints raised by electric railway companies in the State which were called to his attention.

Mr. Choate thought that when improvement of the highways in any district was contemplated the Highway Commission should confer with the electric railways which might be affected before final plans were drawn.

WEDNESDAY MORNING SESSION

The tenth quarterly meeting of the Street Railway Association of the State of New York was called to order at 10:15 a. m. by President Peck, at the Fort Orange Club.

The first order of business was the presentation of a paper by J. K. Choate, of the Otsego & Herkimer Railroad on the subject of the remuneration for mail service. This paper is published on page 1197 of this issue.

TRANSPORTATION OF MAIL

President Fassett opened the discussion by saying that he was a member of the committee of the American Street & Interurban Railway Association on the transportation of mail. It was impossible for him to be present at the Denver convention, but he repeated for the benefit of the

delegates present a synopsis of the report on this subject presented at Denver with the accompanying figures. He then asked whether any companies represented at the meeting had direct contracts with the Government for handling mail matter. Two delegates stated that their companies had. Mr. Fassett, continuing, said that some time ago he found that his company was losing money under his contracts for handling the mail and had notified the Government that it would discontinue this service. The compensation for carrying the mail was then raised. It was the general experience that the purchasing power of the unit passenger fare was growing less and practically the same conditions found in the passenger business existed in the mail business. Instances were also brought out of electric mail service supplanting wagon service which cost from 25 to 30 cents a mile.

Others who discussed Mr. Choate's paper were R. H. Smith, of the Albany & Hudson Railroad; W. H. Collins, of Gloversville; J. H. Pardee, of New York; Frederic H. Beach, of Ballston Spa; Captain J. W. Hinkley, Jr., of Poughkeepsie; C. Loomis Allen, of Utica; J. E. Duffy, of Syracuse; J. T. Smith, of Fishkill; W. R. W. Griffin, of Rochester, and Frank Rhea, of the General Electric Company.

Mr. Allen urged that, in taking the matter up with the Government, the argument for an increase of rates be not based simply upon the complaint that the present revenue was too low, but that emphasis be laid upon the value of the service. He suggested that for closed pouch service a rate be made based on weight, and suggested that 1½ cents per 100 lb. might prove satisfactory.

On motion by Mr. Fassett, the president was empowered to appoint a committee of three to act with the corresponding committee of the American Street & Interurban Railway Association and place the matter before Congress at the same time that the subject of remuneration for mail service of the steam railroads was taken up.

DISCUSSION ON ENGINEERING SUBJECTS

H. A. Benedict, mechanical and electrical engineer of the United Traction Company, Albany, presented a paper on "Tests of Electrical Equipment."

The discussion was opened by E. H. Anderson, of the General Electric Company, who gave information in regard to special and commercial factory tests and described the methods used by the General Electric Company. Mr. Anderson was followed by Charles Remelius, superintendent of rolling equipment, Public Service Railway Company, Newark, N. J., who described the portable testing car used on that line.

Owing to the inability of Charles R. Barnes, railway expert of the Public Service Commission, to present the paper scheduled for him on "Block Signaling on Electric Railways," this paper was laid over until the following meeting.

WEDNESDAY AFTERNOON SESSION

H. A. Benedict, chief engineer of the United Traction Company, Albany, opened the afternoon session with a discussion on electrolysis. W. J. Harvie, chief engineer of the Oneida Railway Company, and E. J. Dunne, superintendent distribution of the Public Service Railway, N. J., also discussed this matter.

Mr. Benedict then described the crushed stone track construction used in Albany, which he believed would last as long as the rails. After a general discussion on rigid concrete track work, Martin Schreiber, engineer maintenance of way, Public Service Railway of New Jersey, gave a long talk on many features of track construction and concluded with a strong plea for the adoption and general use of a few standard rail sections.

Mr. Harvie opened the discussion on fire insurance. He called attention to the differences in the recommendations of the National Board of Fire Underwriters and the State Board of Fire Underwriters. E. J. Cook, general manager of the Rochester Railway Company, said that the rules of the National Board of Fire Underwriters should be followed. Mr. Cook also referred to the possibility of the formation of a central rating bureau for electrical risks during the coming year.

Mr. Harvie introduced the subject of grooving commutators. His experience had been that slotting was an excellent means of reducing the maintenance costs on any type of motor. He had been told, however, that slotting was entirely uncalled for if the proper grade of mica were used. E. H. Anderson of the General Electric Company thought that slotting was the only means of overcoming motor trouble and he believed that in the future it would have to be resorted to in all cases. H. S. Williams, electrical engineer, Utica & Mohawk Valley Railway Company, gave the following figures on the maintenance of commutators and brushes before and after slotting commutators: In 1908, 82 commutators repaired a month and in 1909 only 32 commutators repaired a month; in 1908, 789 brushes required a month and in 1909 only 471 brushes required a month.

The subject of high-tension crossings was then introduced by Mr. Harvie. He called attention to the tendency to eliminate cradles over telephone and telegraph wires because they involved more material in the air. He thought that the greater the cost of maintaining the crossing, the greater the danger. Mr. Benedict quoted from the specifications of the American Telephone & Telegraph Company, covering the construction of high-tension lines which cross their wires. The specifications do not require cradles, but some type of grounding device on the cross-arm of the high-tension line to prevent the high-tension wire from falling on the arm and burning it off before the power goes off the line. Mr. Benedict advocated the use of an angle iron bolted to the cross-arm and projecting slightly above the top surface of the cross-arm. This angle iron should be grounded. Following these remarks there was a long discussion on the subject of crossing foreign wires above high-tension lines.

A. L. Linn, Jr., who had been announced to report as a member of the committee on classification of accounts, was suddenly called back to New York. Mr. Linn, however, did not have any special report to make at this time, but will report at the next meeting.

RULES FOR INTERURBAN RAILWAYS

C. Loomis Allen, vice-president of the New York State Railways, spoke at length in support of the rules for interurban railways adopted at Denver by the American Street & Interurban Railway Transportation and Traffic Association and referred to the action of the Ohio lines and the Ohio Railroad Commission in adopting a tentative system of rules which is radically different in some respects from the rules adopted at the Denver convention. He understood that the American Association's committee had asked for a rehearing on these rules in order to present its side of the question and have the Denver code adopted. He said that the old New York Street Railway Association code was closer to the American Association's code than any other. He wanted to give notice that at the next annual meeting of the New York Association he would move the adoption of the American code with such amendments as might be needed for local conditions in New York. E. S. Fassett,

general manager of the United Traction Company, Albany, moved that the State secretary request the secretary of the American Association to send a copy of the interurban rules as adopted at Denver to every member of the New York State Railway Association. The motion was carried.

MISCELLANEOUS

James F. Shaw, president of the American Street & Interurban Railway Association, and General G. H. Harries, second vice-president of the Washington Railway & Electric Company, had been invited to address the meeting. Both of these gentlemen had fully intended to do so, but were unavoidably prevented from going to Albany at this time. The association expressed its regrets that they were unable to be present.

Mr. Allen moved a vote of thanks to the Fort Orange Club for its hospitality in offering its quarters for the use of the association. After this resolution was adopted, President Peck appointed the following committee of three on "Compensation for Carrying United States Mail": J. K. Choate, general manager, Otsego & Herkimer Railroad; Edgar S. Fassett, general manager of the United Traction Company of Albany, and C. Loomis Allen, vice-president of the New York State Railways, Syracuse, N. Y.

The next meeting of the association will be held in Rochester, N. Y., on March 1 and 2.

REMUNERATION FOR HANDLING UNITED STATES MAIL*

BY J. K. CHOATE, GENERAL MANAGER, OTSECO & HERKIMER RAILROAD

The remuneration for handling United States mail is probably one of the most perplexing questions that the electric railway manager has to consider, for the reason that he finds his most difficult customer in the Post Office Department of the United States Government.

The mail service by electric lines is practically a new business and yet in its infancy, and it has not been fully appreciated either by the railroad companies or by Congress or the Post Office Department. The possibility of a service by electric lines was little thought of until within the last few years, and the first carrying of mails by the electric lines was simply as an accommodation to localities that had in the past received their mails only by star routes or no mails at all. These first efforts have steadily grown, until it has become a very important branch of the Post Office Department service and made it possible not only for isolated localities but for comparatively large cities to receive and dispatch mails in connection with the fast mail service of the great trunk lines by the receipt and delivery of mail at the stopping points of the fast mail trains on these great arteries.

The first service by electric lines was the gathering of mails in the larger cities from substations for delivery at the general post office or railroad stations. This service, apparently, was so satisfactory that the service next extended to outlying districts and little towns for delivery at some general post office.

The efficiency of this service so quickly demonstrated to the Post Office Department not only the efficiency with which mail could be carried, but the saving in cost to the Post Office Department (as against the star route service) that it was fast extended to the interurban lines, not only with a closed pouch service, but finally up to a complete railway post office service, with the consequent result that tremendous saving in time in the dispatch of mails was accomplished, as well as a great saving in cost to the Government. I know of no point where this has been demonstrated more strongly than on the lines of the company I have the honor to represent. Not only has the railway post office car on our lines shortened the time between towns of such importance as Cooperstown, Richfield Springs and Oneonto from one to six hours in the time of the dispatch and delivery of letters between these points and New York City and Boston, but it has made as much as a day in the saving of time on letters to the Far West.

I am quite sure that the experience of other lines is similar to this in the carrying of United States mail. While I think that the Otsego & Herkimer Railroad is the only purely electric line in the State over which the Government operates a railway post office, I feel certain that it is only a question of time before this character of service will be extended to practically all of the interurban electric lines, with great benefit to the Post Office Department, provided the electric lines are to receive proper consideration and proper remuneration for the service performed.

It is very difficult to understand just how the original pay for the carrying of closed pouches on electric lines was determined, but it is presumed that the rate of 3 cents per mile (which seems to be the prevailing rate on nearly all of the electric lines) was fixed as a consideration for carrying a few pouches to outlying and isolated places, and was never intended as a fair or just remuneration for the service the electric lines are now asked to perform.

The Post Office Department is a most difficult customer to deal with. It is difficult to understand or appreciate its arbitrary methods, ways and rules, for certainly no private business could be, or would be, accepted from any patron of a railroad under like conditions. Nevertheless, it is but fair to say that the Post Office Department in many cases is hampered by the laws as they exist. When these laws were passed by Congress it was without proper information, and it was not expected at that time that the service would grow to its present proportions.

The railroad companies themselves have been in a very awkward position up to the present time, for the reason that, acting by themselves, they have been able to exert little or no influence beyond the Congressman representing the district or districts through which they operate, while the postal laws must apply to the entire country.

It would seem to me that the most plausible way to bring about satisfactory results would be by a united effort through the American Street & Interurban Railway Association or a combined effort through the various State railway associations a committee that would present the entire matter to the Congress of the United States; or, better still, by an understanding with the steam railroads and acting with them; for the steam railroads themselves are dissatisfied with the rate of pay as now fixed by the Government, and are making a determined effort to have a fair readjustment of the compensation for such service. To this end they are acting in conjunction with a committee composed of some of the most distinguished officers of steam railroads, with headquarters at Chicago, who are collecting and tabulating detailed statstics of the mail service, both as to the character of the service performed and as to the cost of doing the service, as compared with the remuneration, with a view to presenting claims to Congress.

In addition to this, there is to be a meeting in Washington early in January of representatives of all of the short line railroads with a view to presenting to Congress their claims as to the cost of performing the service as compared with the remuneration received, and also with the further view of showing the unfairness of the rate that applies to a short line of from 25 to 100 miles as being on an equality with the fast mail service over thousands of miles of rails, and as to the application of the rate for single car service as against train load service. As the Otsego & Herkimer Railroad does a general railroad business, and is not purely a passenger railroad, it has been considered among the short line railroads, and it is my intention to be present at that meeting and take part in its deliberations.

These two committees will certainly have a very great influence with Congress by the presentation of the facts as gathered, and I believe it is of the greatest importance that the electric lines should be represented directly in some manner.

It might be possible that this could be brought about through the short line association, and with the approval of our association I should be very glad to suggest at the meeting in Washington the desire on the part of the elec

* Abstract of paper read before the Street Railway Association of the State of New York, Albany, Dec. 8, 1909.

tric lines to join in any way that would seem proper and agreeable.

These suggestions seem to offer a practical way for us to get the remuneration to which we are entitled, and it is hoped that in this connection some radical change can be brought about, not only for proper payment, but fair treatment at the hands of the Post Office Department.

At the present time the appropriations for the Post Office Department (as I understand it) have been insufficient, and the department has shown a very large deficit. While I think the causes of this deficit have been entirely outside of the transportation of mails either by steam or electric lines, and are almost entirely due to the rural free delivery this deficit has without doubt been the cause of many of the very unfair and unjust propositions of the department itself. For certainly the department in its dealings with railway lines has made propositions so unbusinesslike and so unfair that it is almost inconceivable that they should ever have been made.

The weighing period of 90 days on all lines where the rate of pay is adjusted to the average weight of mails carried has always been fixed for the months of the year most unsatisfactory to the lines outside of the large cities. This, however, is probably not unfair when all sections of the country are considered. After the rate of pay has been fixed for railroads (at the end of the weighing period), for a term of years the department does not hesitate, the day after the weighing is completed, or as many times as it sees fit, to authorize increases in the service, for which it pays nothing. In fact, it issues an order for carrying mails after the weighing period, wherein it specifically states that the order is issued without increase of pay. This is so absurd, so unjust and so unfair on its face that it is inconceivable that any officer of the Government, let alone the Government itself, should issue such an order.

It means nothing more nor less than fining or taxing the railroad company for improved and additional service. No railroad in dealing with any private individual or corporation or any private individual dealing with another would for one moment consider so unfair and unjust a proposition, nor would the proposition receive the slightest consideration from any one making it.

In the matter of fines imposed by the Government, it is entirely unfair. It never gives you the information upon which the fines are based, that you may investigate the matter. You never know that the fine has been justly applied, or, what is of more importance, a chance to improve your service and avoid other delays or protect yourself against being fined in the future for the very same thing. The appearance of the fine slip or notice received from the second assistant postmaster general's office always has the appearance of no investigation, and is simply based upon the report of some postmaster, and that this report, in turn, has been read simply by a clerk, who says the fine should be so much, and accordingly the road is so fined.

We all know the necessity in railroad operation for the most thorough and careful investigation of all complaints and failures. We know that investigations made in anything but the most thorough manner bear no result, and that no good is accomplished.

From my experience in dealing with the Post Office Department I am convinced that in the great volume of business of the department most of these matters of which I complain are not considered of much importance, and never reach the ears of the honorable postmaster general or his principal assistants. I do not mean for one moment to infer by these remarks anything personal to any officer of the Post Office Department; for the officers with whom I have personally come in contact I have a very high regard. The conditions are much as I have presented them, and were it not for the accommodation and convenience that the service gives to our patrons I would throw the mail service off our lines, for it costs us more to do the service than we receive, until such time as we were treated more fairly. The remuneration for handling the United States mail is a troublesome question, but is susceptible of solution. By continuous and efficient "knocking" at the door of Congress, with the facts and conditions fairly presented, I feel certain in the end we will receive the remuneration to which we are entitled, based upon cost and efficiency of the service given.

MEETING OF NEW ENGLAND STREET RAILWAY CLUB

The regular monthly meeting of the New England Street Railway Club was held at the American House, Boston, on Dec. 2, with President W. D. Wright in the chair. The evening was devoted to a discussion of the electric railway conditions of the Far West, as observed by the Pacific Coast party in connection with the Denver convention.

Hon. James F. Shaw, president of the American Street & Interurban Railway Association, was the first speaker. He spoke of the gratifying attendance at Denver, and emphasized the excellent physical condition of the properties in Denver, Salt Lake City, Seattle, Los Angeles, El Paso, San Antonio, New Orleans and other cities. He suggested that the Western properties have built well and without many of the mistakes which came earlier in the East.

B. V. Swenson, secretary of the American Street & Interurban Railway Association, reviewed the growth of that organization and spoke of the value of the recent Denver convention in bringing the East and West into closer touch. He praised the manufacturers' exhibits and emphasized the cordial welcome received everywhere on the trip.

Henry C. Page, general manager of the Worcester Consolidated Street Railway Company, spoke on the operating conditions observed on the trip. He reviewed favorably the combination car design used in Denver, pointing out the advantages of its lightness without sacrifice of strength. He considered the track construction the best he had ever seen, all the rails being of T-section. The width of the streets in Salt Lake City was impressive. He spoke of the enormously rapid growth of Seattle; praised the enterprise of the people and the handling of the properties there and in Tacoma by the Stone & Webster organization, and emphasized the steadier riding of the Western communities at different hours of the day. Mr. Page said that the San Francisco revival in growth has been wonderful.

Paul Winsor, chief engineer of motive power and rolling stock, Boston Elevated Railway Company, spoke of the equipment and power of the Western systems. He emphasized the use of sewer water in the condensers of the South Side elevated plant in Chicago; reviewed the advantages of the Denver track in the life of the light cars used, described the reduction of hills by hydraulic power in Seattle, and touched upon his visits to power plants on the Coast. At Portland the power plant burns sawdust. The cost of power from the sawmill, including fixed charges, was said to be about the same as the cost from a water-power plant, including all charges. Water-power developed with very long transmission lines is expensive. The Redondo oil-burning plant is producing current at the equivalent of about 1.8 lb. of Pocahontas coal per kw-hour.

M. H. Bronsdon, electrical and chief engineer of the Rhode Island Company, discussed the track conditions of the Western properties. The use of T-rail and concrete paving in Denver was described. The narrow gage of 42 in. keeps the vehicles away from the tracks; less paving is required, and accidents are reduced by the increase in side overhang of the cars. The speaker also spoke favorably of the T-rail construction in Seattle and Bellingham, and of the track work of San Francisco. Time was saved by the use of electric track switches in Denver. Concluding, Mr. Bronsdon described the pin map used by the San Francisco claim department to show the location of accidents graphically each month, colored pins showing the character of the accident. These maps have been very helpful in reducing accidents by calling the attention of the operating department to bad conditions at particular locations.

News of Electric Railways

Cleveland Traction Situation

At noon on Dec. 3, 1909, the evidence in the street railway arbitration at Cleveland was completed, unless it should be decided by either side to discuss the schedules which were agreed upon in the beginning. Judge Tayler stated that as some of the expert evidence related to a few of the items in those schedules, he would take them into consideration. Both sides were to prepare briefs and make such oral arguments as they felt necessary on Dec. 8. It is possible that Judge Tayler will be ready to announce his findings shortly after the arguments are completed, as he has kept up with the evidence and has formulated rules as the hearing progressed regarding many of the points with which he has to deal. The Judge has indicated that he will treat several doubtful points from a legal standpoint. Franchises will present a difficult problem because two court decisions must be taken into consideration.

While all the sessions were short, the greater part of the week ended Dec. 4, 1909, was taken up in discussing the life and value of the franchises of the different lines. Judge Tayler stated that he would consider the life of each franchise instead of the average of all as suggested by Mayor Johnson. He also said that he would value the franchises of both the Cleveland Electric Railway and the Forest City Railway on the basis of net earnings during 1908 and 1909. It was also stated that 5¾ per cent on the physical valuation would be considered as the cost of financing the rebuilding of the lines.

Horace E. Andrews, president of the Cleveland Railway, introduced figures to show that the operating expenses and taxes represent 63¾ per cent of the gross earnings during the period from February to the present time. Mayor Johnson stated that he would introduce a table which would show different results.

Judge Tayler said that in making up the franchise value he would consider the system as a whole. Mayor Johnson estimated that the franchises of the Forest City Railway are worth about $400,000 and said that this amount should be added to the franchise value of the Cleveland Railway as a credit. Judge Tayler refused to accede to the demand of the Mayor.

On Nov. 30, 1909, President Andrews introduced the report of Superintendent Clark of the Municipal Traction Company which showed the value of the property of the Forest City Railway to be $1,220,450, with no allowance for overhead charges, in comparison with $1,805,000 allowed in the Goff-Johnson settlement. The physical valuation of the property of the Forest City Railway was made on the basis adopted in the former settlement by Superintendent Clark.

The franchise ordinance will be completed as soon as Judge Tayler decides the value of the property and the other matters which have been submitted to him, and will be taken up by the Council at once, but it is very doubtful if the ordinance will be passed before the end of the year. The referendum vote can not be taken until after the administration changes, however. It is a question what stand will be taken by the present officials after they have retired from office.

Warren Bicknell, receiver of the Municipal Traction Company, has been notified that none of the new cars ordered will be received until after Jan. 1, 1910, although some of them were to be completed for use during the holiday rush.

Terms of Ordinance to Be Submitted to Voters of Kansas City

Negotiations for a new franchise to impose terms and conditions under which the Metropolitan Street Railway, Kansas City, Mo., shall operate hereafter were begun early in 1909. An ordinance was drawn and submitted to the West traffic way committee of Kansas City in June, 1909, as a basis for negotiations, and was subsequently modified by the sub-committee of the West traffic way committee and submitted to the whole traffic way committee, as noted in an article in the ELECTRIC RAILWAY JOURNAL of July 17, 1909, page 120, in which a digest of the terms of the unamended grant was given. Since then the matter has been before the Council for consideration and, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 23, 1909, page 918, the franchise as amended when it was presented to that body is to be submitted to the voters of Kansas City on Dec. 16, 1909, for approval. The franchise as finally passed by the Council and approved by the Mayor imposes briefly the following conditions:

The several companies comprising the system operated by the Metropolitan Street Railway shall be merged into one company organized under the laws of Missouri within a year after the grant goes into effect. The penalty for failure to consolidate within that time is the forfeiture of $500,000 to the city. After such consolidation there is to be no transfer of the rights of the consolidated company without the consent of the city. It is intended that the ordinance shall cover all the lines in Kansas City, Mo., and Independence, Mo., for purchasing purposes, and Kansas City, Kan., Argentine, Kan., and Rosedale, Kan. All the rights under the new grant shall cease on June 1, 1951. The city reserves to itself all rights which it may now have by contract or law to regulate fares within the city limits, and after June 1, 1925, the city is given the right to fix the rates of fare by ordinance from time to time. Such rate, however, shall be reasonable and shall not be changed oftener than once every two years.

The company shall charge not more than 5 cents for a single fare for passengers 12 years of age or over for a continuous trip in one direction, and one-half fare for passengers under 12 years of age. Children under 7 years of age, accompanied by a person paying fare, shall be permitted to ride free. After Jan. 1, 1913, the company shall furnish all conductors with tickets which shall be sold at the rate of six for 25 cents and shall establish at least 25 convenient agencies where 25 tickets can be purchased for $1, five of such places to be located in Kansas City, Kan. Commencing with the acceptance of the ordinance half-fare tickets shall be sold at the rate of two for 5 cents. All transfer privileges now in force shall be continued, and universal transfers shall be given in Kansas City, Mo., and on the system in Kansas; such transfer privileges, however, not to be construed to enable a passenger to return substantially to the initial point for a single fare. A time limit of not less than 30 minutes in which a passenger can use a transfer shall govern. If the company cannot agree with any of the other cities mentioned regarding the extension of its franchise, then it shall not be obliged to extend such transfer privileges to such city or cities.

The company shall not be required to build more than 5 miles of single track nor more than 2½ miles of double track in a year, the provisions of the ordinance to govern such new lines. All paving, repairing and reconstruction shall be done to the satisfaction and approval of the city. The company shall pave its tracks between the rails and for 18 in. outside of the outside rails and keep such paving in repair.

At all points where the tracks of the company cross a steam railroad watchmen shall be constantly employed at the joint expense of the company and the railroads. The company is to provide arc lights at all crossings of its line with steam railroads, the railroads to share the expense. The company shall also maintain arc lights at the intersections of its own lines.

All cars of suburban lines other than those of the new company operated into the city shall be manned by employees of the city company at the point of intersection. Passengers on such cars shall be subject to the conditions governing passengers on the company's own cars and enjoy the same privileges as such passengers. The suburban companies shall be paid 1 cent for each passenger turned over to the Kansas City company, and the Kansas City company shall pay the suburban companies 1 cent for each passenger turned over to them.

Except between the hours of 6:30 a. m. and 9 a. m., and 4:30 p. m. and 7 p. m., the company shall receive and transport all cars of suburban lines carrying freight, charging for this service the actual cost of such transportation, plus 10 per cent. The right is also reserved to the company to carry light freight and parcels over its own lines, such service, however, not to interfere with the regular passenger traffic.

The company shall contribute to the cost of the Twelfth Street viaduct, assuming the responsibility for certain costs, such costs, however, not to exceed $1,315,000. The right is reserved to the city to make and enforce such police regulations as shall be reasonably necessary to secure adequate and sufficient accommodations to the public.

All cars hereafter placed in operation shall have center aisles, are to be without running boards, and shall have cross seats facing forward, except two longitudinal seats with a capacity for four passengers each, which may be

used at the ends of the cars. At least 50 cars shall be acquired and placed in service within one year from the passage of the grant. The speed of cars within limits clearly defined shall not be more than 15 m.p.h. Outside the city limits the speed shall not be more than 20 m.p.h. Cars shall be operated according to a schedule given in detail in the ordinance.

The terms of the ordinance giving the city the right to purchase the property of the company and governing the price to be paid by the city follow:

"Section 28. 'The companies' by the acceptance of this ordinance, shall and do grant to the said city, and the said city hereby reserves to itself the right upon the first day of June or upon the first day of December of each and every year after Jan. 1, 1945, upon giving at least six months' notice in writing of its intention so to do, to purchase and take over the entire street railway system and properties of 'the companies' then existing.

"In case the city shall purchase and take over the street railway system of 'the companies' as in this ordinance provided, then it shall pay for the same the actual value thereof as the same may be agreed upon by the city and 'the companies' at the time of the purchase, and in the event of disagreement, then for such price as the Circuit Court of Jackson County may adjudge to be the just and fair valuation thereof (excluding franchise value) after a fair judicial examination of the question as in ordinary and usual procedure in said court, saving to both parties hereto the right of appeal from such finding and vesting said Circuit Court and Appellate Courts with full authority to hear and determine the same, and authorizing and empowering said court to enter such judgment as will effectuate the purpose of this agreement.

"In the event that it shall be determined that the city is at the time this ordinance is passed or at the time this ordinance takes effect without lawful power or authority to acquire, own or operate street railways under the provisions of this ordinance or otherwise in any one or more of the cities in this ordinance referred to, and the city of Kansas City, Mo., shall thereafter acquire such power or authority, thereupon and after such acquirement the city shall have the right to purchase, acquire and operate said street railways, rights and property under the provisions of this ordinance to the same extent and in the same measure as if said city had full right and lawful authority so to purchase, acquire and operate said street railways, rights and property at the date of the passage of this ordinance and on the date when this ordinance takes effect.

"The city shall have the right to elect whether it will take the entire street railway system, including the property located in Missouri, as well as the property located in Kansas, or in lieu thereof, it may elect to purchase only the lines and property located in the State of Missouri. Any appraisement shall only include the lines and properties which the city so elects that it shall purchase, but it is stipulated and agreed that the Missouri lines and properties if purchased must be taken as a whole, if at all, and that the Kansas lines and properties, if included, must be taken as a whole, if at all."

Transit Affairs in New York

The Brooklyn Rapid Transit Company has discussed informally with the Public Service Commission a plan for improvements to the lines of the company which involves the expenditure of $50,000,000. Briefly summarized, this plan proposes the following:

To equip and operate the Fourth Avenue subway.

To extend its Fifth Avenue elevated line, as an elevated road, to Fort Hamilton.

To elevate its West End line from Coney Island to Eighteenth Avenue, and to depress the tracks from that point north to Forty-third Street, where they will run into the Fourth Avenue subway.

To elevate its Sea Beach road from Coney Island to the point where it joins the West End line.

To elevate its Culver line for its entire length.

To extend its Brighton Beach division by subway to Flatbush Avenue and Fulton Street, and thence via the Fourth Avenue subway, the Manhattan Bridge and the Canal Street subway in Manhattan, to a loop at the North River.

To third-track its Fulton Street elevated line.

To third-track its Lexington Avenue elevated line.

To third-track its Broadway elevated line.

To make various extensions to its elevated system in the Eastern District with a view to furnishing the East New York and Ridgewood sections with a much better transportation service than now exists.

The Board of Estimate has sent a recommendation to the Public Service Commission for an experimental moving sidewalk line under Thirty-fourth Street between Second Avenue and Ninth Avenue. The commission subsequently announced that it did not favor trying the plan on north and south thoroughfares for fear that it might interfere with contemplated subway extensions.

To carry on its work next year and perform the duties prescribed under the law of 1907, the Public Service Commission has laid before the Board of Estimate and Apportionment a requisition for $1,093,274. For special purposes the sum of $58,300 is asked, and $25,000 for contingencies, but apart from the regular maintenance charges the bulk of the total, amounting to $931,994, is to be apportioned to the head which includes executive, engineering, statistics, franchises, gas and electricity, legal and transportation bureaus, salaries and disbursements, including stationery, library supplies, printing, maps, plans and engineering supplies. The total to be provided by the Board of Estimate does not, however, cover the entire cost of the commission, as the salaries of the members of the commission, their counsel and secretary are paid by the State.

The Public Service Commission has issued to the Interborough Rapid Transit Company a permit to begin the work of lengthening the platforms in the subway, for which the Board of Estimate recently authorized an issue of bonds to the extent of $1,500,000.

Philadelphia Transit Talks

Transit Talk No. 30, of the Philadelphia (Pa.) Rapid Transit Company was published on Nov. 9, 1909. It was entitled "Connections With Outside Lines," and was introduced with a brief statement about Philadelphia being the terminal of 12 interurban lines, all of which connect with the lines of the Philadelphia Rapid Transit Company. A list of junction points followed with instructions about reaching them. As an addition to the talk proper, a statement containing less than 100 words was published about the company's new freight service.

Talk No. 31 was published on Nov. 11, 1909. It was entitled "Street Railway Fare Increases," and contained extracts from the announcements of the Hartford & Springfield Street Railway and the Tacoma Railway & Power Company regarding increases in fare on their lines, the original statements of which companies have been published in full in the Electric Railway Journal. This talk was also supplemented with a reference to the company's freight service.

Talk No. 32 was dated Nov. 16, 1909. It was entitled "Our Schedule System," and was written to convey an idea of the schedule system and to show the effort that is made to distribute cars equitably.

Talk No. 33 was dated Nov. 18, 1909. It was entitled "The Most Transportation for the Least Money." The talk follows:

Twenty-four per cent of Philadelphia's population—360,000 people—must ride three miles to reach the center of the city.

Thirty-five per cent—525,000 people—must ride four miles or more.

Twenty per cent—300,000 people—must ride five miles or more.

Fifty-nine per cent—885,000 *people, or nearly three-fifths of the city's population*—are so distributed that they must ride from three to ten miles to arrive at Market Street east of Broad.

This distribution of population is based upon a careful analysis of ward population by the city statistician.

These figures explain why we must maintain so many long-distance routes—a greater number, in fact, than any other traction company in the world.

The figures also prove that 5 cents buys more transportation here than in any other city.

Some wards having the largest population are on the outskirts of the city. The Twenty-second, for example, with 70,000 residents—the largest ward in point of population—is located five miles north of Market Street and extends to a point 10 miles north. The Twenty-third Ward, with 35,000 population, is equally remote. And travel from these wards to the central section is consistently heavy.

It is true that all passengers on our cars are not traveling to the central district all of the time. Some ride further, many travel a shorter distance.

But all of the people must have facilities for reaching the center of the city at all times. And in a given period practically the entire population does visit the central district.

These facts indicate a high average length of ride—higher here than elsewhere, just as our average length of route (11½ miles) is greater than the average in other cities.

And, of course, the higher the average length of ride the more transportation there is given for the rider's 5 cents.

Talk No. 34 was dated Nov. 22, 1909. It was entitled "No Passengers on Front Platforms," and referred to the necessity for enforcing the rule of the State Railroad Commission prohibiting passengers from riding on front platforms. The talk follows:

We have been ordered by the State Railroad Commission to enforce its mandate that passengers shall be excluded from the front platforms of our cars.

We believe that the rule is a good one and we have been endeavoring to enforce it so far as consideration for the wishes of the traveling public permitted.

The Railroad Commission now orders that the rule be enforced at all times, under all circumstances, and whether the public likes it or not. In justification of this position, Commissioner Ewing says:

"The safety of the public demands that this rule shall be rigidly enforced. I want to make it plain that the rule is to benefit the public, and not the company. Where it might result in some inconvenience and disorder, it is better to have the inconvenience and disorder at the start than danger of accident."

In accordance with the commission's instructions, beginning Wednesday, Nov. 24, both front gates of our cars will be closed, and passengers will not be allowed to stand on or to enter or leave the cars by the front platform. This rule does not, of course, apply to pay-within cars, which will be operated as heretofore.

Talk No. 35 was dated Nov. 25, 1909. It was entitled "Keeping Our Equipment Up to the Mark." The talk follows:

Eternal vigilance is the price of safety. That is why we keep an inspection force of 530 men eternally vigilant.

These men must make sure that each of our 2000 cars is in perfect working order every time it goes out on a run. To insure rigid inspection, the work is supervised by four deputy inspectors, two visiting deputy inspectors and one chief inspector.

All cars receive thorough inspection at the barns each day when they complete their runs. This applies to all mechanism, and also to the car bodies.

Motors and trucks are lubricated daily. For this purpose we use about 2600 gal. of oil and 5000 lb. of gear lubricant per month.

When cars are in service the inspection is all the more exacting. Our motormen constitute an auxiliary inspection force. If a motorman says his car is not running the way he thinks it ought to run, it is taken off the line immediately for barn inspection, even if no defects are apparent.

Motormen are required to make daily reports at their barns about the condition of all cars. The barn superintendents and district inspectors in turn forward reports each day to the chief inspector, thus keeping the operating department fully informed.

And we carry precaution to a further point. Our inspection system requires that each car pass through the shop once in eight weeks for a complete overhauling, even though it may appear to be in satisfactory running order.

It is this "eternal vigilance" that keeps our cars up to the standard of efficiency shown last month, when two of our barns made perfect reports. This means that they had not a single car withdrawn from service because of mechanical defects. *And the least favorable showing was that of a barn which reported trouble with the mechanism of only one car out of every 250 operated.*

Program of Meeting of Central Electric Accounting Conference

The Central Electric Accounting Conference announced the following program for the meeting of the conference at the Algonquin Hotel, Dayton, Ohio, on Dec. 11, 1909:

Business session, 1 p. m.

Report of committee on uniform practice in the treatment of car miles and car hours, with abstract of proceedings of the Denver convention, by S. C. Rogers, chairman.

Paper: "Conductors' Fare Collections," by Chas. E. Thompson, auditor of the Chicago & Milwaukee Electric Railroad.

Paper: "Accounting Features of Corporation Tax Law," by C. D. Gault, auditor of the Mahoning & Shenango Railway & Light Company.

Election of officers.

Adjournment.

Decision Defining Powers of Public Service Commission

In a decision handed down on Dec. 7, 1909, the Court of Appeals of New York holds that the Legislature did not intend that the Public Service Commissions should substitute its judgment and discretion for that of the directors and stockholders of a corporation as to the wisdom of a transaction; that a statute that should make such substitution would probably be unconstitutional, for the ownership of property carries with it the right of occupancy and management, and a statute that would deprive an owner of that right would undermine his right to protect and make his property remunerative.

The Public Service Commission of the Second District of New York on Dec. 7, 1908, refused assent to the issue by the Delaware & Hudson Company of bonds to pay indebtedness incurred by the purchase of the securities of the Hudson Valley Railway amounting to $4,665,295.85, and a part of the indebtedness incurred in the purchase of undeveloped coal lands in Pennsylvania amounting to $2,500,000. The properties in question were not included in the mortgage upon the property of the Delaware & Hudson Company under which it was proposed to issue these bonds. The property was acquired prior to the commission coming into existence. An appeal was taken by the Delaware & Hudson Company and on Sept. 30, 1909, the Appellate Division of the Third Department annulled and set aside on certiorari the order of the commission which refused assent to the bonds in question.

The Court of Appeals in its opinion holds that the paramount purpose of the Public Service Law creating the commission was the protection and enforcement of the rights of the public in that the commission must simply see to it that the railroads maintain their equipment, tracks and roadbed in good order and operate with safety to the public and give proper service, and that they should also supervise the issuance of securities so as to protect the public against over-capitalization.

Plans for Elevated Extension Filed in Boston.—The Boston (Mass.) Elevated Railway has filed detailed plans of its elevated extension from Sullivan Square to Malden and Everett, with the Railroad Commission.

Reduced Fare Ordinance for Passengers Who Stand Passed in Houston.—The City Council of Houston, Tex., has passed an ordinance which provides that a fare of only 3 cents shall be collected from passengers in street cars operated in Houston who are not provided with seats.

New Franchise Drawn in Des Moines.—The City Council of Des Moines, Ia., passed a resolution on Nov. 15, 1909, instructing the legal department of the city to prepare a draft of an ordinance to conform to a tentative agreement entered into between the City Council and the Des Moines City Railway. Such a draft has since been completed, and is being printed for distribution.

Franchise Tax Suits Before New York Supreme Court.—The Appellate Division of the Supreme Court of New York has granted a motion by Attorney-General O'Malley for the designation of a special term of the Supreme Court to hear suits brought by the Attorney-General to collect special franchise taxes from a number of corporations. The cases will begin in the January term.

Wisconsin Electrical Association to Meet in Milwaukee in January.—The next meeting of the Wisconsin Electrical Association, which is a consolidation of the Northwestern Electrical Association and the Wisconsin Electric & Interurban Railway Association, will be held at the Hotel Pfister, Milwaukee, Wis., on Jan. 19 and 20, 1910. The program for the meeting is now being arranged.

Suit to Annul Contract Between City and Company in Philadelphia Appealed.—An appeal has been filed in the Supreme Court from the recent decision of Common Pleas Court No. 1 in dismissing the taxpayer's suit brought by Elmer E. Brode attacking the validity of the contract between the City of Philadelphia and the Philadelphia Rapid Transit Company. The appeal will probably be argued in January.

Suit to Annul Franchise in Beaumont.—The city attorney of Beaumont, Tex., has filed suit in the District Court to forfeit the several franchises under which the Beaumont Traction Company operates in Beaumont, alleging failure on the part of the company to comply with conditions of the franchise by properly constructing the track on concrete foundation and failure to operate cars in accordance with the schedule defined in the franchise.

Submission of San Francisco Plan to Voters.—The Council of San Francisco has decided that the vote on the question of the reconstruction of the Geary Street, Park & Ocean Railroad by the city and the building of an extension in Market Street from Geary Street to the Market Street ferry shall be taken on Dec. 30, 1909, and that the amount of bonds to be authorized to cover the cost of the work shall be $2,100,000.

Canadian Paving Decision.—The Ontario Railway & Municipal Board has decided that the Dominion Power & Transmission Company, Ltd., Hamilton, Ont., is required to pave and keep in repair the streets over which it operates street railways for 2 ft. outside of the rails. The decision involves about $2,500, and the settlement of the disputed question. The company contended that the city should make the repairs and collect the cost from the company. The case will be appealed.

Council of Toronto Favors Subway Proposal.—The City Council of Toronto has decided to adopt the report and recommendation of the special civic committee dealing with the proposed subway, mentioned in the ELECTRIC RAILWAY JOURNAL of Dec. 4, 1909, page 1163, and at the municipal election in January the electors will be asked if they favor the city obtaining the necessary legislative authority to construct and operate a municipal subway and surface railway subject to the approval of the qualified ratepayers.

Consideration of Providence Tunnel Indefinitely Postponed.—C. S. Mellen, president of the New York, New Haven & Hartford Railroad, in a letter dated Nov. 23, 1909, addressed to Charles R. Makepeace, Providence, R. I., has declined to enter into any further conferences with the members of the city committee on the East Side approach in Providence and declared that as far as he is concerned the proposition of an East Side tunnel is indefinitely postponed. He charges that the committee has broken faith with him, and that it has declined for a second time to abide by a definite understanding made between that body and the railroad. It was originally agreed that the city should secure the necessary legislation, furnish the capital, obtain the right-of-way and own the tunnel, but that the construction work should be done by the Rhode Island Company under the supervision of one of its own engineers and an engineer to be appointed by the city.

Financial and Corporate

New York Stock and Money Market

December 7, 1909.

The activity and strength of the Wall Street maket to-day were centered largely in the Interborough-Metropolitan issues, the persistent buying of which indicates confidence in the reorganization plans and in the earning capacity of the properties. Both the preferred and the common reached new records to-day, the former selling at 61¾ and the latter at 25¾. Brooklyn Rapid Transit has also been moderately active and has recorded small gains. Third Avenue has been weak and lower, selling to-day for 15¼. This is as low as it has sold this year.

The money market continues easy. Quotations to-day were: Call, 4½ to 5 per cent; 90 days, 4¾ per cent.

Other Markets

In the Philadelphia market transactions have been fairly numerous and the price has improved more than 2 points. Other tractions with limited activity have been unchanged.

There has been little trading in traction shares on the Chicago market. Subway reached new low records, but the appointment of receivers has checked activity.

In Boston, Massachusetts Electric has been less active than during the past few weeks, although the tendency is still downward. The preferred has lost 2 points during the week. Other traction issues have been out of the market.

In Baltimore, the bonds of the United Railways continue to be active at prices practically unchanged.

In last week's auction of securities in New York the following were sold: 30 shares Christopher & Tenth Street Railroad, at 88½; 45 shares Forty-second Street & Grand Street Ferry Railroad, at 220; 51 shares Twenty-third Street Railway, at 201½; $3,000 Second Avenue Railroad first consolidated 5 per cent bonds, at 70½, and 250 shares St. Louis Car Company, $50 for the lot.

Quotations of various traction securities as compared with last week follow:

	Nov. 30	Dec. 7
American Railways Company	a45¼	a45½
Aurora, Elgin & Chicago Railroad (common)	a49¾	a60
Aurora, Elgin & Chicago Railroad (preferred)	*92	a92½
Boston Elevated Railway	a131	a130
Boston & Suburban Electric Companies	a18	a16
Boston & Suburban Electric Companies (preferred)	a76¾	75½
Boston & Worcester Electric Companies (common)	a12	a12
Boston & Worcester Electric Companies (preferred)	a50	a50
Brooklyn Rapid Transit Company	77½	82½
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	85⅞	88
Capital Traction Company, Washington	a133½	a133½
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*2	*2
Chicago & Oak Park Elevated Railroad (preferred)	*10	*10
Chicago Railways, ptcptg., ctf. 1	a100	a100
Chicago Railways, ptcptg., ctf. 2	a32¾	a31
Chicago Railways, ptcptg., ctf. 3	a20	a21
Chicago Railways, ptcptg., ctf. 4s	*10	*10
Cleveland Railways	*84	*84
Consolidated Traction of New Jersey	a77½	a76½
Consolidated Traction of New Jersey, 5 per cent bonds	a107	a106
Detroit United Railway	*60¾	*65
General Electric Company	159¾	160
Georgia Railway & Electric Company (common)	100	a101
Georgia Railway & Electric Company (preferred)	87	87
Interborough-Metropolitan Company (common)	22¾	25⅝
Interborough-Metropolitan Company (preferred)	54¾	61¾
Interborough-Metropolitan Company (4½s)	82⅞	84⅜
Kansas City Railway & Light Company (common)	a38½	a38½
Kansas City Railway & Light Company (preferred)	*82	*82
Manhattan Railway	139½	*140
Massachusetts Electric Companies (common)	a16	a16
Massachusetts Electric Companies (preferred)	a78⅞	a76
Metropolitan West Side, Chicago (common)	a17	a17
Metropolitan West Side, Chicago (preferred)	a52½	a52
Metropolitan Street Railway	a24	a23
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	78	82¾
Northwestern Elevated Railroad (common)	a18	a18
Northwestern Elevated Railroad (preferred)	a68	a68
Philadelphia Company, Pittsburg (common)	a48¾	a49¾
Philadelphia Company, Pittsburg, (preferred)	a44½	44
Philadelphia Rapid Transit Company	25⅞	25⅞
Philadelphia Traction Company	89	a90
Public Service Corporation, 5 per cent. col. notes	*100⅜	*100⅛
Public Service Corporation, ctfs.	a105	a100¼
Seattle Electric Company (common)	a117	a117
Seattle Electric Company (preferred)	a104	a104
South Side Elevated Railroad (Chicago)	a53	a52
Third Avenue Railroad, New York	18¾	16
Toledo Railways & Light Company	*8	*8
Twin City Rapid Transit, Minneapolis (common)	109½	113
Union Traction Company, Philadelphia	52¼	a54
United Rys. & Electric Company, Baltimore	a14	a14⅜
United Rys. Inv. Co. (common)	40	41
United Rys. Inv. Co. (preferred)	*72½	72¾
Washington Ry. & Electric Company (common)	a44	a42¾
Washington Ry. & Electric Company (preferred)	a91	a91⅛
West End Street Railway, Boston (common)	93	a93⅛
West End Street Railway, Boston (preferred)	104¼	a106
Westinghouse Electric & Manufacturing Company	83	84
Westinghouse Elec. & Mfg. Company (1st pref.)	*140	135

a Asked. * Last Sale.

Decision of Public Service Commission Regarding Issue of Bonds by the Coney Island & Brooklyn Railroad

Mention has been made of the decision of the New York Public Service Commission, First District, approving in part the application of the Coney Island & Brooklyn Railroad for authority to issue $372,000 additional consolidated mortgage bonds. The opinion was written by Commissioner Bassett and says in part:

"This is an application for an order authorizing the issuance of $372,000 of 4 per cent bonds, to be sold at 80 in order to realize $297,000 which the company submits is the estimated cost of reconstruction of its railroad in Franklin Avenue and DeKalb Avenue, Brooklyn, the relaying of its present rail in Smith Street and the paving of all three streets.

"The mortgage to an authorized amount of $10,000,000 was consented to by the former Board of Railroad Commissioners by an order entered Dec. 14, 1904, and by that order the company was directed before issuing any bonds under such mortgage beyond $5,500,000 to make application to the Board of Railroad Commissioners for its approval. Bonds to the amount of $5,500,000 have been issued as follows:

"1. $2,000,000 to be held by the trustee to retire in 1948 a like amount of bonds of the Coney Island & Brooklyn Railroad.

"2. $2,000,000 to be held by the trustee to retire in 1939 a like amount of bonds of the Brooklyn City & Newtown Railroad.

"3. $1,500,000 issued and sold.

"The company shows upon the application that the directors have by resolution declared that in their judgment the betterment proposed under this application ought not to be charged as expense of operation.

"The figures and estimates submitted by the company as to the cost of this work have been carefully examined by the engineers of the commission and a report made, and it is apparent that the company's estimate is probably not much, if any, in excess of the probable necessary cost. It is, however, shown that the larger portion of the work proposed to be done is replacement of structure and material, and that only a portion thereof, estimated to be about $85,000 in cost, can be regarded as an improvement or betterment. If new track of the same weight as the old were laid, and in the same manner substantially as the old, then the whole would be a replacement, but to such extent as the present track is heavier and laid in a better and more expensive manner, such excess over mere replacement should be treated as a betterment. The commission is of the opinion that replacements should not, except possibly in extraordinary cases, be made with the authority of the commission from the proceeds of bond issues, but that depreciation in perishable structures and property should be provided for and made good out of the earnings of the venture. The result of providing for the replacement of worn out and perishable property by constant issues of new stock or new bonds of public service corporations has been shown to be a constantly increasing capitalization representing a constantly decreasing property and equipment, resulting in false statements by public service corporations as to their assets in public reports and in reports to stockholders, which have been misleading and damaging. This subject has been carefully considered in an opinion of the Public Service Commission of the Second District entitled: 'Matter of Application of Niagara Light, Heat & Power Company, decided June 29, 1909,' and the practice of capitalizing replacements of property or equipment of public service corporations has been disapproved.

"The commission is therefore of the opinion that bonds should be authorized to be issued by the company upon this application only so far as may be necessary to pay for the $85,000 of betterments and improvements which are included in this work proposed to be done. The 4 per cent bonds, however, proposed to be issued are not first mortgage bonds, but consolidated bonds, and testimony has been introduced which tends to show that at this time they cannot be sold at a price in excess of .80.

"It is accordingly recommended that an order be made authorizing the issue of not exceeding $107,000 of such bonds which shall be sold at not less than .80 and net the company $85,000, the proceeds to be applied only to pay for the said betterments and improvements in carrying out this work, and the discount and expenses in connection with the sale to be distributed over the term of the bonds and charged against the income of the company. The order should also contain a proper provision for audit by the commission."

The commission adopted an order in accordance with the recommendations of Commissioner Bassett.

Modified Reorganization Plan Filed for Third Avenue Railroad

The committee of bondholders of the Third Avenue Railroad, New York, N. Y., has filed a modified plan of reorganization with the Public Service Commission of the First District of New York, the commission having disapproved the original plan for reorganizing the company. It is proposed to assess stockholders 45 per cent on the $16,000,000 stock, and they in exchange will receive $45 in new stock and $40 in first refunding mortgage 50-year 4 per cent gold bonds. Securities of the old company, stocks, bonds and notes are stated at $65,088,737 and new securities at $79,125,000, of which only $54,916,000 would be immediately issued, the balance being in reserve until receiving approval of the commission. The new securities to be issued sum up as follows:

First refunding mortgage 50-year 4 per cent gold bonds, dated Jan. 1, 1910, as follows: To present bondholders, being 15 per cent of principal and 10 per cent in payment of unpaid interest, $9,390,000; to stockholders, on payment of $45 per share, $6,400,000, making immediate issue, $15,790,000; to be reserved for underlying bonds and future extensions, betterments, etc., $24,210,000, making total authorized issue $40,000,000.

Adjustment mortgage 50-year 5 per cent income gold bonds, dated Jan. 1, 1910, to present bondholders 60 per cent of principal, $22,536,000. Holders of the adjustment mortgage bonds are to have full voting powers upon all questions upon which stockholders may vote until full interest, including accumulations, is paid for five consecutive years, and the bonds shall be redeemable at par and interest in whole, but not in part, at any time on three months' notice.

The securities thus proposed compare with present securities as follows:

Obligations of old company, exclusive of first mortgage, $5,000,000; prior claims, $7,200,000; bonds, $41,888,737; stock, $16,000,000; total, $65,088,737.

Obligations of the new company, exclusive of first mortgage, will be: Refunding bonds, $15,790,000; adjustment bonds, $22,536,000; stock, $16,590,000; total, $54,916,000; reduction, $10,172,737.

It is proposed by the bondholders that a new railroad be formed under provisions of sections 9 and 10 of the stock corporation law, and to vest in it ownership or control of all properties as acquired by the committee at foreclosure sale or otherwise, except so far as the stocks may be dealt with in effecting the plan.

The Public Service Commission has ordered a hearing on Dec. 15, 1909, on a plan of the bondholders' committee for the reorganization of the company. Wm. R. Willcox, chairman, and Milo R. Maltbie, of the commission, will preside.

Hearing on Increase of Capital of Boston & Worcester Street Railway

The Massachusetts Railroad Commission gave a public hearing on Dec. 1, 1909, on the petitions of the Boston & Worcester Street Railway for authority to issue new stock to the amount of $500,000 and additional bonds to the amount of $500,000. William M. Butler, president of the company, stated that the company's total assets on Nov. 1, 1909, were $4,960,728. The principal items were track and roadway, $2,484,648; overhead line construction, $333,706; power and substation equipment, $634,338; rolling stock and miscellaneous equipment, $391,125; electrical equipment of latter, $272,720; engineering, interest, etc., about $600,000. George A. Butman, treasurer of the company, submitted a statement showing that the working capital required for the last two years amounted to $191,256. Mr. Butler stated that the company desired to undertake an express business in the territory which it served. The line from Boston to Worcester was nearly all double-tracked. It was estimated that six freight cars would handle the business at the start between the terminus of the lines of the Worcester Consolidated Street Railway and the Boston Elevated Railway. At present the company was handicapped by the difficulty of securing the right to carry freight at the Boston and the Worcester ends of its line. The company was considering the plan of handling the express matter by automobile trucks after it left its own system, six trucks being estimated as necessary for the work. In order to handle the business properly Mr. Butler said that the company would have to build the following freight stations: Chestnut Hill, cost, $10,000; Natick, $2,500; South Framingham, $5,000; White's Corner, Westboro and Shrewsbury, $500 each; Lake Junction, $2,500; Hudson, $3,000, and Marlboro, $5,000. At Chestnut Hill about $6,000 would have to be expended in grading, and tracks and overhead work would cost at that point $5,000 additional. The company does not desire to begin the new service until the business is in good condition, and would probably not do any construction work before the spring of 1910. The board took the matter under advisement.

Boston & Northern Street Railway, Boston, Mass.—The Boston & Northern Street Railway and the Old Colony Street Railway have petitioned the Railroad Commission of Massachusetts for authority to issue bonds to the amount of $300,000 for each company to refund floating indebtedness. A hearing on the matter will be held on Dec. 14, 1909.

Brockton & Plymouth Street Railway, Plymouth, Mass.—The Brockton & Plymouth Street Railway has petitioned the Railroad Commission of Massachusetts for authority to issue new bonds to the amount of $35,000 to refund floating debt.

Cape Electric Tramways, Ltd., Cape Town, S. A.—The report of the directors of the Cape Electric Tramways, Ltd., presented at the thirteenth annual meeting in London on Nov. 16, covers the year ended June 30, 1909. The number of passengers carried in Cape Town was 11,888,180, as compared with 14,742,155 in the preceding year; the number of car-miles run was 1,874,802 in the last year, as compared with 2,185,103 in the previous year; the total receipts from traffic amounted to $588,570, as compared with $604,545 in the previous year. In Port Elizabeth the gross receipts were $157,275 last year, as compared with $187,235 in the preceding year; the number of passengers carried was 2,978,217 and 3,561,211 in the last year and preceding year, respectively. The total dividends declared by the subsidiary companies aggregated $235,145, as compared with $230,405 in the previous year.

Eastern Ohio Traction Company, Cleveland, Ohio.—The Cleveland & Chagrin Falls division of the Eastern Ohio Traction Company has been ordered sold by Judge Phillips, of the Common Pleas Court at Cleveland. The court was informed that the first mortgage bondholders purpose to bid in the property, and if that is accomplished they will form a new company to operate the line.

Forty-second Street, Manhattanville & St. Nicholas Avenue Railway, New York, N. Y.—The sale of the property of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway under foreclosure of the $1,600,000 second mortgage has been set for Feb. 1, 1910. The amount found to be due for principal and interest is $1,676,933.

Illinois Tunnel Company, Chicago, Ill.—Judge C. C. Kohlsaat in the United States Circuit Court has appointed receivers for the Illinois Tunnel Company and the Chicago Warehouse & Terminal Company, controlled by the Chicago Subway Company. David R. Forgan, president of the National City Bank, and Charles G. Dawes, president of the Central Trust Company of Illinois, were named receivers for the Illinois Tunnel Company. Edwin A. Potter, president of the American Trust & Savings Bank, was made receiver for the Chicago Warehouse & Terminal Company.

Irwin-Herminie Traction Company, Irwin, Pa.—The Irwin-Herminie Traction Company has increased its capital stock from $100,000 to $125,000.

Massachusetts Electric Companies, Boston, Mass.—The Massachusetts Electric Companies has made public its report for the year ended Sept. 30, 1909. The operating statement for the year compared with the previous year, follows: Gross earnings for 1909, $8,052,355, as compared with $7,809,010 for 1908; operating expenses for 1909, $5,148,396, as compared with $5,001,517 for 1908; net earnings for 1909, $2,903,958, as compared with $2,807,492 for 1908; fixed charges for 1909, $1,778,128, as compared with $1,784,437 for 1908; balance for 1909, $1,125,829, as compared with $1,023,054 for 1908; dividends for 1909, $1,000,464, as compared with $880,773 for 1908; surplus for 1909, $125,365, as compared with $142,281 for 1908.

Metropolitan Street Railway, New York, N. Y.—G. E. Tripp has been elected chairman of the joint committee on reorganization of the Metropolitan Street Railway constituted by representatives of the bondholders' committee of the general 5 per cent bonds and the refunding 4 per cent bonds, to succeed the late John W. Castles. In a memorandum filed in the United States Circuit Court, Judge Lacombe says that the special master in charge of the New York City Railway has up to the present time passed on claims aggregating $3,000,000, which are presumably substantial, but there are still a number of claims which were filed long ago which have not yet been approved or passed upon. Judge Lacombe also says that the same special master has before him other claims against the receivers of the Metropolitan Street Railway presented by the Third Avenue Railroad, Fifty-ninth Street Crosstown Railway,

and Second Avenue Railroad, which over a year ago took back their property. Concluding the memorandum, Judge Lacombe says: "It is suggested to all parties in interest and claimants and their respective counsel, that the court does not regard the receivership of this group of roads as perennial. The Supreme Court has indicated that the judicial administration should cease at the earliest possible moment."

Ocean Shore Railway, San Francisco, Cal.—J. Downey Harvey, president of the Ocean Shore Railway, is quoted as follows regarding the reorganization of the company: "We have overcome every obstacle; 80 per cent of the bondholders has already turned in their holdings and as soon as the new company is incorporated will receive the bonds of that company in lieu of the previous issue. We fixed Nov. 10, 1909, as a final date for the receipt of the old bonds in order that the reorganization committee might determine definitely whether the plan was feasible. That has now been demonstrated and no restrictions are placed on those who still desire to turn in their bonds."

Ohio Electric Railway, Cincinnati, Ohio.—The Ohio Electric Railway reports earnings for the year ended June 30, 1909, as follows: Railway, $2,555,321; light and power, $198,397; miscellaneous, $21,888; total, $2,775,607. The earnings of the Indiana, Columbus & Eastern Traction Company for the year follow: Railway, $967,063; miscellaneous, $6,274; total, $973,338. The earnings of the Columbus, Newark & Zanesville Electric Railway for the year follow: Railway, $622,704; light and power, $76,760; miscellaneous, $9,339; total, $708,805. The earnings of the Lima Electric Railway & Light Company for the year follow: Railway, $135,048; light and power, $121,637; miscellaneous, $896; total, $257,581. The earnings of the Cincinnati, Dayton & Toledo Traction Company for the year follow: Railway, $501,036; miscellaneous, $3,047; total, $504,084. The earnings of the Ft. Wayne, Van Wert & Lima Traction Company for the year follow: Railway, $211,174; miscellaneous, $1,434; total, $212,608.

Springfield (Mass.) Street Railway.—The Railroad Commission has approved the petition of the Springfield Street Railway and the Western Massachusetts Street Railway for permission to consolidate and has authorized the Springfield Street Railway to increase its stock by the issue of not more than 5500 shares, to be exchanged share for share for the outstanding stock of the Western Massachusetts Street Railway.

Toledo & Indiana Railway, Toledo, Ohio.—The property of the Toledo & Indiana Railway was sold under foreclosure on Nov. 27, 1909, by C. F. M. Niles, receiver, to J. M. Longnecker, Delta, Ohio, and associates, minority stockholders, for $1,006,000. A bid of $1,004,500 was made at the sale in the interest of the Ohio Electric Railway, and after the sale D. J. Cable notified Mr. Niles of the willingness of the Ohio Electric Railway interests to pay $1,056,000 for the property, accompanying the offer with a check for $50,000 as a guaranty of good faith. The offer was filed with the court with the master's report and will be considered when the sale comes up for confirmation.

United Railways, Portland, Ore.—The following new board of directors has been elected by the United Railways: P. L. Greenough, A. E. Emmon, L. B. Wickersham, F. E. Bowman, Portland; J. H. Hilbert, Ohio; Chas. D. Pullen, Seattle. Following the election of the new directors, T. L. Greenough was re-elected president; Chas. D. Pullen was elected vice-president to succeed Jos. E. Healy; A. C. Emmons was elected secretary, and L. B. Wickersham was retained as general manager.

Westchester Street Railroad, White Plains, N. Y.—The Westchester Street Railroad was incorporated at Albany on Dec. 1, 1909, with a capital stock of $1,000,000 in the interest of the New York, New Haven & Hartford Railroad as the successor of the Tarrytown, White Plains & Mamaroneck Railway, sold under foreclosure as noted in the Electric Railway Journal of Nov. 13, 1909, page 1038. The directors of the company are: Richard Sutro, William Greenough, Charles M. Sheafe, Jr., William L. Barnett, John L. Anderson, Frank F. Hall and Edward O. Brown, New York, N. Y.; John G. Parker and August S. May, New Haven, Conn.

Worcester & Blackstone Valley Street Railway, Worcester, Mass.—The Railroad Commission of Massachusetts has approved the terms of consolidation of the Worcester & Blackstone Valley Street Railway with the Uxbridge & Blackstone Street Railway, and also an increase of the capital stock of the Worcester & Blackstone Valley Street Railway by an issue of shares not exceeding 1200, amounting at par to $120,000, to be issued for the purpose of carrying out the terms of contract. The stock of the Worcester & Blackstone Street Railway are to be issued share for share for the outstanding stock of the Uxbridge & Blackstone Street Railway.

Traffic and Transportation

Service in Pittsburgh

As a result of the study which it made recently of street railway operating conditions in Pittsburgh the Railroad Commission of Pennsylvania, through Nathaniel Ewing, its chairman, has made public the following statement regarding the effort made by the Pittsburgh Railways to meet the recommendations made by the commission in the spring of 1909 and abstracted in the Electric Railway Journal of March 20, 1909, page 528:

"Since the former recommendation of this commission the evidence that we have had leads us to the conclusion that there has been a considerable increase of travel on the street car lines of Pittsburgh, and in consequence it would follow that recommendations that were adequate at that time would hardly prove so to-day. At that time the commission's experts thought there was crowding of the cars on at least certain of the lines in the city to such a degree as demanded relief, and our own observation and experience since we have been here on this occasion, as well as the information which we have received from various reliable sources, convince the commission that there is such crowding of the street cars during the rush hours as naturally arouses the antagonism of the public and calls for immediate relief. In consequence of that the commission has been advising with the Pittsburgh Railways and the Mayor, informing them of the commission's opinion in this respect, and we have concluded that as a result of that conference no further testimony in this case is needed, and all that is required at present is for the commission to make a recommendation, which we are prepared to do now. That recommendation in brief is this:

"That the company put into immediate service all its available closed cars, suitable for the season, assigning the extra cars to those of their routes which seem the most crowded. That assignment to be subject to supervision and direction of an expert to be appointed by the commission, and in connection with that assignment the commission's expert shall also take up the question of a change in the routing of the different lines to ascertain what relief can be obtained in that way, and this work to be done as speedily as possible.

"Furthermore, if after the employment of all the cars now in control of the company it is found that the service is still inadequate the commission recommends that the company forthwith proceed to supply additional cars. It is understood that other cars have already been ordered, but have not yet been delivered. Some of them are expected in a short time. They are to be put into service as soon as they are received.

"When the expert to be appointed by the commission makes his report as to the adequacy of the service, what additional cars are yet needed and what changes, if any, can be made advantageously in the routes of the different lines, the commission will make a further recommendation embracing those points."

Subsequently the company issued a statement about general betterments to its system, in which it said in part:

"The company will put into operation at once 50 trail cars on the lines which are most crowded during the rush hours. To do this it will be necessary to pull two trailers with some motor cars to make up for others of the cars that have not sufficient motor capacity to pull one trailer. Grades on some lines prevent the operation of trailers.

"The company placed orders on June 10, 1909, with The J. G. Brill Company, Philadelphia, for 30 cars for city service, and later transferred to The Brill Company an order for 50 cars of the same type originally placed with another company. On June 8, 1909, the company placed an order with G. C. Kuhlman Car Company, Cleveland, Ohio, for 20 interurban palace cars for use on the suburban lines, the intention being thoroughly to remodel the present interurban cars for city service.

"The report of our inspectors at the car building shops shows that 18 of the interurban cars are in the paint shop and that the entire 20 will be ready for shipment to Pittsburgh within two weeks. The Westinghouse Electric & Manufacturing Company, which has the order for the electrical equipment for these cars, is also behind in shipment, so that all of the material for these cars will not be received in Pittsburgh before Jan. 1, 1910. The city cars will cost about $750,000.

"During the year drawing to a close the Pittsburgh Railways has expended about $2,000,000 for these new cars, the erection of subpower stations, additions to existing power plants, improvements and additions to car barns, laying and renewing roadbed, track and street paving throughout the

system. The power plant at Brunot's Island has been enlarged by the erection of a new building in which an additional 5000-kw turbo-generator and 6000 hp of boilers have been installed, and a large substation has been about completed at the south end of the Mount Washington tunnel to care for the traffic of the South Hills district. Two units of 1000 kw each have been installed in this substation, greatly reinforcing the power through the tunnel and on the hills beyond. This will insure greater speed, greater regularity of service, fewer delays and annoyances and greater comfort to the public.

"The action of the police department in securing authority from Councils to inaugurate a traffic squad to compel better observance of street traffic rules will aid materially in relieving congestion in downtown streets and will afford the company a better opportunity to operate its cars on schedule and take better care of the public. Regular automobile and carriage 'bus stands are maintained on the most crowded downtown streets, and many business men allow their automobiles to stand in front of their office buildings the entire day. This aggravates downtown congestion."

Report of Fort Wayne & Wabash Valley Traction Company's Employees' Association

The second annual report of the Employees' Mutual Benefit Association of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., was submitted at a recent meeting of the trustees of the association. The association organized with 352 members out of a total of 758 employees of the company, making 46 per cent of the employees members of the association. The membership of the association now numbers 627 out of a total of 804 employees, or 79 per cent. The report, which is for the year ended Oct. 1, 1909, shows that 160 members were disabled during the year. The amount paid during the year for sick benefits was $832; for accident benefits $850, and for death benefits $300. This makes the total paid for sick, accident and death benefits since the organization of the association $3,192. The statement of the receipts and expenditures for the year follows:

Receipts:		
Carried over from last report	$2,150	
Dues from members	3,576	
Interest on bank deposits	80	
		$5,806
Expenditures:		
Contributions returned	$5	
Accident benefits	832	
Sick benefits	850	
Death benefits	300	
		$1,987
Leaving balance on hand in treasury		$3,818

In addition to the above relief expenditures, the following amounts have been expended by the company:

Clerk hire	$420
Expenses on E. M. B. A. rooms	618
Books, printing, stationery, magazines, etc.	85
Wages paid employees while attending meetings	67
	$1,190

The members of the association have elected the following as trustees: Noble Graham, Fort Wayne, shop department; M. B. Gouty, Fort Wayne, power house department; Arthur Johnston, Fort Wayne, maintenance of way department; Charles A. Beamer, Fort Wayne, transportation department; F. G. Hill, Logansport, transportation department; W. H. Stephens, Lafayette, transportation department, and Fred H. Schmidt, Fort Wayne, accounting department.

Record Traffic in Boston.—On Nov. 20, 1909, the day of the Yale-Harvard football game, the Boston (Mass.) Elevated Railway carried 1,400,000 people without an accident.

Massachusetts Company Seeks Freight Rights.—The Old Colony Street Railway, Boston, Mass., has petitioned the Railroad Commission of Massachusetts for authority to act as a common carrier of baggage and freight in the city of Quincy and the town of Weymouth.

Accidents in Fog in Chicago.—Eleven persons were injured in three collisions between cars in Chicago on the morning of Dec. 3, 1909, during a dense fog. Trains over the suburban steam roads operating into the city were from 10 minutes to 30 minutes late.

Portable Waiting Stations on Interurban Railway.—The Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind., has purchased more than 20 portable waiting stations from the Foster Lumber Company, Indianapolis, Ind., and will install them at various points along its line for the convenience of its patrons.

Extra Car Out of Dayton in the Evening.—As the cars of the Dayton & Troy Electric Railway leaving Dayton at 4:30 p. m. and 5:30 p. m. have been very heavily patronized recently, the company has put on an extra car, for 30 days, which leaves Dayton at 5 p. m. If patronage warrants the 5 p. m. car will be established permanently.

Express Service on Colorado Road.—The Denver & Interurban Railway, operating between Denver and Boulder, 30 miles distant, will soon establish an express service between the two cities with a stop only at Louisville Junction. The run will be made in 50 minutes, at an average of 40 m.p.h. This service will be in addition to the present hourly service.

Service Stripes in York.—Conductors and motormen in the employ of the York (Pa.) Railways have been wearing stars and stripes on their sleeves since Nov. 15, 1909, to designate the number of years they have been in continuous service. Conductors wear gold stars and stripes and the motormen silver ones. Each star indicates five years of service and each stripe indicates one year.

Pay-as-You-Enter Service in Columbus, Ohio.—Forty of the 70 cars in regular use on the main lines of the Columbus Railway & Light Company, Columbus, Ohio, are of the pay-as-you-enter type. A red board sign which is illuminated from behind by a red light at night has been adopted as a special marker to distinguish these cars, in addition to the sign on the side of the car.

Swastika Selected as Emblem by an Indiana Company.—The Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind., has adopted the Swastika, the Indian sign of good luck, as its official emblem, and has formed the points of the Swastika to represent the eight county seats reached by the lines of the company, namely, Ft. Wayne, Huntington, Wabash, Bluffton, Peru, Delphi, Logansport and Lafayette.

Tickets on a New Hampshire Line.—The Claremont Railway & Lighting Company, Claremont, N. H., which some time ago increased the unit of fare on its lines from 5 cents to 6 cents and subsequently made a special rate to workmen of 6 tickets for 25 cents, good in the morning and evening rush hours, has placed on sale ticket books which contain 20 tickets for $1, good for transportation at any time during the day. The cash fare, however, is still 6 cents.

Fare Readjustment Asked in Massachusetts.—A petition has been presented to the Railroad Commission of Massachusetts by residents of Hamilton for a re-adjustment of fares as follows on the Gloucester division of the Boston & Northern Street Railway: Hamilton to Essex, 5 cents; Hamilton to Ipswich, 5 cents; Hamilton to transfer station on Cabot Street, Beverly, 5 cents, and within the limits, Hamilton, 5 cents. A public hearing will be given on the matter.

Meeting of Central Electric Traffic Association.—At the meeting of the Central Electric Traffic Association held in Fort Wayne, Ind., on Nov. 29 and 30 and Dec. 1, the work of compiling divisions of through rates published in Joint Passenger Tariff No. 3 was completed. The next meeting of the association will be the regular annual session and will be held in Columbus, Ohio, on Jan. 27, 1910, the day previous to the annual meeting of the Central Electric Railway Association.

Freight Over Indianapolis-Louisville Line.—The Indianapolis & Louisville Traction Company has established a freight service between points on its line and Louisville, Ky. For the last two years the company has been unable to handle heavy shipments into Louisville on account of bridge conditions. Cards were used to announce the service, and on the backs of them the rates in effect between Louisville and points south of Seymour, Ind., were printed. The phrase for the service is, "Ship your goods via 'The Gateway Route.'"

Increase in Wages in Lincoln.—The Lincoln (Neb.) Traction Company has announced an increase in the wages of its employees of 1 cent an hour for first-year men, 1½ cents for second, third, fourth, fifth and sixth-year men, and 2 cents for all employees who have been in the service of the company more than six years. All of the men who have been in the employ of the company for 10 or more years will receive a uniform each year and will be permitted to wear one service stripe for each five years' service. The schedule of wages paid at present follows: First year, 19 cents per hour; second year, 20½ cents per hour; third year, 22½ cents per hour; fourth year, 22½ cents per hour; fifth year, 23½ cents per hour; sixth year, 24½ cents per hour; seven and one-half years and thereafter, 26 cents.

Hearing on Fenders and Wheel Guards in Washington.—The District Electric Railway Commission, Washington, D. C., granted the Washington, Alexandria & Mt. Vernon Railway and the Great Falls & Old Dominion Railway a hearing on the question of fenders and wheel guards on Nov. 24, 1909. On June 21, 1909, the Interstate Commerce

Commission, on recommendation of the District Electric Railway Commission, adopted a new regulation relative to fenders and wheel guards as used in the District of Columbia, the regulation to become effective on Nov. 1, 1909. The Washington, Alexandria & Mt. Vernon Railway and the Great Falls & Old Dominion Railway operate almost entirely outside of Washington, and claim that the new regulation should not apply to them, especially as they operate at high speed outside of Washington and a fender of wheel guard of the platform-operated or automatic type would be a source of danger in the suburbs. No decision has been rendered in regard to the matter.

Elevated Traffic in New York.—The Interborough Rapid Transit Company made public on Dec. 6, 1909, figures which show that for the first time since the subway was opened the elevated lines of the company are carrying more passengers than at any time before in the history of the company. The year previous to the opening of the subway, 1904, the elevated lines carried 286,634,195 passengers, of which number 139,315,267 were transported the first six months and 148,318,928 the last six months. During the first six months of the present fiscal year, with the remainder of the present month estimated, the number of passengers carried on the elevated lines will reach 144,372,662, an increase over the corresponding period of 1904 of 5,057,285 passengers. Assuming that the same ratio of increase in the number of passengers carried the first six months of the present fiscal year obtains throughout the remaining six months of the year, notwithstanding the large growth of travel on the subway, the company estimates that the elevated lines will carry not less than 292,000,000 of people, an increase of 5,365,805 passengers over 1904.

Circular to Employees in St. Louis.—The following is the first of a series of notices to the employees of the United Railways, St. Louis, Mo., over the signature of Robert McCulloch, president and general manager of the company, to impress the men with the fact that any course of action taken by them in the interest of the company necessarily is to their best interest individually: "A word of beseechment is sent to every person in the service of the United Railways and intended for all, from the president to the most remote employee, warning all and every one as to the danger and folly of internal dissension or disagreement. 'The world, the flesh and the devil' are all combined against us and loyalty and honesty and prudence warrant and suggest the same compactness of organization on our part. Personal contention between ourselves is unworthy; reserve all your strength, mental and physical, for defense against the combination always against us. The motto of our good State is 'United We Stand, Divided We Fall'—so let us not waste strength or energy in even trivial disagreement, but harmonize and forgive and forget, and hold always to the strength and correctness of our own affairs as against everybody outside."

Illinois Traction System Advertising Card.—The first advertising matter of the Illinois Traction System to call attention to the magnificent terminal which is being constructed by that company in St. Louis, Mo., has just been issued in the form of a wall or rack card. The entrance into St. Louis of the Illinois Traction System is being made at a cost of about $6,500,000. This work includes the construction of double tracks on a private right of way leading from the present southern terminus of the interurban system at Venice, Ill., 2½ miles to the bank of the Mississippi River; the erection of a great steel bridge crossing the river, the total length of which, including approaches, is 2 miles; the construction of 5 miles of heavy city trackwork leading from the western end of the bridge, on the Missouri side, up to a terminal in the business center of St. Louis near the Jefferson Hotel, and the erection of passenger and express stations at that terminus. The company has also purchased 23 acres of river front property, part of which is under the Missouri side approach to the bridge and all of which will be used for freight yards, team tracks and freight handling purposes. In addition to this work, a large modern electric generating station is being built close to the eastern approach to the bridge and near the river's edge on the Illinois side. The present advertising card displays an artist's drawing showing a portion of the wholesale district of St. Louis, the freight yards, the bridge and its approaches and the new power station on the Illinois side. At the right-hand end of the advertising card an outline map of the State of Illinois, with the routes of the Illinois Traction System and the Chicago, Ottawa & Peoria Railway, is presented. These interurban railways have more than 500 miles of track in addition to the many local railway and lighting plants. All of these properties are under the management of superintendents reporting to H. E. Chubbuck, general manager.

Personal Mention

Mr. Douglas Robinson, receiver with Mr. Adrian H. Joline of the Metropolitan Street Railway, New York, N. Y., sailed on Dec. 2, 1909, on an extended tour of Europe and Asia.

Mr. Lloyd Lyon has resigned as auditor of the Mobile Light & Railroad Company, Mobile, Ala., effective Jan. 15, 1910, to become treasurer of the Mexico Tramways and the Mexican Light & Power Company, Ltd., Mexico City, Mex.

Mr. William Stewart has been elected secretary of the Evansville & Southern Indiana Traction Company, Evansville, Ind., to succeed Mr. Charles M. Murdock, who has been elected president of the company to succeed Harry B. Smith, deceased.

Mr. James Campbell has been elected president of the North American Company, New York, N. Y., to succeed Mr. C. W. Wetmore. Mr. Campbell is a prominent banker of St. Louis, and is one of the leading members of the syndicate which recently secured control of the 'Frisco Road.

Mr. G. P. Chapman has resigned as superintendent of the Pascagoula Street Railway & Power Company, Scranton, Miss., to accept the position of general manager of the Pascagoula Northern Railroad, a steam railroad which extends from Scranton (Pascagoula) to Evanston, Miss., a distance of about 45 miles.

Mr. C. W. Wetmore has resigned as president of the North American Company, New York, N. Y., and Mr. James Campbell has been elected to succeed him. Mr. Wetmore's resignation was caused by continued ill health. He will remain as a member of the board of directors, and has been appointed its special adviser.

Mr. George D. O'Connor has been appointed superintendent and local manager of the Northwestern Gas & Electric Company, Walla Walla, Wash. Mr. O'Connor was formerly traffic manager of the company. He was born in 1879 and became connected with the Northern Pacific Railway in 1891 as a messenger. He was promoted from time to time and finally became traveling freight and passenger agent of the company. He resigned from the Northern Pacific Railway in 1908 to become traffic manager of the Northwestern Gas & Electric Company.

Mr. Charles M. Murdock has been elected president of the Evansville & Southern Indiana Traction Company, Evansville, Ind., to succeed Harry B. Smith, deceased. Mr. Murdock being a director of the company, Mr. John Smith was elected a director to succeed Harry B. Smith. Mr. Murdock was born in Lafayette in 1867 and was educated at Purdue University. His father, James Murdock, was a successful railroad promoter and invested later in interurban railways, and Mr. Charles M. Murdock succeeded to the interest of his father at the death of the latter.

Mr. S. Tompkins, who has been in charge of the shops and engineering department of the Miller School in Virginia, has succeeded Mr. P. J. Murphy as superintendent of power stations of the Coney Island & Brooklyn Railroad, Brooklyn, N. Y. Although Mr. Tompkins has spent a considerable portion of his time in the mechanical and electrical departments of several universities, he has also had extended commercial engineering experience in power generation, distribution and shop work. Besides taking over the work heretofore in charge of Mr. Murphy, Mr. Tompkins will be chief engineer of shops and track.

Mr. Edwin E. Witherby has resigned as vice-president of the Susquehanna Railway, Light & Power Company, Parkersburg, Pa., and the Railways Equipment Company, Ltd., New York, N. Y. When the Union Gas & Electric Company was merged with the United Gas & Electric Company the title of the latter company was taken and held until 1906, when the Susquehanna Railway, Light & Power Company succeeded the United Gas & Electric Company. Mr. Witherby has been chief engineer and assistant to the president of the Susquehanna Railway, Light & Power Company for more than a year, or since the office of general manager of the company was discontinued. He has been vice-president of the Railways Equipment Company since its formation.

Mr. J. P. Tingle has been appointed secretary to Mr. William A. House, president of the United Railways & Electric Company, Baltimore, Md. Mr. Tingle entered the service of the Western Maryland Railroad in 1893 as a clerk in the freight department and was transferred a year later to the office of General J. M. Hood, president of the company. In 1902, General Hood was elected president of the United Railways & Electric Company, and Mr. Tingle was continued by General Hood as his confidential secretary. When Mr. House succeeded General Hood as president of the United Railways & Electric Company in 1906, he appointed

Mr. Tingle chief clerk and has recently advanced him from this office to that of private secretary. The appointment was made in accordance with the practice of Mr. House of filling all positions by promotions whenever practicable.

Mr. P. J. Murphy has resigned as superintendent of power stations of the Coney Island & Brooklyn Railroad, Brooklyn, N. Y., to take charge of construction work in San Francisco for Ford, Bacon & Davis, New York, N. Y., in connection with a contract which that firm has with the United Railroads of San Francisco. More than two years ago Mr. Murphy undertook to superintend the rehabilitation and reconstruction of the power distribution system of the Coney Island & Brooklyn Railroad for Ford, Bacon & Davis, and in June, 1908, he accepted the position of superintendent of power stations of the company. Mr. Murphy's conduct of the power, transmission and line departments of the company has been marked by very economical results, as noted in the article on the power station improvements published in the ELECTRIC RAILWAY JOURNAL of Aug. 14, 1909.

Mr. F. E. Pritchard, who recently resigned as superintendent of the Rochester & Manitou Railroad, Charlotte, N. Y., to become general manager of the Indiana County Street Railway, Indiana, Pa., was born in Illinois. Most of his early childhood, however, was spent in Iowa. In 1889 he came East to introduce an electric water wheel governor, of which he was patentee; but in 1890 he sold his interest in the governor and accepted the position of superintendent of the People's Electric Light & Power Company, Oswego, N. Y. In 1891 the People's Electric Light & Power Company purchased the Oswego Street Railway and began the work of equipping the street railway with electricity. Mr. Pritchard had the duties of superintendent of the railway added to those of superintendent of the light and power company. In 1899 he resigned from the companies at Oswego and removed to Rochester, N. Y., where he engaged in electrical work of various kinds until April, 1900. He then built and operated a municipal lighting plant at Fairport, N. Y., in connection with the water works plant in Fairport, continuing in charge of both until August, 1908, when he was appointed superintendent of the Rochester & Manitou Railroad. The original governor made in accordance with Mr. Pritchard's design and installed in Oswego is still in service there.

OBITUARY

Charles Stewart Smith, a member of the Rapid Transit Commission of New York City, which was succeeded by the Public Service Commission of the First District, is dead. This is the third member of the old Rapid Transit Commission to die within the year. The surviving members are Mr. Alexander E. Orr, Mr. John Claflin and Mr. Woodbury Langdon.

S. W. Cantril, superintendent of transportation of the Denver (Col.) City Tramway, is dead. Mr. Cantril submitted to an operation for appendicitis in June, 1909, and it became necessary to operate on him again recently. He gradually lost strength after the second operation and died on Dec. 2. Mr. Cantril was born in Iowa on Aug. 8, 1854, and was educated in the public schools in that State. When 20 years of age he went to Colorado and started as a merchant at Castle Rock. Subsequently he was made Deputy United States Marshal. After remaining in the Government service for eight years he resigned to accept the position of coal agent for the Denver & New Orleans Railroad. Public service again claimed Mr. Cantril's attention, and from 1891 to 1895 he served as deputy county treasurer. Subsequently he became connected with the Denver Consolidated Gas Company, with which he remained until 1898, when he resigned to enter the employ of the Denver City Tramway. Shortly after entering the employ of the Denver City Tramway he was appointed assistant to the superintendent of the cable division and was later given the title of superintendent of transportation. Mr. Cantril is survived by a widow, a daughter and two sons.

NEW PUBLICATION

Electric Waves. By William S. Franklin. New York, 1909: The Macmillan Company Cloth, 320 pages (illustrated) with 93 Problems. Price, $3 net.

It is unfortunate that the title of this book could not be made to express the author's simple treatment of wave phenomena. Wave motion is a most interesting and important study to electrical men, but hitherto writers have laid too much stress on the theoretical side. Professor Franklin's book shows how the subject of electric waves is directly applicable to the study of transmission lines and commercial types of alternating-current machinery. The mathematical treatment is confined to essentials and can be comprehended by those who have had only a brief course in the differential and integral calculus.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Westchester Street Railway, White Plains, N. Y.—Incorporated, with a capital stock of $1,000,000, as a reorganization of the former Tarrytown, White Plains & Mamaroneck Railway. The New York, New Haven & Hartford Railroad recently bought the property and franchises of the Tarrytown, White Plains & Mamaroneck Railway in foreclosure proceedings brought by the Knickerbocker Trust Company, as trustees of the electric railway. The route of the new lines will be the same. Directors: Richard Sutro, William Greenough, Charles M. Sheafe, Jr., William L. Barnett, John L. Anderson, Frank E. Hall, and Edward O. Brown, New York; John G. Parker and Augustus S. May, New Haven, Conn.

***Port Hope-Toronto Railway, Toronto, Ont.**—Application has been made at Ottawa for the incorporation of this company for the purpose of building an electric railway from Port Hope to Toronto, passing through Newcastle, Bowmansville, Oshawa and Whitby, with branches to Peterborough and Lindsay, and also stub lines to Lake Ontario. Capital stock, $1,000,000. Applicants for charter are: Dr. T. E. Kaiser, W. F. Cowan and Robert McLaughlin, Oshawa; Frank Robson and J. H. Downey, Whitby, and Ralph R. Mobray, Kinsale.

Cle Elum (Wash.) Traction Company.—Incorporated to build an electric railway from Roslyn to Cle Elum, via Jonesville, a distance of 17 miles. Capital stock, $300,000. Incorporators: Frank S. Farquhar and M. E. Farquhar. [E. R. J., July 31, '09.]

FRANCHISES

Bridgeport, Conn.—C. H. Chapman, superintendent of the Connecticut Company, has asked the City Council for permission to extend the line on Barnum Avenue, from the present terminus to the boundary line between Bridgeport and Stratford, a distance of nearly 1 mile. A duplicate of the petition has been presented to the Selectmen of Stratford, asking for permission to extend the tracks in Barnum Avenue from the boundary line easterly to Main Street, Stratford. Both the petitions provide for double tracks.

***Des Moines, Ia.**—Morton E. Weldy, dean of the Highland Park College of Law, has asked the City Council for a chance to submit a proposition for a franchise for an electric railway in Des Moines. Pending the arrival of his clients, Mr. Weldy will not disclose the interests which will finance the proposition.

***Cumberland, Md.**—J. P. J. O'Brien, Wheeling, is said to be negotiating to secure the franchise to build an electric railway from Piedmont to Bloomington, Md. The franchise, which had been granted Wheeling parties, expires Dec. 15. No effort toward building the line, which would pass through Luke, Md., and Beryl, W. Va., has been made. Mr. O'Brien agrees for his clients to give $5,000 bond to complete the line within one year and to pay $200 a year for the franchise.

Cleveland, Ohio.—The City Council has granted to the Cleveland Underground Rapid Transit Company a 75-year franchise for the use of certain streets for subway purposes. [E. R. J., April 24, '09.]

Lawton, Okla.—At a special election recently held in Lawton, a street railway franchise was voted to the Lawton & Fort Sill Electric Railway, which proposes to build a street railway in Lawton, and an interurban railway through the Fort Sill Military Reservation, connecting Lawton with Fort Sill and Medicine Park, northwest of the reserve, a distance of 20 miles. The right-of-way through the military reservation has just been granted to the company by the War Department. D. L. Sleeper, vice-president. [E. R. J., Nov. 6, '09.]

Monaca, Pa.—An extension of a year has been granted the Monaca & Ambridge Street Railway, whose franchise through Monaca, Moon and Hopewell Townships expired Dec. 1.

Salt Lake City, Utah.—The City Council has granted a 50-year franchise to the Salt Lake & Los Angeles Railway for the purpose of double-tracking and electrifying its lines from the city limits of Salt Lake City to Saltair. [E. R. J., Nov. 20, '09.]

Walla Walla, Wash.—The City Council has granted the Northwestern Gas & Electric Company a 25-year extension of its franchise covering its three activities, street railway, gas and electric power and lighting.

Kenosha, Wis.—Robert D. Wynn, vice-president of the Waukegan, Rockford & Elgin Traction Company, Waukegan, Ill., has asked the City Council to consider a plan to build an electric railway into Kenosha. The proposed line will carry both passengers and freight. If the proposition is favored by the people of Kenosha, it is the purpose of the company to appeal to the Wisconsin Railroad Commission at once for a certificate of necessity and convenience for the building of the line. [E. R. J., Oct. 23, '09.]

TRACK AND ROADWAY

Kansas-Colorado Railroad, Cañon City, Colo.—This company will construct about 40 miles of new track during 1910. R. B. Ketcham, chief engineer.

Meriden, Middletown & Guilford Railway, Meriden, Conn.—This company, which proposes to build an electric railway to connect the cities named in the title, has placed an order with the Pennsylvania Steel Company for 1800 tons of steel rails. [E. R. J., Nov. 20, '09.]

Delaware Interurban Railway, Wilmington, Del.—At a meeting of the stockholders of this company recently held at the offices of David J. Reinhardt, Wilmington, it was decided to dissolve on recommendation of the board of directors. This company was organized several years ago, with the intention of building an electric railway from Wilmington to Elkton.

Alton, Jacksonville & Peoria Railway, Jerseyville, Ill.—This company has decided to build 17 miles of track during 1910, to extend from Godfrey to Jerseyville, Ill. W. R. Heager, general manager.

Dixon, Rock Falls & Southwestern Electric Railway, Tampico, Ill.—This company will build 30 miles of new line during 1910 extending from Tampico to Genesco, via Rock Falls and Hooppole. The company has just placed through Burns & Company, Chicago, an order with the Illinois Steel Company for 2500 tons of 60-lb. steel rails with fastenings for delivery early next spring.

Indiana Northwestern Traction Company, Monticello, Ind.—This company has secured terminal facilities in Chicago by contracting for the purchase of the Chicago Heights & Eastern Electric Railroad, which will give it an entrance into the city. The company has arranged for an immediate survey of the route. The La Salle Supply & Construction Company, Trust Building, Monticello, has been awarded the contract to build the line. [E. R. J., Nov. 20, '09.]

South Bend & Logansport Traction Company, South Bend, Ind.—The board of public works has signed a contract with this company in which it is given permission to operate within the city limits over and upon the tracks of the Chicago, South Bend & Northern Indiana Railway. [E. R. J., Nov. 20, '09.]

Wabash & Northern Indiana Traction Company, Warsaw, Ind.—This company has filed for record at Wabash a mortgage to the Carnegie Trust Company, New York, N. Y., as trustee, to secure an issue of $1,200,000 in bonds. The company is constructing an interurban railway from Warsaw to Wabash. [E. R. J., Oct. 23, '09.]

Winona Interurban Railway, Winona Lake, Ind.—This company has nearly completed a 40-mile connection between Warsaw and Peru, Ind. Cars are now operating over sections at each end about 10 miles long and rails are being laid on the remaining 20 miles of grade. It is expected that this connection will be put into service shortly after the beginning of the year. This will make possible through electric travel between Chicago and Indianapolis.

***Mississippi Shore Line Railway, Davenport, Ia.**—Walter D. Olney, Lock Box 430, Davenport, advises that this company proposes to build an interurban railway between Davenport and Muscatine. Articles of incorporation will be filed next February.

Rockland, South Thomaston & Owl's Head Railway, Rockland, Maine.—This company will construct during 1910 a 3-mile line connecting Martin with South Thomaston Village. John T. Berry, superintendent.

Boston (Mass.) Elevated Railway.—This company has filed with the Railroad Commissioners a petition for the approval of its plans for connecting the new East Cambridge elevated extension with the Washington Street tunnel and the Sullivan Square and Atlantic Avenue elevated lines. The plans provide for a new elevated station on Causeway Street in front of the North station, capable of accommodating 8-car trains, and for four tracks on Causeway Street between the new station and the Sullivan Square junction. Two tracks are to be used by the Sullivan Square trains and two by those to Cambridge. The commission has approved the plans of the company for a double-track connection between the Park Street station of the Tremont Street subway and the Cambridge Bridge, where the line will join the tracks of the Main Street subway now being built in the City of Cambridge by the company. West of Park Street the line will be carried under Beacon Hill by a tunnel, coming to the surface near Grove Street, in the West End.

Detroit, Lansing & Grand Rapids Railway, Detroit, Mich.—This company has awarded a contract to Frederick C. Wales, Boston, Mass., for surveying the right-of-way of its proposed railway. It was erroneously stated in a recent issue that the contract for this work had been let to P. C. Johnson, Chicago, Ill. F. A. Bean, 706 Union Trust Building, Detroit, chief engineer. [E. R. J., Nov. 20, '09.]

Mexico, Santa Fe & Perry Traction Company, Mexico, Mo.—C. W. Gaither, secretary, advises that this company expects to place contracts during the next few weeks for material and apparatus for the construction of about 100 miles of track. The company expects to build eight or ten bridges. The proposed railway is to extend south from Mexico to Columbia and Fulton, and north to Santa Fe, Perry and Hannibal. All material will be purchased through Burns & Company, Isabella Building, Chicago, Ill.

Kansas City, Lawrence & Topeka Electric Railroad, Kansas City, Mo.—It is officially announced that during 1910 this company expects to build 32 miles of electric railway from Monrovia to Lawrence, Kan., passing through De Soto and Eudora, Kan. Willard E. Winner, purchasing agent.

North Missouri Central Railway, St. Louis, Mo.—This company has awarded a contract to the M. A. Talbott Company, Baltimore, Md., for the construction of its 60-mile interurban railway from Jefferson City to Mexico, via Columbia. Contracts for the material and supplies are now being let, and work will begin as soon as the weather permits. Headquarters, National Bank of Commerce Building, St. Louis. O. F. Spaete. [E. R. J., Sept. 11, '09.]

St. Louis, Lakewood & Grant Park Railway, St. Louis, Mo.—It is planned by this company to construct during the coming year a 6-mile extension to the Meramac River. E. G. Hughes, general manager.

Brooklyn (N. Y.) Rapid Transit Company.—This company has discussed informally with the Public Service Commission of the First District tentative plans for improvements which will provide for an expenditure of $50,000,000. The plans of the company include the equipping and operating of the Fourth Avenue subway, construction of more elevated lines and laying of more tracks on its present elevated structures.

Ashville & East Tennessee Railroad, Ashville, N. C.—This company will build during the coming year 7 miles of track extending from Weaverville to Grantville, Ohio.

North Carolina Traction Company, Danbury, N. C.—Dr. H. P. MacKnight, Southern Pines, N. C., chief engineer, writes that this company has not yet been fully organized. The original incorporators will have charge of the work until Jan. 1, 1910, when officers and directors will be elected. The line, as projected, will be 80 miles in length, and will extend from Winston Salem to Rural Hall, Capell Gap, Vade Mecum, Piedmont, Danbury, Hartman, Campbell, N. C., and Stuart, Va. Work has already been begun on the line and it is the intention to award all contracts within the next 60 days. The company proposes to erect a power station on the Dan River and will locate its repair shops at Danbury. Three popular resorts will be reached by the line. Connections will be made with the Danville & Southern Railroad at Stuart, Va.; with the Southern Railway at Rural Hall and Walnut Cove, and with the Norfolk & Western Railway at Walnut Cove and Madison, N. C. Capital stock authorized, $2,000,000; bonds authorized, $1,500,000. [E. R. J., Dec. 4, '09.]

Ohio Electric Railway, Cincinnati, Ohio.—Negotiations are being conducted in the interest of this company for the purchase of the Toledo, Wabash & St. Louis Electric Railway, which was planned originally to extend from Toledo to St. Louis. The company formally opened on Nov. 5 its new line between Lima and Defiance.

Cincinnati, Harrison & Indianapolis Traction Company, Cincinnati, Ohio.—Will L. Finch, of the Cincinnati Industrial Bureau, Union Trust Building, Cincinnati, who is interested in this proposed railway, writes that the company has taken out its preliminary incorporation papers, has completed a survey from Cincinnati to Harrison and is now at work securing the right of way. The line will be built from Cincinnati to Harrison. [E. R. J., Nov. 20, '09.]

People's Gas & Electric Company, Defiance, Ohio.—This company proposes to add 3 miles of new track to its line during the next year.

Toledo, Urban & Interurban Railway, Toledo, Ohio.—It is announced that this company will build 32 miles of new line during the coming year, to extend from Findlay to Kenton, Ohio. C. F. Smith, purchasing agent.

El Reno (Okla.) Interurban Railway.—Henry Schafer, president, advises that this company has 2 miles of track in operation in El Reno. A gasoline motor car is operated over this section temporarily. The company expects to place the line now under construction between Oklahoma City and Youkon, 12 miles, in operation next February. The plan is to connect El Reno and Oklahoma City.

Enid & Central Oklahoma Traction Company, Enid, Okla.—Contracts will be let in about two months for the construction of this 65-mile interurban railway between El Reno and Enid. One bridge 900 ft. long will be required, besides two bridges of 100 ft. each. Office, Chamber of Commerce Building, Enid. W. S. Whittinghill, president. [E. R. J., Sept. 11, '09.]

Southwestern Traction Company, London, Ont.—This company expects to build from 20 to 40 miles of new line during 1910. One line will extend from London to Ingersoll and the other from St. Thomas to Aylmer, Ont. S. W. Mower, general manager.

St. Thomas (Ont.) Street Railway.—The Municipal Street Railway Commissioners and a committee of the City Council have agreed to ask the ratepayers to vote $25,000 to improve the roadbed and equipment and make extensions to the city's street railway. $15,000 to be spent for new rolling stock, $5,000 on roadbed and $5,000 on extensions.

***Toronto, Ont.**—Messrs. Watson, Smoke, Chisholm & Smith, a local legal firm representing capitalists, it is said, have made an offer to Mayor Oliver to construct and operate a subway and radial railway lines for a term of years not to exceed the life of the Toronto Railway's franchise.

Oregon Electric Railway, Portland, Ore.—This company proposes to build about 50 miles of new track during 1910. One branch will extend between Tigard and McMinnville, Ore.; the other will connect Salem with Albany, a distance of 25 miles. George F. Nevins, purchasing agent.

Port Vue Street Railway, McKeesport, Pa.—G. F. Myer advises that construction is under way on this local street railway. It will be about 1 mile in length, broad gage, and will extend from McKeesport to the Port Vue Borough line. It is being built by the Realty Company, McKeesport, of which G. F. Myer is president. One car will be operated. [E. R. J., Sept. 18, '09.]

***Phœnixville, Valley Forge, Stratford & Philadelphia Electric Railway, Philadelphia, Pa.**—This company has been organized to build an electric railway from Phœnixville southeast to Philadelphia. A. W. Klay, Phœnixville, president.

Pennsylvania Railroad, Philadelphia, Pa.—This company has decided on a plan for a new branch line to extend from Park Place, Newark, to Harrison, N. J. The tracks from Harrison to Jersey City will also be electrified and direct track connection made with the Hudson & Manhattan Railroad east of Marion station, Jersey City. The construction and electrification of this new line will provide a new electric train service from Newark into Jersey City, and a direct route into the Church and Cortlandt Streets terminal of the Hudson & Manhattan Railroad.

Pittsburgh, Chester & East Liverpool Street Railway, Pittsburgh, Pa.—This company announces that construction will be started on its projected railway in or before the early spring. The route is from Pittsburgh to East Liverpool, Ohio, passing through Imperial, Clinton, Murdocksville, Frankfort Springs and Chester, a distance of 35 miles. The motive power has not yet been definitely decided upon. Officers: J. M. Reed, Box 1146 Frick Building, Pittsburgh, treasurer; A. M. Buchanan, Montgomery, W. Va., secretary; J. H. McLaren, Murdocksville, treasurer. [E. R. J., June 26, '09.]

Tioga Traction Company, Wellsboro, Pa.—This company, which proposes to build a 15-mile railway to connect Wellsboro, Whitneyville, Cherry Flats, Covington and Mansfield, has secured the necessary rights of way and expects to begin work early next spring. The plans of the company include the building of a power plant and repair shop at Wellsboro, where its headquarters are also located. It is the intention to furnish power for lighting to towns along the route. Capital stock authorized, $150,000. Officers: B. F. Edwards, Wellsboro, president; Thomas L. Young, Wellsboro, vice-president; H. C. Kerwin, Wellsboro, secretary; S. O. Putnam, Covington, treasurer; Geo. F. Keagle, Avis, general manager and purchasing agent; H. C. Young, Wellsboro, superintendent and chief engineer. [E. R. J., March 27, '09.]

Metropolitan Steam & Electric Railway, San Antonio, Tex.—Announcement is made that this company, which was incorporated last May in Delaware for the purpose of constructing railways in Texas, will build a line from San Antonio to New Braunfels, Seguin, Lockhart, Gonzales and Austin. Branches are proposed from Seguin to Gonzales and Sutherland Springs. It is expected that the total length of the system will be 500 miles. Charles H. Russell is in charge of the preliminary work. Officers: John G. Marmion, San Antonio, president; E. L. Squire, Wilmington, Del., vice-president; M. Kaufman, Yorktown, secretary and treasurer. [E. R. J., May 29, '09.]

Morgantown & Dunkard Valley Railroad, Morgantown, W. Va.—This company announces that it will have the first 3 miles line from Morgantown to Randall, in operation by Jan. 1. F. P. Weaver, secretary.

SHOPS AND BUILDINGS

Connecticut Company, Bridgeport, Conn.—This company has awarded a contract to Charles W. Murdock, New Haven, for the construction of its new brick and concrete car houses in Bridgeport, foundations for which have been completed. The building is to cost about $150,000. The new building is to cover 241 ft. x 331 ft. partly two stories high and partly one.

Northern Indiana Railway, South Bend, Ind.—This company has taken an option on a site located at Jefferson and Main Streets, Goshen, on which to build a new interurban depot. Plans are now being prepared for a passenger and freight station with offices in the second story.

Wichita Railroad & Light Company, Wichita, Kan.—This company is preparing plans for a new car house to be erected on Waco Avenue north of Second Street, Wichita. The structure will be 100 ft. x 300 ft., two stories high and will be of concrete and steel construction. It will contain six tracks and will have a storage capacity of 36 cars. The waiting room will be 40 ft. x 52 ft. The second floor will be used for quarters for the company's employees. The estimated cost of the building is $30,000.

Mexico, Santa Fe & Perry Traction Company, Mexico, Mo.—This company advises that it plans to award contracts during the next few weeks for the construction of car shops. C. W. Gaither, secretary.

Virginia Railway & Power Company, Richmond, Va.—Announcement is made that this company is planning to expend $600,000 in improvements which will include the erection of a new terminal passenger station, car house and repair shops at Manchester.

POWER HOUSES AND SUBSTATIONS

Lexington (Ky.) Railway.—This company is installing in its power plant a 1000-kw General Electric turbo-generator and one 500-kw turbo-generator.

Fitchburg & Leominster Street Railway, Fitchburg, Mass.—Plans are being prepared by this company for increasing the capacity of its power plant at South Fitchburg. An extension, 50 ft. x 82 ft. and two stories high will be built to the present station. The company will install a 500-kw generator, 1000-hp, cross-compound Cooper Corliss engine and additional boilers.

Mexico, Santa Fe & Perry Traction Co., Mexico, Mo.—This company, which proposes to build a 100-mile interurban railway to connect the cities mentioned in the title, advises that contracts will soon be awarded for the construction of three power plants. C. W. Gaither, secretary.

Pt. Pleasant (N. J.) Traction Company.—This company advises that it expects to place orders during the next six weeks for two 150-hp water-tube boilers. F. B. Musser, Harrisburg, Pa., purchasing agent.

Binghamton (N. Y.) Railway.—This company is installing in its power plant a 750-hp turbine and a General Electric generator. The company has already purchased all the appliances in connection with this apparatus.

Metropolitan Street Railway, New York, N. Y.—This company has filed plans for a one-story substation to be built on Madison Avenue, south of Eighty-sixth Street, on the site of the old car house that was destroyed by fire last year. The station is to be 40 ft. x 36½ ft., of brick and stone. It will cost $3,500 and will give place later to a larger building.

Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C.—This company expects to contract during the next few weeks for a 1000-kw turbine. P. H. Gadsden, president.

Union Utilities Company, Morgantown, W. Va.—This company will shortly be in the market for a 200-kw 60-cycle generator and a low-pressure turbine. H. R. Warfield, general manager.

Manufactures & Supplies

ROLLING STOCK

San José & Santa Clara Railroad, San José, Cal., is making inquiries as to various types of city cars.

Albany Southern Railroad, Hudson, N. Y., may purchase two new motor cars early next year.

Niagara Gorge Railroad, Niagara Falls, N. Y., is constructing six additional trailers in its own shops.

Long Island Railroad, Long Island City, N. Y., will buy 10 62-ft. double-truck steel baggage cars during 1910.

Grand Rapids (Wis.) Street Railroad will purchase enough cars during 1910 to equip an 80-mile interurban road.

Third Avenue Railroad, New York, N. Y., is drawing new specifications for about 100 cars to be ordered in the near future.

Mineral Wells & Lakewood Park Street Railway, Mineral Wells, Tex., is considering the purchase of a few open cars during 1910.

United Railroads, San Francisco, Cal., will buy 50 city cars next year, although the type and equipment have not yet been decided upon.

Hudson & Manhattan Railroad, New York, N. Y., expects to close an order for 30 all-steel passenger cars for tunnel service before Jan 1.

Washington Water Power Company, Spokane, Wash., has ordered 10 30-ft. 8-in. closed motor car bodies to be mounted on Brill 27-E-1 trucks from The J. G. Brill Company for April 1 delivery.

North Carolina Traction Company, Danbury, N. C., expects to buy four McKeen 200-hp, 71-ft. all-steel gasoline-motor cars and six all-steel freight cars next year. The company is also considering the purchase of 20 all-steel freight cars.

Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C., reported in the Electric Railway Journal of Dec. 4, 1909, as expecting to buy four single-truck and six double-truck passenger cars, has placed an order for four 20-ft. 8-in. Brill semi-convertible motor cars with The J. G. Brill Company.

Virginia Railway & Power Company, Richmond, Va., it is reported, is in the market for 20 semi-convertible double-truck pay-as-you-enter cars and 40 sets of new motor equipment to be used for replacement. New high-speed motors and motor equipments will also be ordered for the cars operating between Manchester and Petersburg.

British Columbia Electric Railway, Vancouver, B. C., has one 43-ft. 4-in. passenger, baggage and smoking car; one 43-ft. 4-in. passenger and smoking car and two 53-ft. 8-in. baggage and express cars, all to be mounted on Brill 27-E-3 trucks, under construction, and practically completed at the plant of the American Car Company. The company also has five cars under construction at the plant of the John Stephenson Company.

Oklahoma Railway, Oklahoma City, Okla., mentioned in the Electric Railway Journal of Nov. 27, 1909, as contemplating the purchase of 10 city cars and six interurban cars, it is learned, has ordered six 20-ft. closed city cars to be mounted on Brill 21-E trucks from the American Car Company and also six 45-ft. interurban double-truck motor cars with center vestibules and enclosed ends from the Niles Car & Manufacturing Company.

TRADE NOTES

American Goetze-Gasket & Packing Company New York, N. Y., has changed its address to P. O. Box 44, New Brunswick, N. J.

Allis-Chalmers Company, Milwaukee, Wis., has removed its Cleveland office from the New England Building to 1411 Schofield Building.

Dearborn Drug & Chemical Works, Chicago, Ill., have removed their St. Paul office from 1237 Lincoln Avenue to 1238 Grand Avenue.

Lackawanna Bridge Company, Buffalo, N. Y., has added H. C. Sharpe, formerly connected with Joseph T. Ryerson & Son, Chicago, to its staff.

Robert McF. Doble, Denver, Col., announces that he has removed his engineering offices from the Majestic Building to 417 Century Building, Denver.

Coin Counting Machine Company, New York, N. Y., has received an order from the Third Avenue Railroad, New York, N. Y., for 300 Johnson fare boxes.

Burdett-Rowntree Manufacturing Company, Chicago, Ill., has moved its factory and offices to the new factory building at 515 Laflin Street, Chicago, the telephone number of which is 2237 Monroe.

Hayes Track Appliance Company, Geneva, N. Y., announces the election of G. E. Ellis as vice-president of the company. Mr. Ellis was formerly signal engineer of the Rock Island System and more recently has been manager of installation for the Federal Signal Company.

Electric Railway Equipment Company, Cincinnati, Ohio, which manufactures catenary and standard overhead line material and metal tubular poles, is located at Cormany Avenue and Township Street, Cincinnati, Ohio, where it has larger quarters and increased facilities for attending promptly to orders.

American Specialty Company, Chicago, Ill., has been appointed sole export agent for the line of portable electric drilling machines made by the Van Dorn Electric & Manufacturing Company, Cleveland, Ohio. The American Specialty Company also has the agency for these tools in Chicago and several Western districts.

Watson Insulated Wire Company, Chicago, Ill., Western agent for the Kerite Insulated Wire & Cable Company, New York, has elected Robert A. Patterson, formerly manager of the railway department at New York of Fairbanks, Morse & Company, Chicago, vice-president, with offices in the Railway Exchange Building.

Pennsylvania Inspection Bureau, Johnstown Trust Building, Johnstown, Pa., has been organized with a capital of $5,000, and is equipped to handle all chemical and physical testing, and to inspect cars, car wheels, rails, structural steel, building material and locomotives. Its officers are J. C. Wickersham, chief inspector for the United States Government for the last eight years, and S. Arch Replogle, both of Johnstown, Pa., and Jas. Plummer, Pittsburgh, Pa.

F. A. Richards has been appointed manager of the car department of Pierson, Roeding & Company, Pacific Coast agents for The J. G. Brill Company. Mr. Richards entered the railway field in 1898, forming a connection at that time with the Peckham Manufacturing Company. He held various positions with that company at its Kingston, N. Y., factory and in the New York sales office until 1901, when he became associated with J. A. Hanna, Cleveland, Ohio. Messrs. Hanna and Richards handled Peckham trucks and Stephenson cars until The John Stephenson Company was purchased by The J. G. Brill Company. They then formed the J. A. Hanna Company, and since 1904 have represented the Niles Car & Manufacturing Company and the Baldwin Locomotive Works in the Central West. Mr. Richards withdrew from the J. A. Hanna Company on Nov. 1, 1909, to accept the position of manager of the car department of Pierson, Roeding & Company. He will represent The J. G. Brill Company in Washington, Oregon, California, Arizona, Nevada, Idaho and Southwestern British Columbia.

ADVERTISING LITERATURE

Ohio Filler & Shield Company, Columbus, Ohio, has issued a publication entitled "A Word About Lubrication of Ropes and Gears."

The J. G. Brill Company, Philadelphia, Pa., has issued catalog No. 186, in which its single-motor trucks are described and illustrated.

Union Steam Pump Company, Battle Creek, Mich., has issued a very complete work in which its air compressors are described and illustrated.

Warren Webster & Company, Camden, N. J., have issued a publication entitled "The Selection of a Heating System," in which the Webster modulation system is briefly described and illustrated.

Chicago Pneumatic Tool Company, Chicago, Ill., and New York, N. Y., has printed a pamphlet describing the Franklin high-speed air compressor, which is particularly suitable for locations where space is limited.

Ohmer Fare Register Company, Dayton, Ohio, has printed an interesting pamphlet entitled "Patent Protection," in which are summarized the history, scope and strong features of the Ohmer fare register patents.

Pettingell-Andrews Company, Boston, Mass., has devoted the greater part of the issue of *Juice* for December to the supplies which it handles for making an electrical Christmas, including tree lighting outfits, pocket lamps and electric toys.

Ingersoll Engineering & Constructing Company, Pittsburgh, Pa., has described and illustrated its racing coaster in a publication entitled "$648 an Hour." A number of letters from those who have installed the coasters are reproduced, including one from the Indiana Union Traction Company and one from the Ohio Valley Electric Railway.

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CURTIS E. WHITTLESEY, Secretary and Treasurer.

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.

L. E. GOULD, Western Editor. RODNEY HITT, Associate Editor.

FREDERIC NICHOLAS, Associate Editor.

CHICAGO OFFICE.....590 Old Colony Building

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Midwinter Meeting of the American Association

A radical change in the policy of the American Street & Interurban Railway Association was adopted at the convention at Denver last year, and will be put into force next month. This consists in holding during the winter a general conference, at which the president or other accredited representative of member companies will be present. The date this year is set for Friday, Jan. 28, the day following the meetings of the executive and other committees of the American Street & Interurban Railway Association, and the place is New York City. Midwinter meetings of the committees of the American Street & Interurban Railway Association have been held for several years past, and last year when all the committees were called together the number of those present was larger than ever before. Opinions were so unanimous on the part of those in attendance at this meeting of its value that it was decided at Denver to extend its character and give up one day of the midwinter meeting to a conference intended specially for the executive and financial heads of electric railway companies. Of course, the program for the meeting will be arranged so as to include discussions upon subjects of most timely interest to these officers.

Many of those most interested in the welfare of the association have believed for some time that an interval of one year was too long between the meetings of the main association, and no time seemed so desirable for a second meeting as the latter part of January, soon after the meetings of the various committees of the association. The selection of this time permits these committees to report the scope of the work which they proposed to take up during the year and receive any additional suggestions which may then seem desirable. The reports of the electric railway companies for the calendar year just closed are also available, so that the conference affords a fine opportunity for the exchange of views among those in attendance. The advantage of the midwinter meeting will also appeal with particular emphasis to those companies in which it has been found impossible for both the executive head of the company and the heads of departments to be absent at the same time. On properties so situated the executive officials will probably find it most convenient to attend the January meeting, and in the fall, if necessary, can remain with the property while the heads of the departments attend the later meeting.

If present expectations in regard to the matter of attendance are realized, the midwinter meeting of the American Street & Interurban Railway Association will be continued in the future as an event of importance comparative to that of the general convention held in the fall.

Remuneration for Transportation of Mail

The appointment at the last meeting of the Street Railway Association of the State of New York of a committee to take up the subject of adequate remuneration for the transportation of United States mail appears to insure a definite inquiry into the cost of this service on electric railways. Mr. Allen's suggestion of an arbitrary rate applicable to closed pouch service of 1.5 cents per mile for 100 lb. appears large in view of various existing arrangements for remuneration, but it seems to be approximately the revenue per mile which most properties calculate on receiving from their passenger traffic. With a 5-cent limit of fare on an urban system and an assumed average haul of say three miles, the rate per mile would be a little greater than that suggested by Mr. Allen for closed pouch service. The average weight per passenger, however, would be larger than the 100 lb. suggested as the unit of weight for the postal service. The average length of passenger haul is greater in some cities, but in such places the heavier density of traffic might overcome the lower revenue per passenger per mile. Transportation of mail by electric railways ought to be a business proposition. It involves the use of the facilities which the company was organized to market at a profit. The service rendered by many electric lines in the transportation of United States mail is of more value than any other transportation agency available can furnish and this fact should be recognized by adequate remuneration. While the rate suggested by Mr. Allen is advenced purely as an arbitrary one, such an attitude will be much more likely to result in definite action toward improvement than mere complaint of existing conditions without precise recommendation of an adequate figure.

Recording Instruments and Accident Cases

Recent observation of the conduct of electric railway accident cases in the court room leads to the conclusion that automatic recording instruments of various kinds may become an invaluable aid to a company in the establishment of operating conditions in connection with specific suits. Not seldom does it become necessary in damage cases to prove to the jury that at the time of an accident the voltage at the power plant was normal; that the current demand upon the system was not excessive, or some other point of technical importance depending upon the physical plant of the company and its general operative efficiency at a definite time. Thus, in a recent case of this kind the company was sued for $15,000 by a passenger who fell off a station platform in the early evening, and who claimed that the accident was caused by inadequate lighting. The company found it most helpful to be able to produce recording voltmeter records from its nearby station covering the day and hour four years before the trial, when the accident happened. These records showed no abnormalities in the power station voltage, and as the railway station lighting was accomplished by a number of separate circuits supplied off the general trolley feeding system, the presumption was established that the lighting conditions were normal; otherwise, any disturbance of sufficient importance to affect the subdivided railway station lighting would have been indicated at the power house. With a large network of trolley lines and feeders between the power house and the station where the accident occurred, the lighting taps at the latter point would be sensitive only to conditions likely to disturb the voltage regulations for at least a few seconds at the power house, such as a block in the cars on a street or a partial short-circuit. The records from the power house indicated steady service conditions, and were thus automatically corroborative of the testimony of the station master, that the lights were burning at their usual brilliancy and steadiness at the hour when the accident happened.

The cost of maintaining records of this kind is small in relation to their possible future value. Obviously, a company cannot usually afford to establish automatic recording instruments at many different points, but it certainly may be well worth while to maintain them at the power house, and possibly at one or two other central locations, provided the records are filed with scrupulous care. Such records may not win a case in themselves, but they always go far to show that the road is being operated scientifically; that the service is kept up to certain desirable standards, and that the memories of employees covering several years can be reinforced by concrete data having a time-value as admissible evidence.

Terminal Electrification in Chicago

An interesting communication from Slason Thompson, manager of the Bureau of Railway News and Statistics, with reference to terminal electrification in Chicago, appears in a recent issue of the *Commercial and Financial Chronicle* of New York. Mr. Thompson takes the view that reform in motive power in Chicago is impracticable. He summarizes the total trackage within the corporate limits of Chicago, which amounts in all to some 2500 miles, and from its size and intricacy and the mass of traffic to be handled, jumps to the conclusion that the thing is economically impossible, stating that the terminal facilities of Chicago cannot be operated with half steam and half electricity.

Mr. Thompson is a close student of steam railroad conditions, and we have had occasion in the past to compliment him on his research work. In this case we agree with him entirely that the electrification of 2500 miles of urban trackage, including a large amount of track installed for industrial purposes, is a very large problem, perhaps the greatest which has yet been suggested for solution to the electrical engineer. But it is equally true that very few suburban services could be so easily and usefully electrified as those of the Illinois Central Railroad quite independently of other trackage. Granting that there may be in Chicago some situations of particular difficulty, this is no reason why all hope of improvements should be abandoned. We do not consider the abolition of smoke possible with electric operation the chief argument in its favor. But if Chicago could get rid of a portion of its smoke nuisance, even admitting that the rest could not immediately be eliminated, it would be an exceedingly good thing for the welfare of the city. An inability to electrify all of the trackage is no excuse for failing to make any improvement whatever.

The chief difficulty which the average steam railroad engineer experiences in analyzing this and other similar problems is that he has difficulty in divorcing in his mind

the underlying principles of steam railroad movement from the broader aspects of the transportation problem. Electrification is not a mere change of motive power—it involves a revolution in transportation methods. From the standpoint merely of operating expenses and fixed charges a plan of electrical equipment such as that proposed for the lines in Chicago or even for those of the Illinois Central passenger equipment may not look particularly attractive. But if the service is cleaner and much more rapid, if the trains, as is the case with electric power, can be run at such frequent intervals during the day that the suburban travelers do not have to think of a time table when they plan a trip to the city, the gross receipts should increase rapidly. If to these advantages are added those of greatly increased capacity of the track and terminals and equipment, the additional fixed charges required for the electrical equipment do not seem such a large obstacle in the problem.

It is not proper to assume, however, that the adverse decision in regard to electrical equipment was reached from a study only of the engineering phases of the question. The other railroad companies in Chicago might see in the suggestion to convert the passenger service of the Illinois Central Railroad a long step toward complete abolition of the steam locomotive within city limits and so have brought pressure to secure a negative vote. There may be other valid reasons in the minds of those responsible for the decision sufficient to outweigh the direct arguments from an engineering and transportation point of view in favor of the adoption of electricity, but the change is bound to come eventually, and this is a fact which cannot safely be ignored.

Permanent Track Construction

The aim of most engineers is to design and build a track foundation which will last at least as long as the rails laid in it. In the recently issued first annual report of the Board of Supervising Engineers, Chicago Traction, a description of the track now being laid in Chicago under the supervision of the board is prefaced with the statement that the structure was designed to "permit the renewal of the rail with the least possible disturbance of the track foundation."

The development of a type of track construction which consists of a foundation heavy enough and indestructible enough to outlast two or more sets of rails and permits the rails to be renewed with little trouble and expense passed through three stages of evolution. At first the engineers of the board were favorably inclined toward the use of steel ties completely embedded in concrete extending 7 in. below the bottom flange. Several miles of track were built of this type during the first year of rehabilitation, but later the board turned its attention to wooden tie construction and in most of the permanent track built in 1908 and during the past summer wooden ties have been used. The first wooden tie specifications called for untreated yellow pine ties of 90 per cent heart, spaced 4 ft. or 5 ft. center to center, which was the same spacing as used for steel ties. The latest specifications call for wooden ties spaced 3 ft. center to center and thoroughly impregnated with chloride of zinc or creosote.

There are three ways in which a permanent track foundation may deteriorate. The concrete, if too thin or lean, may crack and crumble under excessive loads or the action of moisture, and the ties, if of wood, may rot or the fiber may be disintegrated under the movement of the rail. The latest type of construction used in Chicago attempts to provide against all three of these sources of failure. In the earlier track construction a saving in volume of concrete was made by banking up a mound of dirt 9 in. high between adjacent ties and putting 7 in. of concrete only under the rails and the ties. This practice has been abandoned in favor of a level bottom in the trench which is thoroughly rolled and compacted before the concrete mixed in the proportions 1:3:6 is laid to a uniform depth of 15 in. This thick mattress of concrete is a monolith reinforced by the ties embedded in it and has ample strength to support the load and resist heaving due to the expansive action of frost.

The board in its report says that all of the data it could collect seem to show that sound wood, when completely encased in concrete, was practically indestructible from decay. As a precaution, however, and to insure that any fungus growth in the wood was destroyed before the ties were placed in the track, creosote treatment was decided upon. Later, this was largely supplanted by the chloride of zinc treatment which is effective so long as the fungicidal salts remain in the wood cells. The zinc chloride treatment is much cheaper than the creosote treatment, costing less than half as much, but its principal fault is that the fungicidal solution leaches out of the wood in time if the wood is exposed to moisture and sunlight. This objection does not hold against ties which are completely embedded in concrete.

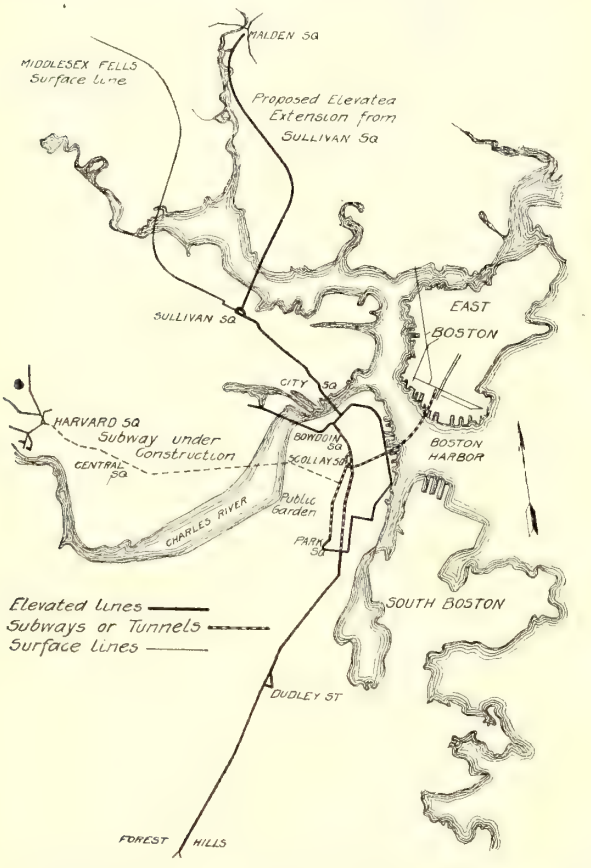
In discussing the report of the committee on way matters at the Denver convention George Weston, a member of the Board of Supervising Engineers, referred to the use of tie plates on wooden ties. The investigation made by the board into failures of track laid on a concrete foundation showed that in almost every instance the fibers of the wooden ties had been destroyed by the action of the rail resting directly on the ties. When the ties gave out the movement of the rail finally disintegrated the concrete. To prevent this a form of tie plate has been adopted for both steel and wooden ties which has a flat bottom and is fastened to wooden ties by lag screws. If any vertical movement or creeping of the rail takes place, its damaging effect is expended on the tie plate. Finally, the board adopted screw spikes for fastening the rails to the ties in order to facilitate the renewal of the rails and prevent damage to the ties when this becomes necessary.

None of the rehabilitated track in Chicago has been in use long enough to require renewal of the rail and the theoretical advantages of the permanent foundation have still to be demonstrated in practice. Some difficulties probably will be encountered in surfacing and aligning the track when new rail is put down. Very slight side kinks will not permit moving the tie plates on the ties and boring new holes for the screw spikes. Shimming may have to be resorted to in order to get good surface. These troubles, however, will be of small moment if it is shown that a track foundation can be built which will outlast the rails first laid on it.

RECENT EXTENSIONS OF THE BOSTON ELEVATED SYSTEM

Rapid transit facilities in Boston are undergoing noteworthy expansion at the present time in the construction by the Boston Elevated Railway Company of important elevated and subway extensions to the north, south and west of the city. With the establishment of elevated train service in Boston in 1901 a far-reaching plan of urban transportation development was inaugurated, and through the construction of new lines, permitting the operation of fast trains and cars from the heart of the city to the four cardinal points of the compass, a most effective radial service between the business and suburban districts is being realized in combination with the local surface lines.

The fundamental plan of operating multiple-unit trains



Boston Elevated Extensions—Map Showing Elevated and Subway Lines

at relatively high speed between the business center of Boston and important surface car transfer stations in the nearer suburbs, with local transfers to and from street cars serving the intermediate territory, has never been departed from since the establishment of the initial service between Dudley Street terminal, Roxbury, and the Sullivan Square terminal in Charlestown, in the summer of 1901. The opening of the Atlantic Avenue elevated lines in the fall of 1901 continued the flexible service started a few months before through the Tremont Street subway between the terminals above named. In December, 1904, the East Boston tunnel was opened for travel, and while this service is maintained by single cars of the semi-convertible type, it exemplifies high-speed operation with few stops between the business district and the residential section lying on the east side of Boston harbor. In November, 1908, the Washington Street tunnel was opened for traffic, and the elevated train service was withdrawn from the Tremont Street subway in accordance with the legislative requirements. In general, the surface car lines were restored to their former routing through the subway, and the train service was then operated between Dudley Street and Sullivan Square, via the Washington Street tunnel and the Atlantic Avenue elevated lines. This arrangement has since been continued, with a decided improvement in the north and south trunk line facilities of the city, since there are now six tracks available for rapid transit off the surface of the streets through the heart of Boston, apart from the existing trolley facilities on Washington Street, Charles Street and Atlantic Avenue.

In connection with the establishment of service through the Washington Street tunnel, plans have been made for extending the platforms of all the elevated stations in the city, to permit the operation of eight-car trains on the rapid transit system, and this work is now rapidly approaching completion. The initial elevated system was designed for the operation of five-car trains, but when the Washington Street tunnel was designed the necessity for a large increase in capacity became evident, and the tunnel was built with 350-ft. platforms to permit a 60 per cent increase in the train service without alteration of the interval between train units. Important modifications of the terminal stations on the elevated system have been necessitated by the provision of these new facilities, including plans for the separation of inbound and outbound traffic, enlargement of platform areas, utilization of former dead spaces between loop boundaries, and the construction of foot bridges and passageways to facilitate the free movement of loading and unloading passengers.

The company now has nearly completed the construction of a 2½-mile extension of its elevated structure southward from Guild Street, near the Dudley Street station, to Forest Hills Square. This line was fully described in the Electric Railway Journal of Aug. 8, 1908, and only brief mention need be made of its physical features here. This line will provide a double-track route from the Forest Hills district to Dudley Street, and thence into the center of Boston, with an approximate saving in time of nine minutes per passenger on every trip to and from the city from the West Roxbury section of Boston when patronized in connection with surface lines terminating at the Forest Hills station. The same saving will apply from Forest Hills inward and outward.

The company is now building a subway in the City of Cambridge, between First Street, near the Charles River, and the Harvard Square district, to provide rapid transit between the western suburban area and the center of Boston. The Boston end of this subway is to be built by the Boston Transit Commission, and the work has been begun on the line within the past few weeks. The Cambridge subway will terminate, according to present plans, at the Park Street station of the Tremont Street subway, and it will shorten the time of transit between points near or beyond Harvard Square and Boston by about 15 minutes per trip. The present running time between Harvard Square and Park Street, via surface lines and the Public Garden loop of the Tremont Street subway, is about 23 minutes. The subway under construction will be double tracked, with but two stops between Park Street and Harvard Square. It is probable that the next Legislature will be asked to consider the extension of the Cambridge subway from Park Street to the South Station.

In the near future the company will begin the construction of an extension of the elevated structure for double-track train service between Sullivan Square and the subur-

ban cities of Everett and Malden, the terminus being at Malden Square, 3 miles north of Sullivan Square station. Detailed estimates of the running time between Malden and the center of Boston via the elevated extension are not yet in hand, but it is anticipated that a passenger will save at least 10 minutes per trip, being able to travel by through train from Malden to the heart of Boston's financial district in about 20 minutes. The present running time, via surface lines to Sullivan Square, including a transfer to an elevated train at the latter point, is about 30 minutes.

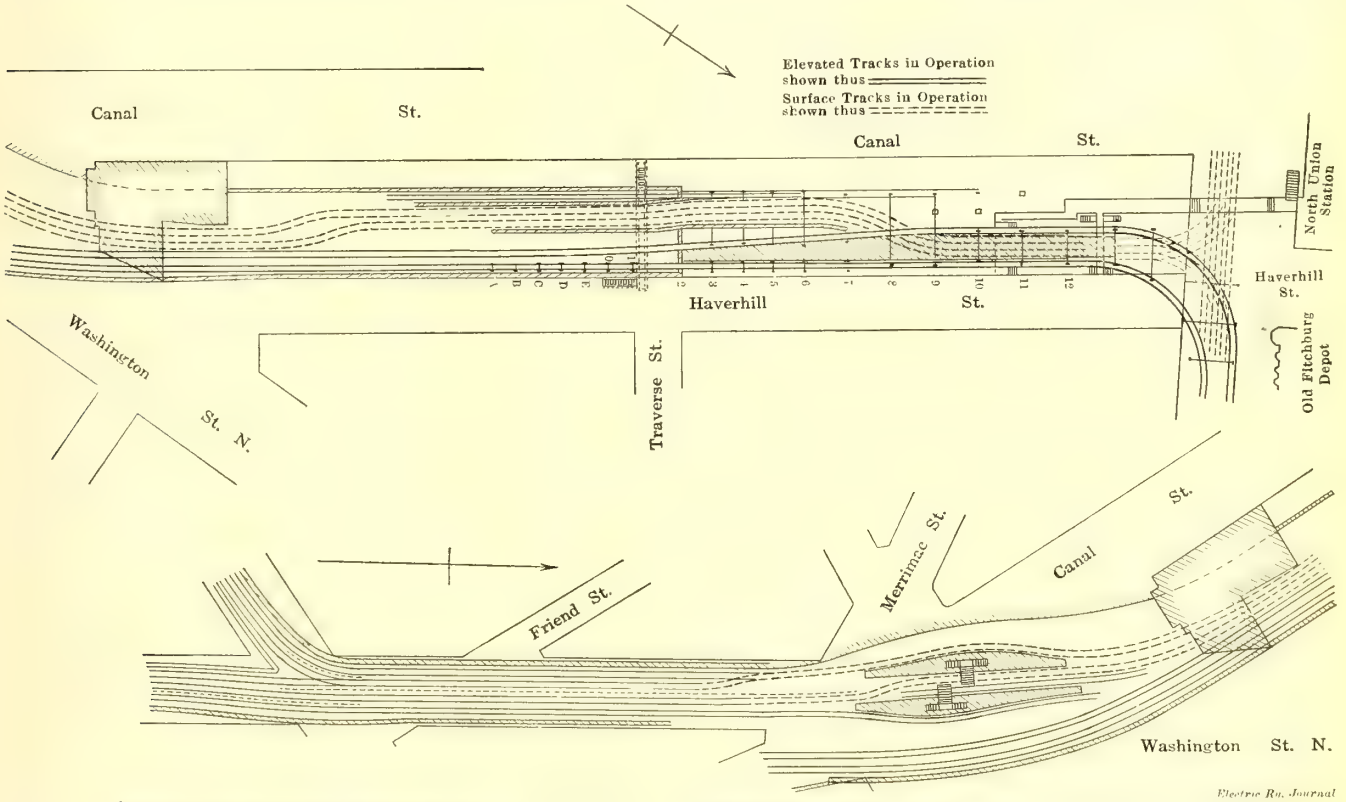
In connection with the withdrawal of the elevated trains from the Tremont Street subway and the restoration of the surface cars, the company has begun the construction of about 1 mile of elevated structure to connect the Lechmere Square district of Cambridge with the subway system at the North Station. This section, called the East Cambridge extension, will be used exclusively by surface cars, which at present are seriously handicapped in their entrance into Boston by the congestion and irregularities of the narrow streets between the North Station and East Cambridge. The elevated structure will be carried across the new Charles River dam on the downstream face of the latter, and it is probable that there will be a saving of at least 50 per cent in the running time between Lechmere Square and the North Station by the elevated structure compared with the present surface schedule.

An important extension of the surface lines has recently been made from Sullivan Square into Middlesex Fells, a noted woodland reservation under the Metropolitan Park Commission's administration. This tract of forest has never before been easy of access to the population of Boston, although it was designed for the fullest enjoyment of the public. The opening of the new line in the summer of 1909 provided a double-track surface route between Sullivan Square and Spot Pond, the running time being 23 minutes and the distance being 4½ miles. The opening of the route to the Fells brings the entire area within the limits of a 5-cent fare from any part of the Boston Elevated system. Ultimately, it is planned to operate through cars from Sullivan Square to Stoneham via the Fells route, thus bringing this suburb into closer touch with Boston than the present facilities afford.

In the following paragraphs are given certain details which illustrate the character of the designs which are being applied to the terminals and stations under construction, the special architectural features of the elevated structure, general arrangements for handling the traffic at transfer points, work in progress in the field, and the former and present track installations in relation to the inauguration of enlarged service. A general map of the Boston system is shown on page 1214.

CHANGES AT THE NORTH STATION

With the opening of the Washington Street tunnel several important changes in the track layout and arrangements for handling traffic were made at the North Station, as indicated in the accompanying drawing. Prior to the opening of this tunnel the elevated train service was handled through the Tremont Street subway, and the tracks were brought out of the subway by an incline between Haymarket Square and the North Station and carried to the level of the elevated structure at the latter point. The surface car lines operating in the subway as far as the Scollay Square loop were likewise brought out of the ground on the incline, and carried along at the street level when the proper grade was reached. When the Washington Street tunnel was opened it became necessary to connect the north and southbound tunnel tracks with the two elevated train tracks on the incline, and this was done without interfering with traffic except for a few hours on the Sunday before the tunnel trains were started in service. The through tracks in the old subway formerly used by elevated trains were again utilized for surface car travel; the platform for handling elevated train traffic at the North Station was extended southward to receive eight-car trains when necessary, and certain short sections of steel structure and tracks were temporarily abandoned.



Boston Elevated Extensions—North Approach of Washington Street Tunnel and North Station East

In the final arrangement the two tracks for the elevated trains entering and leaving the tunnel are located side by side on the east of the incline, giving a direct run between the portal of the tunnel and the North Station, and affording unimpeded facilities for surface car movements at the west of the train tracks. At the North Station the two elevated train tracks were spread to make the island platform between them, and a new and commodious transfer station was established under Haymarket Square, between the Washington Street tunnel trains at the so-called Union-Friend Station and surface cars in the subway in each direction. This change has eliminated much of the congestion which hampered the company at the North Station, and has facilitated interconnection of the tunnel and subway systems for all classes of passengers. The work of building the Union-Friend Station and the alteration of tracks at Haymarket Square was carried on by the Boston Transit Commission and the Boston Elevated organization in the face of extreme difficulties of space limitation, necessity of supporting overhead structures, including part of a hospital, and the maintenance of a heavy traffic. Under the new arrangement a spur track was also built at the North Station, with a covered platform for the use of shuttle trains running between the North and South stations, and several important changes were made in the layout of passageways and ticket offices to facilitate the movement of traffic under the new conditions.



Boston Elevated Extensions—Remodeled Station at City Square

CHANGES AT CITY SQUARE, CHARLESTOWN

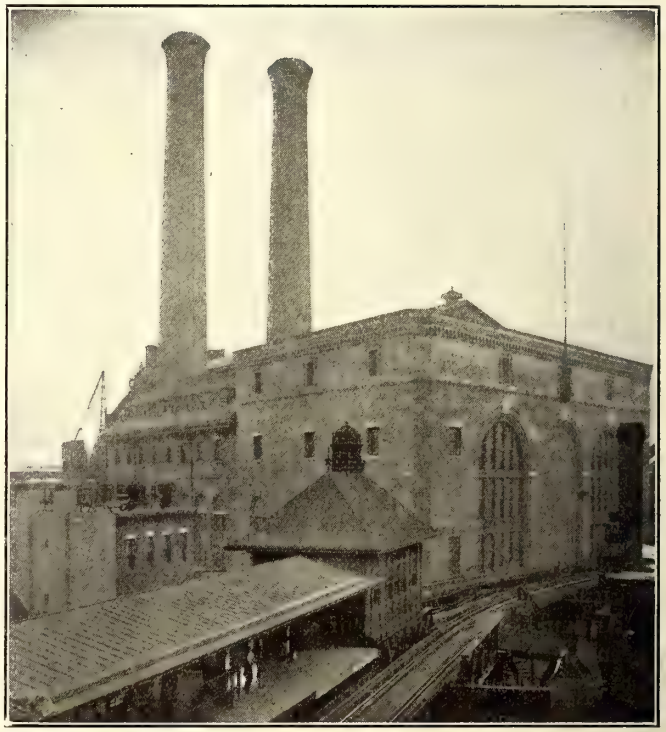
In order to adapt the elevated station at City Square, Charlestown, for the operation of eight-car trains it became necessary to change over this important transfer point from the island type of station to the outside platform type. A half-tone view of the modified station is shown above. This work was carried on without stopping the train service, and the new arrangement of the station affords maximum facilities for handling the inward and outward business with thorough separation of opposing streams of travel beyond the confines of the station platforms. The approach to and leaving of trains at this station is much improved by the modified design.

POWER STATION DESIGN

Expansion of the company's power supply system in connection with the opening of the Washington Street tunnel has already been fully described in the Electric Railway Journal. However, an exterior view is shown of the enlarged Lincoln power station, on Atlantic Avenue, to illustrate the architectural attractiveness of the company's later work. The original station building is shown at the left of the picture. The extension is close to the elevated structure, and is seen by passengers in all trains passing the station. Special attention was given in the design to the end windows, the cornice and the facade of the building, the central panel and trimmings being particularly attractive. The station capacity has been increased from 8100 kw to 13,500 kw.

FOREST HILLS EXTENSION AND EGLESTON SQUARE

The Forest Hills extension has been built with but one local station, in order to accommodate the through traffic from the center of Boston to the terminus of the elevated structure on the edge of the West Roxbury district. A special feature of the structure is the use of reinforced concrete posts and sheathing where it crosses the Boston park system near Forest Hills Square. A view is shown of the construction at the Arborway, where the double-track line is carried on a single row of massive posts encased in concrete and supported on foundations 11 ft. 6 in. square and 12 ft. deep. The structure proper here is of deck construction with steel plate cross and longitudinal girders as elsewhere on the extension; but the sides and under portion are sheathed with concrete reinforced in the manner shown in the half-tone view on the opposite page.



Boston Elevated Extensions—The New Wing of the Lincoln Power Station

A view is also shown of the Egleston Square station, which is of the side platform type and is unique in being

the first Boston station to use reinforced concrete for platforms, galleries and stair landings. The reinforcement extends both longitudinally and transversely. The Forest Hills station is also to be of the two-platform type, and will be equipped with escalators and stairways connecting the surface and elevated lines. Outward-bound trains will stop at a platform 20 ft. wide, and after the cars have been emptied the train will proceed to a cross-over just beyond the station and return to receive inward passengers at the second platform of the station. The latter has been made 30 ft. wide to facilitate rapid loading of trains. Surface platforms and track loops below provide for expeditious



Boston Elevated Extensions—Egleston Square Station Built Largely of Reinforced Concrete

movement of traffic received from and delivered to the elevated trains.

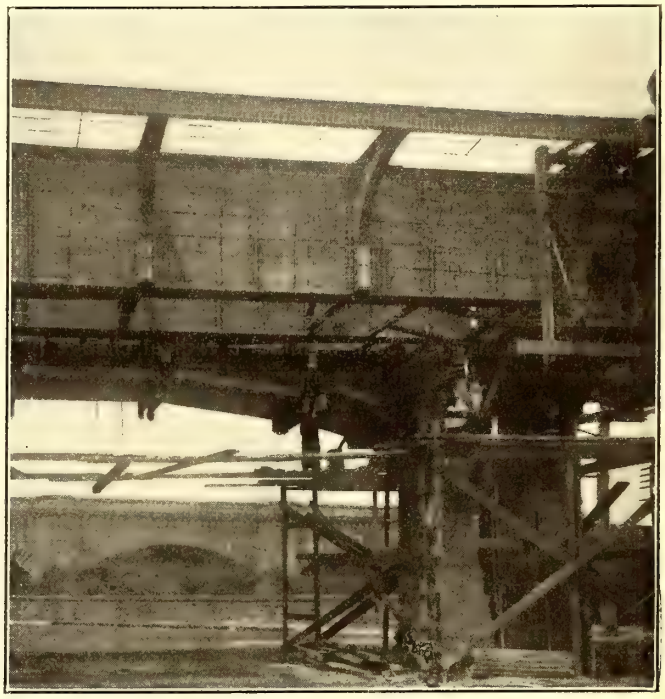
ALTERATIONS AT DUDLEY STREET STATION

Important alterations in the Dudley Street station have



Boston Elevated Extensions—Forest Hills Structure Nearing Completion

been made in connection with the Forest Hills extension. These were briefly described in the ELECTRIC RAILWAY JOURNAL of Aug. 8, 1908. Since the general plan of changes at Dudley Street was approved in 1908 by the Massachusetts Railroad Commission a still further improvement in the plans has been made by the company through the utilization of the space inside the surface car loops at the elevated level for waiting room accommodations, as shown in the plan on page 1219. The principal changes at Dud-



Boston Elevated Extensions—Concrete Reinforcement on the Forest Hills Structure

ley Street are the construction of a new unloading platform on the Washington Street side of the property, the building of foot passages and bridges to enable transfers to be made without crowding between the trains and outward-bound cars, and the filling in of the surface car loops at the elevated level, so that by using both sides of the surface car platforms loading and unloading may take place simultaneously and with far less massing of passengers than the present operation of the station entails. In the central portion of the terminal the equivalent of six platforms will be provided. Entire separation of inward from outward traffic will be facilitated to a remarkable degree by the establishment of the unloading platform over Washington Street and the utilization of the passageways indicated. The use of a portion of the surface loops for waiting-room space will tend to relieve the present waiting room from overcrowding, reduce the number of passengers standing or crossing the inbound elevated platform and shorten the time required for a passenger from Boston to the suburbs to reach his particular surface car at the elevated level when it approaches its berth. The accompanying recent view of the changes at Dudley Street shows the general type of construction which the company is pushing to completion here. The bridges are covered, and are of ample width to enable rapid transfers of passengers to be made across them. They are provided with short stair-

way connections to the different platforms. A special feature of the design which has received very little attention from the public, but which will add greatly to its comfort, is the absence of the stair climbing usually necessary to make transfers between surface cars and trains. The bulk of stair travel in the station will be downward, regardless of whether the passenger is inward or outward bound. The remodeled station can be used either as a terminal or a way station, trains being switched back to Boston through Dudley Street when desired and thence returned to Boston, or run through to Forest Hills with a single stop on the west side of the property. The capacity of the station will be greatly increased by the above changes, which also include the lengthening of the original elevated platforms to handle eight-car train service.

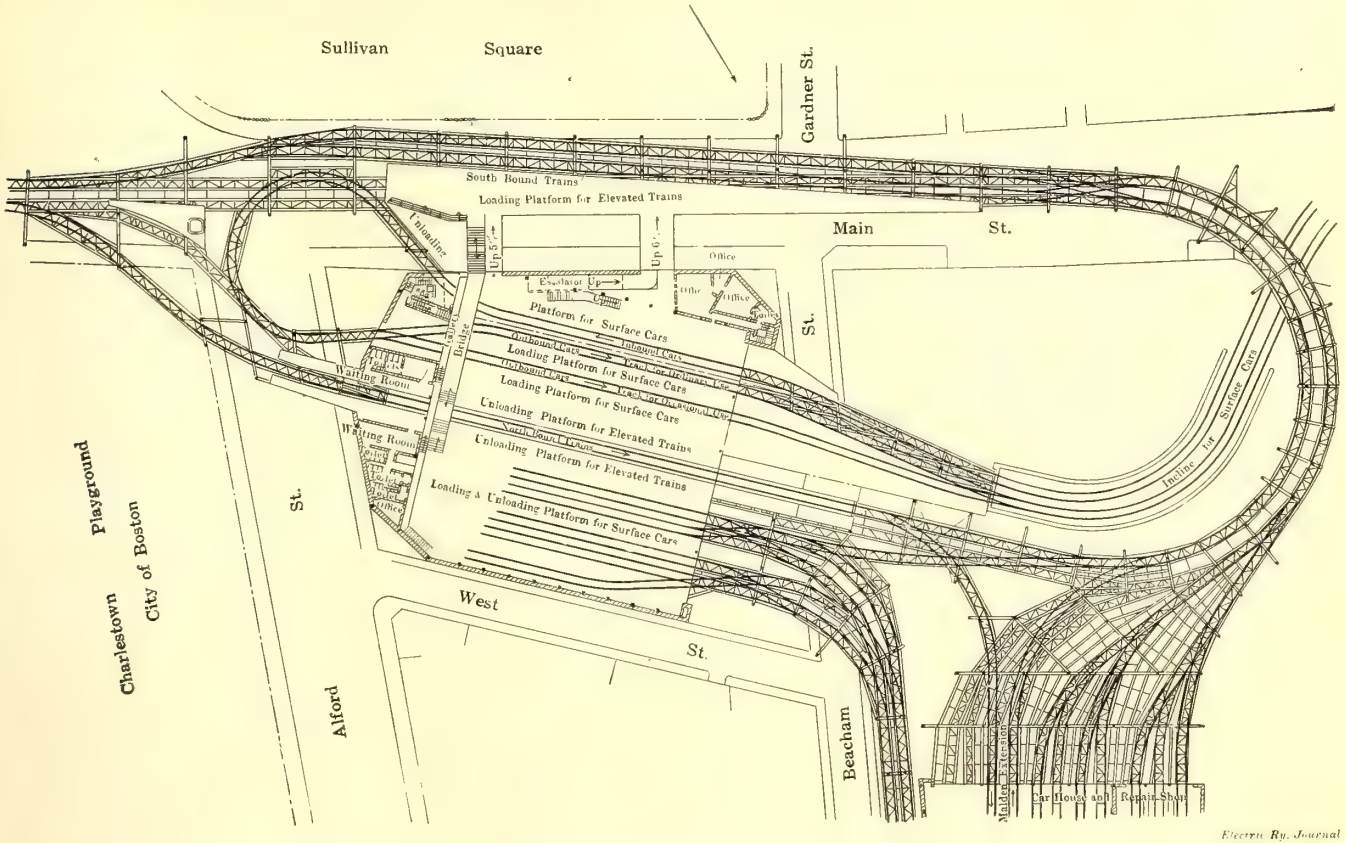
IMPROVEMENTS AT SULLIVAN SQUARE AND SOUTH STATION

At the Sullivan Square terminal a radical change in the station design has just been approved by the Railroad Commission in connection with the inauguration of service on the future Malden extension. The original design of this station provided a single track through it for use by elevated trains arriving from Boston, and on each side, at the same platform level, parallel surface car tracks with stub terminals which received and delivered traffic transferred between the trains and suburban cars. Little separation was possible between inward and outward travel except by encouraging passengers to enter the elevated trains by the end doors and leave by the center doors, and by trying to empty the surface cars at the forward end and load them at the rear end. With the growth of travel consequent upon the full utilization of the elevated system and its connecting surface lines, together with the admission to the terminal of new lines of interurban cars from distant points, the capacity of the station became closely limited. Hence a rearrangement was necessary in preparing the plans for the new line of elevated service to Malden. Under the new plan, as shown on page 1219, there will be built a platform about 350 ft. long on the west side of the station over Main Street, Charlestown, for use by passengers destined for Boston via the elevated trains. This platform will be at a slightly higher level than the present interior platform of the terminal, and will be connected with the latter by one 5 per cent and one 6 per cent ramp, with a combined width of 30 ft., besides having a bridge connection 10 ft. wide with the easterly platform of the terminal. In place of the present stub tracks on the west side of the station a loop for surface car traffic will be built, with an unloading platform having short connections with the inward elevated platform. Cars will ascend the inclines to the elevated level as at present, on the west side of the station; they will discharge their passengers upon the unloading platform at an average distance of 60 ft. from the trains, traverse the loop and make a second stop at the surface loading platform, which is in immediate touch with the outward-bound elevated trains. An extra track for occasional use in times of heavy traffic or other emergencies will be available in the center of the surface car loading platform. All outward-bound trains from Boston will enter the station as at present, and after discharging their passengers at the unloading platforms in the center of the station, trains will proceed either to Malden or to Boston as desired. Malden trains entering the station will pass around the north elevated loop and make a stop at the loading platform on the west side of the building, receiving inward passengers in the same manner as the trains looped through the station direct from Boston.

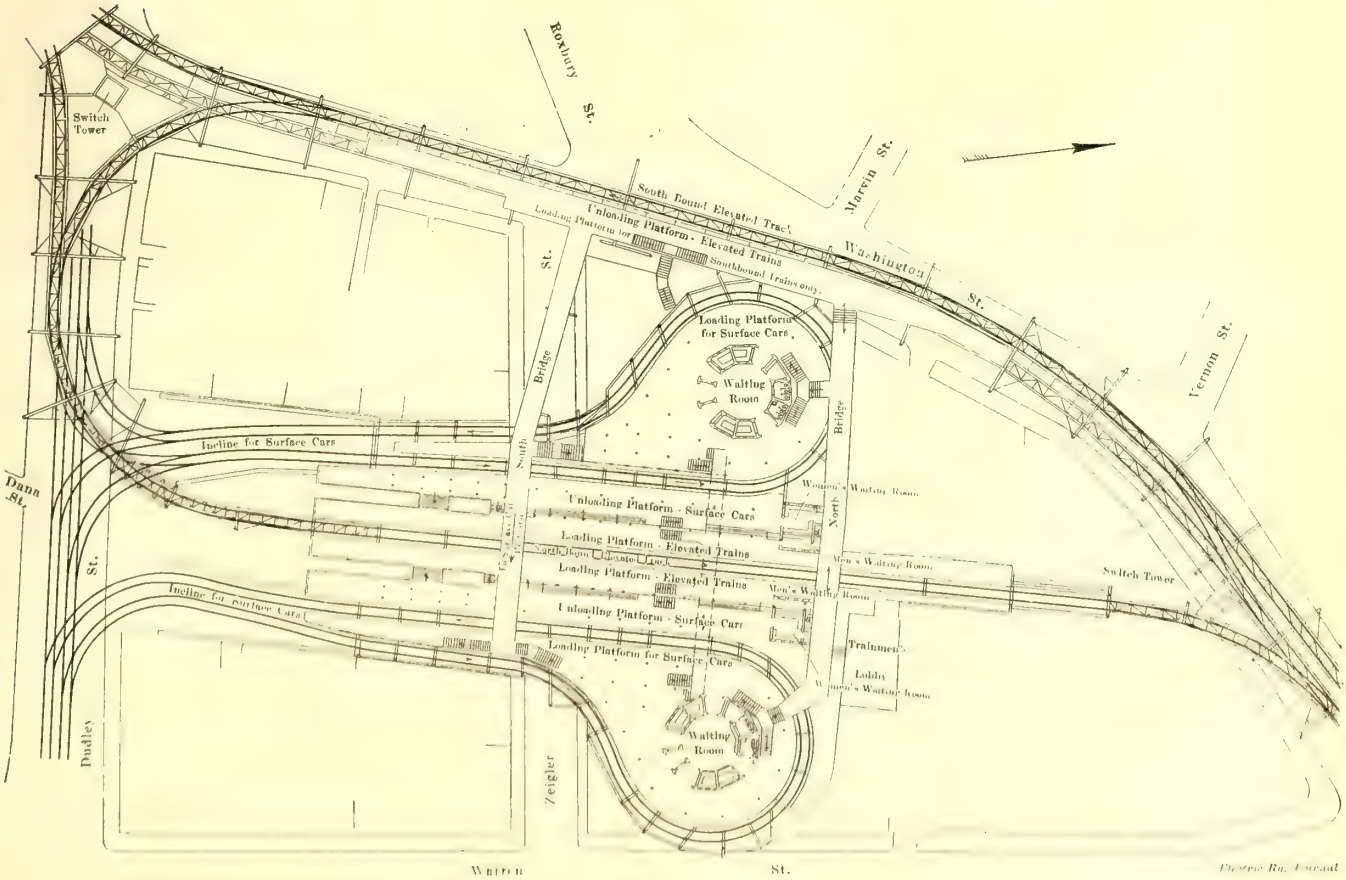
The tracks and incline on the east side of the station will remain unchanged, because a large part of this traffic will be handled by the Malden extension, and the necessity for separating inward and outward passengers at the surface car platforms will be less urgent. The rearrangement of the station, however, provides for a general separa-



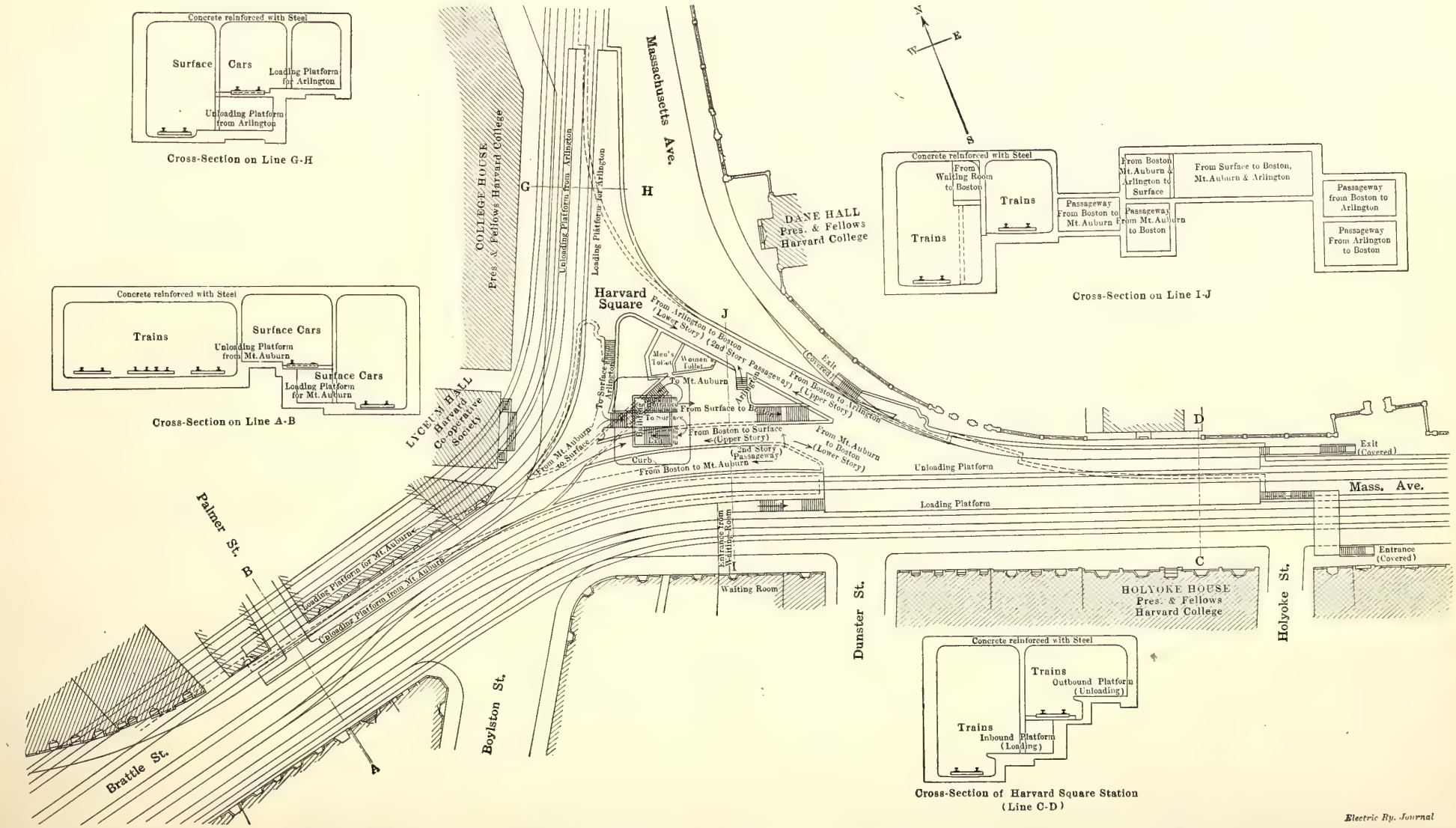
Boston Elevated Extensions—Changes under Way at the Dudley Street Station



Boston Elevated Extensions—Plan of the New Sullivan Square Station



Boston Elevated Extensions—Plan of the Dudley Street Station Improvements



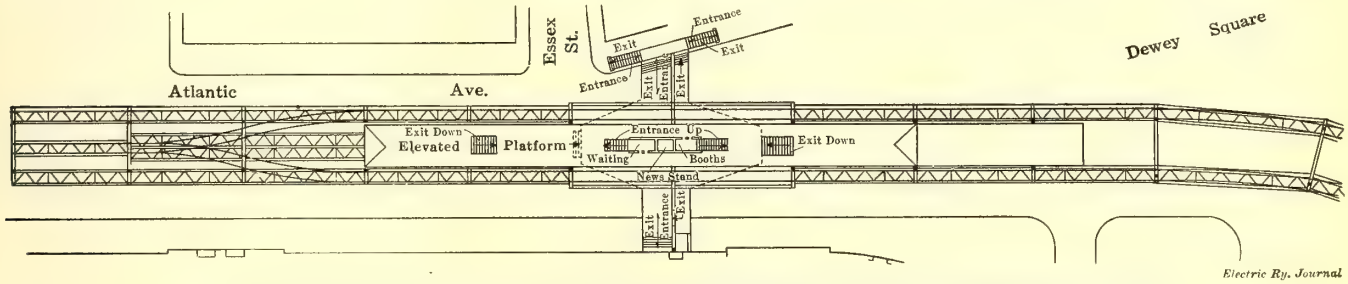
Boston Elevated Extensions—Plan and Sections of the Harvard Square Station of the Cambridge Subway

the platform areas, together with a freer movement of surface cars. These changes should result in a considerable increase in the capacity of this station.

A representative way-station improvement is illustrated by the accompanying plan of the South Station with extended platform. The company has widened the physical connection here between the elevated station and the steam railroad terminal building of the same name; it has extended the platform at each end to accommodate longer trains, and has installed a middle siding and switches to facilitate the turning back of the inter-terminal trains operating on a shuttle schedule between the North and South Stations. Formerly these trains were necessarily operated through Atlantic Avenue to Beach Street, making a relatively unprofitable run of about 1 mile per round trip. This will be eliminated by the track improvements at the South Station.

CAMBRIDGE SUBWAY STATIONS

The work now under way in connection with the building of the Cambridge subway by the company is still in the excavation stage. The general features of the route and the station designs have been briefly reviewed in the ELECTRIC RAILWAY JOURNAL in connection with the hearings held before the Railroad Commission in which the designs of the company were in the main approved as presented. The terminal station at Harvard Square will present the most complicated problem in construction, and is the most interesting feature of the subway. The subway



Boston Elevated Extensions—Plan of South Station as Modified for Eight-Car Trains

will be built for double-track service, with arrangements for free transfers between surface cars and trains in the same general direction. By this plan the intermediate territory between subway stations will share in the fast service afforded by the subway trains to and from the business district of Boston.

The Harvard Square station will be arranged for the separation of inward and outward traffic by the construction of separate platforms for each service, and the physical division of the station into sections and passageways for special movements of trains, cars and passengers on foot. In general, the surface cars connecting with this station will be carried under ground by inclined approaches beginning at considerable distances from the center of Harvard Square. These cars will deliver their passengers at platforms connecting by ramps of moderate grade to the loading platform for the Boston-bound subway trains. Outward trains will stop at a special unloading platform, also connected with the different surface car lines by passageways leading to separate loading areas for use by surface car passengers bound for points beyond Harvard Square. At Harvard Square there are two general directions for connecting surface cars. One group of lines is operated in the direction of North Cambridge and Arlington, and the other to Mount Auburn, Watertown and Newton. The surface car tracks at the subway station will be arranged so that if desirable through service may be given between Newton and Arlington Heights or between intermediate points. The shape of Harvard Square approximates an equilateral triangle of very limited area, and this, with the number of surface car lines passing through the district and the valuable property of Harvard University abutting, made necessary the adoption of different levels and grades for the tracks and platforms to be utilized by the different services. Ample accommodations have been provided, however, by the use of platforms of considerable length, and while these are of necessity connected by passageways of corresponding length, the accessibility of the different connections is straightforward and the opportunities for congestion greatly reduced. Besides the usual sidewalk entrances and exits, there will be an entrance to the station from the waiting room of the company now located on the south side of the square and a main entrance and exit housed in a tasteful structure in the center of the square on an area of about 1800 sq. ft. A large part of the traffic will pass through the station without any necessity of coming to the surface until it does so on the suburban surface cars passing out of the terminal, via the inclines.

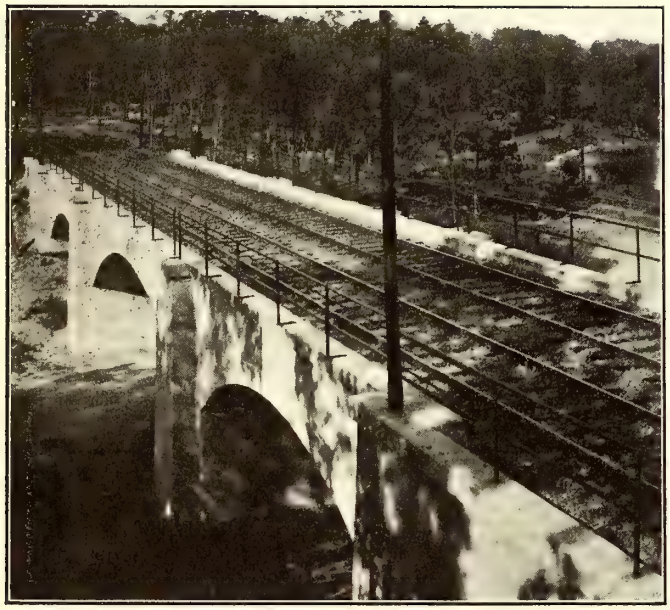
There are also to be stations at Central and Kendall Squares, on the Cambridge subway. These are to be of simple design, consisting of a platform for westbound trains on the north side of Massachusetts Avenue, below the street level, and a similar one on the south side for eastbound service. At Central Square no special surface car facilities are planned outside the present double-track lines through Massachusetts Avenue and their branching connections to Somerville, Brighton and the Cottage Farm district. The entrance and exit stairways will be located at the sidewalk edges and above the ends of the subway platforms. Below the surface the two subway tracks will be carried through the station without special features, the platforms being on the outside of the tracks. At Central Square a similar arrangement will be installed, with the addition of a surface car loop to permit lines serving the north center of Cambridge via Broadway, to terminate above the subway station if desired. By this arrangement passengers from the heart of Cambridge can be transferred to the subway, and surface car operation into Boston avoided to any extent required by the traffic conditions, or, if desired, cars can be operated on the surface as far as Kendall Square, and then turned back into Boston to handle any special traffic. The stations at Kendall and Central Squares are specially planned to serve the manufacturing and mercantile districts of Cambridge, while that at Harvard Square is planned to handle the residential and university traffic, and will furnish quick access to the subway trains to and from Boston in connection with athletic events at the Harvard Stadium.

OTHER CONSTRUCTION

The elevated structure for surface cars running between

East Cambridge and the North Station is to be carried over the Charles River dam on a stone arched bridge with Chelmsford granite piers. A bascule lift bridge will be provided in the span over the main channel lock of the dam. The architectural features of the bridge have been designed to harmonize with the improvement work which is being effected by the Charles River Basin Commission.

The Middlesex Fells extension is a double-track line with span construction, following the parkway from Mystic Avenue, Somerville, into the Fells on a reserved right-of-way in the middle of the highway. The line is carried on a semi-private right-of-way, with rock ballast within the Fells, and opposite Spot Pond it crosses Brooks Road on a new reinforced concrete bridge to avoid the highway. This bridge was designed and built by the Metropolitan Park Commission, and is illustrated herewith. It emphasizes the character of the construction work on the entire Fells extension. This bridge is 170 ft. long, 20.5 ft. wide, and is reinforced in the deck, arches and piers. The bridge is built in three spans, and was especially designed to meet the requirements of transportation without injuring in any way the beauties of the reservation.



Boston Elevated Extensions—Brooks Road Bridge at Middlesex Fells

The elevated and subway extensions reviewed above are being built under the general direction of George A. Kimball, chief engineer of elevated and subway construction, to whom this paper is indebted for courtesies extended in the preparation of this article. The surface line work mentioned has been carried out under the direction of H. A. Plimpton, civil engineer of surface lines, Boston Elevated Railway Company.

It is the practice of the Cincinnati Traction Company to soak the car motor brushes in sperm oil, which is said to keep them from chipping and to greatly improve the surface of the commutators. Two sets of brushes are provided for each motor. The lead brush of the No. 1 motor on a car carries the number of the car and the motor numbers for the other brushes are indicated by scratches. One of the two sets of brushes is kept in oil while the other is in use, and a shift is made about every third night. A high-grade Columbia brush is used, from which excellent results are obtained, even though the steep hills in Cincinnati require the motors to work under severe loads.

ANNUAL MEETING OF PENNSYLVANIA STREET RAILWAY ASSOCIATION

The annual meeting of the Pennsylvania Street Railway Association was held in Harrisburg on Wednesday, Dec. 1, and was attended by the following representatives from different sections of the State: R. P. Stevens, of Allentown, president of the association and president Lehigh Valley Transit Company; E. H. Davis, manager, Williamsport Passenger Railway Company; Charles O. Kruger, president, Philadelphia Rapid Transit Company; F. B. Musser, president, Central Pennsylvania Traction Company, Harrisburg; H. R. Fehr, president, Easton Transit Company; L. C. Bradley, Pottsville, general manager, Easton Pennsylvania Railways Company; F. D. Shaffer, Oil City, general manager, Citizens Traction Company; C. H. Bishop, Lemoyne, superintendent, Valley Traction Company; J. I. Quigley, president, Lewistown & Reedsville Electric Railway Company; C. Edgar Titzel, Lancaster, manager, Conestoga Traction Company; W. H. Lanius, York, president, Hanover & McSherrystown Street Railway Company; Dr. H. M. Stine, Harrisburg, secretary of the association.

Prior to the opening of the convention at 11 a. m. in the offices of the Central Pennsylvania Traction Company, the executive committee held a brief session for the purpose of considering its report, then met in the office of the secretary. The convention approved the minutes of the last annual convention, and President Stevens appointed a committee to place candidates in nomination for the ensuing year.

Treasurer Lanius read his paper showing a balance in the treasury of $2,055.10. The report was approved and ordered to be filed.

President Stevens called upon Secretary Stine for an address, and the latter gave a brief report of the work of the association during the year, and expressed great confidence in the future growth in numbers and influence of the association during the coming year.

President Stevens then followed in an address full of suggestions for improved methods of work that would prove of much benefit to the members of the association, and that would stimulate interest in the organization. He urged stronger cohesion, loyalty and zeal on the part of all the members and referred to the suggestion that he had made at the Denver convention about the organization of the executives of State associations. This body, he said, could meet at stated intervals and co-operate with the efforts of the national association of street railway interests. He stated that he had been invited to represent the State association at a meeting of the executive committee of the American Street & Interurban Railway Association, to be held in New York City in January next, at which time the matter of an organization of State executives will be brought up.

After some discussion it was decided that the association should hold quarterly meetings in the future, to be called by the president, at which times papers of interest to the membership would be read by various officials and members.

The nominating committee then submitted the following slate, and upon motion the secretary was instructed to cast the ballot, with this result: President, R. P. Stevens, Allentown; vice-president, E. H. Davis, Williamsport; treasurer, W. H. Lanius, York; secretary, H. M. Stine, Harrisburg; executive committee, R. P. Stevens, E. H. Davis, Chas. O. Kruger, Dr. Walter A. Rigg, Reading.

The convention then adjourned to the Harrisburg Club, where dinner was served at 1 o'clock The delegates were then taken over the lines of the Central Pennsylvania Trac-

tion Company in two special cars and shown through the concrete car houses which have recently been built on North Cameron Street.

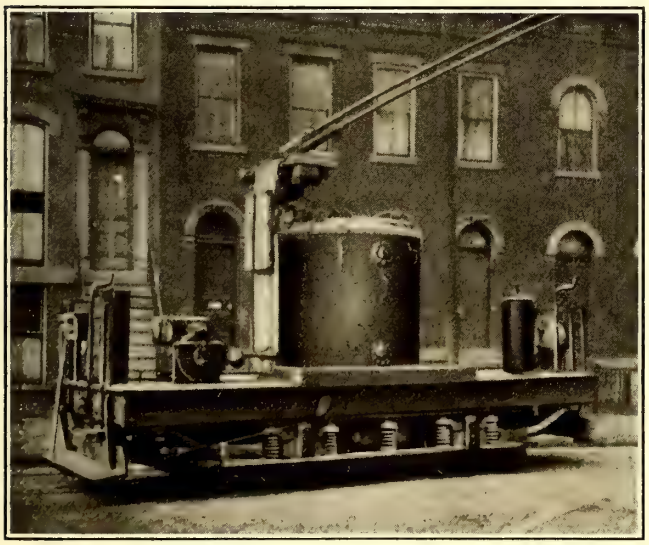
Fourteen new members were added to the association in 1909, making the present membership 44 companies. The outlook for 1910 is most favorable.

SAND DRYING PLANT OF THE CINCINNATI TRACTION COMPANY

The Cincinnati Traction Company has a very complete mechanical system for drying and distributing sand. The great number of hills in Cincinnati and the numerous steep grades ranging up to 13 per cent require the use of about 10,000 tons of sand each year. Sand is dried in a central plant at the Brighton car house and distributed to other car houses in a tank car, which handles the sand entirely by air pressure. This car also delivers sand to line cars, which place it on the tracks.

DRYING PLANT

The Brighton car house is built on a side hill, and the sand-drying plant is installed in the basement. Sand is



Pneumatic Sand-Distributing Car

delivered in wagons which drive onto the car house floor and dump their loads through traps into the basement. A leather conveyor belt carries the sand from the dumping piles to the drier. This belt is about 40 ft. long and travels at a speed of approximately 3 ft. per second. At the present time the sand is screened and thrown on the belt by hand, but the company proposes shortly to install an I-beam runway with a traveling grab bucket which it is thought will considerably reduce the labor required in handling wet sand.

From the upper end of the belt the wet sand falls into the feeding hopper of the drying drum. This drum is 3 ft. 6 in. in diameter and 20 ft. long. It is made of boiler plates heavily riveted. Within the drum are baffles, which serve to distribute the sand and pass it through from end to end. The drum revolves continuously on roller bearings and is driven by a 12-hp electric motor, which also operates the two conveyor belts. The upper end of the drying drum is enclosed in a brick furnace setting, in which coal and barn refuse are burned. Gases from the furnace pass through the drum and then up a stack built in the wall of the car house. The sand as it falls from the conveyor belt into the hopper automatically feeds through the drum, and with the turning of the drum is thoroughly exposed to the hot gases. As the drum revolves the sand is carried through to the end farthest from the furnace, where it falls into the hopper of an elevating belt conveyor. This conveyor lifts the dry sand into a steel storage tank above the car house floor.

The tank has a capacity of 30 yd., which is not sufficient to store sand dried during the dry days, when it is not needed on the tracks. New storage tanks will shortly be provided in the same car house, so that the drier may be run for longer periods and enough sand accumulated to last through a long period of bad weather. Three outlets from the steel storage tank serve to load the sand onto flat cars or into an air-operated sand distribution car which is used to fill the bins at the car houses.

SAND CAR

The sand car illustrated was designed and built in the shops of the Cincinnati Traction Company. It consists of a steel-plated underframe mounted on a special two-axle truck, carrying a steel tank which holds the sand. The tank is loaded by gravity at the drying station. This tank has a capacity of 9 yd. and the sand is forced out of it by air pressure. A National Brake & Electric Company D-4 air compressor mounted on the platform of the car furnishes the air for handling the sand. The air is fed in near the top of the tank, and the discharge outlet for sand has its opening near the bottom of the tank.

With the tank loaded, the crew, comprising a motorman and conductor, runs the car, which is fully equipped electrically to a car house and spots it on the track nearest to the bin from which sand is drawn to fill the sand boxes in the street cars. The air pump is then started, and a 4-in. hose connected to the sand discharge. One of the car crew stays on the car to operate the air valves and the other sits on the edge of the sand bin and moves the discharge end of the hose so that the sand is evenly distributed over all parts of the bin.

An air pressure in the tank of about 25 lb. forces the sand through the hose sufficiently fast to unload the 9-yd. tank in about 25 minutes, discharging the sand at an elevation of about 10 ft., at a labor cost of 2 cents per yard. When this work was done by hand about an hour was required by four men to unload 9 yd. of sand and place it in a bin. The sand car crew is made up of a motorman and conductor receiving 20 and 16 cents per hour, respectively. When these men are not operating the sand car they work at one of the car houses. On an average this crew with the air-operated sand car will deliver 30 yd. of sand a day to outlying car houses or to sand boxes located at grades along the street.

Formerly the sand bins had doors in the sides to facilitate filling and for getting out sand for use on the cars. Since the air-operated sand car was put into use these doors have been bricked in and sand valves placed along the sides of the bins.

This system of handling sand by air pressure has been installed in some of the car houses. The sand is stored in a steel tank in the basement, which can be filled through a trap in the car house floor. When it is desired to withdraw sand, air pressure from the shop piping system is let into the tank and the sand lifted by this pressure to the car house floor.

Acknowledgment is made to T. Fitzgerald, assistant general manager of the Cincinnati Traction Company, for information used in preparing this article.

RAILWAY DEPRECIATION ACCOUNTS*

BY C. I. STURGIS, GENERAL AUDITOR, CHICAGO, BURLINGTON & QUINCY RAILROAD

In a committee meeting held recently, Henry C. Adams, chairman of your committee on railroad statistics, lifting from the table the recently adopted balance sheet rules, said:

"I consider this a beautiful piece of work; every paragraph represents a harmonizing of the interests of the public, of the investor, and of the railroad manager."

He was asked who represented these interests while they were being harmonized, and, in his honest, outspoken way, he admitted that he represented the public. "And who the investor?" "Well, I did," said Mr. Adams. "And who the railroad manager?" "Why, the auditors; but of course I was the umpire," said Mr. Adams.

Now, gentlemen, I am going to be in somewhat the position of Mr. Adams for the next few minutes, for I am going to try to represent and present all sides of this depreciation question—the side of the public, of the investor and of the railroad manager.

Broadly speaking, depreciation is a lessening in value. To illustrate: A manufacturer buys a lathe and puts it into use; later he sells it. The difference between the value new and the value worn out represents the depreciation. This depreciation is measured by what the manufacturer has to pay for a new lathe, which he must buy to take the place of the old one, but from the price paid for the new lathe there must be deducted the amount realized from the sale of the old one, and what is left measures the depreciation.

When we talk about setting aside a depreciation fund, we mean setting aside, out of income, periodically during the life of the lathe, various sums which, in the aggregate, should equal the amount of depreciation by the time a new lathe must be purchased.

CAUSES OF DEPRECIATION

This depreciation, or lessening in value, may be due to two causes, which we may classify: First, depreciation due to wear; second, depreciation due to premature abandonment, necessitated by changed conditions; this is generally known as obsolescence.

The first of these—that is, "depreciation from wear"—is the simpler, and in its determination by month or by year, in advance, we can apply certain general principles for all properties of any given class, but beyond these generalizations are thousands of questions of detail so complex as to require separate study for each independent plant or railroad, and when all is said and done the result is but an estimate. On a railroad, the life of ties varies with soil and climate, the life of bridges depends on the weight of locomotives running over them, the life of locomotives depends on the quality of water and coal with which they are fed, and there is hardly a railroad tool or machine the life of which does not depend on local conditions, and, even if, in determining depreciation, we could approximately estimate such variable factors as those, we would still have to consider what in the end will be the cost of the new articles to replace the old, and with markets ever fluctuating that is impossible definitely to determine. Furthermore, prosperous roads, in maintaining high standards, consider equipment is worn out when, on poorer roads, it would be considered still good for many years of service.

The second class—that is, "depreciation due to this obsolescence"—is far more difficult to anticipate and to measure, and commissioners may well shrink from assuming a railroad director's responsibility along this side of the financial policy of his road.

No doubt some of you are manufacturers, or are interested in manufacturing plants, and know how often newer makes of machines in the hands of your competitors force you to dispose of yours, when only partly worn out, that you may meet the competition. To take care of this depreciation, the successful manufacturer must put aside sums equal to 10 or even 20 per cent of the value of his plant in those years when he can afford to—that is, when satisfactory prices and large business warrant his doing so. Good business policy dictates that the railroad director should do likewise, for a similar condition holds in the manufacturing side of railroading—that is, the building of locomotives and cars. With up-to-date machinery, the railroad can afford to do its own building, because the maintenance of the plant, salaries of officers and general expenses, as well as the cost of running boilers and dynamos, are shared with the repairing and other branches of railroad work. This advantage to the railroad lasts only so long as its planers, lathes and other machines are as up to date as those of the outside builder.

As further illustration of depreciation due to premature abandonment, necessitated by changed conditions, let me cite one or two further cases: A railroad has 40 miles of road in a city, and the city authorities require that the tracks be elevated. The old roadbed must be abandoned, a new and more expensive one built, and this without bringing 1 cent more earnings—this is clearly a case of depreciation due to premature abandonment of the old roadbed. Some will claim that while track elevation brings no more gross earnings, it does result in larger net earnings, because it saves payments for gates and gatemen and for personal injuries. Without disputing the propriety of track elevation, under certain conditions, I contend that the expense of those gates and gatemen and the personal injury payments became necessary after the road was originally built, and their growth represented loss of efficiency and hence increased expense, and therefore were in the nature of depreciation charges.

On another road the director sees that a city, to free itself from smoke, is likely to insist on electrification of the railroads, or perhaps he sees the approaching necessity of steel freight and passenger cars. Either of these requirements means premature abandonment of a still good conditioned plant and equipment and the rapid accrual of depreciation due to prospective and sudden ending of efficiency. These changes will bring no increase of earnings, and the expenditure may come in a year when his earnings are not large; therefore the director should begin at once to set aside each year, out of income, as much as he can spare, in order to meet these expenses.

It is interesting to study the effect of the increase in the price of fuel on the necessity of premature renewals and, consequently, on depreciation. This increase necessitated greater earnings per train, which meant heavier engines to pull more cars, larger cars to reduce dead weight as compared with paying load—then the heavier engines required heavier rails and roadbed and stronger bridges—and all without any increase in net earning efficiency.

In England, there has been consideration of this question of depreciation in its relation to railroads. I want to impress upon your attention the fact that the English agreement covered only depreciation deducted in the determination of the taxable income, and that while a similar agreement (or an arbitrary or a court ruling) may be necessary in this country in determination of the net income to which the recently passed corporation tax law shall apply, such depreciation figure will not properly be the one which the directors of any railroad will wish shown on the books of their company. In other words, the necessity under the law of determining the net income seems to force upon the department of internal revenue the necessity of deciding how much it is willing to allow the railroads to deduct for depreciation; even as the Interstate Commerce Commission must decide, in any hearing on rates (where net earnings are to be considered), how much the railroad at bar may deduct for depreciation.

POSITION OF INTERSTATE COMMERCE COMMISSION

In our country the diversity of practice on different roads resulted in an attempt by the authorities charged with the formation of a uniform system of accounts to arrive at a basis for determining amounts which, charged monthly on the books of different roads, would distribute, by months, the depreciation claimed by some to be uniformly going on on railroad property. The present rules of the Interstate Commerce Commission permit of a depreciation charge and in any amount desired by each carrier, but it is understood that the commission contemplates

*Abstract of a paper read before the National Association of Railway Commissioners, Washington, D. C., Nov. 16, 1909.

determining upon an arbitrarily determined basis for the charge, to be as nearly correct as may be, and requiring all the roads to use that basis.

This intention to require the roads to make, upon their books, a monthly charge for depreciation is, it is claimed, justified by the twentieth section of the amended interstate commerce law.

Now when the law authorized the Interstate Commerce Commission to formulate a system of accounts, did it not authorize it to go ahead and draw up a plan of recording actual facts and transactions? All through the section there is reference to the recording of facts and transactions, and there is not one word about prescribing what those facts and transactions shall be.

This section of the law does not appear to authorize the commission to arbitrarily determine what amounts, if any, any railroad shall set aside to cover depreciation. The act of setting aside an amount is a transaction wholly within the right and power of the directors of the railroad company, and the commission can properly order the recording of such act upon the books and state how and in what manner it shall be recorded, how it shall be shown in the accounts and statements, but it cannot arbitrarily determine the transaction itself.

It is a fact that, incidentally, section 20 does control management, but only in the indirect way in which all publicity of accounts tends to prevent questionable and dishonest acts of management.

To sum up, there does not appear to be anything in this twentieth section which authorizes the requirement that the accounts be made to contain anything but a record of transactions, nor does this section 20 authorize excluding from the accounts the record of any transaction which has been had. If this is so, then it would seem that an arbitrary depreciation charge cannot be ordered by the commission to be placed upon the books of a railroad company until such time as the commission has right to order the transaction itself—that is, the right to order the directors of a railroad to set aside such amount from the annual income as the commission may deem proper. I propose to show later why the commission should not desire this right, which now belongs strictly to the board of directors of a railroad, who alone are held responsible for the successful conduct of the property, including its financial policy, upon which, perhaps more than on anything else, depends the success or the failure of every legitimate business enterprise.

There is another reason for questioning the commission's power, under authority to prescribe a uniform system of accounts, to order an arbitrary charge for depreciation or any charge at all. This depends on the necessary nature of such a charge. It is an estimate. No definite or satisfactory rule can or ever has been found for determining the exact amount of depreciation in any manufacturing institution, and still less on a railroad. There are so many factors which enter into such a determination, and each factor varies so greatly with each branch of industry, and with each department of each branch of industry, and with each variety of condition surrounding each such department, and with every busy day as against every dull day, and with each rainy, dry, hot and cold day, each separate condition having an unequal bearing on the amount of depreciation accruing.

All of the difficulties make the problem one of great complexity—so much so that the theoretical advocate of a correct basis for depreciation seeks refuge in the claim that the law of averages must govern. This is really begging the question, for the bases for the averages exist only in men's minds and are not determinable facts. This shows that any annual depreciation charge can only be estimated—must be an estimate.

The idea of exercising supervisory control over railway operations, through the agency of accounts, did, I have been informed, originate in the statistical department of the commission, and it is not unnatural. Many of us railroad auditors have had the same dream. It is natural for one who feels that his ambition in the railroad world is limited to the formulating and the keeping of accounts. This auditor's dream of the control of operation through the accounts has invariably had a rude awakening when it bumped up against the practical question, With whom does operating responsibility lie? The railroad director, looking far into the future and realizing his responsibility to the investing public which he represents, is continually confronted with new problems, to meet which ordinary prudence requires the setting aside of depreciation funds. Where these future problems take the shape of exceptionally large renewal charges, he should set aside out of the current year's income as much as can be spared to meet the future expenditures. If at this stage he finds that the Government has limited the amount which he may set aside, as result of which the misinformed stockholder clamors for and gets further dividends, who is responsible for this failure to provide for the future expenditure? In that case does the responsibility rest with the director or with the Government? Gentlemen, I do not believe that anyone of you is willing to relieve the director of that responsibility.

When the directors have decided that an amount shall be set aside to meet depreciation incident to future renewals the commission may properly, under the twentieth section of the interstate commerce law, insist on it being shown in the accounts and reports—that is publicity and is reasonable—and if there is a hearing before a commission or before a court, the railroad should be called on to explain its justification of the amount it has set aside, that the commission or the court may decide, on the evidence, whether the amount is too high or not high enough as affecting the question before it.

STANDARD BASIS FOR DEPRECIATION

After all, what would be gained by requiring roads to make monthly charges to depreciation on a fixed standard percentage basis?

The railroad manager would not be benefited, because in studying the monthly returns, he would have to discard this arbitrary figure before he could determine the actual results accomplished by his efforts to obtain business and by the exercise of his judgment in making renewals and in operating the property.

The investor would not be benefited, because including a charge for depreciation in the monthly accounts and published statements of a railroad is but a "penny wise, pound foolish" attempt to show the investor, by a present 30-day measure, how valuable or otherwise his investment is. As a matter of fact, the true investor bases his idea of value on past history and future prospects, and the immediate present snap-shot view given by a monthly statement misleads more than it helps him.

The public would not be benefited, for if railroads are to be regulated it must be on the basis of facts and not of estimates. The use of an arbitrarily based depreciation figure for all roads or for a group of roads is similar to a doctor giving the same pills for all ailments.

It is sacrificing broad policy in railroad financing to an attempt to get theoretical accounting.

The attempt to apportion depreciation by months may have been based on the common practice of including in the monthly accounts, on an estimate, certain regular monthly bills which are not received before the closing of the month's accounts, but this latter practice, like the monthly apportionment of bond interest, is the including of a part payment of an actual expense, and hence there is no parallel between that practice and the including of a monthly depreciation estimate. It has been contended that if an estimated depreciation rate is used and at the end is found to be too high or two low, an adjustment can then be made. This is an admission that the arbitrary monthly figure may be and probably will be wrong, and, furthermore, there is no cutting-off place; there is no time in the future when we may say, "Now we may take the measure of the correctness of all these past monthly depreciation charges."

To gain the imaginary advantage of having arbitrarily fixed depreciation, the railroad director would be deprived of the right to do that for which he is responsible to his stockholders and to the public; that is, to intelligently carry out that financial policy which will maintain the property for its owners and which will build up a successful and prosperous railroad, able to give high standard service to the communities through which it runs, and to give employment to thousands located along its line.

ELECTRIC RAIL WELDING IN BERLIN, GERMANY

The Grosse Berliner Strassenbahn, Berlin, Germany, is now welding a large number of new and old rail joints by an electric arc welding process developed by its chief engineer of way and construction, Arthur Busse, and the Ac-

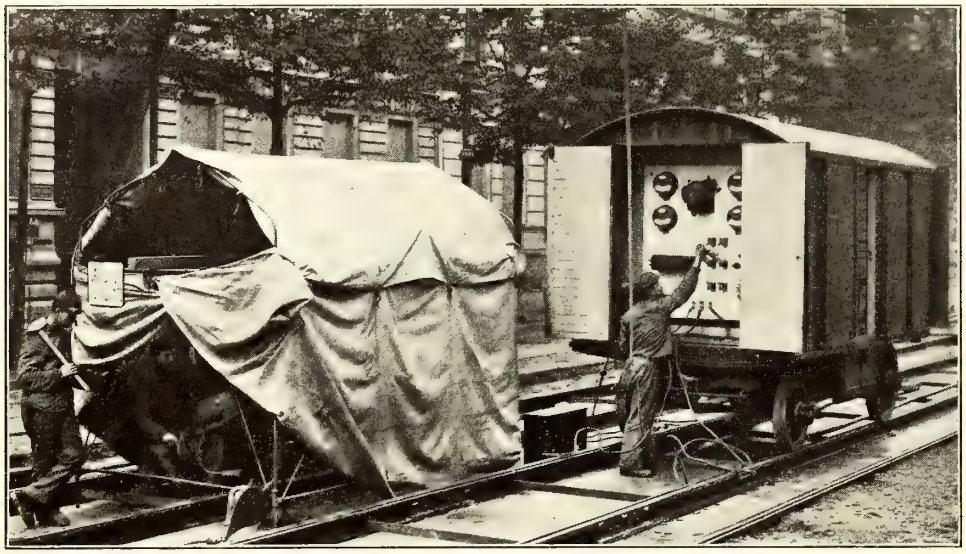


Fig. 1—Berlin Rail Welding—Motor-Generator and Tent Outfit

cumulatoren-Fabrik, Berlin. Over 12,000 joints were installed in 1908 by this method in a dozen Continental cities. The current for the electric arc is furnished by a generator which is operated at 60 volts to give a normal current of about 400 amp, and is driven by a shunt-wound motor which is connected to the trolley wire. This apparatus and control board are mounted in a car as shown in Fig. 1. In addition, there are two welding tents, with cable connections to the switchboard. The gang in one tent prepares a joint for welding while that in the second is carrying out a weld. The rail to be welded is connected to one pole of the circuit and the carbon rod is connected to the other pole. One workman then manipulates the arc over the portion to be welded. He is aided



Fig. 2—Berlin Rail Welding—Emery Grinder

by another, who supplies extra material in the form of small pieces of steel or of a bar, which is pushed forward to be melted off like solder. Under the intense heat produced by the arc both new and old materials are combined into a homogeneous mass. Each workman carries in one hand a large shield provided with a pane of dark-colored glass as a protection from sparks and the blinding light of the electric arc. The welded joints are completed in the open with the emery grinder illustrated in Fig. 2, which grinds both the head and groove of the rail.

Aside from a transporting wagon, this grinder consists of a frame mounted on wheels, the side of the frame being provided with slides on which the grinding apparatus moves to and fro. The latter consists of a vertical slide carried on a traverse, the slide having a 12-in. adjustable emery grinding wheel at its lower end and a small guide wheel running on a guide bar at its upper end. The face of the emery wheel has a profile to suit the shape of the rail, so that in grinding any alteration of the rail shape is excluded. The working range is 39.37 in. With a 6-hp motor and two men, this machine can grind down in one hour the rail ends for 8 to 10 joints, or an equivalent length of corrugated rail. The machine was furnished by Ernst Schiess, Düsseldorf, Germany.

The welding description given covers this electric arc system only in a general way. The applications of the prin-

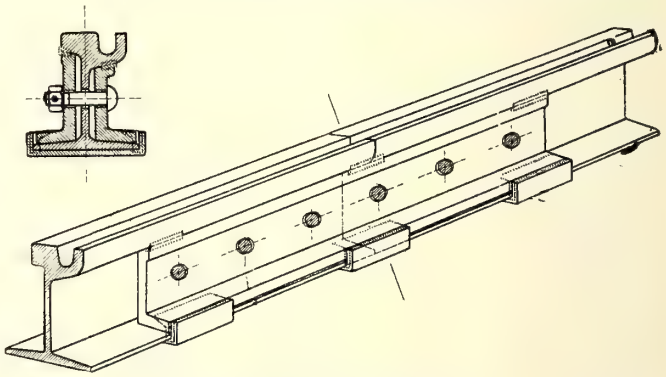


Fig. 3—Berlin Rail Welding—Three-Point Weld at the Base and Under the Head

ciple are numerous, but in the following paragraphs data will be given on the special welding designs used by the Berlin street railway company. Figs. 3 and 4 show how old fishplates are welded to the base and upper portion of the rail without touching the rail tread. On account of this concurrent use of plates and half a dozen welds, the vertical moment of resistance is very high. Even if several welds should break, the rail ends would still be held together firmly by the fishplates.

In some cases where the rails are not totally embedded a welded expansion joint is installed about every 120 meters (370 ft.). One of the plates is welded to one rail end and the opposite plate to the other rail end, while the bolts are tightened up throughout. This construction is not as good, of course, as the multiple weld, but the moment of vertical resistance is still far greater than a simple bolted joint.

The electric arc process is also used for repairing worn-out joints. After such joints have been raised to their

original level, the worn-off material is replaced by the direct welding on of new metal. To prevent the molten matter from running over the side of the rail, two cast-steel molds are fitted to the head of the rail and held in place by two pivoted and weighted levers, as shown in Fig. 5. The added material is always of the same composition as the rail and the weld is uniform throughout, since the dross naturally goes to the top, from which it is ground off afterward. In general, this form of welding is carried out on rails whose worn parts do not exceed 20 cm (8 in.) in length. Fig 5 also shows the U-shaped base plate which is laid under and welded to the base of the rail to increase the strength of the joint.

In some cases worn pieces of rail up to 6 ft. in length have been taken out and new sections have been welded

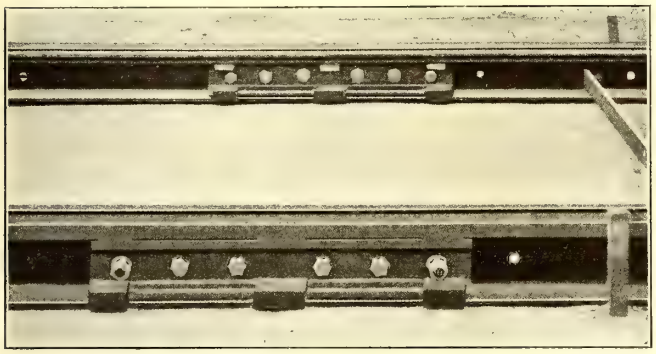


Fig. 4—Berlin Rail Welding—Top and Bottom Three-Point Weld Completed

into place. After the angle plates were attached, four welds were made at the junctions, two of the base plates to the base of the rail, and two of the angle plates to the head of the rail. The old pieces of rail were cut out by a machine carrying two circular saws driven by one motor. One of the saws is fixed, and the other is adjustable for lengths up to 6 ft. 6 in. To obtain a perfectly uniform cut, the saws are sharpened and adjusted by an emery wheel

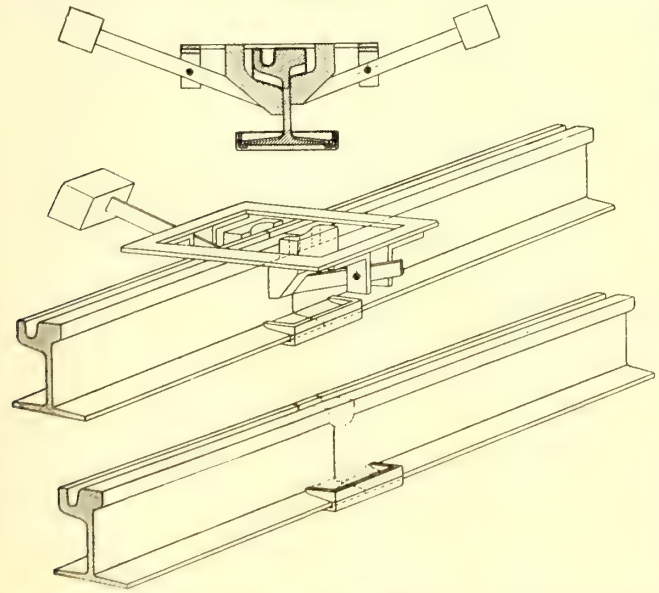


Fig. 5—Berlin Rail Welding—Welding an Old Butt Joint

which is switched off automatically as soon as the teeth have reached a certain degree of sharpness.

In repairing worn mitered joints of the type shown in Fig. 6, it is usual to weld only the tread of the rail, as the contact surfaces of the inverted joint or splice are large enough to give ample strength. However, new material up to 60 cm (23 in.) length may be welded on if necessary, and the base plate and other welds added as illustrated in the same drawing.

During 1908 and up to August, 1909, about 2000 new and old joints were welded electrically on the lines of the

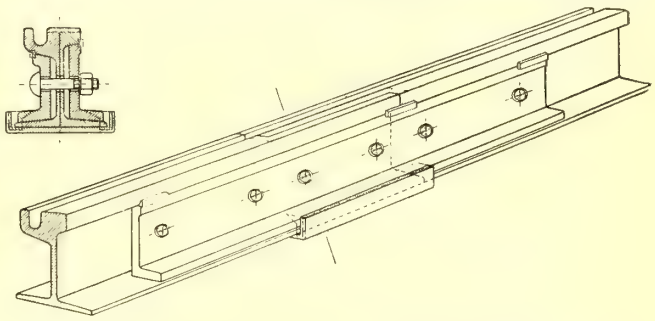


Fig. 6—Berlin Rail Welding—A Repaired Mitered Joint

Grosse Berliner Strassenbahn. The welds were guaranteed by the contractor for four years. The new joints cost $4.25 each and the old joints $6.75 each.

SIGNS IN GERMAN STREET CARS

One of the transportation practices of the Grosse Berliner Strassenbahn is to give every route a distinctive Arabic number if it is a city line and a Roman number or letter if it is a suburban line. These symbols are not picked at random, but as nearly as possible neighboring numbers or letters are chosen for lines operating in the same territory. Thus lines "G" and "H" overlap one another for a considerable distance, so that most travelers can choose either route. The number assigned to each line is marked

Berlin-Charlottenbg. Street Railway (Office: Leipziger Platz 14).
HALENSEE
(Station of Belt Railway.)

T

Schedule and Fares in Force from July 20, 1909.
KUPFERGRABEN

over Holtzendorff St.—Charlottenburg (City Court)—Leonhardt St.—Stuttgart Square—Kant St.—Leibniz St.—Bismarck St.—Knie—Zoological Garden Station—Great Star—Brandenburg Arch—Dorotheen St.

Cars leave Halensee every 15 minutes from *6:25 to 10:55 to Charlottenburg Car Depot; and every 15 minutes from 11:10 to 12:25. Cars leave Kupfergraben every 15 minutes from 7:10 to 11:40.

Sundays and Holidays: Leave Halensee every 20 minutes from *6:24 to 11:24; every 15 minutes from 11:40 to 10:55 to Charlottenburg Car Depot; and every 15 minutes from 11:10 to 12:25. Leave Kupfergraben every 20 minutes from *7:09 to 12:09, and every 15 minutes from 12:25 to 11:40.

* During the winter months, from Nov. 1 to March 31, the week-day service from Halensee begins at 7:25, at the Charlottenburg Court House at 6:31; Sundays and holidays cars leave Halensee at 7:24 and Kupfergraben at 8:09.

The cars of lines T and U run over the same tracks between Halensee and the Charlottenburg Court House and between Bismarck-, E. Leibniz St. and Kupfergraben to give a 10-minute and 7½-minute service respectively.

Fare 10 Pf. Running Time: 38 Minutes

Lap dogs, 10 pf., and the same for hunting dogs when accompanied by men in hunting costume.

Translation of Sign Placed in All Cars on Line "T"

in black on the whitened glass disk of the end lantern alongside the destination sign of the cars. The numerals or letters are very large, and therefore visible at a considerable distance.

Besides the end signs, each car carries two long non-illuminated side signs, which bear a list of all important places on the route. It is, therefore, a simple matter for the stranger to pick the right car to his destination. Once inside the car, moreover, the passenger will notice a sign which gives still further details concerning the route, together with the schedule, fare, riding regulations and running time between the terminals. These signs are placed on cardboard and renewed with every change in the time card. They are of special importance on the Berlin system because many lines run no owl cars.

THE COST OF HEATING CARS ELECTRICALLY

BY AN INSPECTION ENGINEER

In a recent issue of the Electric Railway Journal an operating official is quoted as estimating the power consumption for car heating at approximately half the total used for car operation during such times as the heaters are turned on at their maximum capacity. To a great many, including a considerable number of experienced railway men, this statement will appear to be an exaggeration, inasmuch as the amperes taken by the heater circuit are but a small fraction of that passing through the motor circuit. This view, moreover, is that naturally taken by the public, and by the municipal or State authorities, who, without technical knowledge of the facts in the case, attempt to compel the heating of cars to a point that would necessitate not only the installation of heater equipments of far greater capacity than are now commonly used, but would divert so large a proportion of current to their use, in the case of electric heaters, as to cripple seriously the efficiency of the power plants.

The demonstration of the truth of the foregoing statement is not difficult. Admitting that the current input to the motive circuits is large, it must be remembered that in city service such use of current is intermittent; in elevated and subway service, for instance, the trains are either coasting or stationary for approximately 60 per cent to 70 per cent of their runs, and the motors, therefore, are taking power only 30 per cent to 40 per cent of the time. In surface operation, particularly in the downtown sections of large cities, the proportion of time when motors are idle is even greater, in many cases reaching as high as 80 per cent of the run. On the other hand, the heaters are continually in circuit in severe weather from the time the car leaves the barn till it returns. In many cases heat will be turned on some time before the first trip is started and left on, through carelessness, for a considerable time after the car is in for inspection or lay-overs. However, considering only the time a car is in service, the following figures should give a fairly accurate idea of the actual proportion of power consumed by the two circuits, motive and heating. They are summarized from data obtained on cars in actual passenger service in one of the largest cities in the country.

Two elevated runs may first be considered, over two different lines of this company; the first, a round trip of 17.92 miles, the second of 18.30 miles. On both three-car service, consisting of two motor cars and a trailer, is maintained during the greater part of the day; but during the rush hours these are replaced by six-car trains of four motors and two trailers. The running time for both runs is practically the same, 80 and 82 minutes, respectively, for the round trip, with from 8 to 10-minute lay-overs at their respective terminals. The three-car train may be considered as the basis unit, inasmuch as the figures for six-car operation would be simply double those for the three cars. The constants used, it must be understood, are averages of many runs at different hours of the day and under varying loads, and may be accepted as substantially correct. A train makes in 12 hours eight round trips on the first route for a total of 143.36 miles, and 146.4 miles on the second route; in even figures, an average of 145 miles. The weight of a three-car train is approximately 90 tons, and the average power consumption of such equipment per ton-mile is 0.075 kw-hour. This gives a total consumption of 979 kw-hours for the 145-mile run, which includes the power taken by the motors and air compressors, but not that for the heaters or lights.

The heater equipment on these trains is of several types. The greater number of the cars, however, are equipped with two-coil panel heaters, connected in series, and giving three points of heat as power is put through the large or small coils singly or through both in parallel. Tests of the current consumption of all the types of heaters used, with line potential at 550 volts, showed wide variations upon the third heating point; in some cases 15 amp was the maximum input, in others as high as 35 amp. All readings were taken after the coils had become thoroughly heated, to obviate their increase in resistance. The average of all cars in service upon the third point was found to be 24 amp. The total power consumption, therefore, was 13.2 kw-hours per car-hour, or 475.2 kw-hours for the three-car train on its 12-hour run.

In this case the heaters consumed 48.5 per cent of the power required for operation. This proportion of power taken by the two circuits, while it would vary somewhat on different roads, owing to differences in equipment, voltage, frequency of stops and number of passengers carried is a fair average for multiple-unit trains in city service.

On singly operated surface cars the results obtained are even more striking. Owing to the greater frequency of stops and the increased number of accelerating periods, the watt-hours per ton-mile are considerably higher for operation than on the elevated, and also vary to a far greater extent because of the greater variety of equipment used and to the personal efficiency of the motorman. The latter variant is an element largely eliminated by the automatic multitple control systems on the elevated and subway lines. On the other hand, the lower speeds and the more frequent stops on the surface cause a much slower schedule, which, in turn, increases the relative size of the heat consumption time factor as compared with the motors.

The performance of four cars, which may be considered representative of all classes of surface equipment in city service, will next be presented. These cars are of different weights, and include both four-motor and two-motor equipments. One was equipped with air brakes, the power consumption of which is included in the operating figures; the other three had hand brakes only. The average weight, light, of each car was 16 tons, and when loaded 18 tons. Their heater equipments were identical, being two-coil panel heaters in series, with a current at 550 volts of 6 amp, 12 amp and 18 amp on the three positions of the heater switch. Two runs were chosen, each starting in the suburbs and running to the center of the city. The mileage of the first was 8.6 miles for the round trip, and for the second 13.4 miles. The average running time for the first (including an eight-minute lay-over per trip) was 1 hour 22 minutes, and for the second 1 hour 54 minutes (including a 10-minute lay-over at the terminal). Hence the average speed of both cars, including stops, was but 6.74 m.p.h.

The power consumption varied widely, both between the different cars and between individual trips of the same car, running from 2177 watt-hours per car-mile to 3245 watt-hours per car-mile, and from 134.7 watt-hours per ton-mile to 173.5 watt-hours per ton-mile. The average, however, for six round trips of all four cars was 2731 watt-hours per car-mile and 147.4 watt-hours per ton-mile. The average loaded car, then, at 18 tons on a 12-hour run, traveled approximately 81 miles and consumed 215 kw-hours for operation, while its heaters consumed 118 kw-hours, or 54.9 per cent of the former amount.

It may be added, as a commentary upon the foregoing figures, that they were compiled from data obtained some time ago, when there was no idea of making use of them in this connection. It is not contended that they are by any means absolute, but they are, nevertheless, the results of tests made in actual service, and as such afford a basis for estimating the additional load placed upon the power station equipment of any Northern road during the winter months.

It is apparent that an increase of approximately 50 per cent above their normal load thrust upon the feeder stations, especially upon days when snow and sleet already are putting an extra burden upon them, calls for very heavy overload capacity or for reserve units that will add a large item of cost to the substation equipment. Thus, both directly and indirectly, the question of adding to the amount of heat furnished the cars assumes a most serious aspect, and it cannot be wondered at that the managements of electric railway properties are more than anxious to avoid the additional expense involved in such an increase.

WINTER PUBLICITY CAMPAIGN IN LONDON

The London Underground Electric Railways has just prepared some new advertising pamphlets and posters for attracting winter travel. Pocket cards have been issued calling attention to the increased theater train service and in contrast thereto a handy time-table folder gives the locations and study periods of the night schools of London. Renewed attention is given to the encouragement of suburban traffic through the non-stop trains, bus connections at terminals, etc. The company is now getting out a card giving a diary of all the special events in London during the month such as concerts, fairs, art exhibitions and football matches with full data on fares and running time. The new posters are fully up to the standard set by those reproduced in the Dec. 4 issue of the ELECTRIC RAILWAY JOURNAL. A very simple yet most interesting poster shows several tints of what may be a London fog and bears the legend "Avoid the Weather—Waste No Time—Travel Underground." The last word is printed in the company's standard boxed letters, but has been ingeniously used on the upper side elevation of a car, the first and last letters covering the vestibules and the remainder covering the windows. The poster for the museums and picture galleries shows a brilliantly colored group of nine persons, dressed in the costumes of different historical periods, who are standing in a hallway flanked by Assyrian human-headed lions. The lettering beneath the picture informs the reader that the station agent is ready to supply particulars concerning every museum and art gallery in town. Two posters have been prepared to lure shoppers, one showing the snow-bedecked streets of London and the other the dry, cheerful interior of a subway car at the same time.

The monthly report of delays to passenger trains on the steam railroads in the State of New York, just issued by the Public Service Commission, Second District, shows that for the month of October 56,230 trains were run, of which 84 per cent were on time at division terminals. The average delay for each late train was 24 minutes, and the average delay for each train run was 3.9 minutes. The principal causes of delay were waiting for trains on other divisions, 30 per cent; train work at stations, 16.5 per cent; waiting for train connections with other railroads, 14.7 per cent; meeting and passing trains, 7.5 per cent; wrecks, 5.2 per cent.

DISCUSSIONS AT QUARTERLY MEETING OF NEW YORK STREET RAILWAY ASSOCIATION

The discussions on a number of topics at the quarterly meeting of the Street Railway Association of the State of New York, held last week in Albany, brought out many interesting points of view. The report of the meeting published in the ELECTRIC RAILWAY JOURNAL of Dec. 11 summarized very briefly the remarks of the speakers. A more complete abstract of the discussions is given below.

REMUNERATION FOR HANDLING UNITED STATES MAIL

In response to a question by Edgar S. Fassett, United Traction Company of Albany, Joseph K. Choate, Otsego & Herkimer Railroad, and Frederick H. Beach, Eastern New York Railroad, said their companies had direct contracts with the Government for the transportation of United States mail. In relation to his notice to the Government that the United Traction Company was losing money on its mail service and would discontinue it unless the remuneration was increased, Mr. Fassett said that on part of the system the rate was raised from 3 to 14 cents per car-mile.

Mr. Choate said that the existing rates on the electric lines for carrying mail overlooked entirely the fact that an electric car was equivalent to a steam locomotive hauling a train. The steam roads could run from 8 to 11 cars in a train, while the electric railway was limited to one car.

Mr. Fassett referred to some of the conditions affecting the transportation of mail. While it was frequently an accommodation to the communities reached by electric lines to have the service, the question should not be one of sentiment, but one of adequate remuneration. He had found that conductors and motormen, who were required by the rules to keep their clothes clean, had been obliged to handle mail bags which were dirty, and he had insisted that the Post Office Department place the mail bags on the cars, and also remove them.

Raymond H. Smith, Albany & Southern Railroad, said the compensation for that line had been reduced since the reweighing to 2.45 cents per car-mile.

W. H. Collins, Fonda, Johnstown & Gloversville Railroad, said that property was classed by the Post Office Department as a steam road, and the arrangement was very unsatisfactory. At the time the mail was reweighed the compensation was reduced 16 per cent, notwithstanding that the general mail had increased, a star route included without extra compensation and one post office on the line raised to the first class. The explanation made by the Post Office Department was that instead of taking 90 working days as a factor in securing the average weight, the Government included Sundays during that period. The company had asked the Postmaster-General's department for a rehearing.

John H. Pardee, J. G. White & Company, Inc., cited an experience in Pennsylvania where mail had been carried at an unprofitable rate, and notice was given that if the Government did not increase the compensation the service would be stopped in 30 days. The company discontinued the service and the Government then increased the compensation.

Mr. Choate stated that it was generally admitted that the compensation was unfair, but the authorities were unable to remedy the situation, as the appropriation was limited. The Post Office authorities attributed the situation to the extension of the rural free delivery system, which involved enormous expenses that had to be overcome in other branches of the department.

Mr. Beach said apparently the Post Office Department did not have sufficient money to carry on all its work satisfactorily.

Mr. Fassett said the actual tendency of Congress and the Post Office Department was to decrease the units of revenue and to increase the facilities constantly.

J. W. Hinkley, Jr., of Poughkeepsie, told an incident of one company which had received 3 cents a mile, or at the rate of 1½ cents a trip, and after complaint to the Government was given an increase to 4 cents a mile, or 2 cents a trip.

C. Loomis Allen, New York State Railways, referred to the provisions of the Public Service Commission's law requiring schedules to be filed, and prohibiting discrimination. Officials of companies seemed to be of one mind, that the transportation of United States mail did not pay. Were they not weak, however, in arraigning that fact before the Government if they did not suggest at the same time what they did consider would be a fair rate? What would be the effect if electric railways carried United States mail at the lowest rates for which they transported other property of the same value and importance? No other property was as valuable unless it might be perishable material. If railway officials who had considered the subject carefully should urge a conclusion as to rates that would be fair and equitable, the companies would be in a much stronger position in presenting their case.

J. E. Duffy, Syracuse Rapid Transit Company, had been carrying mail in closed pouches for some years. The Government established substations and asked the company for what compensation it would carry mail to these substations, intimating that the rate for star route service would amount to about $450 a year. In presenting an estimate to the Government for this service, the average earnings of $2 per car-hour were taken as a basis. It was figured that it would take a car 14 hours a day to give the service demanded, and a price of $10,500 per annum was fixed in the tender to the Government. The offer had not been accepted.

Mr. Hinkley thought the discussion showed how necessary it was that the committee should be prepared to suggest to the Government rates that the lines should receive.

Frank Rhea, General Electric Company, had had experience in steam railroad service, and referred to an incident where an exchange office was built in accordance with the requirements of the department at the crossing of nine roads. This location was much more convenient for most of the merchants in the town than the main post office, and they used it at the expense of the railroads until, after a long time, this unsatisfactory condition was finally remedied.

Mr. Allen thought that if a company was carrying perishable goods 365 days in the year, it would endeavor to find out something about the cost of the service. The compensation should be figured at the same rate as for a standard passenger car. It seemed to him that the committee could be furnished with statistics giving an idea of what would be just compensation for the service.

J. T. Smith, Fishkill Electric Railway, had received an increase from 3 to 4 cents per car-mile for the service. The facilities were a convenience to the people, who had five or six deliveries a day, whereas if they depended upon the steam roads they would have but two deliveries daily.

Mr. Allen thought the railways and the Government were placed in the position of giving one class of service discriminatory rates, with little equity and justice. Governor Hughes had vetoed a law providing for free or reduced rates to postal employees. Under existing laws electric lines were in a position to demand just and proper compensation.

Mr. Allen stated in answer to a question that he would suggest for closed pouch service an arbitrary rate of 1½ cents for 100 lb. per mile.

Mr. Fassett thought that there should be a definite statement of the situation. The Post Office Department sent on his lines heavy boxes of postal cards and iron posts with mail boxes attached.

W. R. W. Griffin, Rochester Railway, referred to the Government report on mail rates in Great Britain, indicating that English railroads were allowed rates high enough to make the earnings of mail trains equal to those of passenger earnings.

The committee appointed by President Peck to take up this subject, as stated in last week's issue, has not yet announced its plan of action.

REPAIR SHOP AND CAR HOUSE TESTS OF ELECTRIC EQUIPMENT OF CARS

H. A. Benedict, chief engineer, United Traction Company, of Albany, opened the discussion on this subject with the following outline of tests commonly made:

The constituent parts of the electric equipment of cars which require testing are the motors, controllers, circuit breakers, fuse boxes, resistances, wiring, air compressor motor and governor. The repair shop is in one sense the factory where all parts of the electric equipment are remade after having failed in service. It may be well, therefore, to consider first what tests are made upon the various parts of the electric equipment before they are delivered to the railway company by the manufacturer. The following is an outline of the factory tests usually made on railway motors:

The tests applied to motors are divided into two classes, special tests and commercial tests. Special tests are made to determine the electric characteristics of a given type of motor, such as core loss, saturation, thermal characteristics, commutation, input-output efficiency test and speed curves. Commercial tests include a series of high potential tests of commutator, armature coils, field coils and complete motor; heat run and speed test.

The detail insulation tests are as follows:

The completed commutator, after all the bars are assembled with insulation and bolts pulled up, is given an insulation test of 4800 volts to ground and 300 volts between consecutive bars. After the commutator is pressed on the armature shaft it is given a test of 4400 volts to ground. After armature coils are in position on the core with the bottom leads connected to the commutator and before the top leads are connected, the armature is given an insulation test of 4400 volts to ground and 300 volts between adjacent leads. After the top leads are connected to the commutator and before banding, the armature is given an insulation test of 4000 volts to ground, and a transformer test for short-circuits. After banding, the completed armature is tested with 3600 volts to ground. Completed field coils before being installed in the motors are tested for short-circuits, and after being placed in the motor and connected in series are tested with 3600 volts to ground.

In the heat run and speed test two motors are mounted upon the same shaft with the pinion of each meshing in the same gear. One motor runs as a driver and the other as a generator at three-fourths of its full load for one hour. The following readings are taken:

Speed in both directions of rotation at the beginning and end of the test.

Voltage across the field coils at the beginning and end of the test.

Insulation resistance before and after test.

Upon completion of the heat run the complete motor, while hot, is given an insulation test of 2800 volts to ground for one minute.

When motors pass through the repair shop it is necessary that repairs be made so that the motor is in as good

operating condition as when it left the factory. In order to determine this fact the commercial factory tests should be applied: Insulation and conductivity tests should also be applied to controllers, circuit breakers, fuse boxes, resistances, cables and air compressor motor, and load tests applied to the circuit breaker and air governor.

The tests applied to the electric equipment of cars in the car house may be divided into two classes:

1. Those tests applied to locate defects which have not as yet reached that stage where they cause trouble in the operation of the equipment.

2. Those tests applied to locate defects which have caused trouble in operation.

The test of the electric equipment of cars which have not shown defects in operation may be made by a test car equipped with motor generator set, resistance coils and galvanometer. In making these tests the resistance is taken from trolley to ground at each step of the controller, and for each motor separately. Circuit breakers and air governors are given current tests at 10 volts. The tests applied to locate defects which have caused trouble in operation are insulation tests, short-circuit test, and conductivity test.

E. H. Anderson, General Electric Company, described the manufacturer's method of developing a new type of motor. After the general characteristics of the motor are decided upon the necessary calculations of windings are made and the details of the mechanical construction are worked out in the drafting room. Two or more sample motors are then built and submitted to the special tests to determine their speed and current consumption under different conditions of load, tractive effort, input-output efficiency and commutation. One sample motor is geared to the shaft with a gear and pinion of normal ratio, and another is geared to the same shaft to act as a load when driven as a generator. The gears and pinions used are moderately worn and represent average service conditions. Tests of input-output efficiency made in this way include gear and bearing losses. If the motors pass these tests they are put under cars of different weights and operated for long periods under different conditions of speed, stops per mile, grades, etc. Test runs of 12 to 14 hours' duration are made to determine the temperature rise in the motors under normal operating conditions. On the temperature rise depends to a great extent the life of the motors. The weight and speed of the test car are usually sufficient to produce a temperature rise in the motors of not less than 65 deg. Cent.

Wire-wound armatures are insulated with cambric and varnish. When the varnish is heated above 80 deg. Cent. it will begin to deteriorate, and the higher the temperature rise in the motor the shorter will be the life of the insulation.

The speaker had made a study of the practice of overloading motors on a number of roads a few years ago and found that when motors were loaded to give a temperature rise of from 45 deg. to 50 deg. Cent. the life of the insulation was limited only by the mechanical wear and tear. With a rise of 65 deg. Cent. the life of the varnish was about six years; with a 70-deg. rise the life was from two to three years, and with a 90-deg. rise, corresponding to a heat much higher than the boiling point of water, the life was less than one year. One company used very small motors and operated them with a temperature rise of 85 to 90 deg., which required the armatures to be rewound as often as once every three months. This company made its own coils and considered it to be more economical to overload light motors and rewind them frequently than to pay more for heavier motors and also to pay for hauling around the extra weight. A 40-hp motor weighs about 2700 lb. and a 75-hp motor weighs 4000 lb. The difference in first cost is nearly proportional to the weight.

In large motors using ribbon or bar windings sheet mica can be wrapped around the separate conductors of the main or polycoils, and this type of insulation is unaffected by high temperatures. Some motors for one of the Chicago elevated railways were operated for three years with a temperature rise of 125 deg. Cent. without developing trouble. The problem in small motor construction is to get a flexible insulation which will withstand excessive temperatures. Asbestos had been tried, but it absorbed moisture readily and thus introduced danger from grounds and short-circuits. Another solution of the problem of keeping down the weight and cost of railway motors would be to use high-speed armatures, but this would involve innumerable commutator, brush and bearing troubles.

Commercial tests of motors, the speaker explained, were intended to insure simply that all motors manufactured of one type correspond in their characteristics with those of the first sample motors. The high potential tests used were necessary to detect faulty workmanship or material during construction of the motors. The potential used should be reduced as the motor progressed toward completion since high-potential current if continually applied would ultimately break down perfect insulation. The tests prescribed by the American Institute of Electrical Engineers require a high potential test of 2800 volts for one minute while the motor is still hot after a run under load. Great care should be used in applying a high potential test to an armature taken from service in order to repair only a few coils. The insulation of the remaining coils while good for further service might be punctured easily by the high potential current and the whole armature would have to be rewound. A test of 1000 volts was usually sufficient for the purpose. The speaker did not believe a resistance test of insulation was of any real value.

T. Scullin, master mechanic, New York State Railways, used a break-down test on commutators of 3000 volts for two minutes and a bar-to-bar test of 200 volts. He made weekly tests of the carrying capacity of circuit-breakers, which required about one minute for each instrument. His experience had been that complete reliance could not be placed on the manufacturer's commercial tests of motors before delivery. New motors which may have tested satisfactorily in the factory sometimes failed after 20 minutes of service when put under a car.

C. Remelius, superintendent of rolling equipment, Public Service Railway, described a testing car used by his company for inspecting the condition of the electrical apparatus on cars at isolated car houses. An old single-truck car had been equipped with a high-current low-voltage motor generator set for testing circuit-breakers and a Herrick galvanometer with the necessary appurtenances had been installed for testing the resistance of motor fields and armatures and car wiring. The motor-generator set supplied current at 7 volts. This car was manned by two experts and was run from car house to car house making tests. It could only get over about half the system each year and the company was considering building one or two more similar cars. Referring to Mr. Scullin's experience with new motors failing in service, Mr. Remelius believed that most failures were due to the motors having absorbed moisture in the windings and insulation while being stored after delivery.

H. S. Williams, electrical engineer, Utica & Mohawk Valley Railway, said that his company gave armatures

which had been completely rewound a break-down test of 2000 volts and 1000 volts to armatures which had only been repaired. All cars were sent to the shop after completing 20,000 miles and the circuit-breakers and car wiring were thoroughly tested for defects. A potential of 1000 volts was used in testing car wiring.

BEST TYPE OF ROADBED CONSTRUCTION IN PAVED STREETS

Mr. Benedict, in opening the discussion on this topic, described the standard track construction of the United Traction Company, of Albany. The subgrade, which is firm clay, is first thoroughly rolled and the trench is then filled in with 6 in. of crushed stone, which is also rolled. On top of this 6-in. x 8-in. yellow pine ties, untreated, are placed on 2-ft. centers. The rails are spiked down and the track surfaced by tamping, after which broken stone is put in between the ties up to the level of the base of the rail. A thin concrete foundation for the paving is then placed on top of the ties. In order to drain the roadbed a row of agricultural tile is laid down each side with cross drains at intervals leading to the curb line of the street. With this construction the ties last as long as the rails. In a piece of track laid with girder rail 14 years ago the ties were recently found to be in almost as good condition as when laid. The speaker believed that steel ties laid in concrete at the same cost as wood ties would corrode in time and would have little if any longer life, certainly no longer than the life of the rails laid on them.

E. P. Roundey, engineer maintenance of way, Syracuse Rapid Transit Railway, thought the weak point of steel tie construction was the fastening between the ties and the rail which had a tendency to work loose and allow the rail to pulverize the surrounding concrete. For track carrying light city cars he thought a crushed stone foundation, such as was used in Albany, was quite satisfactory, but for track carrying heavy interurban cars rigid concrete construction was preferable.

M. J. French, engineer maintenance of way, Utica & Mohawk Valley, thought that heavy vehicular traffic did more damage to the pavement and track foundation than the passage of cars. The life of the pavement was the real criterion, and he believed that a rigid concrete foundation would prolong the life of the pavement.

E. J. Cook, vice-president, New York State Railways, said that the most important point in laying concrete track foundations was to keep the cars off the track for at least seven days, and preferably 10 to 14 days, after the concrete was laid in order to permit the cement to take a permanent set. In laying track on a crushed stone foundation, however, it was advisable to tamp the track to surface while the cars were running over it as in no other way could perfect and lasting surface be obtained.

Mr. Benedict did not think rails laid on a rigid concrete foundation would have as long a life as if laid on crushed stone. He also called attention to the marked deterioration of concrete pavement foundation near street car tracks in Albany, which he believed could be ascribed to the effects of electrolytic action from stray return current.

Martin Schreiber, engineer maintenance of way, Public Service Railway, Newark, N. J., thought that engineers had gone too far in advocating rigid concrete foundations for all track in paved streets. If the soil in the subgrade was such that the track could be held to surface and alignment on a crushed stone foundation it was not worth while to put in the more expensive concrete construction, which would be ruined if the street was opened for sewer, water or gas pipe excavation. Steel ties could not be used to advantage on a crushed stone foundation because so many ties were required per mile of track that the expense was almost prohibitive. If steel ties are used in a concrete foundation they should be rigidly fastened to the rails to prevent vibration and disintegration of the concrete. Wooden ties when embedded in concrete gave some flexibility to the track structure which the speaker believed was desirable. Mr. Schreiber thought that some form of preservative treatment would eventually be used with all wooden ties. The cost of this treatment was constantly decreasing.

Referring to the relative merits of Bessemer and open-hearth steel rail the speaker said that open-hearth rails had not yet been in service long enough to determine their increased life, if any. They were harder than Bessemer rails. Manganese steel rails for curves and points of heavy wear were coming into general use. Two curves on the Public Service Railway, on which Bessemer rails formerly wore out and had to be renewed every nine months, were laid with manganese rail two years ago and to-day show little appreciable wear.

The life of rail joints should equal the life of the rails, but not mechanical joint with which the speaker was familiar had a long life under heavy traffic. The ordinary bolted fish-plate joints gave out in about three years. Some form of welded or rigidly riveted joint should be used. It was most important, however, to finish perfectly by grinding the surface of the rails at welded joints so as to prevent any pounding. A difference of as little as 0.01 in. would cause trouble in time.

Mr. Schreiber called attention to the desirability of adopting a few standard rail sections. At the present time more than 200 sections, many of them differing only slightly from others, were being rolled. He believed that 10 standard sections would cover all requirements and the general use of these standards would result in lowering the cost of rails and promote prompt deliveries from the mills.

HAS SLOTTING COMMUTATORS ELIMINATED MOST OF THE COMMUTATOR AND BRUSH TROUBLES?

W. J. Harvie, chief engineer, Utica & Mohawk Valley, opened the discussion on this topic. He had been told by an engineer whose opinion he valued highly that slotting commutators was unnecessary and that good commutation was dependent entirely on the kind of mica used for insulation between the segments. His own experience had been that slotting the commutators of any type of motor reduced trouble from sparking and flat spots and reduced the wear on the brushes.

E. H. Anderson, General Electric Company, said that if the softest grade of amber mica was used it might not be necessary to slot commutators, but very soft mica caused trouble by having insufficient resistance against compression. It tended to squeeze out and distort the shape of the commutator. A carbon brush sliding on a commutator is in effect an arc lamp of high temperature which burns away the copper and disintegrates the mica. The problem is to cut down the mica as fast as the copper wears away. There had been great improvements made in carbon brushes recently and less commutator trouble might be expected. He cited some motors used in extraordinarily hard service in Kansas City, Mo., in which brushes containing 1½ per cent of carborundum had solved the difficulty of cutting down the mica as fast as the copper wore off. He did not believe, however, that this was the proper solution. The best method was to use mica hard enough to prevent the

commutator losing its shape and then slot out the mica to a moderate depth at regular and frequent intervals.

Slotting commutators too deep may cause as much trouble as not slotting at all. The Boston Elevated Railway attempted to overcome commutator trouble on a large number of WP-50 motors by slotting ¼ in. deep. The commutators still gave trouble and the company is now slotting only 1/32 in. deep, but doing the work frequently. A possible method of overcoming most if not all commutator trouble would be to use the very hardest mica of double the thickness now employed and keep the mica constantly cut out to a moderate depth.

D. E. Blair, superintendent rolling stock, Montreal Street Railway, said he had had no trouble with commutators which were not slotted, but he was planning to experiment with slotting and had designed a machine to do the work. In repairing commutators he always used the softest grade of Canadian amber mica and commutators made or repaired in the company's shop had a life nearly three times that of the commutators on the motors when received from the manufacturer.

Mr. Benedict said he did not slot the commutators of small motors, but did slot large motor commutators. He did not believe the results on small motors warranted the expense.

Mr. Williams said that the Utica & Mohawk Valley began to slot all commutators about a year ago and that the results on small motors were as satisfactory as on large motors. In 1908 before slotting was tried, an average of 82 commutators were repaired each month, but in 1909 this had been reduced to 32 a month. There had also been an equally large reduction in brush consumption. In 1908 an average of 789 brushes were used per month, while in 1908 this had been reduced to 471 brushes per month. The value of slotting lay not so much in the better commutation obtained and freedom from break-downs as in the marked saving in general motor maintenance.

INTERURBAN CODE

C. Loomis Allen, in discussing the interurban rules adopted at the Denver convention of the American Street & Interurban Railway Transportation & Traffic Association, stated that there was a long time when it was a question of doubt in the minds of many whether the American Association as reorganized in St. Louis in 1904 would survive. There was a period of considerable trial in the early years of the association, and great credit was due to a few of the first officers and supporters of the movement to make the association a representative one in the industry. Those who attended the last Denver convention realized that the future of the association was now assured.

Mr. Allen said that the work in which electric railways were engaged was live work. It changed as the day changed, and what was good practice a year ago was not good practice now. For a number of years the committee of the American Association had considered rules governing the operation of trains, and was most active last year, giving time and experience freely in the consideration of the subject. The first report submitted at the convention of 1908 was not adopted, but was referred back to the committee for further consideration. Another report was made at the last convention, after consultation between the railroads and public service commissions. It was without doubt the unanimous sentiment of the officers and the executive committee of the Transportation & Traffic Association and the American Association that the interurban and city rules as presented and amended represented the best thought and practice of the industry. While there were some radical amendments at the convention, the clearing house of votes reconciled all the differences.

Mr. Allen then referred to the movement for the adoption of rules in Ohio involving differences from the American code. He said, as announced in last week's issue, that at the next annual meeting of the New York State Association, he would move the adoption of the American code with such amendments as might be needed to fit it for local conditions in New York.

HEARING ON LIGHTING OF SUBWAY TRAINS

The hearing before the Public Service Commission of the First District of New York regarding the lighting of trains in the subway was continued before Commissioner Eustis on Dec. 10, 1909, with Chairman Willcox also in attendance and H. H. Whitman as counsel for the commission. Frank Hedley, vice-president and general manager, and Theodore Waugh, attorney, represented the Interborough Rapid Transit Company.

The first witness was an expert for the commission who had conducted photometric tests to ascertain the relative efficiency of 16-cp frosted lamps with prismatic reflectors and 16-cp lamps without the reflectors. The efficiency of the 16-cp frosted bulbs with prismatic shades as light diffusers was 10 per cent to 15 per cent greater than the unshaded, unfrosted lamps. To equip the trains of the company with the frosted lamps and shades would involve an initial expenditure of $7,500. He cited the auxiliary storage battery installation on the cars of the Hudson & Manhattan Railroad, which was automatically cut into circuit when the power current failed. This equipment added 180 lb. to the weight of each car and cost $70.

Mr. Hedley said that the 16-cp plain lamps were so far superior to the 10-cp lamps now in use that he felt they would meet all the requirements. He was certain that the slightly increased efficiency with the frosted lamps and reflectors did not justify the additional expense which they would entail. Moreover, they would be costly to maintain, and would detract from the appearance of the car if the reflectors were damaged and not replaced at once.

E. G. Connette, transportation engineer of the commission, had inspected the train being operated by the company which is equipped with the 16-cp plain lamps and from a layman's viewpoint felt that these lamps were better suited to the requirements than the frosted lamps with reflectors. It was true that the distribution of light was better with the reflectors and frosted globes, but the difference did not seem to justify the additional expense involved and the car equipped with the unfrosted, unshaded lamps certainly appeared to be better lighted than the other. Mr. Eustis and Mr. Whitman both agreed with Mr. Connette about the relative attractiveness of the two methods of lighting and their probable effect upon the passengers.

Mr. Hedley had 50,000 10-cp lamps on hand at the time of the hearing and thought it would take about 30 days to secure enough 16-cp plain railway lamps to replace those now in use. He agreed to change from the 10-cp lamps to the 16-cp unfrosted lamps on both the elevated and the subway rolling stock, the one case before the commission being made to cover both the subway and the elevated lines, pending an order from the commission to this effect. The subjects of station lighting and storage battery equipment to supplement the lighting circuits on cars were to be heard on Dec. 17.

MEETING OF THE CENTRAL ELECTRIC ACCOUNTING CONFERENCE

The eleventh regular meeting of the Central Electric Accounting Conference was held at the Algonquin Hotel, Dayton, Ohio, on Dec. 11, 1909.

There were present, representing the accounting departments of electric railways within the States of Ohio, Indiana, Illinois, Kentucky and Western Pennsylvania, W. H. Forse, Jr., A. F. Elkins, C. B. Baker, W. B. Wright, S. C. Rogers, E. D. Gault, Herbert M. Burington, C. E. Thompson, Kinney Sprague, Walter Schroyer, E. J. Skehan, F. K. Young, A. Katterheinrich, Gus A. Kohler, William H. Neikirk, L. T. Hixson, A. J. Lamb, E. L. Kasemeier, O. Burgett, O. J. Davis, J. E. Hirshey and W. D. Mertins. C. C. Collins was present as a representative of the Central Electric Traffic Association. W. H. Forse, Jr., acting president, was chairman. Following is an abstract of the report of the executive committee:

REPORT OF EXECUTIVE COMMITTEE

The conference during the past year has again had its influence recognized in a national way. The rules for settlement of interline transactions, which were adopted by the conference in March, 1907, and the set of uniform blanks adopted in March of this year were used as a basis for the report submitted by the committee on interline accounts of the American Street & Interurban Railway Accountants' Association. After a full discussion of that report at the Denver convention, in October, it was adopted, and the National Association is now on record as recommending the methods which were formulated by the Central Electric Accounting Conference.

The question of affiliation with the Central Electric Railway Association has not yet been discussed in a formal manner with the members of that association, because it has been impossible on account of sickness or absence of members of our executive committee, to meet the appointments requested by the Central Electric Railway Association. When the meeting is held your committee will present whatever proposal is made, to be voted upon by the conference as a whole.

The report of the committee on "Uniform Practice in the Treatment of Car-Miles and Car-Hours" included an abstract of the proceedings of the Denver convention of the American Street & Interurban Railway Accountants' Association, and was presented by S. C. Rogers, the chairman.

The plan outlined by the committee as a uniform practice in the treatment of car-miles and car-hours, as published elsewhere in this issue, was on motion adopted as the standard of the Central Electric Accounting Conference.

The abstract of the proceedings of the Denver meeting of the Accountants' Association, presented by the same committee, said in part:

REVIEW OF DENVER MEETING

The convention held at Denver was attended by a fair representation of the members.

Denver is an ideal city in which to hold a convention. About the first thing a person observes upon arriving in the city is the narrow-gage railway track and its very light and well-kept cars. The mountain scenery about Denver is very beautiful. The hospitality shown and the entertainment furnished by the local company have never been excelled by any company.

While there were fewer meetings, the prompt and regular attendance of every delegate showed the deep interest in the convention. The meeting was called to order by President R. N. Wallis and he delivered a very able and interesting address.

The paper on "Interurban Statistics," by S. C. Rogers, treasurer, Mahoning & Shenango Railway & Light Company, was read in his absence by Wm. H. Forse, Jr., treasurer, Indiana Union Traction Company. There was considerable discussion which brought forth the fact that almost all companies represented were using revenue miles. A number thought that dead miles should also be included as it cost almost as much to operate cars to and from starting point as for regular service, which consumes a certain amount of power, including maintenance of equipment, platform time, etc. After some further discussion as to whether or not the "ton-mile" was not the most accurate the subject was referred to the committee on standard classification of accounts for a report.

The paper on the "Electric Railway Auditor and His Duties and Relation to the Organization," by W. B. Brockway was a very able paper, and in his absence was read by W. F. Ham, of Washington.

The paper on "Pay Rolls and Time-Keeping," by N. E. Stubbs, auditor, United Railways & Electric Company, of Baltimore, was also a very able paper. Almost all companies pay twice a month. The Denver company trainmen receive their pay each day. Mr. Ham, of Washington, stated his company used the same method. Both companies think this is a very good practice and lessens the desire of the trainmen to hold out fares, as they always have money of their own by being paid each day. Mr. Ham stated it did not entail a great deal of additional labor to keep this record. From the discussions brought forth it seemed that most companies present paid by cash and took receipts, while a number paid by check and gave very good reasons for that system, which is far in advance of the cash envelope system, where companies operate interurban lines or other properties that are pretty well scattered, as it reduces the labor in making up a pay roll. It also is a better protection to the company. There is less chance for leakage, as a check is made payable to the order of the employee and this can be sent out to the different foremen through registered mail, while in the case of paying cash it would be taking quite a risk, unless a company runs a pay car, which is quite expensive.

The paper on "Stores Accounting and Inventory," by E. S. Pattee, was a very interesting paper.

The report of the standing committee on standard classification of accounts and forms of reports urged the members of the association to use the new classification as adopted by the Interstate Commerce Commission whether or not they were subject to Federal or State supervision. It seems the majority of roads present were not using the new classification. Everybody that was using the standard classification as adopted by the Interstate Commerce Commission was very much in favor of it and found it more satisfactory than the old classification formerly used, especially those operating interurban lines.

The report of the committee on interline accounting recommended the unit type of way-bill for each shipment, instead of the blanket way-bill such as is used by steam lines and a few electric lines, as the unit way-bill answers the purpose of the interurban lines better than the blanket way-bill. This is the same form that has been adopted by the Central Electric Accounting Conference. The committee also recommended the same use of forms and manner in reporting interline ticket sales as adopted by the Central Electric Accounting Conference.

PAPERS PRESENTED

The paper on "Conductors' Fare Collections," by C. E. Thompson, auditor, Chicago & Milwaukee Electric Railroad, which is published elsewhere in this issue, resulted in a discussion that brought out a number of important points in connection with the collection of fares. This paper will no doubt be followed in the near future by another taking up other features in connection with the same subject.

A paper was read by E. D. Gault, auditor, Mahoning & Shenango Railway & Light Company, on the "Accounting Features of the Corporation Tax Law." This paper and the subsequent discussion served to give a very much better understanding as to the requirements of this law. Mr. Gault said there were possibilities of changes in the law by Congress as business men expected to make objections to some of its provisions. Companies were not, however, justified in assuming that any changes would be made, but

should prepare to observe the law and render reports within the specified time.

The committee on resolutions, composed of S. C. Rogers, L. T. Hixson and Kinney Sprague, prepared suitable resolutions expressing the appreciation of the work done in the interests of the conference by the former president, M. W. Glover. The resolutions were adopted and ordered spread upon the minutes of the meeting and a copy forwarded to Mr. Glover.

OFFICERS ELECTED

The nominating committee consisted of C. E. Thompson, F. K. Young and E. D. Gault. The election was by ballot and resulted as follows: President, W. H. Forse, Jr., treasurer, Indiana Union Traction Company; vice-president, S. C. Rogers, treasurer, Mahoning & Shenango Railway & Light Company; secretary and treasurer, L. T. Hixson, auditor, Terre Haute, Indianapolis & Eastern Traction Company; to fill places on the executive committee, C. B. Baker, assistant auditor, Western Ohio Railway; C. E. Thompson, auditor, Chicago & Milwaukee Electric Railroad.

The next meeting of the conference will be held at Fort Wayne, Ind., on March 12, 1910.

UNIFORM PRACTICE IN THE TREATMENT OF CAR-MILES AND CAR-HOURS*

BY S. C. ROGERS, W. H. FORSE, JR., AND H. E. VORDERMARK

Your committee, after careful consideration, would respectfully submit the following plan of uniform practice in the treatment of car-miles and car-hours:

REVENUE CAR-MILES

The miles run by all cars when in use for revenue earning purposes only.

Revenue car-miles to be divided into two classes:

a. Cars used in passenger service (including chartered and special cars).

b. Cars used in freight, express and mail service.

NON-REVENUE CAR-MILES

The miles run by all cars for other than revenue earning purposes.

Subdivisions of Non-Revenue Car-Miles

First. Non-revenue car-miles of revenue earning cars.

The miles run by all cars between the car house and initial route terminal prior to their use for revenue earning purposes, divided into two classes:

a. Cars used in passenger service (including chartered and special cars).

b. Cars used in freight, express and mail service.

Second. Non-revenue car-miles of cars for repair and transfer.

The miles run by all cars while being transferred from one point to another for the purpose of repair or to be placed in service (not including movement of cars within car houses or car yards).

Third. Non-revenue car-miles of company service cars.

The miles run by all cars used in the service of the company, the expense of which is chargeable to the company itself, including work cars, sand cars, sprinklers, sweepers, snow plows, wrecking cars, etc.

TRACTION MILES

The miles run by locomotives or other forms of motor vehicles used for traction purposes only.

TRAIN CAR-MILES

When cars are operated en-train, either in passenger or freight service, the miles run by the train as a unit should be computed, but should not be used in the division of revenue or operating expenses except as it may apply to the revenue or expense incident to the operation of the train itself. The miles run by the motor car and each trailer car individually to be used in applying to division of revenue and operating expenses.

REVENUE CAR-HOURS

The hours of all cars when in use for revenue earning purposes only.

Revenue car-hours to be divided into two classes:

a. Cars used in passenger service (including chartered and special cars).

b. Cars used in freight, express and mail service.

NON-REVENUE CAR-HOURS

The hours of all cars for other than revenue earning purposes.

Subdivisions of Non-Revenue Car-Hours

First. Non-revenue car-hours of revenue earning cars.

The hours of all cars between the car house and initial route terminal prior to their use for revenue earning purposes, divided into two classes:

a. Cars used in passenger service (including chartered and special cars).

b. Cars used in freight, express and mail service.

Second. Non-revenue car-hours of cars for repair or transfer.

The hours of all cars while being transferred from one point to another for the purpose of repair or to be placed in service (not including hours of cars within car houses or car yards).

Third. Non-revenue car-hours of company service cars.

The hours of all cars in the service of the company, the expense of which is chargeable to the company itself, including work cars, sand cars, sprinklers, sweepers, snow plows, working cars, etc.

TRACTION HOURS

The hours of locomotives or other forms of motor vehicles used for traction purposes only.

TRAIN CAR-HOURS

When cars are operated en-train, either in passenger or freight service, the hours of the train as a unit should be computed, but should not be used in the division of revenue or operating expenses except as it may apply to the revenue or expense incident to the operation of the train itself. The hours of the motor car and each trailer car individually to be used in applying to division of revenue and operating expenses.

METHOD OF OBTAINING DATA NECESSARY FOR COMPUTATION OF CAR-MILES AND CAR-HOURS

The data for the computation of the car-miles and car-hours should be obtained from the daily report of conductors, which report should be so arranged in form as to indicate the exact movement of the car or cars under the conductor's direction and the hours such car or cars are operated, supplemented by a daily report from the mechanical department as to the movement and car-hours of cars under their direction. In other words, the accounting department should have, each day, a report as to the exact movement of each and every car of the company or system and the car-hours in operation, and all computation should be made directly from such daily reports.

Your committee recommends the foregoing plan, with the belief that it will furnish data of great value to the management engaged in operation of railway property. It also forms a better basis of comparison between companies, particularly as it serves to define many of the questions that arise when an analysis of car-miles and car-hours is made for comparative purposes, namely:

First. Car-miles and car-hours that apply to revenue earning purposes exclusively.

Second. That apply as an expense in the movement of cars between the car house and the initial route terminal, as to which point they enter upon their revenue earning.

Third. That apply as an expense in the movement of cars over the system for the purpose of repair or transfer to other points for service.

Fourth. That apply as an expense in the movement of cars used exclusively in the company's service.

Fifth. That apply to locomotives or other forms of motor vehicles used exclusively for traction purposes.

We believe that many economies can be effected by the

* Report presented at the meeting of the Central Electric Accounting Conference, Dayton, Ohio, Dec. 11, 1909.

management having an accurate knowledge of the car-miles and car-hours under the above plan, as the lines are drawn very clearly between the miles run and the hours in service of cars when in use for revenue earning purposes only and the miles run and hours of all cars when operated for non-revenue purposes, segregated in a manner that will allow of the cost per car-mile and per car-hour being determined under each of the subdivisions.

Your committee has in the foregoing plan simply laid down fundamental principles that will be practical in uniform practice operative on all companies, and under which further segregation of car-miles and car-hours can be made as may be desired by individual companies.

CONDUCTORS' FARE COLLECTIONS *

BY CHARLES E. THOMPSON, AUDITOR, CHICAGO & MILWAUKEE ELECTRIC RAILROAD

The proper accounting for all fares collected by conductors is one of the most difficult problems which confronts the accountants of electric railroads and it is also one of vital importance to the companies because of the fact that the conductors' collections represent, in almost every case, at least 90 per cent of the revenue of the company.

Every one who has studied the question of checking employees who handle cash in any business, must realize that there is a limit to every system beyond which he must rely upon the honesty of the men. We will probably all agree that honest men are greatly in the majority and that most men who become dishonest become so because proper methods are not used to prevent their first step in wrong doing. The accountant, therefore, has a responsibility to the men as well as to the company he represents, when devising and conducting a system for accounting for money handled by them; and he finds it his duty to throw as many safeguards around the men as possible.

The aim of every system of accounting for fare collections is to insure that all fares collected will be turned in and to provide traffic statistics. No one method may be relied upon entirely to insure that all fares will be turned in, but all methods must be combined to obtain the best results. The principal methods include the fidelity bond, the fare register, cash fare receipts, reports of over and shortages and secret inspection. Requiring trainmen to give a fidelity bond insures the company that no men will get into their employ who have not clean records, and the fact that they are under bond has a splendid moral effect upon the men. The fare register and the cash fare receipt give each passenger the opportunity of discovering and reporting the conductor who does not register the fare promptly and correctly. The report of overs and shortages, if properly followed up by the superintendent, keeps him informed as to the conduct of his men and makes them feel that they are being checked closely and are subject to discipline.

Much may be accomplished by inspiring the spirit of rivalry among the men. This can be done by a system of grading the men and furnishing each man a report at stated intervals which shows his standing. Secret inspection, while seldom productive of direct results, has a good moral effect upon the men and is of value when combined with the general scheme of preventing men from wrongdoing.

In preparing traffic statistics, the accountant must know the total number of fares collected, the amount of each fare, whether ticket, cash fare or transfer, and if he provides the transportation department with the required information he must know between what points the passenger rides. The cash-fare receipt is superior in many ways to the fare register. We find it equally as good a check upon the conductors and it gives information as to points between which passengers ride as well as the amount of fare collected. The cash-fare receipt, however, requires more time than the register, and for this reason cannot be used to advantage by companies having a large volume of short-ride patrons. There are many kinds of registers in use, all of which are good under certain conditions, but none of which is entirely satisfactory to companies having fares of more than $1 in amount. By registering the amounts of fares most frequently received and issuing cash-fare receipts for all other cash fares, we are enabled to get from the register the total passengers carried, and from the register reports and the cash-fare receipts, the number of transfer passengers, ticket passengers and cash passengers of the different denomination of fares. We are not able to determine, however, the points between which the passenger paying cash fare rode.

Great care must be taken in establishing a system of fare collections in order that the conductors shall not be so burdened with red tape that they cannot properly operate the car and collect the fares from all passengers in the running time allowed between stations.

The collection of fares on our city lines has been greatly simplified by the introduction of the pay-as-you-enter cars. These cars place the conductor in a position where he can collect fares easily and rapidly and at the same time be where he can look after the safety of passengers boarding and alighting from his car; and the companies using these cars are enjoying largely increased revenue as the result. Interurban roads are coming to realize the advantages gained by inducing their patrons to purchase tickets before boarding cars. The conductor can collect ticket fares much more rapidly than cash fares, is relieved from handling large amounts of money and of making change, and the money is handled by a few agents whose accounts are much more easily audited. Patrons of electric railroads have been accustomed so long to paying a cash fare on the electric cars that it is now largely a matter of education to get them to purchase tickets, but liberal advertising will bring results even where there is no saving and business can be greatly stimulated by inducing patrons to purchase return tickets at a rate slightly lower than double the one-way rate. Companies that have established cash-fare rates, which are as low or lower than consistent with the service rendered, are greatly handicapped in inducing patrons to purchase tickets. Companies not so handicapped can reduce their cash fares to a very small percentage of the total by selling tickets at a lower rate than the cash-fare rates.

The solution of the question of proper methods of accounting for conductors' fare collections is to reduce to a minimum the number of passengers paying cash fares and by so doing relieve the conductors of much labor, furnish the accounting department a source of information from which any statistics desired may be compiled and to a much greater degree insure the company against loss.

* Abstract of paper read before the Central Electric Accounting Conference, Dayton, Ohio, Dec. 11, 1909.

COLLECTION OF CORPORATION TAX

The rules which will govern the United States Treasury Department in the collection of the corporation tax have been made public by Secretary Franklin MacVeagh. The definitions of net and gross income are as follows:

"Net income" means not only net profits arising from the operation of the principal business of the corporation, but all items of income received from other sources, such as investments, holdings in other companies and businesses, etc. The expression "net income" is used because there can be no question as to its embracing amounts of income received from these outside sources, whereas there might be some question as to whether or not such items would be included in the expressions "net profits" or "net earnings."

In the same manner the term "gross income" includes gross profits, the expression being used because there can be no question but that it embraces all items of income received by any corporation from any source, while there might be some question as to whether "gross profits" or "gross earnings" would embrace such items.

Corporations are divided into six classes, and the following definitions apply to transportation companies:

Gross income consists of the gross revenue derived from the operation and management of the business and property of the corporation making the return, together with all amounts of income (including dividends received on stock of other corporations, joint stock companies, and associations subject to this tax) derived from all other sources, as shown by the entries on its books from Jan. 1 to Dec. 31 of the year for which return is made.

PROGRAM FOR MID-YEAR MEETING OF THE AMERICAN STREET & INTERURBAN RAILWAY ASSOCIATION

The American Street & Interurban Railway Association is planning to hold its mid-year meeting in January at which time there will be a meeting of the executive committee and a number of concurrent meetings of other committees of the association. The dates set for the mid-year meeting are Jan. 27 and 28, the last Thursday and Friday of the month, and it will be held at the headquarters of the association, 29 West Thirty-ninth Street, New York. On Thursday morning the committees which will meet will be those on public relations, Interstate Commerce Commission affairs, compensation for carrying United States mail and revision of associate membership. The chairmen of the committees on active and associate membership will also be present.

On Thursday afternoon the executive committee of the association will hold a session and will receive the reports of the committees which have met during the morning so as to act on their conclusions and draw up a tentative program for the work during the ensuing year and for the convention of 1910.

In accordance with the resolution passed at the recent Denver convention, a general conference will be held on Friday, Jan. 28, which will be open only to the officials or representatives of member companies who fix the policies of the member companies they represent. This conference has been arranged with the idea of bringing together the representative men of the street railway field to discuss the important subjects which bear directly on the question of return upon capital invested, and it is expected that, with a large attendance and a general interchange of ideas, results beneficial to street railways will be derived.

On Friday evening the Manufacturers' Association will tender a banquet to the executive committee and other visiting officials. Arrangements have been made for addresses at this banquet by several gentlemen prominent in national affairs who have an intimate knowledge of the electric railway industry.

ANNUAL MEETING OF THE AMERICAN STREET & INTERURBAN RAILWAY MANUFACTURERS' ASSOCIATION

A meeting of the executive committee of the American Street & Interurban Railway Manufacturers' Association was held in New York on Dec. 10. The members of the outgoing executive committee who were present were the following: Jos. R. Ellicott, Eastern manager, Westinghouse Traction Brake Company, New York, N. Y.; Charles C. Peirce, manager railway department, General Electric Company, Boston office, Boston, Mass.; Charles C. Castle, vice-president, Hildreth Varnish Company, New York, N. Y.; C. S. Hawley, vice-president and general manager, Consolidated Car Heating Company, New York, N. Y.; K. D. Hequembourg, general sales agent, Walker & Bennett Manufacturing Company, New York, N. Y.; James H. McGraw, president, McGraw Publishing Company, New York, N. Y.; Henry C. Evans, Lorain Steel Company, New York, N. Y.; Howard F. Martin, general manager of sales, Pennsylvania Steel Company, Philadelphia, Pa.; Arthur S. Partridge, president, Arthur S. Partridge & Company, St. Louis, Mo.; J. W. Porter, first vice-president, Electric Service Supplies Company, Chicago, Ill.; A. H. Sisson, general manager, Forsyth Brothers Company, Chicago, Ill.; W. L. Conwell, Westinghouse Electric & Manufacturing Company, New York. Otis H. Cutler, president American Brake Shoe & Foundry Company, New York, N. Y., was represented by William McGowan.

The outgoing committee approved the secretary-treasurer's report, which showed that on Dec. 8, 1908, the balance on hand was $6,851.88; that receipts for the year since were $24,007.17, the disbursements $25,989.76, and the balance on hand $4,869.29. The secretary-treasurer's report also showed that the association had 274 members, of whom 60 had been initiated during the past year.

The election of officers followed, and Joseph R. Ellicott was re-elected president. The four vice-presidents were also re-elected, as follows: Mr. Peirce, in charge of entertainment; Mr. Hawley, in charge of finances; Mr. Hequembourg, in charge of exhibits, and Mr. McGraw, in charge of relations with the American Street & Interurban Railway Association. Mr. Conwell was appointed chairman of the committee on hotels; Mr. Castle, chairman of the committee to report on changes in the method of issuing badges; Mr. McGraw, chairman of the press committee, and Mr. Partridge, chairman of the membership committee.

ASSISTANCE TO PASSENGERS IN ALIGHTING

By Howard C. Lake

In the discussion of the report of the city rules committee at the Denver convention a written communication was contributed by James L. Quackenbush, general attorney for the Metropolitan Street Railway Company in New York City, and was printed on page 753 of the Electric Railway Journal for Oct. 7, 1909. This communication called particular attention to Rule 110, which refers to conductors assisting elderly and feeble persons, etc., from the cars, and stated that the highest court in New York State had decided that such action on the part of the conductor imposes a duty upon the company that it shall be done carefully and that if a passenger falls by reason of an employee's negligence, the company is liable. In other words, liability may be imposed for the negligent doing of a gratuitous act. The letter has suggested the inquiry as to whether the law on this point was the same in other States.

A reading of the case cited by Mr. Quackenbush (Hanlon vs. Central Railroad Company, 187 N. Y. 73) shows that plaintiff was a passenger on a train which had arrived in Jersey City and that, while she was in the act of descending the car steps, the conductor reached out his hand to help her, took her arm by the elbow, but before she stepped down withdraw his support and she fell. The plaintiff received a judgment which was unanimously affirmed in the Appellate Division of the Supreme Court, though no opinion was rendered. It was then taken to the Court of Appeals, the highest tribunal, where it was again unanimously affirmed, so that question may now be said to be definitely determined.

The negligence alleged was that the servant, without warning, removed his hand. There was no claim of defective steps or platform. This the jury was distinctly told and further: "That the defendant was under no duty, through its employees or otherwise, to assist this plaintiff in alighting from the train." The counsel for the company was refused the requested instruction: "That the defendant was not liable for the carelessness, if any, of the conductor in performing a gratuitous courtesy to the plain-

tiff." The only question was said to be whether the company's contractual relation extended to a responsibility for the act of its servant in charge of the train. The reasons for the decision are quoted below:

A conductor is placed in a position of responsible control by the company and he is bound to exercise the greatest care in seeing to the safety of passengers. He is invested with such apparent authority over them as, reasonably, to induce their confidence in and compliance with his directions and, as well, their reliance upon his acts. The situation, in this case, it is true, was not such as to suggest any serious danger to the plaintiff in leaving the car; but, when the conductor assumed to extend his aid in doing so, she had the right to accept it and to rely upon his act being a careful one.

The action was apparently decided *de novo,* and at the time did not attract the attention which its novelty and importance deserved.

This New York decision, twice unanimously made by two different courts, would doubtless be followed should the question arise in other States, but so far as the writer of this article has been able to find, it has never been adjudicated elsewhere in exactly this form, but there will be general assent to Mr. Quackenbush, who has had considerable experience in defending the suits of the largest street railway litigant in this country, as to the practicability as a business proposition of continuing the rule and assisting certain classes of passengers in alighting. The reasons advanced in his letter seem convincing.

A somewhat similar case was decided by the Supreme Court of Wisconsin in 1900, in the case of Werner vs. Chicago & Northwestern Railway Company (81 N. W. Rep., 416). It appeared that a railway employee invited a lady passenger weighing over 200 lb. to alight on the side of the car where the lowest step was over 2 ft. above the frozen ground. She was the last to leave the car, and her little boy got off just ahead of her. When she reached the platform and came down the steps the employee, who "had a uniform on," took hold of her left hand, gave her a little pull and caused her to lose her balance. The uniformed employee of the railway, whose duty it was to stand by the steps as passengers entered or left the car, testified that preceding passengers had alighted on the west side, that when plaintiff and her son approached she was not looking toward him and he said: "Step off on this side, please." As she neither looked nor made answer, he crossed to the opposite side, helped the boy off, turned around to put down her shawl-strap, which she had handed him, did not get hold of her until she was getting off the step and that after she got upon the ground her legs gave way. He had asked her to wait until he could put down the bundle.

The Appellate Court said that it would have to accept plaintiff's version as correct, but observed that both agreed in testifying that tendering his services to assist her off the east side of the car must be regarded as an invitation for her to get off on that side of the car. Plaintiff's verdict of $3,000 was affirmed on the authority of other Wisconsin cases, the court saying:

The defendant, as a common carrier of passengers, was certainly bound to provide a safe place for the plaintiff to alight on reaching her destination, and, in view of her age and condition, to render her such reasonable assistance as to enable her, if in the exercise of ordinary care on her part, to alight in safety.

Cases in Texas and New Hampshire, where the facts varied somewhat, also consider this question of assisting passengers to alight, but the two cases mentioned above are those which possess particular interest to operating departments in formulating rules.

COMMUNICATIONS

RULES FOR OHIO INTERURBAN RAILWAYS

Washington, Baltimore & Annapolis Electric Railway Company

Baltimore, Md., Dec. 13, 1909.

To the Editors:

The writer has read very carefully the letter published in the Electric Railway Journal of Dec. 11, page 1192, bearing date of Nov. 29, and signed by John C. Sullivan for the Railroad Commission of Ohio, and Frank A. Davis, for the committee of electric railway operating officials of Ohio, dealing with the subject of operating rules for Ohio interurban railways.

Referring particularly to the last paragraph in their letter, it is stated that "It will be understood that the book of rules which has been prepared by us is not a standard code of rules in the sense that it will have to be adopted by the interurban roads of Ohio." It is fair to assume, however, that the rules changed by these gentlemen must not be incorporated in the form they were adopted at Denver. In other words, they brand as unwise or dangerous these rules as shown in the Denver code. The interurban lines of Ohio do not differ in any essential particular from those of Indiana, or of New York, yet rules which are believed by the operators of those States to represent the best practice, and to be entirely safe, entirely change their character when they are intended for use in Ohio. The American Association has no feeling that the Denver code should not be modified, but undoubtedly does hope that in the form adopted, or some modified form, the code can be made standard throughout this country. If the rules as adopted at Denver are unwise, or dangerous, surely this can be clearly shown, and in that event the American Association would not only consent to a modification, but would insist that such change be made.

In suggesting a code for operation in their State, it was hoped that the Ohio operators would feel that they could use as a basis the Denver code, with such modifications as were made necessary by local conditions. If on the other hand they found there were certain broad rules of general application that they could not consistently incorporate without change, then a conference with the rules committee of the American Association might have brought about an agreement on disputed points.

The efforts of the American Association for several years past have been directed toward harmonizing the rules of the various State and sectional associations in the belief that eventually a code could be formulated capable of general adoption. This was precisely the case with the steam railroads a number of years ago, and it was eventually found that the operating conditions of railroads in widely separated parts of this country did not differ to the extent that had generally been supposed. The standard code of the American Railway Association, I believe, has been almost universally adopted by the steam railroads in the United States.

I am at present of the opinion that most of the changes suggested and recommended by the Ohio Commission are unwise and ill advised, but I am perfectly willing to be shown my error.

J. N. Shannahan,

Chairman Committee on Interurban Rules of the American Street & Interurban Transportation & Traffic Association.

THE CONNECTION BETWEEN VENTILATION AND HEATING

McKEEN MOTOR CAR COMPANY
OMAHA, NEB., Dec. 7, 1909.

To the Editors:

There is an enormous amount of misunderstanding on the subject of the connection between the ventilation and the heating of passenger cars. Unless the air is perfectly fresh, passengers will often not be satisfied with a temperature of even 75 deg. in a car, and many of them will not even be comfortably warm. On the other hand, it is equally impossible to expect them to be satisfied even with perfect ventilation, if the temperature is from 40 to 50 deg. and if they are obliged to occupy uncomfortable seats. This is particularly true in the ordinary passenger car where the floor is many degrees colder than the roof.

An almost perfect system of ventilation can be obtained if a continuous supply of fresh air is taken in near the floor of the car and then evenly distributed, and if suction ventilators in the deck exhaust the foul air. This plan assumes that the windows are kept closed and are air tight so that there are no drafts. Under these conditions the temperature of a passenger car can be lowered to 60 deg. without any discomfort to the passengers. In other words, the proper blood circulation is kept up by means of the fresh-air supply and the passengers are comfortable even though the temperature is 12 deg. below that often considered necessary. The truth of this principle is exemplified in an ill-ventilated sleeping car where usually some of the occupants feel too cold and others feel too warm, while an insignificant per cent is comfortable.

The fundamental law of heating and ventilation is that foul air affects different people differently, and temperature conditions cannot make up for a lack of ventilation. With a proper ventilating system and with the temperature between 65 and 70 deg., conditions most attractive to the general public will be obtained.

W. R. McKEEN, JR.
President and General Manager.

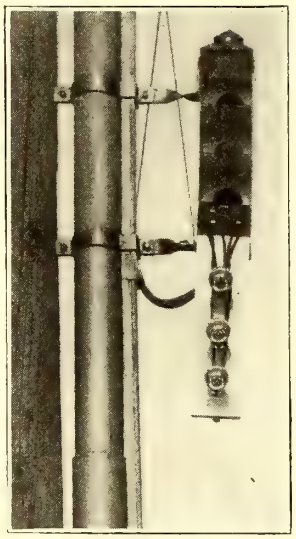
A MODERN BOILER FACTORY

Under the title of "A Modern Boiler Shop," a paper was presented on Nov. 13 before a joint meeting of the Engineers Club of St. Louis and the St. Louis branch of the American Association of Mechanical Engineers on the new works of the Heine Safety Boiler Company. The area of the ground occupied is 6½ acres. The buildings are of steel frame construction with brick walls and reinforced concrete slab roofs, and the structures consist of a main shop and flange shop wing, power house, toilet and wash house, oil house and general offices, totaling about 2½ acres of floor space. The whole area of both the main and flange shops is served by cranes, while a 24-in. Koppel industrial railway encircles the buildings with connections to the interior. The power equipment is steam-electric, hydraulic and pneumatic. Most of the tools are electric-driven by individual Wagner motors. The lighting of the shop is very good, about 75 per cent of the walls being made up of windows. Artificial lighting is mainly by flaming-arc lamps and incandescent lamp clusters. The main shop is furnished with an indirect heating system.

On Sept. 30, 1909, there were 155 miles of electric tramways in operation in New South Wales.

BLOCK SIGNAL SYSTEM ON TEST IN NEWARK, NEW JERSEY

Among the block signal systems which the Public Service Railway of New Jersey is now using is an equipment on Ogden Street, Newark, N. J., furnished by the Kinsman Block System Company, New York. This apparatus differs from other types of electric railway block signals in using insulated sections of one of the running rails instead of overhead contacts to close the signal circuits. Power for operation may be obtained either from the trolley wire or from storage batteries, as used in the Newark installation.



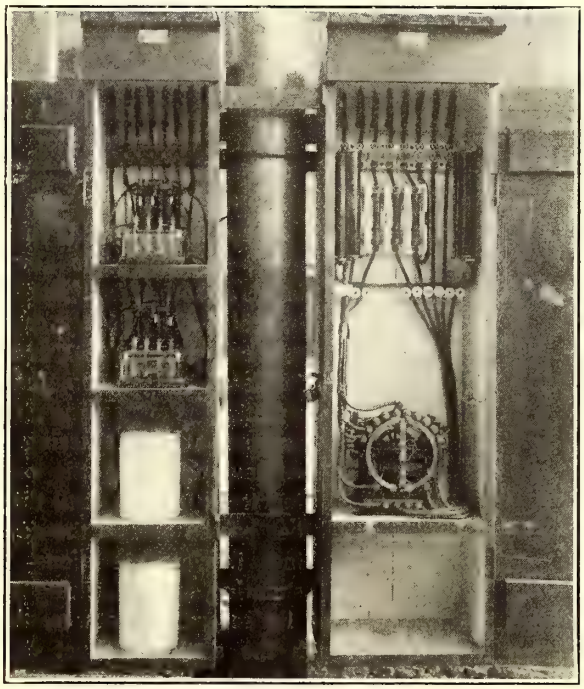
Lamp Signal

When the system is in normal condition the orange lamps at both ends of the block indicate safety. As a car enters one end it passes over an insulated rail section, thereby shunting the setting track magnet at the entering end without operating the restoring track magnet until the car has passed beyond the adjoining insulated section. The shunting of the setting magnet causes the dropping of its several armatures, thereby closing a circuit through the setting magnet of the controller which operates a step-by-step mechanism. The latter moves one tooth forward for every car entering the block in the same direction. At the entering end of the block this change of contacts extinguishes the orange safety lamp and lights the green caution lamp, while the line circuit magnet at the exit end is de-energized. The distant line circuit magnet, therefore, drops an armature which at the exit end of the block extinguishes the safety lamp and lights the red danger lamp. In other



Car Entering a Signal Block

words, when a car enters a clear block it sets a cautionary signal for following cars and a danger signal for opposing cars. Without entering into a lengthy explanation, it may be added that following cars cannot change the signals set by the first car. As the car leaves the block it passes over two adjoining insulated rail sections, thereby de-energizing the restoring track magnet at the exit end, causing it to drop several armatures. One of these armatures closes the circuit through the releasing magnet of the controller at the entering end of the block, thereby causing the step-by-step mechanism to move back one tooth. This backward movement is repeated by every car as it leaves the block until the last car has restored the controlling mechanism to its original position, whereupon the danger and caution lamps are extinguished and the safety lamps are again lighted. The step-by-step mechanism in Newark is made for a maximum of 17 cars in the block at one time.



Boxes Containing the Magnets, Storage Batteries and Step-by-Step Mechanism

Where this signal system is installed in the open country, it is practicable to install contact rails which close a trolley to ground circuit in the car to actuate a valve for the emergency application of the air brake.

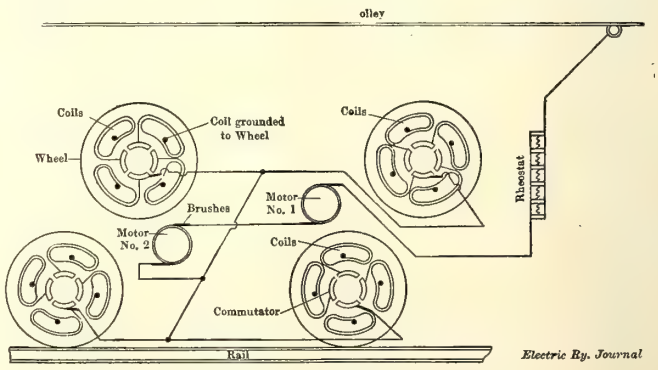
MAGNETIC TRACTION WHEEL

Experiments with a method of increasing traction by magnetic wheels have been conducted for some time by John O. Heinze, of Lowell, Mass., whose final wheel contains four magnet coils. Outside of the coils are four segments which themselves comprise part of the tread of the wheel, and a ring of 12 per cent manganese steel is clamped between them and the wheel proper to send the magnetic circuit into the rail. The energizing of the magnets is so timed that each succeeding section of the wheel is attracted to the rail just in advance of making contact with it, so that the device besides giving increased traction also assists acceleration. The current is cut off from each given segment as soon as it is no longer in contact with the rail. Experiments show that coils wound with 50 lb. of No. 6 B. & S. wire produce the best results. Such a coil has a resistance of but one-quarter ohm, so that the current consumption is practically a negligible factor. The truck employed in the Lowell tests and shown in the accompanying view is equipped with two G-67 GE 35-hp, 550-volt standard railway motors. Repeated tests under widely varying load conditions show that the voltage at the axle commutators does not exceed 50 volts in starting, while the normal average under running conditions is about 25 volts. The absence of sparking at the brushes and the small number of segments make these commutators very simple and reliable.



Truck Equipped with Magnetic Car Wheels on Heavy Grade

The weight of the truck illustrated is 13,000 lb. and with the traction due to weight alone, the motors develop a drawbar pull of 2500 lb. With the wheels magnetized, the tractive effort is increased to 8500 lb. or more than 300 per cent. However, the inventor does not claim to increase the traction by such a liberal percentage on an ordinary car, but states that a car equipped with his device should be able to mount grades that are otherwise impossible. The truck illustrated is on an incline slightly greater than 50 per cent.



Wiring Diagram for Magnetic Car Wheel

An electric funeral car has recently been put in operation in Stahnsdorf, near Berlin, Germany.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES

Indiana.—Street Railroads—Ordinances—Nature—Acceptance—Repair of Street—Charter from City—Construction.

A city ordinance accepted by a street railroad for whose benefit it was made becomes a contract between the city and the railroad.

If a street railway ordinance merely requires those operating the railway to keep the street between and near its tracks in repair they are not required to pave.

A city ordinance empowering the construction and operation of a street railway in the city streets is to be strictly construed against the railway company; and, if there are doubtful provisions therein, they are to be taken in favor of the city.

Under an ordinance granting the right to construct and operate a street railway, which provided that the portion of the street between and adjacent to the tracks should be kept in as good repair, considering the nature of the use, as other parts of the street are kept by the city, those operating the railway must pave that portion when it becomes necessary to keep it in as good condition as the rest of the street is kept by the city. (Columbus Street Ry. & Light Co. v. City of Columbus, 86 N. E. Rep., 83.)

Michigan.—Corporations—Invalidity of Organization—Defense—Street Railroads—Contracts—Ultra Vires Acts—Defense of Ultra Vires—Availability—Franchises—Construction—Acceptance of Franchise.

A street railway company, formed by the consolidation of two street railway companies, cannot, when sued on an obligation incurred by one of the two, assert the invalidity of its own organization.

A contract between a city and a street railway company, authorized by its charter to construct a street railway from the State line to B., and to make connections into the county in which the city lies and other enumerated counties, which permits the company to construct and operate a street railway in the city, and binds the company to pay a part of the cost of paving a street, is not ultra vires, on the ground that the charter of the company does not authorize it to extend its line into the city.

In an action against a street railway company, formed by the consolidation of two companies, on a contract made by one of them, the defense that the contract is ultra vires is not available in the absence of notice of it under Circuit Court rule 7.

A street railway company agreed in its contract with a city to pay a part of the cost of paving a street, as a consideration for the granting of a franchise. The street was paved, the amount to be paid by the company was agreed on, and a part of it was paid. An agreement by the city to release the company from further payment, and by the company to surrender its franchise in the street, and the grant by the city of a franchise to another company in the the street, and the assumption by the latter company of a part of the cost of the pavement, were a part of the same transaction. Held, that there was a novation, and the latter company was unconditionally bound to pay its part of the cost of the paving, though the franchise to it bound it to prosecute its application to secure a grade crossing over railroad tracks on the street, and stipulated that if the right to make the crossing was not granted its rights should cease at the election of the City Council, etc.

A city granted to a street railway company the right to construct and operate a street railroad on a street, and the company agreed to pay a part of the cost of paving the street, and to diligently prosecute its application to secure a grade crossing over railroad tracks on the street. It was agreed that if the right to make the crossing was not procured, and the street railway tracks were not constructed within a year, all rights granted should cease on the city so directing. Held that, assuming that the payment of a part of the cost of paving the street was conditional on the company obtaining permission to cross the railroad tracks, the street railway company or its successor must, to relieve itself from liability to pay, show diligent prosecution of its application for permission for a grade crossing, and a mere showing that permission was not obtained was insufficient.

A franchise giving a street railway company the right to construct and operate a street railroad in a street, and requiring it to pay a part of the cost of paving the street, and to prosecute its application to secure a grade crossing over railroad tracks on the street, and stipulating that if the right to make the crossing is not granted, and the tracks on the street are not constructed within one year, the rights under the franchise shall cease, if the city so direct, gives to the city the option to terminate the rights of the company on its failure to procure the grade crossing; and, where the city has not exercised its option the company is bound to pay its part of the cost of paving the street, though it has not obtained the right to construct a grade crossing.

A written acceptance of an ordinance granting a franchise to a street railway company, which is signed in the name of the company by its president and secretary, accompanied by the seal of the company is prima facie an acceptance by the company. (City of Niles v. Benton Harbor-St. Joe Ry. & Light Co., 117 N. W. Rep., 937.)

New York.—Injunctions—Preliminary Injunction—Denial Grounds—Statutory Provisions—"General and Ordinary Business of a Corporation"—Street Railroads—Rights to Use Streets—Temporary Injunction Against Corporation—Affecting Public Generally.

Code Civ. Proc., sec. 1809, providing that an injunction shall not be granted ex parte which operates to suspend "the general and ordinary business of a corporation," contemplates only injunctions extending to a total suspension of corporate business, and has no application to an injunction restraining a single act or duty. A railroad company occupying a public street may run its cars back and forth through the street, stop on switches for the passing of other cars, and take on passengers and freight upon the street to a reasonable extent; but if its freight becomes so extensive that to place a car in the highway and receive freight there amounts to a practical obstruction of the highway or unreasonable interference with its use by the public, the company must receive its freight at a private station. What amounts to an unreasonable obstruction of the highway is a question of fact for the trial court, and not only the actual obstruction, but any littering of the highway by reason of receiving freight thereon so as to frighten horses, would be chargeable to the railroad both as cause and occasion thereof. An injunction interfering with the loading of freight in the street by a railroad company operating over the streets, on the ground that the company was obstructing the highway, should not be granted except upon a full investigation by trial, since not only the company, but the public offering its freight for carriage, is affected. (Town of Ft. Edward vs. Hudson Valley Ry. Co., 111 N. Y. Sup., 753.)

New York.—Street Railroads Paving Between Tracks—Repaving—Notice by City.

Under Railroad Law (Laws 1890, p. 1112, c. 565) § 98, a city railroad company is required to keep in permanent repair all portions of the street between its tracks and 2 ft. outside, and to make such repairs when the city determines to repave the street.

A notice given under Railroad Law (Laws 1890, p. 1112, c. 565) § 98, to a street railroad company to repave between its tracks, and that on its default the city would pave, with a definite statement as to the extent of the repavement required, did not conclude the municipality as to the amount of repaving required, because it erroneously stated that the area was about 140 yd., when it was in fact 1200 yd.—(City of New York v. New York City Ry. Co., 113 N. Y. Sup., 860.)

New York.—Street Railroads—Injuries from Construction and Maintenance—Presumption—Corporations—Actions — Pleading — Corporate Existence — "Duly"—Admission.

Under Laws 1890, p. 1108, c. 565, as amended by Laws 1901, p. 1520, c. 638, providing that whenever a railroad shall be in operation for one year, or the motive power thereon has been or shall be changed and put in operation for one year, such fact shall be presumptive evidence that the construction and operation of such railroad, or change of power, has been duly obtained, where it was conceded that defendant had constructed and equipped its road with an overhead trolley system more than one year prior to the accident complained of, and there was no claim that defendant was negligent, it was not liable because of a nuisance in maintaining such system.

A complaint, alleging that defendant is a domestic corporation "duly" organized and existing, and engaged in operating street railroads, means that defendant has been legally organized and existing for the purpose alleged.

In an action against a street railroad for injuries from an alleged nuisance in maintaining an overhead trolley system, an allegation of the complaint that defendant was duly organized and engaged in operating street railroads was not controverted by the further allegation that defendant "knowingly and wrongfully jeopardized the lives," etc., of persons on the highway, nor by the further allegation that the injury was caused "solely by the wrongful acts of the defendant," so that it stood admitted, by failure of the answer to deny, that defendant was lawfully organized and existing and engaged in operating a street railroad.—(Hollis v. Brooklyn Heights R. Co., 113 N. Y. Sup., 4.)

LIABILITY FOR NEGLIGENCE

Indiana—Carriers — Injuries to Passengers — Care — Witnesses—"Privileged Communications"—Physician and Patient.

A street car passenger exercising due care may assume that the street car company will do its duty under the circumstances.

Statements by passenger, injured in alighting from a street car, on the day of the injury, to her physician, as to how the injuries occurred, in the presence of her daughter and another, were in the nature of "privileged communications," within Burns' Ann. St. 1908, sec. 520, cl. 4, declaring that physicians, as to matter communicated to them as such, by patients in the course of their professional business, shall not be competent witnesses, and plaintiff was not obliged to testify thereto on cross-examination. (Indiana Union Traction Co. vs. Thomas—No. 6468—88 N. E. Rep., 356.)

Massachusetts.—Damages—Personal Injuries—Impairment of Earning Capacity—Married Women—Pleading and Proof.

In an action by a married woman to recover damages for a personal injury, an impairment of her capacity to perform labor may be considered as an element of damages, whether she ever worked or not.

A declaration, in an action for injuries to a married woman, alleging that "the plaintiff was thrown to the ground and caused to suffer great and severe bodily injury and anguish of mind," is sufficient to admit proof of the impairment of the plaintiff's capacity to perform labor as an element of damage.—(Millmore v. Boston Elevated Ry. Co., 84 N. E. Rep., 468.)

Massachusetts.—Carriers—Injury to Passenger Thrown from Car—Instruction.

In an action for injury to a street car passenger, who was thrown to the street while the car was rounding a curve, a request for a ruling that passengers are not required to expect that on turning a curve the car will be driven at a rapid rate, etc., was properly refused for ignoring the character of the curve in question.

In an action for injury to a street car passenger, who was thrown to the street while the car was rounding a curve, a request for a ruling that passengers may assume that a car will be operated in view of the fact that some of the passengers may be standing in the car or on the platform was properly refused, where the car was almost empty, making it unnecessary for plaintiff to stand, and where there was no showing that the motorman knew plaintiff was on the platform with the conductor's consent.—(Zamore v. Boston Elevated Ry. Co., 84 N. E. Rep., 858.)

Massachusetts.—Carriers—Street Railroads—Protection of Passengers—Care Required—Master and Servant—Contract of Employment—Conditions—Ignorance of Rules of Employment—Excuse.

A street railway company is, as to its passengers, bound to exercise through its employees the highest degree of care reasonably consistent with the transaction of its business; and that a motorman did not have time to read the rules of the company, where he had been in its service nearly two weeks after having been instructed for 12 days, is no excuse.

The contract of employment of a street railway motorman is subject to the implied condition that he will study and apply rules prescribed by the company and furnished to him.

The experience of one as a motorman consisted of 12 days while receiving instructions from employees and nearly two weeks of employment, during which time he was employed as spare motorman. The company gave him two rule books of 56 pages. The notice on the first page of the books expressly enjoined on him the duty of reading the rules. All the rules in the books pertaining to motormen could be read in less than half an hour. Held that, in the absence of any excuse for his ignorance of the rules pertaining to motormen, he was subjected to the same responsibility as if he actually knew them.—(Foley v. Boston & N. St. Ry. Co., 84 N. E. Rep., 846.)

Massachusetts.—Carriers—Injuries to Passengers—Personal Injuries—Taking Up Passengers—Due Care of Person Injured—Question for Jury—Due Care of Person Injured—Standard for Determining—Carriage of Passengers—Negligence of Defendant—Duty of Carrier—Determination of—Appeal—Harmless Error—Examination of Witnesses—Error in Question Cured by Answer—Negligence of Carrier—Instructions—Construction—Taking Up Passengers—Comment on Evidence—Conformity to Issues—Province of Court and Jury—Instructions Invading.

Whether the plaintiff, in an action for injuries received by her while attempting to board a car, exercised due care in attempting to pass over a sliding platform into the car, held, under the evidence, a question for the jury.

The standard for determining whether a person injured by falling into a hole in attempting to board a car used due care is not whether she could by looking have seen the hole, and did not look, but whether it was reasonable conduct for ordinarily prudent people under the circumstances surrounding the accident to so look as to discover the danger.

In an action against an elevated railroad company for injuries to a person attempting to board a train, whether or not the defendant was guilty of negligence in opening a side door of its train for the reception of passengers before the train was properly adjusted to a movable platform provided by the defendant, without having some one at the place to warn persons attempting to board the car of the open space, held, under the evidence, a question for the jury.

The liability of a railroad company for injuries to a person attempting to board a train, caused by the inadequacy of a movable platform to cover the entire space between the permanent platform and the entrance to its train, was to be determined upon the footing of what might reasonably be required of it in the light of knowledge existing at the time of the accident, and not that acquired afterward.

Asking an expert witness, on cross-examination, in an action against a railroad company for injuries caused by the inadequacy of a movable platform to cover the entire space between the permanent platform and the entrance to a train, to state, "with all the information he has now," whether it would not have been proper to put in more than one platform, or wider platforms, was harmless, where the witness stated that his answer was based upon knowledge possessed at the time of the accident.

Though a movable platform constructed by a railroad to enable passengers to board a train without danger of stepping into an open space was the most perfect device known and was perfectly constructed, the railroad would still be negligent as to the means provided passengers for entering cars, where the operation of the platform in connection with the train was wanting in the degree of care required in a carrier of passengers.

Though ordinarily the bald statement of an employee of a railroad telling passengers to "Step lively" is not negligence, still, where a dangerous place, not existing with trains and platforms in their normal condition, existed between the station platform and the car entrance by reason of the act of the employee who called to passengers to step lively, it cannot be said as a matter of law that the request was not negligence.

In an action for injuries to a passenger attempting to board a train, in which action plaintiff claimed that the negligence by the defendant respecting the management of a movable platform in relation to the train which he attempted to board had created a particular danger apart from those naturally to be apprehended, an instruction was given that the act of an employee of the defendant in calling to passengers to "Step lively" would not be negligence, assuming that everything was in proper condition for the people to step lively. Held, that the qualifying assumption must not be taken abstractly, but in connection with the claim that negligence of defendant had created a particular danger, and must be confined to acts of the defendant, and not construed as applying to permanent conditions.

Whether or not a motorman was negligent in failing to stop his train, so that the door of a car in its whole width would be opposite to a platform furnished by a railroad company, held, under the evidence, a question of fact for the jury.

In an action for injuries to a passenger attempting to board a car, an instruction, standing alone, that plaintiff was not obliged to assume that there were dangerous places where she was invited to go into the car, would be erroneous.

Where, in an action against a railroad company for injuries to a passenger received while attempting to board a car, the defendant's evidence showed that it was the custom for trains so to stop that a movable platform furnished by defendant would cover the entire door space of the car, the court, in charging on the due care of plaintiff, stated that if she had been in the habit of taking cars at the place where she was injured, and had observed that it was the practice to have a space of the kind that caused her injury, then that would be notice to her. Held, that it was not inaccurate for the court to summarize the evidence by adding to the instruction that the court did not understand that it was claimed on the part of the defendant that it was the custom to have such a space uncovered by the movable platform, so that perhaps it was unnecessary to say she was called upon to notice if there was such a space there, when it was not claimed that it was the custom.

In an action for injuries to a passenger, received while attempting to enter the middle door of a car, caused by falling into a space between the door and the station platform, an instruction charging that if defendant could have opened the end doors of the car and taken the passengers in there with safety, but failed to do so, because it was not paying attention to the safety of the passengers, its failure to do so would be negligence, was erroneous, as not justified by the issues, where neither the pleadings nor the evidence raised any issue as to the company's duty to open the end doors.

Michigan.—Carriers—Injuries to Passengers—Actions—Proof—Variance—Damages—Assessment—Physical Examination of Plaintiff—Discretion of Court—Instructions—Items of Damage.

In an action by a passenger against a street car company, where the declaration alleged that plaintiff was a machinist when he was injured, the fact that the evidence showed that he was a tool maker did not prevent him from recovering damages for decreased earning capacity as a skilled workman, the proof showing that tool makers were machinists, as the word "machinist" was broad enough to cover skilled machinists.

In an injury action by a passenger against a street car company, where defendant's physician had examined plaintiff and testified to his injuries, the court did not abuse its discretion in refusing to permit another examination of plaintiff by a physician who testified for defendant that he had treated plaintiff for injuries some years before in another place, and in offering to order an examination by a physician appointed by the court, if the parties desired.

In a personal injury action by a passenger, a statement by plaintiff's counsel in argument that plaintiff had offered to submit to an examination by a physician in the jury's presence was not reversible error, where the court suggested that it would be better not to refer to it, and there was no request to caution the jury further as to counsel's remarks.

In a personal injury action by a passenger, a requested charge that if plaintiff's injuries resulted in part from physical defects caused by previous injuries, so that his present injury was greater than it would otherwise have been, plaintiff cannot recover for those injuries resulting partly from the previous injuries, was sufficiently covered by a charge that, if plaintiff was suffering from a nervous disease when injured, that alone would not prevent recovery for that part of his condition caused by defendant, and the jury should determine what pain and suffering resulted from his injury, and only allow for such suffering, and not for disease existing when he was injured.—(Fillingham v. Michigan United Rys. Co., 117 N. W. Rep., 635.)

Missouri.—Evidence—Carriers—Injuries to Passengers—Premature Starting of Car—Physical Facts—Damages—Personal Injuries—Evidence—Instructions.

Where plaintiff was injured by the premature starting of a street car as she was endeavoring to alight, while facing outwardly at right angles to the car, her evidence that when the car started she fell so the back of her head struck the step of the car was not necessarily contrary to natural law.

In an action for injuries to a female passenger who earned a living by washing and sewing for families, evidence that she was of unchaste character, while irrelevant on the damages sustained from pain of mind and body in consequence of the injury, was admissible, as bearing on the damages recoverable for future loss of earnings.

An instruction that if the jury found that plaintiff prior to receiving her injuries was of unchaste character, such fact could only be considered as affecting her credibility as a witness, and did not affect her right to recover, and should not be considered in determining defendant's alleged negligence and plaintiff's right to recover, was erroneous in limiting the evidence of unchastity to plaintiff's credibility.—(Carlton v. St. Louis & Suburban Ry. Co., 106 S. W. Rep., 1100.)

Missouri.—Carriers—Injury to Passenger—Complaint—Negligence—Allegations—Pleading—Variance.

A petition alleging that defendant allowed the car, controller, motor and electrical appliances "to become out of order, and allowed the controller * * * to burn out, causing an explosion, setting said car on fire and causing a panic among the passengers, and plaintiff was thrown, pushed and knocked from the car by the persons frightened * * * striking upon his head," etc., specifically charges negligence.

A petition in an action against a street railroad company for injuries to a passenger charged that defendant negligently allowed the car and appliances to become out of order, so as to cause such an explosion as caused a panic among the passengers, whereby they threw, pushed, or knocked plaintiff off the car. Plaintiff testified: "This flash struck me in the face, and I don't know, the current or something must have carried me off the car. I don't know how I got off, whether I jumped off or that knocked me off; didn't know anything," etc. Held, that plaintiff's evidence failed to show that the explosion caused the panic, and the knocking him off the car by the other passengers, and amounted to a failure to sustain the petition.—(Kennedy v. Metropolitan St. Ry. Co., 107 S. W. Rep., 16.)

New York.—Carriers—Injuries to Passengers—Evidence.

In an action for injuries to a passenger by the alleged premature starting of a car as she was attempting to alight, evidence held to require a finding that she attempted to alight before the car stopped.—(McNeece v. Brooklyn Heights R. Co., 108 N. Y. Sup., 317.)

New York.—Street Railroads—Operation—Actions for Injuries—Questions for Jury—Persons Crossing Track.

Whether plaintiff, a pedestrian who was struck by defendant's street car while she was crossing the street, was guilty of contributory negligence in failing to look and listen, held, under the evidence, to be a question for the jury. (Thornton vs. Interurban St. Ry. Co., 113 N. Y. Sup., 127.)

New York.—Street Railroads—Actions for Injuries to Pedestrians—Contributory Negligence—Duty to Warn—One Knowing Conditions.

Plaintiff was struck at a crossing by a trolley car, which he saw 50 or 60 ft. distant when he stepped from the sidewalk, about 15 ft. from the track. He saw that the car was coming rapidly, and thought he could get across in time, but failed to do so. Held, that plaintiff was negligent and could not recover.

Where a pedestrian is aware of the approach of a car, and the peril is apparent, the motorman owes no duty to give him warning and slow down the car. (Mullen v. Joline et al., 111 N. Y. Sup., 776.)

New York.—Carriers—Street Railways—Subways—Injuries to Passengers at Stations—Actions—Instructions.

In an action by a passenger against a subway carrier for injuries from stepping into an opening in the station platform while boarding a car, a charge that, if certain circumstances were found to exist, the carrier was negligent in not providing sufficient light in and about the platform and guards around the opening to avoid injury, "as testified to by the plaintiff," was erroneous, as requiring a higher degree of care than the law requires; since the carrier was not an insurer of the safety of passengers, but was only required to exercise reasonable care in that respect. (Dinkelspiel vs. Interborough Rapid Transit Co., 113 N. Y. Sup., 187.)

New York.—Death—Contributory Negligence—Burden of Proof—Street Railroads—Collision with Person on Track—Evidence—Questions for Jury.

Where, in an action for death, the evidence as to negligence of defendant was not such as to excuse contributory negligence, the burden of proving that decedent was in the exercise of due care was on the plaintiff.

In an action for death of a person by collision with a street car, evidence as to decedent's freedom from contributory negligence held to require a nonsuit at the close of plaintiff's evidence.

Where, in an action for death, the circumstances point as much to the negligence of the deceased as to its absence, or point in neither direction, a nonsuit should be granted. (Lamb vs. Union Ry. Co. of New York City, 88 N. E. Rep., 371.)

New York.—Street Railroads—Crossing Accident—Injuries to Traveler—Contributory Negligence—Negligence—Imputed Negligence—Driver of Vehicle.

Plaintiff, while riding on the seat of a furniture truck beside the driver, was injured in a collision between the truck and a street car. The driver testified that he stopped his horses 6 ft. from the track, at which time the car was at a crossing two blocks away, and that without making any other observations he drove on the track and stopped his team before the truck cleared the last track, and that the collision occurred immediately after. Plaintiff testified that he paid no attention to the car, did not look to see if a car was coming, and used no care to avoid the accident. Held, that plaintiff was negligent as a matter of law, he being bound to show that he exercised the care which the circumstances required.

Where plaintiff was riding with the driver of a furniture truck at the time plaintiff was injured in a collision between the truck and one of defendant's street cars, plaintiff was not chargeable with the negligence of the driver, but was bound to show that he exercised the care the situation demanded. (Caminez vs. Brooklyn, Q. C. & S. R. Co., 111 N. Y. Sup., 384.)

News of Electric Railways

Cleveland Traction Situation

At noon on Dec. 13, 1909, it was thought that the questions to be settled relative to the Cleveland Street Railway by Judge Tayler as arbitrator would be submitted to him within a short time. At that time Mayor Johnson was still to make a final argument in favor of considering the guarantee of the Forest City Railway stock as a debt of the Cleveland Railway, and Horace E. Andrews, president of the Cleveland Railway, was expected to oppose this plan on the ground that the guarantee was a personal matter.

On Dec. 9 Mr. Andrews introduced a schedule in which the physical property of the Cleveland Railway was valued at $21,470,806, exclusive of franchises and good will. This is $6,436,191 more than allowed by the Goff-Johnson settlement. Some of the items of increase were represented by an allowance of 10 per cent for contractors' profits on the idea that the system is to be rebuilt; 10 per cent for financing, interest charges at 9 per cent during the period of construction, and general overhead charges.

During the discussion of the valuation of the property of the Forest City Railway, Judge Tayler said that the Mayor had attacked the valuation made by Engineer Clark after the valuation had been accepted, by proposing to value the property at $193,000 instead of $289,904, as given by Mr. Clark, and $440,555 by the Goff-Johnson settlement. An attempt was made to show that the East Cleveland contract is a burden upon the system and should be considered so in the valuation. Mr. Andrews replied that East Cleveland is virtually Cleveland, and that he believed in five years more one-half the earnings of the Euclid Avenue line would come from beyond the city limits.

The hearing on Dec. 10 was adjourned at noon to permit the officers of the Cleveland Railway to prepare some figures that were needed. Mayor Johnson thought that April 15, 1910, would be a good date for the referendum vote. Judge Tayler said that Feb. 15, 1910, would do as well. The judge refused to separate the franchises for valuation.

On Dec. 11 L. W. Blyth, of Ernst & Ernst, presented a report showing a comparison of values as disclosed by his investigation of the records of the Forest City Railway contrasted with the values claimed by Engineer R. H. Bunning. Mr. Blyth had been commissioned by Judge Tayler to do this work. Mr. Blyth's report showed that more than $50,000 had been charged in duplicate and had been allowed under the Goff-Johnson settlement. Judge Tayler made no comment on the report, but Mayor Johnson made an effort to discredit it.

The Cleveland Underground Rapid Transit Company has asked the Common Pleas Court to dissolve the injunction secured by Attorney George B. Harris to prevent the company from accepting the new franchise. The Cleveland Recorder has also been restrained from publishing the ordinance. The idea is to delay the ordinance in order that new propositions in the hands of Mr. Hidy can be presented to the City Council, which ignored the request that the vote on the ordinance be delayed so that the proposal from Mr. Hidy might be presented.

Transit Affairs in New York

E. J. Farrell, John J. Hopper and their associates have presented to William R. Willcox, chairman of the Public Service Commission, a plan for a system of subways to surround the Boroughs of Manhattan and the Bronx, with five crosstown loops connecting the east and west side and extending under the East River to Brooklyn, there to connect with the Fourth Avenue subway now building, and later, when practicable, by way to Fort Hamilton and the Narrows to Staten Island, and also by a Fifty-ninth Street crosstown under the East River into Queens, reaching several Long Island points. The proposal involves an expenditure of $130,000,000. Just who are associated with Messrs. Farrell and Hopper has not been announced. Mr. Farrell's first work of this sort was in connection with the building of the Hoosac Tunnel. He took charge of the completion of that tunnel work after the disagreement of Shanley Brothers and the State. Mr. Farrell was connected with the building of sections A and B of the Canadian Pacific Railway by the Dominion Government, the heavy rock section, at Lake of the Woods, between Prince Arthur's Landing and Winnipeg, Manitoba. He was also connected with later Government contracts on the Lachine Canal and St. Gabriel Basin at Montreal between the years 1879 and 1883. Since that time he has been engaged in construction work in New York, Maryland, and Pennsylvania, most of which has been tunnel work, which included the Baltimore Belt Line tunnel.

Reference was made in the Electric Railway Journal of Dec. 4, 1909, page 1161, to the unofficial reports of the vote on the four proposed amendments to the Constitution of the State of New York at the election on Nov. 2, 1909. Secretary of State Koenig announced on Dec. 12, 1909, that all the amendments were passed. One amendment, known as the "debt-limit amendment," is designed chiefly to extend the borrowing powers of the City of New York by permitting the city, under control to be prescribed by the Legislature, to exclude from the computation of the debt-limit bonds issued exclusively for rapid transit and dock improvements so long as such bonds are self-sustaining and self-extinguishing.

Justice McLean in the Supreme Court has granted an injunction restraining Collector of Assessments and Arrears Moynahan of New York from selling the city's tax lien on the Metropolitan Street Railway. The court held that because of oversight, neglect or other official fault exorbitant sums are stated to be due for the taxes on the road between 1901 and 1907. Justice McLean has also granted an injunction restraining the city from selling its tax lien against the Second Avenue Railroad.

On Nov. 16, 17 and 18 the Public Service Commission, working with the Bridge Department, made a count covering one 24-hour period of the people crossing the Brooklyn Bridge which showed that apparently 3311 more persons traveled into Manhattan than went back to Brooklyn. The total count showed that in the 24 hours 882,511 persons passed back and forth between New York and Brooklyn.

The present Board of Estimate and Apportionment cannot pass upon proposed modifications of the franchise of the South Shore Traction Company, which operates surface cars over the Queensboro bridge and through certain streets in Queens Borough, according to a decision handed down by Justice Seabury, in the Supreme Court, in which he holds that the action taken by the board is illegal. William Jay Schieffelin, a taxpayer, asked for an injunction to restrain the board from granting extension of the franchise of the South Shore Traction Company on the ground that to do so would work to the detriment of the city.

Philadelphia Transit Talks

Transit Talk No. 36 of the Philadelphia (Pa.) Rapid Transit Company was dated Dec. 1, 1909. It was entitled "Cutting Down the Accident Roll." The talk follows:

After a year's trial of the pay-within car we are able to show the actual results achieved by its adoption. We *believed* that the car would lessen accidents; now we *know* it.

For example, in October, 1909, accidents on the Twelfth and Sixteenth Streets division decreased 74 per cent, as compared to the same month of 1908. This can only be credited to the effectiveness of the closed doors and steps in eliminating boarding and alighting accidents.

In the five heaviest months of the year—April, May, June, July and August—accidents on the Fifty-second Street division decreased 79 per cent, as compared to the five months' accident record of 1908, when no pay-within cars were in use.

Similar results are shown on all lines where the pay-within car is operated, and this is true notwithstanding the fact that, as a result of especial effort, car crews are reporting all accidents, however trifling, while a year ago this was not the case.

It happens that while this decrease of accidents is being brought about here other cities report increases in the accident roll. In New York in October there were 1202 boarding and alighting accidents. The latest Chicago report for the month of September shows an increase of 7 persons killed and 32 injured, as compared to August, and an increase of 142 injured over the month of July.

The greatest number of injuries in Chicago were caused by boarding and alighting accidents (128 out of a total of 350), a class of accidents that has been almost entirely avoided here by the pay-within car.

Transit Talk No. 37 was dated Dec. 8, 1909. It was entitled "Safety Comes First," and contained an illustration from one of the bulletins issued semi-monthly to the employees of the company by the bureau for the prevention of accidents, showing how a horse and wagon left in the street carelessly by the driver menaces passengers on the cars.

Transit Talk No. 38 was dated Dec. 11, 1909. It was entitled "How You Can Help," and contained a subject for a New Year's resolution by passengers which would materially expedite the movement of cars.

Reports of Earnings Not Compulsory in California

U. S. Webb, Attorney-General of California, has recently expressed the opinion to C. F. Curry, Secretary of State of California, that the provisions of Section 480 of the Civil Code which stipulate that "every railroad corporation must make an annual report to the Secretary of State or other

officer designated by law, of its operations for each year ending Dec. 31, verified by oaths of the president," etc., do not apply to street railways. The opinion of Mr. Webb reviews a number of decisions in California in which the courts were called upon to determine the question of whether or not the term railroad includes street railroads and street railways. Mr. Webb concludes his opinion as follows:

"Considering the object that was to be accomplished by compelling a report from commercial railroads, under the provisions of Section 480, we are led to the conclusion that commercial railroads being under the control of the State in the regulation of service and charges, whereas the control over street railroad corporations is exercised by the municipality in which such road is operated, the reason for requiring such a report from commercial railroad corporations is apparent, it being incidental to the proper exercise of the State's powers; whereas, for any purpose of State government, a report of such character is not necessary from street railroad corporations.

"Having considered these two sections of the Civil Code from the standpoint of the early legislation that led to their enactment, their relative location in the codes, the construction placed upon the word 'railroad' by our Supreme Court, the words used in and the context, and purpose of the sections, I am of the opinion that Section 480 of the Civil Code does not apply to street railroad corporations, and no obligation is placed upon them under the provisions of the same."

Office of Auditor of Ohio Electric Railway Moved.—The Ohio Electric Railway has moved the office of E. L. Kasemeier, auditor of the company, from Cincinnati, Ohio, to Springfield, Ohio, where temporary quarters have been taken pending the completion of the company's new building in Springfield.

Rapid Transit Legislation Urged in Illinois.—The call of Governor Deneen for a special session of the Legislature of Illinois outlines 24 subjects on which action is requested as early as is consistent with thorough consideration of the problems involved. He especially advocates legislation to authorize cities to construct, maintain and operate subways and to control and regulate them.

Another Gyroscope.—The experiments conducted by Louis Brennan in England in the application of the gyroscope to railway transportation have resulted in the study of the subject by others and it is announced from Berlin that August Scherl, proprietor of the *Lokal Anzeiger,* Berlin, has arranged to exhibit a model of the system invented by him in the United States under the direction of Hart O. Berg, who has lately been associated with the Wright brothers.

Meetings of Central Electric Traffic and Central Electric Railway Associations.—The Central Electric Traffic Association will hold its annual meeting at the Great Southern Hotel, Columbus, Ohio, on Jan. 26, 1910, at 9 a. m. The morning session will be devoted to the routine business, and in the afternoon the annual election will take place, at which a chairman will be selected for the ensuing year. The executive committee will meet on the evening of Jan. 26. On Jan. 27, 1910, the Central Electric Railway Association will hold its annual meeting at the same place at 10 a. m. The morning session will be devoted to the reading of several papers. In the afternoon officers will be elected for the ensuing year.

Subway Legislation in Massachusetts.—A petition has been filed with the Secretary of State by Edmund D. Codman and others asking for legislation under which the Boston Transit Commission may construct a subway loop from Park Street to the Cambridge Bridge in Boston, in connection with the Cambridge subway. It is planned to provide a loop terminus for the Cambridge subway in this way, from Park Street under the old Tremont Street subway to Scollay and Bowdoin Squares, and thence to the Charles River, a distance of nearly a mile. The estimated cost is $1,750,000. The Boston & Eastern Electric Railroad has filed a petition with the Secretary of State asking for legislation to permit it to build a tunnel and subway under Boston Harbor and the city proper, from East Boston to Post Office Square.

Draft of Maryland Public Utilities Bill.—At the request of Governor Crowthers of Maryland, Attorney-General Straus of that State has completed the draft of a bill creating a public utilities commission in Maryland. According to the terms of this bill the commission will consist of three members, to be appointed by the Governor for terms of two years, the limit fixed by the constitution. Their authority will extend over the entire State. The salary of each commissioner is to be $3,000, paid by the State, and supplemented by an amount not yet determined upon, to be paid by Baltimore. The commission is given authority to regulate railroads and street railways, gas, electric, refrigerating, heating, telegraph, telephone and water companies and other public service corporations. If it is approved by the Governor the measure may go before the Legislature.

Hearing by Massachusetts Commission on Boston & Providence Electric Railroad Plans.—The Massachusetts Railroad Commission gave a hearing on Dec. 14, 1909, on the plans of the Boston & Providence Electric Railroad, which have been held in abeyance for the last two years on account of general business conditions. R. M. Saltonstall, of the firm of Gaston, Snow & Saltonstall, Boston, Mass., counsel for the company, announced the intention of the company to proceed as soon as various legal obstacles were overcome. During the hearing Chairman Hall of the commission stated that the commission was aware of the conditions which prevented the company from proceeding. Revised surveys now in process will shortly be completed. Mr. Saltonstall said that the company desires to change the route by about 12 miles, passing through North Attleboro instead of crossing the Rhode Island State line at Seekonk. Within a month the company would be prepared to submit its detailed locations to the town authorities. The route now desired extends from the Forest Hills station of the Boston Elevated Railway, through Hyde Park, Dedham, Westwood, Norwood, Canton, Sharon, Foxboro, Mansfield and North Attleboro to Rhode Island, where connection could be made with the lines of the Rhode Island Company.

Railroads Oppose Electrification in Chicago.—Thirteen steam railroad trunk lines were represented at a meeting of the local transportation committee of the Chicago City Council on Dec. 8, 1909, at which the electrification of the lines was considered. The officers of the railroads contended that "electrification is impracticable; first, because of cost; second, because of danger to employees; third, because the science of electrification is not sufficiently matured to make it applicable to freight terminals." It was stated that the Illinois Central Railroad was the only steam railroad entering Chicago which had seriously considered electrification, but that the company had abandoned the idea of changing the motive power of its lines as the result of the study which it had made of the problem. It was suggested that a commission composed of representatives of the city and experts from the railroads be appointed to investigate the subject of smoke, because it was principally to abate the smoke nuisance that the city had ordered electrification. L. C. Fritch, chief engineer of the Chicago Great Western Railroad, who was formerly employed by the Illinois Central Railroad to study the advisability of changing the motive power on that company's lines into the city, suggested that the commission proceed on the assumption that electrification is not practical and that the members of the committee consider such matters as fuel, a central passenger terminal and the arrangement of a system for handling freight whereby most of the trains would be kept outside of the city limits. Before announcing whether or not this committee will be appointed the local transportation committee will send letters to the engineering departments of all the railroads operating into Chicago, asking for operating data.

Advanced Instruction in Electrical Engineering at the Massachusetts Institute of Technology.—During the last year the requirements for the degree of Doctor of Engineering at the Massachusetts Institute of Technology have been made substantially equivalent to those of the degree of Doctor of Philosophy, so far as the period of study and the candidate's attainments are concerned. The number of candidates for the doctor's degrees in engineering and philosophy has this year increased largely over the number of candidates last year. The number of students entered as candidates for the Master's degree is also larger than last year. Advanced instruction in the theory of alternating currents and electrical transmission of power, accompanied by advanced research, is being continued this year under the direction of Dr. Harold Pender, whose investigations in these branches are well known. Other work carried on by the department for the benefit of students desiring to do original research, or who are studying with a view to obtaining advanced degrees, includes lectures and investigations under Professor Jackson on the organization and administration of public service corporations, and instruction in the designing of electric plants by Professor Wickenden. Forty per cent of the men who were graduated from the Institute as electrical engineers at the last commencement had previously received college degrees, and had thereafter spent from one to three years in the electrical engineering studies at the Institute of Technology. The number of student hours of instruction in the electrical engineering laboratory is about twice as great as it was three years ago.

Financial and Corporate

New York Stock and Money Market

December 14, 1909.

Trading in Wall Street during the last week has been moderate in volume but firm in tone, with few distinct advances recorded. Traction shares continue to be more or less active. Interborough-Metropolitan issues and Brooklyn Rapid Transit are strong and higher, while Third Avenue is weak at about the lowest record in its history.

The money market is practically unchanged. There is very little pressure upon the domestic banks and foreign financial institutions have shown no disposition to increase the prevailing rates of discount. Quotations to-day were: Call, 4½ to 5 per cent; 90 days, 4½ to 4¾ per cent.

Other Markets

In the Philadelphia market, Rapid Transit stock continues to be fairly active. There have been a few sales of Consolidated Traction of New Jersey at about 77. Other tractions have been dull.

Massachusetts Electric shares have been the traction feature in Boston. The preferred has been especially active, but both issues have recorded slight gains. There have also been some sales of Boston Elevated at about 130.

In the Chicago market some trading developed last week in Series 1, 2 and 3 of the Chicago Railways Company. All of these issues have been a trifle stronger than at any period during recent months. Some sales of Kansas City Railway & Light stocks were made at better prices.

In Baltimore the trading in the bonds of the United Railways Company continues to be active. Prices are practically unchanged.

At the weekly auction of securities in New York the following were sold: $10,000, 5 per cent bonds Second Avenue Railroad Company, at 69¼; 5 shares Brooklyn Union Elevated Railroad, at 75.

Quotations of various traction securities as compared with last week follow:

	Dec. 7	Dec. 14
American Railways Company	a45½	a47¼
Aurora, Elgin & Chicago Railroad (common)	a60	a57
Aurora, Elgin & Chicago Railroad (preferred)	a92½	a92
Boston Elevated Railway	a130	a131
Boston & Suburban Electric Companies	a16	a16
Boston & Suburban Electric Companies (preferred)	75½	75
Boston & Worcester Electric Companies (common)	a12	a12
Boston & Worcester Electric Companies (preferred)	a50	a49
Brooklyn Rapid Transit Company	82½	80
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	88	86¾
Capital Traction Company, Washington	a133½	a132½
Chicago City Railway	a190	a185
Chicago & Oak Park Elevated Railroad (common)	*2	*2
Chicago & Oak Park Elevated Railroad (preferred)	*10	*10
Chicago Railways, ptcptg., ctf. 1	a100	a105
Chicago Railways, ptcptg., ctf. 2	a31	a31
Chicago Railways, ptcptg., ctf. 3	a21	a15
Chicago Railways, ptcptg., ctf. 4s	*10	a10
Cleveland Railways	*84	*84
Consolidated Traction of New Jersey	a76½	a76½
Consolidated Traction of New Jersey, 5 per cent bonds	a106	a106
Detroit United Railway	*65	*63
General Electric Company	160	160¼
Georgia Railway & Electric Company (common)	a101	101
Georgia Railway & Electric Company (preferred)	87	87
Interborough-Metropolitan Company (common)	25⅝	24
Interborough-Metropolitan Company (preferred)	61¾	64¾
Interborough-Metropolitan Company (4½s)	84⅜	83⅞
Kansas City Railway & Light Company (common)	a38½	a42
Kansas City Railway & Light Company (preferred)	*82	a79
Manhattan Railway	*140	*140½
Massachusetts Electric Companies (common)	a16	a16
Massachusetts Electric Companies (preferred)	a76	a78½
Metropolitan West Side, Chicago (common)	a17	a18½
Metropolitan West Side, Chicago (preferred)	a52	a56½
Metropolitan Street Railway	a23	*20
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	82¾	85⅜
Northwestern Elevated Railroad (common)	a18	a17½
Northwestern Elevated Railroad (preferred)	a68	a70
Philadelphia Company, Pittsburg (common)	a49¾	a50¾
Philadelphia Company, Pittsburg (preferred)	44	a45
Philadelphia Rapid Transit Company	25⅞	a28¼
Philadelphia Traction Company	a90	a89½
Public Service Corporation, 5 per cent. col. notes	*100⅛	*100⅛
Public Service Corporation, ctfs.	a100¼	a100¼
Seattle Electric Company (common)	a117	a116½
Seattle Electric Company (preferred)	a104	104
South Side Elevated Railroad (Chicago)	a52	a53
Third Avenue Railroad, New York	16	13
Toledo Railways & Light Company	*8	*8
Twin City Rapid Transit, Minneapolis (common)	113	111⅛
Union Traction Company, Philadelphia	a54	a52¾
United Rys. & Electric Company, Baltimore	a14⅜	a14
United Rys. Inv. Co. (common)	41	42¾
United Rys. Inv. Co. (preferred)	72¾	73¾
Washington Ry. & Electric Company (common)	a42¾	a44½
Washington Ry. & Electric Company (preferred)	a91⅛	a91¾
West End Street Railway, Boston (common)	a93⅜	93
West End Street Railway, Boston (preferred)	a106	106
Westinghouse Electric & Mfg. Company	84	83¾
Westinghouse Elec. & Mfg. Company (1st pref.)	135	*135

a Asked. * Last Sale.

Jamestown Central-Station Property Sold

Following the recent special taxpayers' election in Jamestown, N. Y., at which the voters rejected the proposal to purchase the property of the Jamestown Lighting & Power Company by a small majority, comes the announcement that the property of the company has been sold to A. N. Broadhead and associates, who control the Chautauqua Traction Company and the Jamestown Street Railway, for $90,000, the sum for which the plant was offered to the board of lighting commissioners of Jamestown, to be incorporated with the municipal plant. The company has a 50-year franchise, granted about 23 years ago. It is possible that by combining the electric light and power service with the street railway, a sufficient demand for electricity may be created in Jamestown to make it profitable to use power transmitted from Niagara Falls. Niagara power is already transmitted to Dunkirk, and if brought into Jamestown it will be delivered to the Chautauqua Traction Company's power station at Mayville and there reduced in voltage for distribution throughout Jamestown. Ultimately the two local plants will be combined at the street railway power house near the boat landing in Jamestown. The Jamestown Lighting & Power Company is the successor of a company organized in 1887. The business progressed satisfactorily for a number of years, but declined after the establishment of a municipal plant. However, the company was reorganized and of late years the business has increased. A majority of the stock and bonds of the company was held by the United Electric Securities Company, Boston, Mass.

Anderson (S. C.) Traction Company.—The court has directed the receivers of the Anderson Traction Company to turn the property of the company over to Ellison A. Smith as the representative of the new owners. The property was sold for $154,750 at receiver's sale on Oct. 12, 1909.

Chicago Consolidated Traction Company, Chicago, Ill.—The United Railway Company has been incorporated with a nominal capital stock of $100,000 by Charles G. Dawes, Emile K. Boisot, George P. Hoover and Andrew Cook, of the reorganization committee of the Chicago Consolidated Traction Company, as the successor to that company. The city will probably be asked very soon to grant the company a franchise similar to that under which the Chicago Railways operates.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—The protective committee, representing holders of the first mortgage consolidated bonds of the Columbus, Delaware & Marion Railway, consisting of Guy M. Walker, New York; N. S. Keith, Cincinnati, Ohio, and W. H. Netherland, Louisville, Ky., has been enlarged by the addition of Judge O. M. Gottschall, Dayton, Ohio, representing Dayton and other bondholders, and L. L. Stanton, vice-president of the Standard Trust Company, New York, representing the General Electric Company.

Eastern Ohio Traction Company, Cleveland, Ohio.—In the Electric Railway Journal of Dec. 11, 1909, page 1203, mention was made of the order of sale of the property of the Eastern Ohio Traction Company at foreclosure, entered by Judge Phillips of the Common Pleas Court at Cleveland. The holders of the $200,000 of first mortgage bonds of the company now plan to bid in the property and form a new company with $300,000 of stock and $300,000 of bonds, the bondholders to get par in new bonds for their holdings plus 12 per cent for accrued interest.

Frederick (Md.) Railway.—At a recent meeting of the stockholders the consolidation of the Frederick & Middletown Railway, the Washington, Frederick & Gettysburg Railway and the Jefferson & Braddock Heights Railway was ratified, the consolidated company to be known as the Frederick Railway. The capital stock will be $1,500,000, of which $1,250,000 is common stock and $250,000 preferred stock. All the bonds of the old companies were retired and a new bond issue to the amount of $480,000, covering the entire property, was made.

Indianapolis & Louisville Traction Company, Louisville, Ky.—The Indianapolis & Louisville Traction Company has executed a mortgage of $600,000 to the Colonial Trust Company, Pittsburgh, Pa. There is a first mortgage of $1,250,000 outstanding against the property.

Johnstown (Pa.) Passenger Railway.—T. C. du Pont, Wilmington, Del., president of the Johnstown Passenger Railway, is reported to have given the American Railways Company, Philadelphia, Pa., an option on 25,000 shares of the total of 40,000 shares of the stock of the company owned by himself and members of the du Pont family.

New York, West Chester & Boston Railway, New York, N. Y.—A special hearing was held at the office of the Public

Service Commission of the First District of New York on Dec. 8, 1909, on the application of the New York & Port Chester Railway and the New York, West Chester & Boston Railway to consolidate under the name of the latter, at which Frank W. Stevens, chairman of the commission of the Second District, presided. Both companies are controlled by the Millbrook Company, the stock of which is in turn owned by the New York, New Haven & Hartford Railroad. The commission for the first district objected to the plan of the company to abandon about half of its branch from West Farms to Throgg's Neck. Francis Lynde Stetson, counsel for the companies, stated that the management was prepared to concede this point and would ultimately build the line as originally proposed if the commission insisted upon the construction of the West Farms-Throgg's Neck branch. The hearing was adjourned.

Ocean Shore Railway, San Francisco, Cal.—The Circuit Court of the United States at San Francisco has appointed Fred S. Stratton, collector of the port of San Francisco, receiver of the Ocean Shore Railway on the application of the Baldwin Locomotive Works, Philadelphia, Pa. Mr. Stratton has announced the continuation of J. Downey Harvey as general manager of the company.

Pittsburgh & Allegheny Valley Railway, Leechburg, Pa.—W. D. Patton, judge of the Court of Common Pleas of Armstrong County, on Nov. 30, 1909, filed his findings in the proceedings by the Safe Deposit & Trust Company, Pittsburgh, trustee, against the Pittsburgh & Allegheny Valley Railway to foreclose the mortgage of $1,100,000 against the property and franchise of the company. In the decree the court finds that the mortgage is a first lien and that the trustee is vested with the power to sell the capital stock of the Leechburg Electric Light, Heat & Power Company, Apollo Light, Heat & Power Company and the Leechburg Bridge Company at public sale. The court also finds that there are $533,500 of bonds outstanding and that George M. Hosack holds $295,500 of these. In addition to the bonds held by Mr. Hosack in his own right, he holds, under certain agreements relating to reorganization, $166,000 of bonds, thus giving him $461,000 of the total of $533,500 of bonds to be turned in to the trustees if he should purchase the property.

Pittsburgh & Westmoreland Railway, Pittsburgh, Pa.—The petition of Manning Stires, receiver of the Pittsburgh & Westmoreland Railway, to sell the property of the company to the Pittsburgh, McKeesport & Westmoreland Railway, organized to take over the Pittsburgh & Westmoreland Railway, was argued in the Court of Common Pleas of Allegheny County on Nov. 27, 1909. The Pittsburgh & Westmoreland Railway operates 8 miles of line between Irwin and McKeesport and has an outstanding bond issue of $330,000. The petitioners filed with the court a sworn summary of the company's business from Nov. 16, 1908, to Aug. 31, 1909, which showed total receipts of $16,657 and operating expenses of $20,720, making the net loss from operation $4,063. The disbursement for betterments amounted to $2,514, and the unpaid contract for betterments to $5,083. Objections were made to the sale by attorneys representing the bondholders and unsecured creditors. The court asked for more complete information regarding the new company, stating that, if all the bondholders and creditors could agree, perhaps it might consent to make the order, but not on the information now before it.

Southwestern Street Railway, Philadelphia, Pa.—When the property of the Southwestern Street Railway was offered for sale under foreclosure on Dec. 9, 1909, no bids were received. The United States Circuit Court ordered that no offer of less than $300,000 should be accepted.

Toledo & Indiana Railway, Toledo, Ohio.—The bid of $1,006,000 made by J. M. Longnecker, Delta, Ohio, and his associates, representing the minority stockholders of the Toledo & Indiana Railway at the foreclosure sale mentioned in the ELECTRIC RAILWAY JOURNAL of Dec. 11, 1909, was set aside by Judge Manton in the Court of Common Pleas at Toledo, Ohio, on Dec. 4, 1909, on the application of the majority bondholders. The court ruled that the appraisement was not filed until after the sale had taken place, and announced that a new appraisement would be made and the property re-sold. At the sale on Nov. 27, 1909, D. J. Cable made a bid of $1,004,500 in the interest of the Ohio Electric Railway, and after the sale notified C. F. M. Niles, receiver, of the willingness of the interests which he represents to pay $1,500,000 for the property.

Wilkes-Barre (Pa.) Railway.—The Wilkes-Barre Railway has been incorporated with a nominal capital of $10,000, with Charles W. Laycook, Kingston, Pa., as treasurer, with the end in view, it is said, of leasing the property of the Wilkes-Barre & Wyoming Valley Traction Company for a long period of years.

Traffic and Transportation

Cases Before Interstate Commission Involving Through Routes and Joint Rates with Steam Roads

The case before the Interstate Commerce Commission in which the Southern California Sugar Company is the complainant, and which involves through rates between electric railways and steam railroads in Southern California, was heard in San Francisco on Nov. 29, 1909. As stated in the ELECTRIC RAILWAY JOURNAL of Sept. 4, 1909, page 379, complaint was made against the San Pedro, Los Angeles & Salt Lake Railroad, the Atchison, Topeka & Santa Fé Railway, the Southern Pacific Company and the Pacific Electric Railway for discriminating against the Southern California Sugar Company in the matter of freight rates to the Missouri River and other Eastern points, and asking that the defendants publish joint through rates on Eastern business that will enable the company to compete with sugar factories at Chino, Los Alamitos and Oxnard.

The district which lies southeast of Los Angeles is served by the Pacific Electric Railway, which has a spur direct to the factory of the Southern California Sugar Company at New Delhi, and collects the beets from the various ranches by means of a branch line through the valley. On Eastern rates from Los Angeles, however, a local rate of 2½ cents per 100 lb. is charged by the Pacific Electric Railway for the haul from New Delhi to the transfer point, Los Angeles, and this handicaps the company in competing with sugar factories located on the lines of the railroads which enjoy through rates.

The testimony was taken before Special Examiner Edward Brown and its presentation occupied two days, including an evening session. The first witness for the complainant was F. B. Case, manager of the Southern California Sugar Company. He testified at length regarding practically all the points covered by the complainant. J. McMillan, general manager of the Pacific Electric Railway, and W. F. Towne, general agent of the freight department of that company, also testified. Other witnesses were Thos. A. Graham, a Los Angeles freight official, and Harvey B. Titcomb, engineer for the Southern Pacific Company; W. B. Barnwell, general freight agent for the Santa Fé Railway, and Messrs. Ward and Flavan, two celery growers who reside in the vicinity of the sugar plant.

Evidence was introduced to show that the company actually produced and shipped sugar from its plant at New Delhi; that it had asked for through joint rates over the Pacific Electric Railway and the railroads; that although the electric railway had been willing to enter into an agreement for such a rate, it had been impossible to obtain concessions from the railroads, and furthermore, that because of the additional local rate which the sugar company had to pay, not only for shipments of sugar East, but also for shipments received from the East, such as raw products, coke, etc., and because these rates were not fixed it could not accurately estimate its business, profits, etc.

It was shown that the Pacific Electric Railway had an extensive railway system covering a large section of the country in the vicinity of Los Angeles; that it had a spur track to the sugar company's plant; that it received freight from the company and shipped same; that it had transfer points with the steam railroads at Los Angeles and several points near the city, and that it transferred transcontinental freight shipments to and from the railroads; that it had some 600 freight cars and about 40 electric locomotives; that it complied fully with the requirements of the Interstate Commerce Commission regulations as to standard couplers, air brakes, trucks, etc.; that it had published its own freight tariff, and in general that it was thoroughly equipped to handle through freight business.

It was also shown that not only was the Southern California Sugar Company interested in the question of rates, but that there were celery growers and other producers who would profit by through rates. Along the line of the electric railway were 21 originating points for Eastern freight. Although the Pacific Electric Railway was named as a defendant, the company announced that it was ready at any time to enter into a joint through Eastern rate with any or all of the steam railroads. One significant point was a letter introduced as evidence showing that some time ago Fred Warren, general freight agent of the San Pedro, Los Angeles & Salt Lake Railroad, in connection with the Transcontinental Traffic Association had ordered a joint rate with the Pacific Electric Railway from all shipping points on its lines. The Pacific Electric Railway had written a letter in which it had concurred in the rate, agreeing to take 10 per cent of the Missouri River rate for its portion of the haul (the customary percentage for local

steam lines transferring to other steam lines being 20 per cent). Testimony was introduced to show that this rate was withdrawn before it went into effect, on telegraphic orders.

The officials of the steam railroad claimed that the territory in question was well served by their lines; that they had offered to build a connection from the Southern Pacific Railroad to the factory for $5,000 to cover the ¾ mile of track necessary, and also that a transfer point with the Southern Pacific Railroad and Santa Fé System at Santa Ana was practical. Mr. McMillan said a transfer at Santa Ana would be very expensive, whereupon the representatives of the Southern Pacific Railroad said they would build a branch line to the factory if right-of-way was given, but that the branch would have to cross a main line of the Pacific Electric Railway. Mr. Barnwell said that the Santa Fé System did not deem it advisable to make a joint traffic arrangement with the Pacific Electric Railway, because a precedent would be established which might result in the loss of business for his company.

Seth Mann, San Francisco, was the attorney for the Southern California Sugar Company. The Southern Pacific Company was represented by C. W. Durbrow, who also looked after the interests of the Los Angeles & Salt Lake Railroad. E. W. Camp represented the Santa Fé System, and Judge Gibson appeared for the Pacific Electric Railway. The complainant has until Jan. 10, 1910, to file its brief, the reply by the defendants must be filed before Jan. 25, 1910, and the concluding brief, if one is deemed advisable by the complainant, must be filed before Feb. 15, 1910.

One of the cases pending before the Interstate Commerce Commission in which the question of through routes and joint rates between electric railways and steam railroads is involved is that of the Cincinnati & Columbus Traction Company, Norwood, Ohio, versus the Baltimore & Ohio Southwestern Railroad and others. The evidence offered on behalf of the traction company in this case was composed principally of testimony by merchants, farmers and manufacturers located on its line as to the public advantage that would be offered by the interchange of facilities. It was also testified on behalf of the traction company that its physical conditions were safe for interchange of cars. The defense of the steam railroad included expert testimony tending to show that the business that would be offered by the Cincinnati & Columbus Traction Company was not sufficient in volume to justify interchange and that through routes and joint rates in this case would interfere with the service furnished to shippers reached directly by the steam railroads and its regular connections.

Near Stop and New Transfers Introduced in Rochester

The New York State Railways recently began to stop its cars in the downtown district of Rochester, N. Y., on the near side of the street. For the convenience of patrons signs with arrows have been suspended from the span wires to indicate the location of the stops. The plan of entering cars at the rear and leaving them at the front is continued. Heretofore cars have been stopped at both the near and the far sides of the street in downtown Rochester, a plan which frequently delayed cars at streets where the wagon traffic is heavy. In explanation of the new crossing stop and a new transfer arrangement, E. J. Cook, general manager, issued the following statement on Dec. 9, 1909:

"This company fully realizes and appreciates that the good will of the public is essential in the successful conduct of its business, and that its success financially and otherwise as a transportation company is dependent upon this same good will.

"The present transfer system was not conceived, developed or put in service hurriedly, but with careful consideration. We undoubtedly have made some mistakes. These will be rectified as rapidly as possible. On the other hand, we request the public not to pass hasty judgment upon the present transfer system. This city is no longer a village—it can no longer have one transfer point. The present system has been devised and planned for an increasing population, so that a revision of the transfer system will not be necessary every two or three years, with its attendant inconveniences and discomfort to the traveling public.

"We also request the public not to confuse the Main Street congestion, which is the principal cause of late cars and consequent crowding, with the recent change in the transfer system. The congested condition existed before the new transfer system was placed in operation and would continue to a less or greater extent with the new or old transfer system, until there was a re-routing of some of the car lines now operating through Main Street. We believe the general public is well informed regarding this fact.

"It is the intention of this company to re-route some lines at the time the 25 new pay-as-you-enter cars which the company has recently purchased are placed in operation. The order for these cars was placed with the understanding that the last car would be received in Rochester on Dec. 7, 1909. This would have enabled us to place these lines in operation in time to take care of the heavy holiday shopping traffic. The builders of the equipment now inform us that it will be impossible for them to make the delivery as promised, and we will not be able to put this line in operation until after the first of the coming year.

"The inability to place these new cars in service before the holidays has been a keen disappointment to us. With the re-routing of some of the Main Street lines and the placing of 25 additional cars on the system, the majority of the complaints now based on the transfer system will be removed.

"For this reason we respectfully ask the public to give the new transfer system a fair trial for at least 30 days, until the above can be done, and after that, if it is generally complained of, we will cheerfully assist in placing the transfer system before the Public Service Commission, Second District, for its decision."

New Freight Service Over Illinois Traction System

On Nov. 18, 1909, the Illinois Traction System, Peoria, Ill., had the traffic officials of the Chicago & Eastern Illinois Railroad as its guests on a tour of the lines of the Illinois Traction System which was made in the private car of H. E. Chubbuck, general manager. The car left Danville at 7:00 a. m. for East St. Louis, running via Champaign, Decatur, Bloomington, Mackinaw, Springfield, and stopping at stations en route. Lunch and dinner were served on the car and the members of the party thoroughly enjoyed the trip, one of them remarking in the evening that the slogan of the company, "No dust, No dirt, No smoke, No cinders," certainly was a fact. As a result of the trip, it was decided to establish a through merchandise service from Chicago, and on Dec. 1, 1909, a car was put on running from Chicago to Glover via the Chicago & Eastern Illinois Railroad. This car arrives at Glover at 12:50 a. m. and leaves at 2:00 a. m., unloading the Urbana and Champaign freight and proceeding to Decatur, delivery being made at most points on the company's line the next morning and not later than noon to every point on the system.

The following officials of the Chicago & Eastern Illinois Railroad made the trip over the lines of the Illinois Traction System: F. C. Reilly, general freight agent, Chicago; R. M. Stannage, chief clerk to the general freight agent, Chicago; T. O. Jennings, general agent, Chicago; G. E. White, commercial agent, Chicago; G. H. Hume, chief clerk to the commercial agent, Chicago; J. J. Hazzard, W. F. Rothwell, C. E. Pierce, T. J. McDermott, F. L. Hasten, J. A. Wallace, A. W. Sheerer, contracting freight agents; J. W. Kelly, district freight agent, Danville; C. B. Anderson, agent at Chicago; M. Thomas, chief clerk to the agent at Chicago.

The officials of the Chicago & Eastern Illinois Railroad were accompanied by the following traffic representatives of the Illinois Traction System: H. H. Roseman, traffic manager, Springfield; J. A. Glover, district freight and passenger agent, Urbana; T. P. Gallagher, traveling freight agent, Urbana; C. C. Hurin, district traffic agent, Decatur; E. E. Kester, general agent, Peoria; T. T. Thompson, district traffic agent, Springfield; H. E. Morris, district freight and passenger agent, East St. Louis; C. F. Handshy, general superintendent; M. Connor, superintendent, Danville; H. J. Vance, assistant general superintendent, Peoria, and F. G. Buffe, publicity agent, Peoria.

Proposed Increase of Fares on Oneida Railway

The Oneida (N. Y.) Railway has filed with the Public Service Commission of the Second District of New York for approval a new schedule of rates between Utica and Syracuse, to go into effect Jan. 1, 1910, based upon the following rates, namely: From Genesee Street, Utica, to Sherrill, and from Wampsville to the city line of Syracuse, 2 cents per mile for cash fare to the nearest cent; 1.8 cents per mile for single trip ticket fare to the nearest cent; 1.6 cents per mile for round trip ticket fare to the nearest cent. The fares between Sherrill and Wampsville are franchise conditions fixed with Oneida and are 5 cents. The present rates of fare on the West Shore Railroad were based upon the following: 1.75 cents per mile for cash fare; 1.55 cents per mile for single trip ticket fare; 1.45 cents per mile for round trip ticket fare. No fare accepted to be less than 5 cents. C. Loomis Allen, general manager and vice-presi-

dent of the company, bases his application to increase the fares on the ground that the line does not pay a sufficient profit on the investment. A comparison of fares at present and those which will prevail after Jan. 1, 1910, follows:

	At Present.			After Jan. 1, 1910.		
	Cash.	Ticket.	Round trip.	Cash.	Ticket.	Round trip.
Glatt's H'y	$0.10	..	..	$0.11	..	..
Clark Mills	.15	$0.13	$0.25	.17	$0.16	$0.30
Westmoreland	.20	..	..	.20	..	..
Cheese F. R'd	.20	..	..	.21	..	..
Hecla	.25	.18	.35	.25	.23	.43
Bronson's	.30	..	..	.30	..	..
Vernon	.35	.25	.50	.35	.32	.58
Sherrill	.40	..	..	.40	..	..
Oneida	.45	.38	.75	.45	.42	.80
Wampsville	.45	.38	.75	.45	.42	.80
Canastota	.50	.43	.85	.50	.46	.88
Sullivan	.55	..	..	.57	..	..
Chittenango	.60	.53	1.00	.62	.58	1.10
Kirkville	.65	.58	1.10	.70	.65	1.23
Manlius C'r	.70	.62	1.20	.75	.70	1.31
E. Syracuse	.75	..	..	.80	..	..
Syra. C. Line	.80	..	..	.85	..	..
Syracuse	.85	.75	1.40	.90	.85	1.60

Shortage of Labor in Bridgeport.—The Connecticut Company, New Haven, Conn., has advertised in that city for motormen and conductors for service on its lines in Bridgeport.

Increase in Fare on Westchester Street Railroad.—The Westchester Street Railroad, which on Dec. 8, 1909, succeeded the Tarrytown, White Plains & Mamaroneck Railway, sold recently under foreclosure, has increased the fare between Tarrytown and Mamaroneck from 10 cents to 20 cents.

Complaint Against Fonda, Johnstown & Gloversville Railroad.—The Public Service Commission of the Second District of New York has received a complaint from H. E. Heidenrich against the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., regarding the operation of passenger cars between Schenectady and Hoffmans, particularly cars between the hours of 5:30 p. m. and 6:30 p. m.

Heating Order Must be Posted.—The Public Service Commission of the First District of New York has refused to modify the order regarding the heating of street cars recently promulgated by eliminating the provision stipulating that the order shall be posted in the cars. A brief account of the hearing at which the arguments were presented to induce the commission to modify the order was published in the ELECTRIC RAILWAY JOURNAL of Dec. 11, 1909, page 1190.

Hearing on Air Brakes Before Railway Commissioners of Canada.—The hearing which was to have been held before the Board of Railway Commissioners of Canada on Dec. 7, 1909, in accordance with a letter addressed on Nov. 25, 1909, to the electric railways subject to the jurisdiction of the commissioners that they would consider an order requiring the railways to equip their cars with automatic air brakes as well as hand brakes as an additional safeguard in case of damage to the air-brake equipment was postponed indefinitely.

Injunction Restraining Electric Railway From Complying with 2-Cent Fare Law.—Judge Smith McPherson, of the United States Circuit Court of Appeals for the Eighth Circuit, has granted a temporary injunction forbidding the Cedar Rapids & Iowa City Railway & Light Company from complying with the Iowa 2-cent fare law. The action was based on a petition by Elizabeth D. McClintock, Haverford, Penn., a stockholder of the company, who declares the company is no longer paying dividends because of the hardship worked by the 2-cent fare law.

Through Service Between Allentown and Bethlehem.—R. P. Stevens, president and general manager of the Lehigh Valley Transit Company, Allentown, Pa., and H. R. Fehr, president and general manager of the Easton (Pa.) Transit Company, have effected an agreement under which cars of the Easton Transit Company will after Jan. 1, 1910, run through to Allentown from Easton instead of to Bethlehem as at present. Crews will be changed at Bethlehem as usual. With through cars, the trip of 18 miles between Easton and Allentown will be made 15 minutes quicker than at present.

Pay-As-You-Enter Cars in Jacksonville.—The Jacksonville (Fla.) Electric Company placed pay-as-you-enter cars in service on its Main Street line on Dec. 8, 1909. Previous to commencing the service the company carried a half-page advertisement in the daily papers showing a plan of the cars and instructing passengers how to use them properly. Hardy Croom, manager of the company, also addressed a letter to the editors of the newspapers, in which he set forth the reasons of the company for adopting the cars, paying particular attention to the advantages that will accrue to the public by their use.

Continuous Service Rewarded in Brooklyn.—The Brooklyn (N. Y.) Rapid Transit Company has announced a new wage schedule effective on Jan. 1, 1910, by which all motormen and conductors on its surface lines who have been in the employ of the company six years or more and have no demerits will receive an increase in wages of one cent an hour. The present pay of motormen and conductors, regardless of length of service, is 23 cents an hour. The company has also announced that a general pension plan is under consideration. At present a number of employees receive pensions, but their cases have been dealt with individually.

Sunday Cars in London, Ont.—The official declaration of Sir James Whitney that he would not declare the population of London to be 50,000 in compliance with the request of the City Council was received in London on Dec. 3, 1909, and will be presented to the Council at the next meeting. In his letter the Premier says that on the figures submitted he would not be justified in declaring the population to be that required by law. As the Council had not asked for a census, he would not order it, though he declared himself willing to order one if the Council wished it and would pay for it. The Council will not ask for a census, and the subject goes over for another year.

San Francisco's Car Fare Bill.—The ordinance which has been pending for six months before the Board of Supervisors of San Francisco to compel street railways to issue checks to passengers when traffic is suspended has been voted down. The ordinance, as originally framed, required street railways to refund the fare in cash, but this was modified, as it was demonstrated that such a regulation would lead to abuse by the conductors and perhaps entail financial loss. William M. Cannon, counsel for the United Railroads, contended that the bill was in violation of the Constitution and made a disbursing agent of the conductors. He thought the use of emergency transfers was sufficient to meet all requirements.

Louisville Accident Fakirs Sentenced.—Luke Hubbard and James Hubbard in the criminal court at Louisville, Ky., on Dec. 8, 1909, pleaded guilty to charges of obtaining money from the Louisville Railway under false pretense and were sentenced to serve one year each in the penitentiary. James Hubbard posing as John Thompson, pretended to suffer injuries when he fell from a car at Fifteenth and Jefferson Streets, Louisville. Luke giving the name of C. T. Martin, became the witness of the accident. An unsuspecting lawyer was employed to prepare a suit, but the claim for damage was settled by the company paying $30, which the prisoners divided between them. The alleged accident occurred in June, 1909, and the indictment was returned by the October jury. Luke Hubbard will also face another indictment in which he is accused of further attempting to defraud the company through a similar conspiracy. Named jointly with him in this indictment is E. W. Stokes.

Traffic Circulars of Texas Companies.—James P. Griffin, general passenger agent of the Texas Traction Company and the Dennison & Sherman Railway, Dallas, Tex., has issued printed matter regarding these companies which includes a booklet descriptive of the properties, a time card and a placard giving the time-table of trains between Dallas and Dennison and the local service between Sherman and Dennison. This placard also contains at the left-hand side a map of the routes of both the Texas Traction Company and the Dennison & Sherman Railway, 3½ in. wide by 7 in. high. The pamphlet describing the properties is entitled "The Convenient Way." It contains 30 pages and includes time cards of through service between Dallas and Dennison and Dennison and Dallas and time cards of service between Sherman and Dennison in both directions. There is a brief history and description of the properties followed by a short article entitled "Imperial Texas." The counties through which the companies operate are then taken up in turn and their natural resources and facilities outlined. Following this there is a similar outline of the resources of the cities and towns through which the companies operate. Full information is given regarding the sale of tickets, the arrangement made for special cars, theater service and handling express and packages. The publication is concluded with an article entitled "Parks and Resorts," in which Kirkland Park, Woodlake Park and Coursing Park, all of which are reached by railways, are briefly described. Mr. Griffin has also issued a desk blotter and a series of picture post cards, some in black and white and some in colors, showing scenes along railways.

Personal Mention

Mr. George M. Kirchmer has been appointed claim agent of the Coney Island & Brooklyn Railroad, Brooklyn, N. Y., to succeed Mr. John C. Hamilton.

Mr. H. M. Beardsley, secretary and treasurer of the Elmira Water, Light & Railroad Company, Elmira, N. Y., has also been appointed acting general manager of the company.

Mr. W. C. Gray has resigned as vice-president and superintendent of the Geneva & Auburn Railway, Seneca Falls, N. Y., which has succeeded the Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company, and Mr. S. H. Dailey has been appointed to succeed him as superintendent, but his successor as vice-president has not been elected.

Mr. C. F. Handshy, general superintendent of interurban transportation of the Illinois Traction System, Champaign, Ill., has been given the title of general superintendent of the company. Mr. Handshy became connected with the Illinois Traction System about two years ago. Before that he was in the employ of the Wabash Railroad for 15 years, serving in turn as telegraph operator, train dispatcher, chief dispatcher and trainmaster.

Mr. Emil Swenson has been appointed by the State Railroad Commission of Pennsylvania to study street railway conditions in Pittsburgh, and has taken up the work in that city following a conference with the commission. Mr. Swenson is a resident of Pittsburgh and has had previous experience as an engineering expert on street railway and other engineering matters. He was employed on the construction of the New York subway.

Mr. P. V. See has been appointed superintendent of car equipment for the Hudson & Manhattan Railroad, New York, N. Y. Mr. See is a graduate of Armour Institute, Chicago, Ill. Since the spring of 1909 he has been general shop foreman of the Illinois Traction System, with headquarters at Decatur, Ill. Previous to becoming connected with the Illinois Traction System Mr. See served for more than two years as shop foreman of the Metropolitan West Side Elevated Railroad, Chicago, Ill.; as superintendent of the Dorner Truck Company, and as general shop foreman of the Twin City Rapid Transit Company, Minneapolis, Minn., for two years.

Mr. M. H. Hovey has been appointed as expert in signaling and interlocking on the engineering staff which jointly serves the Railroad Commission of Wisconsin and the Wisconsin Tax Commission, reporting to Prof. W. D. Pence, who is engineer for the two State commissions. Mr. Hovey has served as signal engineer in the signal staff of several railroads and signal companies, and has recently served as signal expert for the Federal Block Signaling & Train Safety Board, having withdrawn from that service to become superintendent of construction of the American Railway Signal Company, Cleveland, Ohio. In resigning from the American Railway Signal Company he will resume his former service with the Federal board in connection with his duties for the Wisconsin commissions. After Jan. 1, 1910, Mr. Hovey's headquarters will be at Madison.

Mr. S. H. Dailey was appointed general superintendent and purchasing agent of the Geneva & Auburn Railway, Seneca Falls, N. Y., which has succeeded the Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company, on Dec. 1, 1909, to succeed Mr. W. C. Gray, resigned. Mr. Dailey entered electric railway work in his home city, York, Pa., about 1894, in the repair shops of the York Street Railway. Since that time he has been connected with the engineering department of several large railway systems and manufacturers of railway appliances. For six years he was with Ford, Bacon & Davis, New York, N. Y., as car and equipment engineer, but resigned from this firm to accept a similar position with E. W. Clark & Company, Philadelphia, Pa., at their engineering headquarters in Columbus, Ohio. While in the employ of E. W. Clark & Company Mr. Dailey directed the construction and equipment of electric cars for the properties controlled by the Clark interests in the Central West and on the Pacific Coast. Early in 1909 Mr. Dailey became connected with the engineering department of Meikleham & Dinsmore, New York, N. Y., supervising managers of the Geneva & Auburn Railway.

Mr. Frank R. Phillips has resigned as master mechanic of the Cleveland (Ohio) Railway to become superintendent of equipment of the Pittsburgh (Pa.) Railways, effective on Jan. 1, 1910. After leaving the high school in Cleveland Mr. Phillips decided upon a railway career and entered the employ of the Cleveland City Railway in 1894. He advanced gradually until he became a foreman and then master mechanic of the company. When the Cleveland City Railway and the Cleveland Electric Railway were consolidated in 1903 as the Cleveland Electric Railway Mr. Phillips accepted the position of master mechanic of the Cincinnati, Newport & Covington Railway. Subsequently he became chief engineer in charge of all but the transportation department of the Michigan United Railway, Lansing, Mich. In 1906 Mr. Phillips entered the employ of the Ohio Brass Company, Mansfield, Ohio, as designing engineer in charge of railway overhead work, and made a study of the street railway conditions of most of the large cities of the United States east of the Mississippi River for that company. In July, 1908, he became master mechanic of the Cleveland Traction Company, in charge of buildings, shops and equipment. Mr. Phillips is the inventor of a number of railway devices and has appeared before several railway commissions as an expert. He is an associate member of the American Institute of Electrical Engineers.

Mr. S. J. Dill, who has been resident general manager of the Elmira Water, Light & Railroad Company, Elmira, N. Y., since July 20, 1908, has been appointed assistant to Mr. George Bullock, president of the Susquehanna Railway, Light & Power Company, New York, N. Y., a holding company which controls 15 public service corporations, including the electric railways in Elmira, N. Y., and Lancaster, Pa. Mr. Dill has also been elected vice-president of the Railway Equipment Company, New York, N. Y., through which purchases are made for the Susquehanna Railway, Light & Power Company. He succeeds to the duties with these companies previously performed by Mr. Edwin Witherby, whose resignation was announced in the Electric Railway Journal of Dec. 11, 1909. Although Mr. Dill will have his headquarters in New York, he will retain the title of general manager of the Elmira Water, Light & Railroad Company, of which he has been elected vice-president. Mr. Dill began his railway career with the Metropolitan Street Railway, New York, N. Y. He was promoted by the company to division foreman and was in charge of the Forty-second Street and Crosstown and the Boulevard lines when they were equipped with electricity. In 1901 he became superintendent of the Detroit, Ypsilanti, Ann Arbor & Jackson Railway, and later was appointed general superintendent of the Michigan Traction Company, Kalamazoo, Mich., in charge of the operations of the city lines in Kalamazoo and Battle Creek and the interurban railway connecting the two cities. In 1904 Mr. Dill was appointed general manager of the Youngstown & Southern Railway, then under construction, and continued in that capacity until appointed to the Elmira Water, Light & Railroad Company.

Mr. Lloyd Lyon, whose appointment as treasurer of the Mexico Tramways and the Mexican Light & Power Company, Ltd., was noted in the Electric Railway Journal of Dec. 11, 1909, was born on June 20, 1877. After attending Beloit College he entered the accounting department of the Augusta Railway & Electric Company, Augusta, Ga., in 1897. At the outbreak of the war with Spain in 1898, Mr. Lyon received an indefinite leave of absence from the company allowing him to enlist and serve until discharged in the fall. He returned to his duties with the Augusta Railway & Electric Company and remained in Augusta until 1902, when he resigned to enter the accounting department of the Birmingham Railway, Light & Power Company, Birmingham, Ala. In March, 1903, Mr. Lyon was appointed auditor of the Montgomery (Ala.) Traction Company, then owned and operated by J. G. White & Company, New York, N. Y. On Feb. 28, 1905, he resigned from the Montgomery Traction Company to accept a position in the lighting department of the Little Rock Railway & Electric Company, but in April, 1905, he was sent to Porto Rico by J. G. White & Company as auditor and assistant treasurer of the San Juan Light & Transit Company and in May, 1905, was made assistant manager of the property. In April, 1906, J. G. White & Company began to rehabilitate the railway and lighting systems at San Juan, construct a railway extension of 20 miles and complete the development of a water-power, including substations and a transmission line of 20 miles. For all of this work Mr. Lyon was appointed auditor by J. G. White & Company, in charge of the finances. Mr. Lyon resigned his position in Porto Rico in November, 1907, to become secretary and auditor of the Mobile Light & Railroad Company, Mobile, Ala., and assumed his duties in Mobile on Dec. 1, 1907. Mr. Lyon will assume the duties of treasurer of the Mexico Tramways and the Mexican Light & Power Company, Ltd., on Jan. 15, 1910. At the first annual convention of the Alabama Light & Traction Association, held in Mobile in 1908, Mr. Lyon was elected secretary-treasurer of the association and was re-elected to this position at the second annual convention, held in Birmingham in November, 1909. Mr. Lyon is an associate member of the American Institute of Electrical Engineers.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Birmingham & Gulf Railroad, Birmingham, Ala.**—Incorporated in Alabama with a capital stock of $3,000 for the purpose of establishing of street and interurban railways. Officers and incorporators: J. M. Dewberry, acting president; R. D. Johnston, Jr., secretary; Lewis Minor, treasurer. The incorporators are also connected with the Birmingham & Gulf Railway & Navigation Company, which operates an electric railway between Tuscaloosa and Holt. Office, Birmingham.

***Gadsden (Ala.) Railway.**—Incorporated to build an electric street railway in Gadsden. The company is also given the right to conduct a light and power business. Headquarters, Gadsden. Capital stock, $2,000. Incorporators: J. B. Carrington, Anniston; W. N. Malone and A. B. Mitchell, Birmingham.

Chicago United Railway, Chicago, Ill.—Incorporated in Illinois to take over the properties of Consolidated Traction Company, Chicago. Capital stock, $100,000. Incorporators: Charles G. Dawes, Emile K. Boisot, George P. Hoover and Andrew Cook.

***Thayer Junction Railway, Chicago, Ill.**—Incorporated to construct a railway, to be operated by steam or electricity from Thayer to Thayer Junction. Capital stock, $65,000. Incorporators: A. L. Sweet, Walter Famer and E. E. Jones.

***Inter-City Viaduct Freight Railway, Kansas City, Mo.**—Incorporated to build a 7-mile freight-connecting belt railway on the viaduct between Kansas City, Mo., and Kansas City, Kan. Several steam roads are interested. It is reported that electricity will be the motive power. Capital stock, $70,000. Incorporators: J. W. Reinhardt, A. R. Ash, Howard Ross, H. J. Curran and William J. Knepp.

***Ottawa, Rideau Valley & Brockville Railway, Ottawa, Ont.**—Application has been made to the Dominion Parliament by D. H. McLean, Ottawa, for the incorporation of the Ottawa, Rideau Valley & Brockville Railway. Permission is asked to construct a railway to be operated by electricity or other motive power, from Ottawa to Brockville; to operate a ferry service across the St. Lawrence River to Morristown, N. Y., and to build an extension from the main line, from Ottawa to High Falls.

***Titusville Central Railroad, Titusville, Pa.**—Incorporated to construct a gasoline motor railway in the vicinity of Titusville. Capital stock, $120,000. W. J. Smith, Titusville, president.

***Greenville, Spartanburg & Anderson Railway, Greenville, S. C.**—Application will be made on Dec. 20 by this company for a charter to build an electric railway from Greenville to Spartanburg, 31 miles. The organizers are Charles W. Ellis, H. H. Prince and O. K. Mauldin.

***Nashville & Adairville Railway, Nashville, Tenn.**—Chartered in Tennessee to build an electric railway from Nashville through Goodlettsville to Whitehouse and thence to Adairville. Capital stock, $25,000. Incorporators: W. A. Buntin, B. P. Gilbert, H. M. Hayes, S. C. Robb and R. A. Wilson, all of Nashville.

***Pe Ell & Columbia River Railway, Pe Ell, Wash.**—Incorporated to build an electric railway from Pe Ell to a point on the Columbia River, at Cathlemet. Headquarters, Pe Ell. Capital stock, $50,000. Incorporators: W. C. Yeomans, Charles Yeomans, C. A. Doty, Seattle, and F. B. Hubbard.

FRANCHISES

Santa Barbara, Cal.—The City Council has granted to the Santa Barbara Consolidated Railway a franchise on State Street, between Victoria Street and Sola Street, and on Sola Street, between State Street and Chapala Street.

Oakland, Cal.—The Southern Pacific Company, San Francisco, has applied to the Board of Supervisors in the name of the Central Pacific Railway for a 50-year franchise to operate a double-track, standard-gage, electric railway from Melrose to Stanley Road, a distance of 4 miles. Similar applications will be made in both San Leandro and Hayward for the same privileges.

***Pensacola, Fla.**—An ordinance has been offered in the City Council to grant a street railway franchise to the Pensacola Development & Construction Company.

Dublin, Ga.—The City Council has granted to the Dublin Street Railway a franchise for the construction of a gasoline motor railway in Dublin. P. L. Wade, Dublin, is interested.

Delphi, Ind.—The Logansport, Frankfort & Indianapolis Traction Company, Logansport, has applied to the County Commissioners for a franchise for its proposed railway over Michigan Road in Washington, Burlington and Carrollton Townships. A. A. Newer, Logansport, is interested. [E. R. J., April 17, '09.]

Martinsville, Ind.—J. N. Crabb, president of the Capital Circuit Traction Company, Indianapolis, has applied to the City Council for an extension of its franchise until 1913. The company proposes to build an electric railway to encircle Indianapolis and connect several cities within a radius of 25 miles from Indianapolis. [E. R. J., Oct. 23, '09.]

***Meridian, Miss.**—Application has been made to the City Council by M. R. Grant for a franchise to build and operate a street railway and power plant in Meridian.

Oswego, N. Y.—The Common Council has granted to the Syracuse, Lake Shore & Northern Railroad a franchise to enter Oswego as the terminus for its projected Fulton extension.

Marshfield, Ore.—At a special election recently held in Marshfield a franchise was voted to J. M. Blake for the construction of an electric railway within the city limits. The line will be about 5 miles long. [E. R. J., Oct. 16, '09.]

Delaware Water Gap, Pa.—The Borough Council has granted a franchise to the Stroudsburg & Water Gap Street Railway, Stroudsburg, to extend its line through the Gap and connect with Portland.

Seattle, Wash.—The City Council has granted two franchises to the Seattle Electric Company for new lines on Sixth Avenue Northwest and on Fourteenth Avenue.

TRACK AND ROADWAY

Calgary (Alta.) Street Railway.—This company will build an extension of about 12 miles during 1910. Thos H. McCauley, general manager.

Power, Transit & Light Company, Bakersfield, Cal.—This company advises that it expects to relay 7 miles of track during the coming year. It is the intention to replace the 59-lb. rails with 87-lb. rails. James E. Baker, superintendent.

Humboldt & Eastern Railroad, Eureka, Cal.—E. E. Skinner, secretary of the Humboldt & Eastern Railway committee, 318 Fifth Street, Eureka, advises that the preliminary surveys for the proposed railway between Eureka and Redding have been completed and the line located. It is not probable that work will be started until next year. [E. R. J., Sept. 23, '09.]

***Redwood City, Cal.**—It is stated that A. H. Lohman, San Francisco, has begun making the preliminary surveys for an electric railway to extend from Redwood City to Woodside, La Honda and the Big Basin.

Oakland & Antioch Railway, San Francisco, Cal.—S. L. Naphtaly, San Francisco, advises that this company is preparing to begin work the first of the year on its projected electric railway which is to extend from Oakland to Berkeley Walnut Creek, Concord and Bay Point, 34 miles. Surveys and final locations have been made. Power to operate the line will be purchased. The company expects to purchase four cars and one electric locomotive. Capital stock, authorized, $3,500,000. Issued, $500,000. Bonds, authorized, $2,000,000. Headquarters, 347 Grant Avenue, San Francisco. H. A. Mitchell, president; F. E. Brooks, secretary. [E. R. J., Sept. 11, '09.]

Washington, D. C.—A bill has been introduced in the House which provides for the extension of the Brookland tracks of the Washington Railway & Electric Company through that suburb and to the District line, without crossing at grade the tracks of the Baltimore & Ohio Railroad.

***Fort Dodge, Ia.**—L. S. Cass, president of the Waterloo, Cedar Falls & Northern Railway, Waterloo, is said to be at the head of a plan to build an electric railway to connect Mason City, Waterloo and Fort Dodge.

Iowa City, Ottumwa & Southwestern Electric Railway, Iowa City, Ia.—This company announces that it will be prepared to begin work on its line between Iowa City and Ottumwa by May 1, 1910. It will be broad gage, 70 miles long, and will pass through Weltman and Keota. The line will cross several trunk lines running east and west. The company's plans include the erection of a power plant near Keota and the repair shops in that city. No contracts have been awarded as yet. Capital stock authorized, $2,500,000; bonds authorized, $2,000,000. Officers: Frank Tanner, Iowa City, vice-president and general manager; Otto Hill, Davenport, secretary and treasurer; D. T. Davis, Iowa City,

superintendent; Irwin Kettlewell, Iowa City, chief engineer. [E. R. J., Dec. 4, '09.]

Kansas Union Traction Company, Altamont, Kan.—This company advises that it has not yet placed any contracts for the construction of its proposed railway. It will extend from Parsons to Coffeyville, Columbus, Oswego, Altamont, Mound Valley and Cherryvale, 90 miles. Work is scheduled to begin the first of the year. Repairs shops and the power station will be located at Altamont. The company plans to furnish current for light, heat and power purposes. Capital stock authorized, $1,000,000; issued, $500,500. Officers: William J. Jones, Altamont, president; Phillip Strack, 23 Postal Telegraph Building, Indianapolis, Ind.; Barney McDaniel, Altamont, secretary; C. N. Petty, Altamont, treasurer; Archer, Rollins & Company, Kansas City, Mo., electrical engineers. [E. R. J., Aug. 21, '09.]

Kansas City-Western Railway, Leavenworth, Kan.—This company plans to gradually take up all the 60-lb. rails on its line between Kansas City and Leavenworth and relay the track with 70-lb, rails. About 1 mile of this work has already been done. Work has been started by the company on a new bridge on the Fort Leavenworth Reservation. It is to be 450 ft. long and will be of steel construction with concrete abutments and pedestals.

Wichita Railroad & Light Company, Wichita, Kan.—This company expects to construct 10 miles of new track during 1910. W. A. Martin, purchasing agent.

Lake Charles Railway, Light & Water Works, Lake Charles, La.—This company will build 6½ miles of new track from Edna to Kinder, La., in 1910. J. A. Landry, general manager.

Maryland Electric Railways, Annapolis, Md.—This company has nearly completed track and overhead line for a distance of about 8000 ft., this additional trackage being practically an extension of two of its main sidings, one siding being extended about 6500 ft. and the other about 1500 ft. An 80-lb. A. S. C. E. T-rail is used in connection with this work. The overhead type of construction is Westinghouse catenary using ⅞-in. messenger and 000 grooved copper wire.

Detroit, Lansing & Grand Rapids Railway, Detroit, Mich.—This company has awarded a contract to F. C. Wales, 8 Beacon Street, Boston, Mass., for making the location surveys for its projected railway between Detroit, Lansing and Grand Rapids. Work was started on Dec. 6. [E. R. J., Dec. 11, '09.]

***Traverse City, Mich.**—L. K. Gibbs is said to have announced that he has financed his proposition to build a street railway in Traverse City, and that he will be ready to begin work as soon as a franchise is obtained. It is stated that the preliminary surveys have been made and the right-of-way has been secured.

Eastern Montana Electric Railway, Billings, Mont.—Daniel D. Gile advises that this company was incorporated for the purpose of building an 85-mile passenger and freight line to connect Billings, Laurel, Selesia, Joliet, Fromberg, Bridger, Belfrey, Bear Creek, Washoe and Red Lodge. The company is considering the extension of the line westerly from Red Lodge, through Carbon County to the valley of the Stillwater, following the river to its junction with the Yellowstone at Columbus, then easterly through Park City to Laurel. This extension would mean at least 80 miles of additional track. It is the intention to start construction during next spring. Capital stock authorized, $500,000. Headquarters, Billings. Officers: A. C. Logan, Billings, president; Daniel D. Gile, 27 William Street, New York, N. Y., vice-president; G. H. Kesselhuth, Billings, secretary; George F. Bennighhoff, Billings, treasurer; F. A. Kesselhuth, Billings, engineer in charge; Herbert F. Pierce, Boston, Mass., chief engineer. [E. R. J., Nov. 27, '09.]

Lincoln (Neb.) Traction Company.—This company contemplates building 3 miles of track during the coming year.

Brooklyn (N. Y.) Rapid Transit Company.—This company is constructing a double-track line on Nostrand Avenue running south from Flatbush Avenue to Avenue U, representing about 12,025 ft. of single track measurement. The company states that it is quite likely that a small portion of this work will be deferred until next year.

Long Island Railroad, Long Island City, N. Y.—This company will build 28 miles of new track during 1910.

New York, N. Y.—John J. Hopper and E. J. Farrell, contractors, have submitted plans to the Public Service Commission of the First District for a comprehensive subway, making a complete loop around Manhattan and the Bronx. The estimated cost is about $130,000,000. The proposed line starts at the Battery and is to run up First Avenue, through the East Side, to Harlem, loop around the eastern edge of the Bronx and return to the Battery by way of Jerome Avenue, Elmhurst and Edgecombe Avenues, St. Nicholas and Eighth Avenues, Hudson Street and West Broadway. There are to be five crosstown links connecting the East and West Side lines. It is proposed to build the tunnel in twenty-four sections, of about 1 mile each, and with four tracks.

Pennsylvania & Ohio Railway, Ashtabula, Ohio.—This company has placed a contract with the Cleveland Frog & Crossing Company for the necessary Y's and special work to be used in connection with contemplated improvements to its line.

Hamilton, Waterloo & Guelph Railway, Hamilton, Ont.—During 1910 this company will construct 60 miles of new track. New lines will be built between Hamilton and Berlin, and Hamilton and Guelph. John Patterson, manager.

Oregon City, Beaver Creek & Mollala Railway, Oregon City, Ore.—It is stated that F. M. Smith, who is promoting a plan to build an electric railway from Oregon City to Silverton, has secured stock subscriptions from different sources amounting to $100,000. Work is to begin at once. [E. R. J., Oct. 2, '09.]

West Side Electric Street Railway, Charleroi, Pa.—This company announces that it will build a 10-mile interurban line between Charleroi and Ellsworth next year. D. G. Callihan, Belle Vernon, general superintendent.

Schuylkill & Dauphin Traction Co., Harrisburg, Pa.—During 1910 this company will build 2 miles of new track. W. E. Harrington, general manager.

***Pittsburgh & Allegheny Valley Street Railway, New Kensington, Pa.**—This company has been organized to build an electric railway from the northern terminus of the Pittsburgh Railways at Oakmont, through New Kensington, Arnold and Valley Camp, to Apollo, Leechburg, Ford City and Kittanning. George B. Campbell, Jr., New Kensington, has begun making the surveys for the route between Ford City and Leechburg. Most of the rights-of-way have been secured.

Quebec Railway, Light & Power Company, Quebec, Que.—Edward A. Evans, chief engineer of this company, has been instructed to revise the plans already made for the building of the Quebec & Saguenay Railway from St. Joachim to Murray Bay. The charter of this company is held by interests identified with the Quebec Railway, Light, Heat & Power Company, and it is expected that work will be commenced early next spring. The route of the proposed line for the greater part of its course is along the St. Lawrance River. The company will construct 2 additional miles of track to its line during 1910.

Rhode Island Company, Providence, R. I.—This company has just completed the extension of its Greystone line from its present terminus to Enfield, a distance of 5500 ft.; also the extension of its Douglas Avenue line from its present terminus, for a distance of 1800 ft.

Johnson City, Tenn.—J. B. Cox, Johnson City, Tenn., who is interested in a proposed electric interurban railway between that point and Bristol, Tenn., is said to have announced that the company has not yet been organized, but that the projected route is from Johnson City via Austin Springs, a summer resort, thence near Piney Flats, Bluff City and Thomas Bridge, and up the Beaver Creek Valley to Bristol, about 24 miles. [E. R. J., March 20, '09.]

East Texas Traction Company, Dallas, Tex.—C. L. Wakefield advises that surveys are now being made for this projected railway between Dallas, Mesquite, Forney and Terrell, 34 miles. A preliminary association, known as the East Texas Traction Company, has been formed to promote the building of the line. Incorporation papers have not yet been filed. It is probable that work will be started on March 1 next. Officers: Schuyler B. Marshall, Gaston Building, president; E. W. Morton, Jr., vice-president; C. L. Wakenfield, 262 Live Oak Street; W. H. Gaston, treasurer, all of Dallas. [E. R. J., Dec. 4, '09.]

Northern Texas Traction Company, Fort Worth, Tex.—This company has arranged for the double tracking of 7200 ft. of the Polytechnic College line in Fort Worth. The work will be carried out by the Stone & Webster Engineering Corporation, Boston, Mass.

Marshall (Tex.) Traction Company.—This company announces that it has completed 1 mile of its street railway in Marshall. The total length of the line will be 4 miles. Two cars will be operated. Power will be rented from the Arkansas-Texas Consolidated Electric Company. M. Turney, president and general manager. [E. R. J., July 4, '09.]

***Bristol, Wash.**—It is stated an eastern syndicate has agreed to build an electric railway from White Salmon or Bingen, on the Columbia River, north to Snowden, a dis-

tance of about 16 miles. White Salmon business men, in co-operation with W. W. Swan of the Swan Lumber Company, Bristol, have subscribed $350 for the purpose of a preliminary survey to be made. H. S. Hall, White Salmon.

Milwaukee Western Electric Railway, Milwaukee, Wis.—The Railroad Commission has granted a certificate of public convenience and necessity to the Milwaukee Western Electric Railway, covering a route extending from Milwaukee to Beaver Dam, Wis., a distance of 56 miles with a division from Sussex, through Pewaukee to Waukesha.

SHOPS AND BUILDINGS

Central California Traction Company, Sacramento, Cal.—It is stated that this company, in conjunction with the Northern Electric Company, Chico, plans to erect a 10-story steel and concrete building at the northeast corner of Eighth and L Streets. The ground floor, it is said, will be used as a terminal, and the first floor for headquarters for both companies.

Augusta-Aiken Railway & Electric Company, Augusta, Ga.—It is stated that this company is considering the erection of machine and car shops in Augusta.

Virginia Railway & Power Company, Richmond, Va.—This company proposes to build a new terminal passenger station, with car house and repair shops, at the corner of Seventh and Perry Streets, in Manchester. The car house will cover a block on Seventh Street from Perry Street to Porter Street, 300 ft., with a depth of about 120 ft. It will be erected of either brick or concrete. On a lot owned by the company near the new reservoir twin car houses will be erected, each 120 ft. x 288 ft. They will be built of either concrete or brick. Other buildings to be erected are a paint shop 75 ft x 90 ft., a storehouse 80 ft. x 90 ft., a blacksmith shop 40 ft. x 60 ft., besides some smaller buildings for oil and sandhouses, and also for providing lockers and rooms for the employees. The company will also erect at the corner of Twenty-ninth and Perry Streets a new station and waiting room, besides a car house and shops for small repairs.

POWER HOUSES AND SUBSTATIONS

Pensacola (Fla.) Electric Company.—This company has purchased and expects to install, within the next few weeks, a 500-kw turbine and a 300-kw motor-generator set.

Bangor Railway & Electric Company, Bangor, Maine.—It is stated that this company has acquired the entire property of Veazie mills water power and dam, the present power station. The property, up to the present time, was leased to the company for a term of 999 years by its owners, J. W. Palmer, C. D. Stanford, and F. W. Hill. The company is said to have paid $150,000 for the property.

Menominee & Marinette Light & Traction Company, Menominee, Mich.—This company has in course of construction a hydro-electric power plant on the Menominee River, 20 miles north of Menominee. A storage of approximately 500 acres will be obtained. A canal 3400 ft. long and 118 ft. wide at the bottom connects the pond with the power station, which is 96 ft. x 124 ft. The present installation consists of two 1100-kva, 2300-volt a. c. Westinghouse generators; two 100-kw d. c. exciters; four 750-kw 2300-33,000-volt Westinghouse transformers with Westinghouse switchboard; two quadruplex 1900-hp and two 225-hp duplex Dayton Globe turbines, controlled by Lombard governors. The peak load capacity of the plant at lowest stage of water when completed will be in excess of 6000 hp. A three-phase transmission line, built to follow the highway on private right of way, connects the plant with Menominee and Marinette. The substation, also in course of construction, 28 ft. x 70 ft., is located in Menominee, is fireproof, and will contain, besides the step-down transformers and switchboards, 2500-volt motor-generator sets for street railway service and apparatus for operating luminous street arcs. Most of the construction work was done by the company.

Twin City Rapid Transit Company, Minneapolis, Minn.—Plans have been made by this company for the improvement of its power house at Sixth Avenue southeast and the river bank. Four new steel stacks, each 265 ft. high, are to be erected, to take the place of the two brick stacks now in use, which are 30 ft. shorter.

Portland Railway, Light & Power Company, Portland, Ore.—This company is stated to have purchased the property of the Portland Water Power & Electric Transmission Company, the price being estimated at $200,000. The property consists of 1642 acres of land along the Clackamas River and a bridge across the river. It is stated that 15,000 hp can be developed by the purchase of this property.

Virginia Railway & Power Company, Richmond, Va.—This company is considering the purchase of a new steam turbo-generator.

Manufactures & Supplies

ROLLING STOCK

Cincinnati (Ohio) Traction Company contemplates ordering 75 single-truck open cars next spring.

Washington Railway & Electric Company, Washington, D. C., will purchase 50 cars for city service shortly.

Utica & Mohawk Valley Railway, Utica, N. Y., will order between 12 and 15 city cars in the near future for use in Utica.

Whatcom County Railway & Light Company, Bellingham, Wash., is receiving bids on three 47-ft., double-truck, closed city cars.

Los Angeles & Redondo Railway, Redondo Beach, Cal., proposes to re-equip 27 cars with Westinghouse 306 interpole 4-motor equipments.

Porto Rico Railways, San Juan, P. R., has ordered 10 flat and five cane cars from the Wonham-Magor Car & Manufacturing Company, New York.

Houston (Tex.) Electric Company has placed an order with the Cincinnati Car Company for five double-truck cars to be mounted on Standard Motor Truck Company's type O-50 trucks.

Columbia Electric Street Railway, Light & Power Company, Columbia, S. C., has closed a contract with the Pay-As-You-Enter Car Corporation, New York, to operate pay-as-you-enter cars over its lines.

Seattle-Everett Interurban Railway, Seattle, Wash., has placed an order with the Niles Car & Manufacturing Company for six 51-ft. interurban motor cars to be mounted on Baldwin Locomotive Works class 78-25 trucks.

Grand Junction & Grand River Valley Railway, Colorado Springs, Col., in addition to the three combination cars mentioned in the ELECTRIC RAILWAY JOURNAL of Oct. 30, 1909, will buy one electric locomotive within the next six months.

Fort Dodge, Des Moines & Southern Railway, Boone, Ohio, has just placed an order with the Haskell-Barker Car Company, Michigan City, Ind., for 150 freight cars, some of which will be 80,000-lb. capacity, gondolas, and the remainder 60,000-lb. capacity, box cars.

British Columbia Electric Railway, Vancouver, B. C., mentioned in the ELECTRIC RAILWAY JOURNAL of Dec. 11, 1909, as having five cars under construction in the plant of the John Stephenson Company, will have these cars built 28 ft. long and of the semi-convertible type. They will be constructed for pay-as-you-enter service and will be mounted on Brill 27-G-1 trucks.

North Jersey Rapid Transit Company, Paterson, N. J., mentioned in the ELECTRIC RAILWAY JOURNAL of Nov. 20, 1909, as having placed an order with the Jewett Car Company for six cars, has decided on the following details:

Seating capacity 44	Underframe.Wood and Steel
Weight ..... 14,000 lb.	Car trimmings ..... Bronze
Wheel base ..... 6 ft.	Curtain fix....Curtain S. Co.
Length of body.30 ft. 4¾ in	Curtain material...Pantasote
Length over vestibule.41 ft.	Gongs.....12 in. Foot
Length over all.....42 ft.	Hand brakes, Ratchet Handle
Width inside.....7ft. 11 in.	Heaters,
Width over all..8ft. 10½ in.	Peter Smith Hot Water
Height inside.....8ft. 6 in.	Roofs ..... Monitor
Height, sill to trolley base 9 ft. 3 in.	Sanders ..... Ham
	Seats ..... Walkover
Height, rail to sills.3 ft. 3 in.	Varnish ..... Hildreth
Body ..... Wood	

Shore Line Electric Railway, New Haven, Conn., reported in the ELECTRIC RAILWAY JOURNAL of Nov. 20, 1909, as having ordered 12 cars from the Jewett Car Company, has drawn up the following specifications for these cars, which will be of the center vestibule type.

Seating capacity 46	Fenders ..Loco. Type Pilot
Weight ..... 20,000 lb.	Gongs .....12 in. Foot
Wheel base.....6 ft. 6 in.	Hand brakes ..... Vertical
Length over vestibule 43 ft.	Headlights ..... Climax
Length over all..44 ft. 6 in.	Motors....four G. E. 217-B
Width inside....7 ft. 7½ in.	Registers ..... New Haven
Width over all....8 ft. 4 in.	Sanders .... Nichols Lintern
Height, rail to roof....12 ft.	Seats .....H. & K. 109 A. E.
Body ..... Wood	Trolley retrievers
Underframe ..... Steel	Wilson No. 2
Car trimmings ..... Bronze	Trucks, type and make
Control system .... Type M	Baldwin M. C. B.
Curtain fix....Curtain S. Co.	Varnish ..... Hildreth
Curtain material...Pantasote	Vestibule ..... Center

TRADE NOTES

H. S. Bradfield has resigned as general sales agent of the New York Car Wheel Company, New York, N. Y.

Holland Trolley Supply Company, Cleveland, Ohio, has opened a sales office in that city at Room 415, Schofield Building.

Thomas F. Carey Company, 141 Milk Street, Boston, Mass., desires to consider agencies for the Eastern States for gears, pinions, car and truck equipment and track supplies on an exclusive basis.

Ohmer Fare Register Company, Dayton, Ohio, reports among many new contracts received, one for equipping the entire system of the Syracuse (N. Y.) Rapid Transit Company with Ohmer registers and another for equipping the lines of the Lincoln (Neb.) Traction Company with Ohmer registers.

Cleveland Tool & Supply Company, Cleveland, Ohio, announces that Charles C. Wright has been connected with the company since Dec. 1, 1909. Mr. Wright, who has an interest in the concern, was a salesman in the Cleveland office of the Carnegie Steel Company, Pittsburgh, Pa., for several years past.

Parker Clark Electric Company, New York, N. Y., announces the retirement of W. G. Clark and the election of Dr. George N. Miller to the office of president and director. The offices of the company have been moved from the Singer Building to the Lincoln Square Building, 1966 Broadway, New York.

C. A. Wood Preserver Company, Austin, Tex., recently received an order from one of the large telegraph companies for furnishing about 3000 gal. of C. A. wood preserver per month for use in treating the butts of poles. A number of electric railway companies are now using this preservative on their poles.

Wonham, Magor & Sanger, New York, N. Y., announce that the fire which destroyed the Athenia, N. J., works of the Wonham-Magor Car & Manufacturing Company on Dec. 11, 1909, has interfered in no way with their facilities for making and shipping H-B wheel guards, as the plant for that work was unaffected.

Edward B. Smith & Company, Philadelphia, Pa., announce that Herbert H. Dean and Thomas Newhall have been admitted to membership in the firm. Francis E. Bond has retired from active partnership and has become special partner. Osborn W. Bright and Charles F. Bloomer have retired from membership in the firm.

Morgan Fare Register Company, Indianapolis, Ind., about March 1, 1910, will have in operation on various interurban railways in the Central States 100 or more of its new interurban fare registers. The new model registers and records the fare and stations from and to which passengers are traveling on any system of less than 500 miles.

Western Electric Company, New York, N. Y., announces that the Louisville & Nashville Railroad is installing its telephone train dispatching equipment between New Orleans and Mobile. The Chicago & Northwestern Railroad is also installing Western Electric telephone apparatus for dispatching on the 198 miles of track between Chadron and Long Pine, Neb.

Root Spring Scraper Company, Kalamazoo, Mich., has shipped 192 sets of its No. 2 and No. 5 scrapers to the Portland Railway & Light Company, Portland, Ore.; also 100 sets of scrapers to the Boston & Northern Street Railway, Boston, Mass. The company has also recently shipped on order from 6 to 40 sets of scrapers to about 100 other electric railways throughout the United States.

Climax Manufacturing Company, Corry, Pa., has appointed the Railway Equipment Company, 72 and 74 First Street, Portland, Ore., selling agents for the new improved Climax geared locomotive in Oregon, Northern California and that section in Washington tributary to the Columbia River. The Railway Equipment Company is opening a number of Eastern accounts and desires to hear from manufacturers who wish to extend their trade on the Pacific Coast.

Simmen Automatic Railway Signal Company, Toronto, Can., will have its head office at 1753 Queen Street West, Toronto, Ont., hereafter, having closed its San Francisco office. The company was notified by the Toronto & York Radial Railway on Nov. 25, 1909, that the installation of Simmen automatic block signals which have been in trial service on that road for eight months has proved entirely satisfactory and has been taken over by the railway company in accordance with the terms of the construction contract.

Paul M. Chamberlain, Chicago, Ill., has opened an engineering office at 1522 Marquette Building, Chicago. Mr. Chamberlain was graduated from the Michigan Agricultural College in 1888, and from Cornell University in 1890. For several years he was connected with the Brown Hoist Company, Cleveland, Ohio; Frick Company, Waynesboro, Pa.; Hercules Iron Works, Aurora, Ill. Then he accepted the assistant professorship of mechanical engineering at the Michigan Agricultural College. For the last two years and a half Mr. Chamberlain has been connected with the Under Feed Stoker Company of America as chief engineer, and has made a special study of boiler-room equipment, economy in fuel burning and smoke abatement. As an independent consultant he will devote his time to improving existing installations and designing new ones.

British Thomson-Houston Company, Rugby, England, has brought out a leakage indicator for use with trolley standards of double-decked cars. Where passengers ride on the roof of the cars and there is a possibility of their coming in contact with the trolley pole, it is necessary to carry the current from the trolley wheel on a seperate conductor, which is usually inside the pole and insulated from it. However, if this installation should become defective, the pole and standard would become alive. The leakage indicator is so arranged that if this should be the case a bell will ring and simultaneously two red lamps fixed above the car platform will light. This provision of two definite, independent and automatic signals, one audible and the other visible, meets the recommendations of the Board of Trade. The indicator has been in successful use for the last five years on several British roads.

ADVERTISING LITERATURE

James Beggs & Company, New York, N. Y., have printed a new and greatly enlarged edition of their publication on feed-water filtration.

Power Specialty Company, New York, N. Y., is distributing a catalog illustrating and describing the construction and application of Foster superheaters to all classes of boilers.

Goheen Manufacturing Company, Canton, Ohio, has prepared two folders stating the advantages of using "Carbonizing Coating" for protecting steel structures and "Galvanum," a protective paint for galvanized iron.

Electric Storage Battery Company, Philadelphia, Pa., is distributing bulletins Nos. 116 and 117, the first dealing with "Exide" vehicle batteries and the second with the installation, care and operation of storage batteries for signal and car lighting service.

Sprague Electric Company, New York, N. Y., has described and illustrated its multilets in a publication known as No. 434, dated November, 1909. In Bulletin No. 110, which supersedes Bulletin No. 107, the company has described and illustrated its Type S continuous-current direct-driven generators for lighting and power.

Crocker-Wheeler Company, Ampere, N. J., has issued bulletins Nos. 116, 117 and 118. The functions of the motor-generator set and the methods of choosing the motor-generator best adapted for each condition are outlined in Bulletin No. 116. How motor drive has gained results for the laundries is outlined in Bulletin No. 117. The application of the small direct-current motors to laundry apparatus, printing presses and other machinery with similar requirements is brought out in Bulletin No. 118.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4702 showing the advantages to be gained by the use of the horizontal Curtis steam turbine in connection with the pumping equipment of fire boats, and Bulletin No. 4708, in which is described an instrument recently placed upon the market by the company for use in the testing of wattmeters. The company has also recently issued pamphlets 3878 and 3874. The first illustrates and describes the method of charging electric automobiles from alternating-current circuits by means of the General Electric rectifiers; the other shows the advantage of the use of tungsten lamps in connection with gasoline cars.

Joseph T. Ryerson & Son, Chicago, Ill., have issued a reference book for 1910 which they have given the title "Everything in Iron and Steel." In recent years Ryerson & Son, in order to serve satisfactorily the diversified interests to which they cater, have been forced to add to their line numerous specialties which through lack of space they have been unable to illustrate in Ryerson's Monthly Journal & Stock List. For some time, therefore, they have felt the necessity of supplementing the monthly with a publication which would comprehensively illustrate their complete line, with the result that the reference book has been issued. Ryerson's Monthly Journal & Stock List will be continued as heretofore, and the "Reference Book" will be issued only from time to time as occasion demands.

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CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.
L. E. GOULD, Western Editor. RODNEY HITT, Associate Editor.
FREDERIC NICHOLAS, Associate Editor.

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Pensions in Brooklyn

The Brooklyn Rapid Transit Company has just announced that it has established a pension system for its aged and incapacitated employees. Certain conditions are attached to those who are entitled to receive the pension, but the rules for eligibility are so broad as to include practically every employee now on the system when he reaches the required age. In adopting this policy the company has excellent precedent in the case of several of the important steam railroads and of several electric roads, for without some system of this kind the question of the aged employee who has grown gray in the company's service is a problem. Usually, such veterans are assigned to some easy work that is available, such as attending switches or as night watchman, but the number of these posts is usually limited, and a period is finally reached when a man cannot perform even these duties; then his case has to come up for individual attention on the part of the company. It is understood that the Brooklyn Rapid Transit Company for some time has taken care of these superannuated cases individually by pensions, but such a plan cannot be as satisfactory to the employees as a general policy, even if there is practical certainty that every case will receive favorable treatment. According to President Winter, the cost will not be large in proportion to the company's aggregate payroll, and the plan, of course, was adopted not entirely because of its philanthropic aspects but because it was considered good business.

The Manufacturer and Home Production

When an electric railway company manufactures part of its own supplies rather than buys from a manufacturer, especially when the parts manufactured are repair parts for equipment originally purchased from outside manufacturers, it is pertinent to ask the reasons. In some cases a direct saving can be made in freight charges or custom duties, but where this is not the case it seems at first sight as if something must be wrong either in the practice of the manufacturer or that the railway company is deceiving itself as to the cost of manufacturing these parts. For many reasons the manufacturer should be able to manufacture all parts of which he makes a specialty so much more cheaply than an isolated customer as far to overbalance all selling expenses and transportation charges, except those for very long distances. He possesses elaborate means of production, buys his raw material under favorable conditions, produces the equipment in large quantities and can determine its cost to a nicety. On the other hand, the consumer who wishes to produce these same parts must duplicate the drawings and patterns, not only of one manufacturer, but usually of several to make the completed product;

must install a variety of tools to secure a comparatively small output and must work under those unfavorable conditions which always surround the small producer. Everything seems in favor of the manufacturer, yet not a few companies do manufacture a great many miscellaneous repair parts on a small or on a large scale and some have gone into the manufacture of larger equipment. The situation is one which can safely bear analysis.

One factor, probably the principal one in inducing companies to engage in this work, is that of cost, but this is a matter of comparative figures for individual case. They can easily be determined in each instance, but no universal law can be laid down. Another factor, however, which is capable of general consideration is that of delivery. In prosperous times the manufacturer is so busy turning out complete equipment that he is often tempted to neglect orders for detail parts of his own apparatus and so leaves them to be filled by smaller local manufacturers or else to be made by the company itself. The local manufacturers have been quick to see the possibilities presented by this situation and have obtained the business, in many cases, where the railway companies themselves have not taken up the manufacture of these parts. This condition is detrimental to the original manufacturer in two ways. In the first place the quality of the detail parts so constructed may not be equal to that which he would have supplied and the performance and consequently the reputation of his apparatus will suffer. In the second place when orders for new and complete equipments are scarce and he would like to engage in the sale of supply parts or detail equipment, he finds large sums invested in their production and active competition. Necessarily he must offer very low prices if he wishes to regain the ground lost.

Another reason why companies have been induced to take up the home manufacture of detail equipment is the absence of standard parts in like apparatus from different makers. A railway company which has been in operation for some time, even if it is a small one, very rarely has purchased all of its equipment from one set or group of manufacturers of cars, motors, trucks and other parts. Consequently it finds many slight and seemingly unimportant differences in the detail parts which, if it manufactures them itself, could be made standard for its particular road. That is, by a few modifications it is often possible to reduce greatly the variety of bolts, nuts, washers and screws, and other parts needed, so the company establishes its own standards and builds to them. Another reason which occasionally is an incentive for home manufacture is that, owing to the development of traffic, railway equipment has often to be applied to different conditions and usually to more severe conditions than when it is first installed or for which it was designed. As this harder work is placed on the apparatus, it is strengthened in the shops of the company until finally it is stronger and better than it was originally. After this has been done, if the company has to buy new apparatus of the same kind it is often disappointed if the manufacturer of the original equipment has not improved his detail parts in the same way so that the company clings to its own methods.

Summing up the situation, it may be stated that it is for the interest of both the manufacturer and the consumer for the apparatus to be constructed under the most economical conditions possible. These, in most cases, are logically those where the original apparatus was built, but the burden of proof that this is the case is on the manufacturer. He can only retain his trade in detail parts if he treats his orders for them as carefully as he does those for new equipment, if he introduces interchangeable parts as far as practicable and if he pays close attention to the behavior of his products after their sale.

Our Semi-Annual Index

This number completes Vol. XXXIV of the Electric Railway Journal and contains the usual semi-annual index. Considerable attention has been directed during the past year to different methods of filing and classifying technical literature, particularly electric railway data, and we have published descriptions of several elaborate plans and schemes followed by different persons. Such methods of individual files and indices are very valuable for those who have the time to keep them up, such as large companies or firms who have frequent occasion to refer to the periodical literature on certain topics. Undoubtedly in most, if not every case, the file is worth all of the time required to maintain it. But we believe that these expensive systems are beyond the needs of most of our subscribers, and consequently that they will depend upon the indices prepared by the publisher for finding articles on particular topics in their bound volumes of the Electric Railway Journal. Hence, a short discussion of the best method of using our indices and the principles on which they are based may be of interest.

A reader is apt to search for an article in one or two ways; either by the subject of the article or by the place where the event of which he is trying to find a record occurred. For this reason each entry in the index published in the Electric Railway Journal is given both a subject and a geographical designation where this is possible. The geographical plan followed is to index each road under the name of the city in which its principal office is located, as given in our Electric Railways Directory. After careful thought it was decided that this would be more convenient than indexing them alphabetically under the name of the company. One reason is that this plan allows of the grouping together of all articles in regard to events which occur in any one city. Another is that the titles of companies are apt to change and it would be confusing, especially when using indices several years old, to search for an entry now under one main heading and now under another. The corporate names have been retained, however, as subheadings where there are several companies in any city. To assist in finding references to interurban companies whose main office is often not in the principal city traversed, cross-references under the corporate name of the company have been introduced liberally into the index.

The second basis upon which the index has been compiled is that of subjects. In preparing these entries a very careful effort has been made to include in the index information whether given in an article devoted exclusively to that topic or if published as part of a longer article. Thus the description of a new car house or of a system of catenary construction would be indexed under car house or

catenary construction, whether it originally appeared as a separate article or was included in a general description of some railway system. This plan has been followed even in reports of conventions, so that the user of the index is able to find in one place all of the references of any considerable length to any particular topic which have been published in the paper during the past six months, no matter what the form was in which the articles appeared in the paper.

No index is perfect and no one perhaps realizes this better than those who compile it. The reader also should not expect to find the index a concordance of the paper, and where it is made broader than an index of titles there is always a difference of opinion as to the relative importance of the entries to be included. Finally, in such a rapidly developing field as that of electric railroading, where the nomenclature of different parts has not been entirely standardized, there is always further opportunity for differences of opinion as to the standard code word to use. In this latter case, however, the name most generally employed in the trade has been adopted and as large a number of cross-references under other possible designations has been inserted as the commercial limits of the index permitted. Every compilation of this kind must reflect the individuality of one or of several persons, but we feel confident that the more our indices are used the more familiar one will become with them and the easier it will be to locate the articles for which he is searching.

Only one change has been made in the general character of the index in this issue as compared with previous issues. Formerly only the longer personals were indexed; this year all of the items which appear under the heading of "Personal Mention" are indexed separately.

Municipal Regulation Limited

The right of a municipality to require the stoppage of electric cars at every street crossing has recently been denied in a case of more than ordinary interest (Village of Excelsior versus Minneapolis & St. Paul Suburban Ry. Co., 122 N. W., 486). Under an ordinance the railway company had been authorized to operate within the village limits under a 5-cent fare proviso, every passenger to be entitled to one continuous ride from any point in the village to any other point along the lines of the railway. After the railway had been built a village ordinance was passed which required the stoppage of cars "at any and all of the intersections and crossings of streets when any person or persons require to enter or alight from such cars, provided such crossings are grade crossings." One of these crossings was at a point where the line was built on a private right-of-way, and the court held that while the village had the right to pass reasonable ordinances regulating, *inter alia* the speed or traffic and the stoppage of cars, ordinances incidentally conducive to the comfort and convenience of the community, it did not follow that an ordinance designed entirely for the comfort and convenience of the inhabitants was a valid exercise of the police power. Continuing, the court said:

> An ordinance may require under given conditions that a street car must stop at the end of any block, or at the middle of long blocks, or at railroad crossings, or at places where fire engines may suddenly emerge. But a requirement that a car must stop at every point at which a passenger may wish to enter or alight would be destructive not only of the purpose for which the corporation was authorized to transact business, but would also completely demoralize traffic, and would be, the authorities generally agree, without legal force.

Several considerations of public policy very properly entered into the court's decision. The first was that the company was not a mere street railway, but had been held to have been organized to construct and operate interurban railroads from place to place and to exercise the power of eminent domain. Another consideration was that the company had the competition of steam roads, and if the principle for which the village contended were adopted, it might be compelled to stop at so many street crossings as seriously to hamper, and possibly to destroy, its competitive power. Authority for this consideration was found in an Ohio case, in which it was said:

> If every city and village through which such a railway passes may require its cars to be stopped at every street intersection to take on or to discharge passengers, and to serve the purposes of a street railway, then its usefulness as a means of interurban transportation may be very much limited, because so much time will be consumed in passing through cities and villages that it will not longer be practicable for many to travel in that way.

The final consideration was that the ordinance did not subserve the public convenience in the village.

Brief mention of a few recent cases on the exercise of the police power with regard to the operation of railways is of interest in this connection.

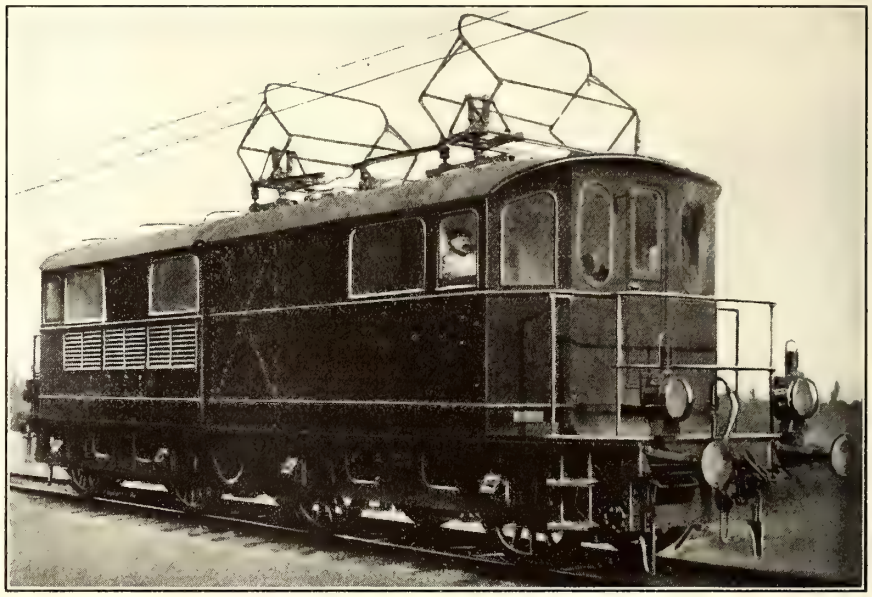
In Texas it was held last year that a statute requiring railway companies to keep their waiting rooms open before and after the arrival and departure of trains was for the convenience of passengers beginning or completing a journey, and did not apply to through passengers stopping at junction points. But as far back as 1870 the Supreme Court of Illinois, in the case of Pittsburgh, etc., Railway Company vs. Thompson (122 N. W., 486), held that the company could not be compelled, for the sake of making travel upon the road absolutely free from peril, to incur a degree of expense in the construction of its track and right-of-way which would render operation impracticable.

In Kansas it was held in 1907 (State vs. Missouri, etc., Ry. Co., 90 Pac., 606) that where a general statute providing that every railroad in the State engaged in the transportation of passengers shall furnish sufficient accommodation for their transportation, an order requiring the defendant company to operate separate passenger trains on a branch of its road, instead of mixed trains, was not unreasonable, though the receipts of revenues from passenger traffic alone was insufficient, where the combined revenues of freight and passenger traffic justified the expense of separate passenger trains. The same court held last year, however, while a street railway is not required to furnish separate compartments for white and colored passengers, an interurban road may be obliged to do so.

The gist of all these recent decisions is that the courts will often interfere to prevent the enforcement against the interests of railway companies of ordinances which are often considered to be within the "police power," and will do so not only for the benefit of the company, but of citizens who would be seriously incommoded if the regulations were enforced.

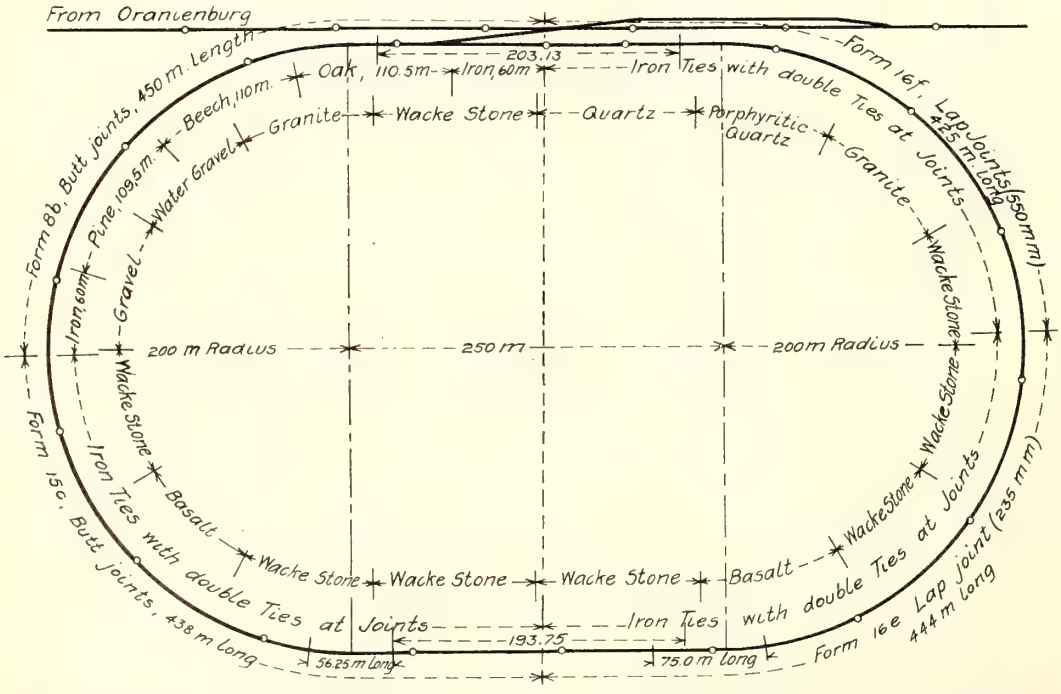
THE ORANIENBURG EXPERIMENTAL LINE OF THE PRUSSIAN GOVERNMENT RAILWAYS

For several years past the Prussian Government Railways have been operating an oval-shaped experimental railway in a forest between Sachsenhausen and Oranienburg, about 33 km (20.5 miles) from Berlin. The principal purposes of this line are to serve as a proving ground for different types of roadbeds and for electrical overhead construction, but it has also been of value in showing the power consumption and running characteristics of the single-phase apparatus tested from time to time. The test road is built in the form of a single-track ellipse having a perimeter of 1.75 km (1.09 miles), made up of two tangents of 250 m (about 770 ft.) each and two semicircles of 200 m (about 617 ft.) radius each. The whole stretch is practically level. The direction of running is reversed from time to time to prevent uneven wear of the guard rails and tires, and plaster casts of both are made at frequent intervals to study the character of wear.



Oranienburg Test Line—Single-Phase Locomotive Now in Service

The roadbed consists partly of wooden ties and partly of steel ties, both laid with varying spacings and in different kinds of rock ballast. Instead of placing two ties close together under the joints, the steel tie sections have been fitted with a double or siamese tie under every joint. No detailed data have yet been given out on the results of the roadbed trials, but in general the object is to determine how much each type of track construction has deteriorated after a certain number of train-miles has been operated.



Oranienburg Test Line—Plan of Track, Showing the Variety in Joints, Ties and Ballast

The overhead construction consists of two catenary designs installed by the Allgemeine Elektricitäts Gesellschaft. One of these is of the simple catenary suspension; the other, which was installed during the past year, has a third wire to equalize the effects of expansion and contraction in the rest of the system. Both overhead systems are installed for 6000-volt, single-phase current, and have proved satisfactory in every detail. Power for the operation of this line is transmitted from Oranienburg, 2.5 km (1.55 miles) distant, to a small control building near the test track.

The first experiments on the line were started early in 1906, with one of the original Spindlersfeld single-phase motor cars, and were continued for nearly two years. The trials are now being conducted with a locomotive and a train of freight cars, the whole constituting a weight of 350 to 380 metric tons. At first the total train weight was only 250 metric tons, pulled by two motors, but now three 250-hp motors are used. The average power consumption, including acceleration, is 17 watt-hours per metric ton-km (30 kw-hours per ton-mile). The locomotive and cars are run for about 20 hours a day, except for short stops to make roadway repairs, etc.

There is no attendant on the train, as the motorman jumps off as soon as he accelerates the motors, and the train is stopped simply by cutting off the current supply at the control station. Excluding Sundays, the train runs about 620 miles a day, and averages over 12,400 miles a month. Every trip made around the circuit by the train is recorded by a perforating machine.

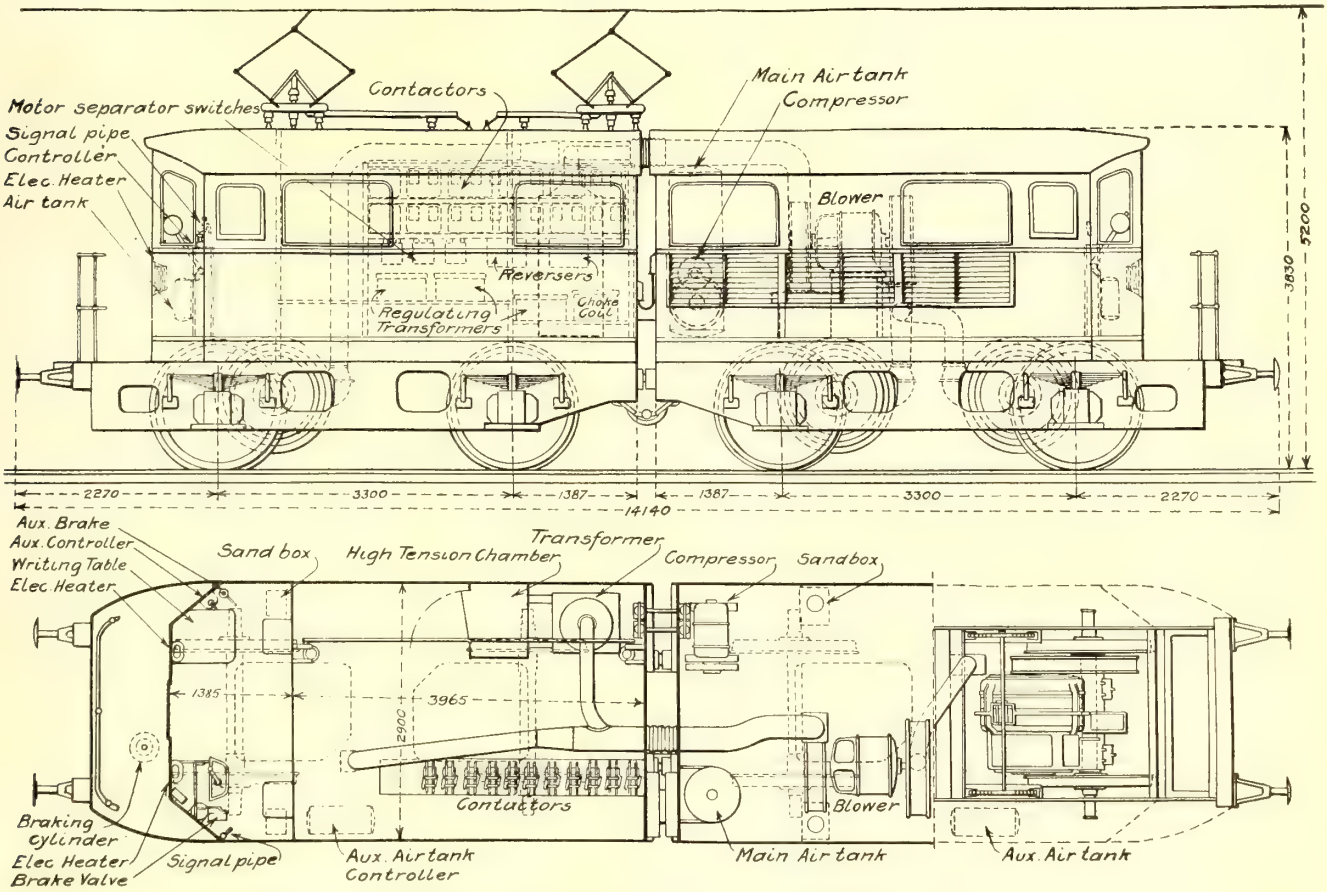
The locomotive consists of two short coupled units, and weighs 59.47 metric tons. Three of its four axles are now driven by Winter-Eichberg 25-cycle, single-phase motors, each of which has an hourly rating of 350 hp at 450 r.p.m., and a continuous rating of 250 hp at 500 r.p.m. when artificially cooled. The motor gearing has the ratio of 1:4.21, and drives wheels of 1400 mm (55 in.) diameter. When the motors are operated at their continuous rating or total of 750 hp the speed is 31.3 km an hour (19.4 m.p.h.), and the tractive effort 6480 kg (14.256 lb.). The highest operating speed is usually 50 km (31 miles), but a maximum of 60 km an hour (37.2 m.p.h.) is attainable. It has been found that after a train of 510 metric tons is once under way, a single motor is capable of pulling it over 30 km (18.6 miles) in 30 minutes.

The two current collectors are mounted on one unit of the locomotive, and by air pressure are kept on the overhead wire at a tension of 4 kg (8.8 lb.). The contact shoes themselves have shown a life of over 47,000 km (29,140 miles). As is customary in the Allgemeine company's design, the collectors adjust themselves automatically to changes in direction, and cannot be raised unless the high-tension compartment is closed. This compartment contains the lightning arresters, oil circuit breaker and the measuring instrument transformers. The adjoining section contains the single load transformer, which steps down the trolley potential to 1000 volts. This transformer has two secondaries, with seven taps each, for making different running combinations through the contactors. The same locomotive unit contains the reverser, contactors, regulating transformers, separator switches and fuses.

Both the load transformer and the motors are cooled by a Sirocco blower which is driven by a 30-hp motor. This installation is mounted in the other half of the locomotive, which is built with louvres, as shown. These louvres are filled with powdered charcoal, to make a filter for all the air drawn in for ventilation. The same section contains a 7-hp motor-compressor outfit, which supplies air for the collectors, brakes, sanders and signals. Each half of the locomotive has a front compartment, one side of which is arranged for the motorman and the other for any one making observations. The motorman's corner contains the usual apparatus, but the opposite corner has, simply for switching purposes, an apparatus which affects only the first control step and permits the necessary braking. This feature, however, is not in use at Oranienburg.

The three motors now in service are operated in two groups through a control circuit of 300 volts. An interesting feature is the use of choke coils for starting. Through the contactors the ends of a choke coil are connected to successive transformer taps, while the middle of the coil is connected to the motor. If it is desired to operate the motor on the next higher voltage, the contactor on the lower voltage tap is opened. Hence one end of the choke coil is freed for connection to the contactor which corresponds to the higher potential. The employment of choke coils in this way prevents interruptions in the motor circuit when moving the controller from step to step. The contactors are so interlocked through auxiliary contacts in the control circuit that a short-circuit is impossible, even if a contactor should stick after the control current has been cut out. The contactors are also interlocked with the reverser in such a way that the latter can be turned only when the motors are on open circuit and the reversing movement must be completed before the motors receive current again.

The Prussian Government Railways is also planning to experiment elsewhere with single-phase locomotives in which the motors will be mounted above the floor and will drive the axles through cranks and side rods.



Oranienburg Test Line—Elevation and Plan of Single-Phase Locomotive

COMPARISON OF GASOLINE CAR, SINGLE-PHASE AND STEAM LOCOMOTIVE COSTS

BY W. E. HARRINGTON, B.S.

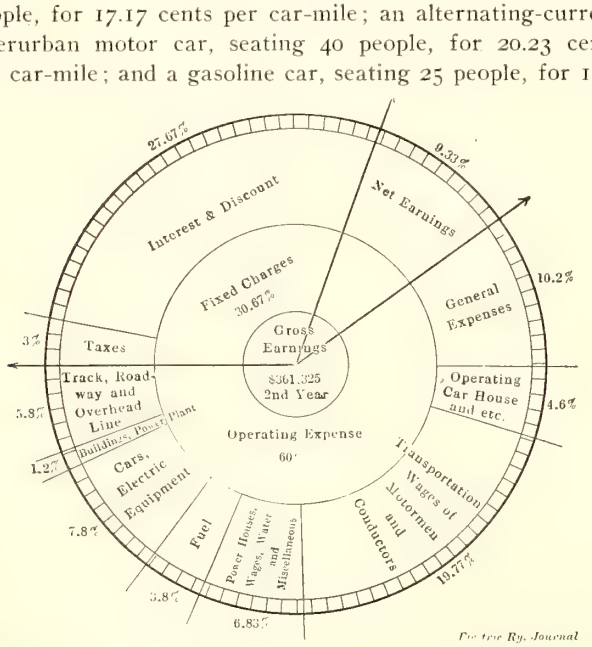
For several years past the writer has given a great deal of attention to the subject of gasoline railroad operation, and during this time more than 100 gasoline cars have been put into regular service on branches of several steam railroads and on a number of interurban lines in different parts of the United States. The results attained with these cars indicate that the time has arrived for the introduction of self-contained motor coaches, both upon the lightly patronized interurban railways and on the less important steam railroad feeders. On the latter lines the operating expenses, now as high as 45 cents per car-mile, could be cut down to 14 cents per car mile with gasoline cars, and these branches thus be made self-sustaining.

Through the courtesy of W. W. Cole, of Dodge & Day, Philadelphia, some valuable comparisons of cost have been obtained on steam, alternating current and gasoline car practice. These figures were prepared by Mr. Cole in accordance with actual service conditions, and were embodied in a report made by him on a railroad project. Mr. Cole found that on a certain line a steam locomotive with one car, seating 60 passengers, was operated for 45.43 cents per car mile; a direct-current interurban motor car, seating 44 people, for 17.17 cents per car-mile; an alternating-current interurban motor car, seating 40 people, for 20.23 cents per car-mile; and a gasoline car, seating 25 people, for 14.2 cents per car-mile. The distribution of the expenses in each case is shown in the accompanying tables.

COMPARATIVE COSTS PER CAR-MILE OF D.C., A.C., AND GASOLINE CAR INTERURBAN SERVICE.

	D.C.*	A.C.*	Gasoline.†
General expenses	$.0330	$.0330	$.0310
Maintenance of way and buildings	.0127	.0127	.0111
Maintenance and equipment	.0249	.0459	.0265
Transportation expenses	.0625	.0679	.0589
Cost of power	.0385	.0458	.0145
Total	$.1717	$.2023	$.1420

*Average daily mileage, 150 miles to 210 miles.
†Average daily mileage, 180 miles to 198 miles on 34-mile lines.



Operation of 44-Passenger Electric Car with Alternating-Current System

OPERATING COST PER CAR-MILE OF STEAM LOCOMOTIVE AND ONE CAR.

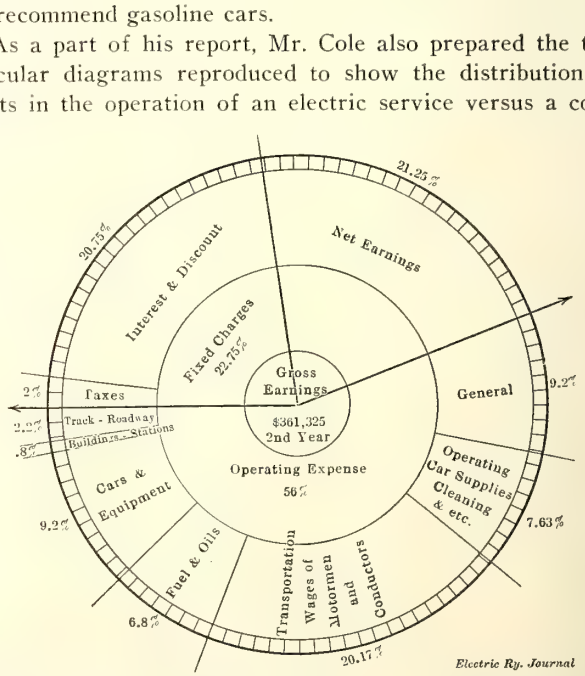
Fuel for locomotive	$.1037
Repairs to locomotive	.0270
Water for locomotive	.0030
Oil waste and supplies	.0035
Round house expenses	.0218
Coach maintenance	.0071
	$.1661
Wages of engineer	$0.370
Wages of fireman	.0220
Wages of conductor	.0245
Wages of brakeman	.0145
	$.0980
General expense, maintenance of way and buildings	$.1902
Total cost per car-mile	$.4543

average percentage of car seats occupied per day, is at least 42 per cent, it is cheaper to operate smaller cars during the day and use extras for the hours of heavy service.

According to the figures given in the tables, it is apparent that gasoline cars are the most desirable from the standpoint of lower costs for the initial investment, maintenance and operation. Besides this, another advantage of the self-contained units is that they can be operated in any desired combination to suit the traffic, whereas an electric railway is obliged to carry the permanent fixed charges of power stations and power distribution equipment, which are just as onerous whether the traffic is light or heavy. The figures given by Mr. Cole on gasoline service were taken from the actual operation of six railroads which had been running cars of this type from six months to one year.

Mr. Cole figured that if a road with a given amount of business were equipped with alternating current transmission and motors, the overhead work would cost about $5,000 a mile and the passenger cars $18,000 each. A good steam locomotive for freight service on such a line could be obtained for $12,000. As this particular railway would not start with a heavy passenger travel, it was considered wise to recommend gasoline cars.

As a part of his report, Mr. Cole also prepared the two circular diagrams reproduced to show the distribution of costs in the operation of an electric service versus a combination of eight 30-passenger gasoline cars for an hourly schedule and one steam locomotive with two passenger cars for an express service of two daily trains each way. It will be seen from these diagrams that the combination service would prove much more effective than the all-electric operation, because of the lower operating costs and the smaller fixed charges.



Operation of 35-Passenger Gasoline Car and Steam Locomotive Service Combined

APPROXIMATE VALUE PLACED ON PHYSICAL PROPERTY OF BROOKLYN TRANSIT SYSTEM

Testimony as to the physical value of the property of the Brooklyn Rapid Transit Company was given on Dec. 15 before the New York Public Service Commission by Bion J. Arnold, consulting engineer of the commission. Commissioner McCarroll presided at the hearing. The cases at which this testimony was presented were those involving the fare to Coney Island, which the commission has been asked to reduce to 5 cents.

Grosvenor H. Backus, assistant counsel of the commission, said that it seemed desirable in presenting the case properly to have evidence introduced as to the value of the properties of the companies.

Mr. Arnold testified that as director of appraisals for the commission he placed a number of assistants in the office of the Brooklyn Rapid Transit Company and upon the property and examined certain schedules which the company submitted. The examination of the property occupied about three months, but did not constitute a complete examination. Certain schedules were examined and an idea formed therefrom as to the value of the property.

When Mr. Backus asked Mr. Arnold to state the figure at which he had arrived as a result of the examination objection was raised by Charles A. Collin, of counsel for the company, on the ground that the Legislature had declared, in section 38 of the railroad law, the basis for estimating the profit which a railroad company was entitled to make. That basis was controlling upon the commission and was 10 per cent of the capital actually expended. Therefore evidence as to the present value of the property as it now stands was immaterial and irrelevant, and not the proper basis upon which the commission should make an estimate of the amount or percentage of earnings the company was entitled to earn from that investment as its reasonable profit therefrom. On the witness's own statement he had not completed his examination of the property for the purpose of determining the value, and the result must necessarily be insufficient, inadequate and not form any practical basis for the estimate to be made by the commission of the amount the company was entitled to earn, even if that were the true or proper basis.

Commissioner McCarroll overruled the objection, but there was further discussion of the point raised by Mr. Collin.

Mr. Backus said the section of the railroad law to which Mr. Collin referred had been repealed by the passage of the Public Service Commission's act.

Commissioner McCarroll said there was some question as to the status of the railroad law at the present time, and it was not regarded usually as in force. He also overruled the point as to the extent of the examination made by the witness.

Mr. Arnold, continuing, said that perhaps he would have been more correct if he had said he had arrived at an idea as to the cost to reproduce the present physical property. The figure which he would give was not necessarily a figure which might not be changed on further examination. But from the best information that he had at hand, the amount of time that was spent upon the work and his general knowledge of railroad work and railroad construction he was willing to say that he found physical property there which, after adding certain percentages to the actual cash cost as of to-day of the elements entering into the physical property to take care of contractor's profits and incidental construction expenses, brought the cost to reproduce the present physical property of the entire system to approximately $100,000,000.

The values of real estate in this estimate were the assessed values. It was probably proper to add certain other figures to take care of development expense, discount on securities, and many other expenses incidental to the development and organization of a railroad company, so that if certain values were added to this figure of $100,000,000 it was not improbable that the amount for these items might bring the figure up so as to approximate the capitalization of the company. The questions as to what items were to be added and the values of them were for the Public Service Commission to pass upon after he had had more time to go into them and after the commissioner had had more time to analyze them.

Mr. Backus asked whether Mr. Arnold would have an analysis made of the estimate of $100,000,000, apportioning it among the different roads in the Brooklyn Rapid Transit system, and submit it at a later hearing, either personally or through his first assistant, George A. Damon.

Mr. Arnold said that would involve a great deal of work. It probably could be done if necessary. It would be a difficult problem to value the property and then segregate it properly into the constituent elements.

The hearing was adjourned subject to the call of the commission.

IMPORTANT POWER DEVELOPMENT FORESHADOWED IN BOSTON

The Boston Elevated Railway Company has purchased a site of 25 acres in South Boston, on the edge of the harbor, for the erection of a great generating station which will largely, if not entirely, do away with the present system of scattered plants producing direct current at 600 volts, and has for a long time operated the company's transportation service. The erection of this station presupposes the installation of alternating-current generating equipment, with transmission to substations for conversion into direct-current for trolley and third-rail service. The company already has under construction at Egleston Square a substation of the rotary converter type for the supplying of power more advantageously to its recently opened Forest Hills extension. Alternating current for this substation is to be secured from the company's power plant in Dorchester, where a steam turbine unit of the direct-current type is being changed over into an alternating-current machine. During the past few years the company has purchased small amounts of power in some of its outlying districts beyond the economical reach of its chain of steam generating plants. Under the arrangement now indicated by the South Boston purchase it is probable that an extensive remodeling of the system of distribution will take place, including the construction of new substations and the more or less complete dismantling of existing stations, although it is not yet known to what extent the larger and more efficient stations of the company may be retained in service. It is probable that wide modifications in the feeder and return system will be necessary when the plans outlined are carried to completion.

The Boston system has been interesting from the power generating point of view on account of the success which the company has attained in the economical operation of its steam plants, scattered though they have been with relation to one another. By the operation of tie lines and the transfer of loads from one station to another as they

have shifted on the system, high load factors have been maintained in the majority of the stations, and in the better installations the manufacturing cost has frequently been carried as low as 0.6 to 0.7 cent per kw-hour delivered at the switchboard. In a single large station of the most efficient design it is certain that substantial reductions can be made from these figures, and the benefits of improved distribution secured.

Within recent years the power plant work of the Boston Elevated has been chiefly along the lines of expansion of facilities in order to meet the growth of the system, including the construction of a large plant at Lincoln Wharf in connection with the opening of the elevated division and the subsequent enlargement of this installation to a capacity of 13,500 kw; the installation of large units at Central, Charlestown and Harvard power plants; a trial equipment of the Dorchester station with a 2000-kw d.c. turbine, and the establishment of two gas engine stations in the suburban communities of Somerville and Medford. Steam-driven machinery forms the backbone of the company's system, and it is unlikely that the new source of motive power will be anything else, although the details of the equipment to be installed in the large station have not yet been made public.

Recently the company appeared before the Railroad and Transit Commissions at Boston in connection with a plan to acquire operating control of all the important suburban trolley lines in the vicinity of Boston, thus forming a co-ordinated transportation system of some 1500 miles of track. If such an organization is completed, it is probable that the Boston Elevated generating plant in South Boston would be capable of providing power for outlying lines extending to the most remote suburban areas, in the same manner that the present Boston Edison station at L Street, South Boston, furnishes electricity to points situated many miles distant in the interior of the State. Whatever the capacity of plant required in the future, the change of the system from a simple d.c. to an a.c.-d.c. basis will present many problems of economic and engineering interest to the management, and their solution will doubtless call for the expenditure of many millions of dollars. The present cost of electric motive power on the Boston Elevated system is about one and three-quarter millions of dollars per year.

SNOW SWEEPING IN VIENNA

An effective method of snow sweeping is used in Vienna by means of motor cars. Formerly, the municipal government had horse-driven wagons to which iron-blade snow scrapers were fastened. This system, however, did not prove very satisfactory, because it was found difficult to get the horses ready fast enough to cope with sudden snowfalls. Further disadvantages of the old way were the slowness of the horses and the high rental expenses for so many animals. To overcome these troubles it was decided to use motor cars on all streets provided with tracks. A number of motor cars were therefore adapted for this service. The new snow scrapers were attached to them in such a way that if one is used to clean the left-hand side of the street, the fixed point of each scraper must be in the right-hand front corner of the car. While the motor car equipment only removes the snow from the tracks, the two trailing scrapers have to clean the remaining part of the street, as shown in the illustration.

Under each platform of the motor car there is carried a set of scrapers which extend about 5 in. over the sides of the track, making the space cleared of snow by a motor car about 5½ ft. wide. The trailers follow at a distance of about 10 ft. each. According to the depth of the snow, the cars run at a speed of 5 m.p.h. to 10 m.p.h.



Vienna Snow-Fighting—Motor Car and Two Trailing Snow Scrapers

Each trailer is attended by one man whose duty it is to direct it properly. This control is exercised through a steering wheel geared to the front axle, as on automobiles. Another hand wheel is used to permit the scrapers to be raised or lowered. In the lowest position they slide over the pavement, scraping all snow and piling it together at the curb with the snow pushed aside by the motor car and the first trailer. In case a trailer attendant notices any obstacles which the motorman may have overlooked, he can stop the trailer immediately simply by opening the coupler with a hand lever.

A Swedish engineer has drawn up plans for the construction of an electric railway from Malmos, Sweden, to Copenhagen, Denmark, passing through a 10-mile tunnel under the intervening sound. The line as projected is 147 miles long.

HEARING ON VALUATION OF CONEY ISLAND & BROOKLYN RAILROAD

At the hearing before the New York Public Service Commission, First District, on Dec. 9, in the case involving the valuation of the Coney Island & Brooklyn Railroad, Frank R. Ford, of Ford, Bacon & Davis, testified that he had made a study as to the methods that should be pursued in valuing the property and franchises. Commissioner Bassett presided at the hearing.

Mr. Ford thought the methods of valuation which should be considered in a rate-making case should comprise a full consideration of the subject and should embrace the various methods which have hitherto been used, together with such modifications as may be necessitated by local conditions. The value of the property of the Coney Island & Brooklyn Railroad was evidenced in two ways; first, as a commercial or profit-earning enterprise, and, second, by the investment required to produce these returns and give such service to the public.

METHODS OF COMMERCIAL VALUATION

Two methods for commercial valuation were suggested by Mr. Ford, as follows:

A. Value of the Earning Power.—This was the basis which in the long run determined the value of a street railway property to the investing public. The valuation of net earnings for a period of from 5 to 10 years was usually taken. The method which the witness had adopted for estimating the present value of the net earning power of the Coney Island & Brooklyn Railroad had been suggested partly by Prof. H. C. Adams in connection with his appraisals for the Michigan Board of Tax Commissioners. Mr. Ford used the period of 10 years for the same reason which induced Professor Adams to use a similar period, "that under existing commercial conditions it is likely that the corporation whose property is appraised would during that period pass through years of both prosperity and adversity."

B. Market Value of Securities.—This was the basis which Prof. H. C. Adams largely employed in his report for the U. S. Census on the "Commercial Value of Railway Operating Property in the United States: 1904." The market quotations on the bonds and stock of the Coney Island & Brooklyn Railroad were averaged for a period of six months ending Aug. 31, 1909, and the result shown in a statement which Mr. Ford presented as an exhibit, together with a comparison with the market value as of Aug. 31, 1909, and the average market value for one year.

VALUATIONS BASED ON INVESTMENT

Three methods of valuations based on investment were suggested by Mr. Ford, as follows:

C. Approved Capitalization Issued.—This valuation was based upon the total securities the issue of which in New York State had to be approved under the law by the proper State commission. This was formerly the Railroad Commission, and for the past two years the Public Service Commission. All of the outstanding securities of the Coney Island & Brooklyn Railroad had been issued with such approval, and the statement presented as an exhibit gave a list of such securities as of Aug. 31, 1909.

D. Cash Investment in the Property.—This was the first cost of the property, or equivalent to its cost of production through the period of development. If the books of account of the company had been properly kept, the cost of property stated therein would equal the cash investment, on the basis that the securities issued for service or property were at cash value. A statement was presented as an exhibit by Mr. Ford which showed the cost of property of the Coney Island & Brooklyn Railroad as per its books on Aug. 31, 1909. The fact that this total value was approximately the same as the amount of securities authorized by State authority would tend to prove the correctness of this basis of valuation. An inventory of general classes of items for which, in the case of this company, a cash investment had been made, was also shown in a statement. This inventory was arranged partly in chronological order, and was in practically the same form as that appearing in the ELECTRIC RAILWAY JOURNAL of June 19, 1909.

E. Cost of Reproduction New To-day.—In the so-called physical valuation of a street railway property the material portions of the property, such as real estate, ties, pavement, cars, buildings and machinery were easily inventoried and priced. The labor and miscellaneous expenses of installation on these materials were matters of more difficult estimate, although usually included more or less accurately. The cash cost of labor and expenses of the company's own organization and of its legal and technical advisers in this construction being less evident, were never carefully inventoried and priced, and were usually included in one or more small perfunctory percentages; and finally, until this case was heard, Mr. Ford believed that no adequate attempt had been made to inventory and price adequately the cash cost of labor and expenses of organizing the corporation, of obtaining its rights to construct and operate and of developing its business and technical standard. In this method it was assumed that the present street railway system of the company did not exist, and it was desired to reproduce not only such present system, but to add the necessary additions and betterments to serve the public adequately. This was the basis which a competing company must use, and upon which a rate of return must be estimated in fixing the rate for its service. In New York City the conditions surrounding the obtaining of rights for the construction of a surface street railway were more complex and difficult than was the case usually in other cities. In addition to this, the system was competitive with that of the Brooklyn Rapid Transit Company, and the cost of reproduction of its rights as a new system would thereby be considerably increased. In the estimate presented as an exhibit by Mr. Ford the value of the physical property was stated at the figures which the expert of the commission presented. An endeavor was made to inventory and price the development expenses and overhead charges during the promotion and construction periods.

ESTIMATES OF VALUATION

The "Estimates of valuation" submitted by Mr. Ford may be summarized as follows:

Method of valuation.	Amount of valuation.
Commercial Valuations—	
A. Earning power	$8,584,245
B. Market value of securities	7,868,162
Valuations Based on Investment—	
C. Approved capitalization issued	8,641,962
D. Cash investment	8,941,227
E. Cost of reproduction, new (not less than)	9,299,898

Commissioner Bassett thought the value of the earning power and the value as indicated by quotations of securities would not be very helpful in a rate case, because if it was right that the rate should be altered, then the earning power would be altered, and also the quotations, presumably; so, in a sense, it was going about in a circle.

Mr. Ford suggested that consideration should be given to the fact that average earnings for a period as long as 10 years and the market values of securities represented to

an extent the vested interest, which might have some effect in fixing a rate. For instance, it would scarcely be assumed that a rate would be established which would reduce by 50 per cent the average net earnings obtained by such property over a period of 10 years, or which would cut in half the market value of securities, some of which were bonds that did not fluctuate very much.

William N. Dykman, of counsel for the company, thought that if the securities were quoted at 200 or 300 there would be a good deal of force in the argument suggested by Commissioner Bassett, but where the valuation was based on a price for the stock of less than par due to discontinuance of dividends, as in this case, it would be rather a serious matter to reduce it still further.

TIME OF REPRODUCTION NEW

Mr. Ford submitted a chart [see page 1269—Eds.] showing the estimated time of reproduction new of the Coney Island & Brooklyn road. The promotion period, as indicated, would require three and one-half years, up to the time of securing the capital. The actual construction would take about 2 years and 10 months additional, or a total of 6 years and 4 months. Of the three and one-half years' promotion period Mr. Ford estimated it would take six months for preliminary work and the organization of the promotion syndicate, which would expend $699,700 before the construction capital was obtained. The promoter would employ engineering assistants and general counsel, and after organization of the promotion syndicate obtain a charter from the State. Thereupon application would be made to the board of estimate and apportionment for a franchise, and from the history of such proceedings in other recent cases it was estimated that approximately two years would be required before the franchise would be granted. Similarly, it was estimated that the certificate of convenience and necessity from the Public Service Commission would require five months additional, and the approval by this commission of the company's proposed capitalization three months additional. These figures were also based on actual experiences in similar proceedings before the commission.

During the promotion period the construction expenditures would be financed and the capital definitely secured immediately after the approval of the proposed capitalization. Property owners' consents, approval of other municipal officials, and trackage and other agreements with operating companies would also be obtained, although these were often deferred until after the commission's certificate and the municipal franchise were obtained, thus delaying the construction still longer. It was estimated that the beginning of partial operation would take place one year before the actual completion of construction, or within five years and four months from the inception of the project.

Mr. Ford stated that the next step was to make an inventory of work and expense items of reproduction new of intangible property in accordance with the schedule shown on the time chart. This inventory was placed in evidence and is reproduced on page 1266. The inventory thus made was priced in detail in the same manner as the inventory of physical property was priced. The summary of the resulting appraised value was presented by Mr. Ford as "Valuation E," the estimated cost of reproduction new of the property of the Coney Island & Brooklyn Railroad Company as an adequate, modern system as of Aug. 31, 1909. The details of this valuation are shown herewith.

The expenses of the promotion period comprised the cost of promoter's organization, legal department and technical department and the additional cost of property owners' consents, and aggregated $699,700. During the construction period the cost of the company's permanent organization was estimated at $195,640. The sales values placed upon the sites for power house, substations, etc., were those fixed by an appraisal made by seven of the leading real estate agents of Brooklyn. The additional sales value and cost of acquiring the company's right-of-way on Coney Island Avenue, 20 ft. in width by approximately 5 miles long, was obtained by adding 150 per cent to the assessed value of this strip. The witness stated that he was guided largely in that percentage by the investigation of the value of this "contiguity factor" made by the engineers of the Railroad Commission of Minnesota. The cost of acquiring land (sites only), $45,400, represented 10 per cent of the sales value of these sites, 5 per cent of which was added for brokerage, legal expenses and insurance, etc., while the other 5 per cent represented the purchase price of the buildings that had to be removed from the land which was purchased.

The cost of the physical construction and equipment as of Feb. 1, 1909, was assumed at the prices presented by the experts of the Public Service Commission, although the item of incidentals, $276,460, was prepared from detailed estimates of each department of construction and equipment. Expenses for interest and taxes during construction, amounting to $561,345, were determined from a detailed estimate based on the length of time taken by each department for the work. Working capital, estimated at $250,000, was based on the estimated necessities of the company at Aug. 31, 1909.

The first total shown represented the cost of reproduction new at Feb. 1, 1909, and to this was added the cost of additions and betterments actually made between that date and Aug. 31, 1909, amounting to $39,549, together with the estimated cost of $569,696 for additions and betterments necessary to produce an adequate, modern system.

ESTIMATED COST OF REPRODUCTION NEW

The resulting total cost of reproduction new at Aug. 31, 1909, of an adequate, modern system was $9,299,898. Under existing conditions Mr. Ford thought this total cost of reproduction would be at least this amount, and might be much larger. In other words, this estimate was based upon the most favorable conditions which he could find had obtained for the recent promotion and construction of street railways in New York City.

Of the total figure $2,354,964 was represented by intangible property and $6,944,934 by tangible property. Mr. Ford then submitted a comparison between the estimates of experts of the Public Service Commission and of his firm, which is reproduced herewith. This showed a maximum and minimum estimate by the experts of the commission upon items included in their estimate and in that of the company's experts, and also items included by one side and not by the other, together with additional items of value or expense for which no estimates had been made.

In Mr. Ford's opinion land and buildings not used in operation should be included in working capital, as some provision must be made for a reasonable amount of excess real estate which was always present in an operating property.

The witness thought that the rate of return on a valuation based on the cost of reproduction should be more than the interest rate, as his estimate of value on this basis did not include profits of promotion, discounts and commissions on sale of securities, and features of the franchises

owned by the present company which could not be reproduced, such as freedom from municipal tax of 5 per cent of the gross earnings now required by statute. The latter item alone, he stated, would amount to about $75,000 per year, which, if capitalized at 6 per cent would equal $1,250,000. He had not included the cost of development of the business, such as the deficit of early operation, and the cost of development of technical standards representing the obsolescence of the horse system and the early electric system.

In view of the fact that all of these items had been excluded an allowance should be made of more than the interest rate on this basis of valuation. If the interest rate was taken at 6 per cent a rate of 10 per cent should be applied, Mr. Ford thought, to his estimate of the valuation on the reproduction basis in order to give a fair return on such capital. If, however, the rate of return should be fixed at 6 per cent these additional items of value or expense for which he had presented no estimates, should be capitalized.

The proportion of intangible to tangible property in the estimate of Mr. Ford was 34 per cent, as compared with 36.8 per cent to 53.8 per cent as shown by the experts of the commission, although if the rate of return was held at 6 per cent and a large additional amount of intangible property capitalized, as suggested by the witness, the proportion of intangible property would be increased to considerably more than 34 per cent.

ESTIMATED COST OF REPRODUCTION NEW OF THE PROPERTY OF THE CONEY ISLAND & BROOKLYN RAILROAD COMPANY AS AN ADEQUATE, MODERN SYSTEM AT AUG. 31, 1909, AS SUBMITTED BY MR. FORD.

Item.	Method of estimate.	Tangible property.	Intangible property.	Total estimate.
PROMOTION PERIOD. (Obtaining rights and capital.)				
1. Promotion expense:				
a. Promoter's organization—time and expenses	Inventory priced	.....	$231,100	
b. Legal department—time and expenses	Inventory priced	.....	103,500	
c. Technical department—time and expenses	Inventory priced	.....	86,600	$421,200
2. Property owners' consents	Estimated	.....	278,500	278,500
Total, promotion period		.....	$699,700	$699,700
CONSTRUCTION PERIOD. (Expenditure of capital to completion of construction.)				
3. Permanent organization—time and expenses	Inventory priced	.....	195,640	195,640
4. Cost of land:				
a. Sites for power house, substations, car barns, shops, yards and terminals:				
Assessed value		$187,800	.....	
Additional sales value (including contract for Coney Island terminal)	Appraisal	266,300	.....	454,100
b. Right of way on Coney Island Avenue:				
Assessed value		290,000	.....	
Additional sales value and cost of acquiring	Add 150 per cent	435,000	.....	725,000
5. Cost of acquiring land (sites only)	10 per cent of 4 a.	.....	45,400	45,400
6. Cost of construction and equipment (sub-contracts), as of Feb. 1, 1909:				
a. Track (including construction on bridges and fill on Coney Island Ave. right-of-way	Estimate of Public Service Commission's experts	829,325	.....	
b. Track, special work	"	219,893	.....	
c. Paving	"	383,159	.....	
d. Overhead trolley construction	"	132,696	.....	
e. Overhead feeders	"	100,575	.....	
f. Underground conduits and cables	"	305,750	.....	
g. Power plants and substations (including power house cribbing and old intake)	"	733,721	.....	
h. Buildings	"	527,258	.....	
i. Rolling stock	"	1,383,461	.....	
j. Incidentals	Detailed estimate	276,460	.....	4,892,298
7. General contractor's overhead charges and profit	10 per cent of Item 6	.....	489,230	489,230
8. Engineering	5 per cent of 6-7	.....	269,076	269,076
9. Interest and taxes during construction	Detailed estimate	.....	561,345	561,345
10. Miscellaneous stock, tools and fixtures:				
a. Inventory	Estimate of Public Service Commission's experts	103,680	.....	
b. Incidentals	5 per cent of 10 a.	5,184	.....	108,864
11. Working capital	Estimated	250,000	.....	250,000
Total, construction period		$6,430,262	$1,560,691	$7,990,953
Total cost of reproduction new at Feb. 1, 1909		$6,430,262	$2,260,391	$8,690,653
12. Additions and betterments from Feb. 1, 1909, to Aug. 31, 1909	Actual cost	39,549	.....	39,549
13. Additions and betterments necessary to produce an adequate, modern system	Detailed estimate	475,123	94,573	569,696
Total cost of reproduction new at Aug. 31, 1909, of an adequate, modern system		$6,944,934	$2,354,964	$9,299,898

COMPARISON BETWEEN ESTIMATES OF EXPERTS OF PUBLIC SERVICE COMMISSION AND THAT OF FORD, BACON & DAVIS.

	Experts of Public Service Commission. Maximum.	Minimum.	Ford, Bacon & Davis.
A. Items included in estimate of both commission's and company's experts as of Feb. 1, 1909	$7,897,256	$6,777,426	$8,690,653
B. Items included by Ford, Bacon & Davis, and while no values are estimated by commission's experts yet agreed to in principle by them.			
12. Additions and betterments from Feb. 1, 1909, to Aug. 31, 1909	.....	.....	39,549
13. Additions and betterments necessary to produce an adequate modern system	.....	.....	569,696
C. Items included by commission's experts, but for which no values are estimated by Ford, Bacon & Davis.			
14. Leases, trackage and power agreements	10,000	10,000	Should be included in promotion expense.
15. Regrading Coney Island Avenue	96,490	96,490	Not a part of reproduction cost.
16. Land not used in operation, assessed value	27,400	.....	Should be included
17. Buildings not used in operation	70,048	.....	in working capital.
18. Profits of promotion	870,000	435,000	Should be allowed for
19. Discounts and commissions on sale of securities	870,000	435,000	in rate of return.
D. Additional items of value or expense for which no estimates have been made.	.....	.....	
20. Features of franchise that cannot be reproduced	.....	.....	
a. Unlimited duration	.....	.....	
b. Freedom from municipal tax of 5 per cent of gross earnings	.....	.....	
c. Freedom from other present restrictions and burdens	.....	.....	
21. Cost of development of business	.....	.....	Should be allowed for
Deficiency below reasonable return 1861 1909 due to deficits of early operation	.....	.....	in rate of return.
22. Cost of development of technical standards	.....	.....	
a. Obsolescense of horse system	.....	.....	
b. Obsolescence of early electric system	.....	.....	
Total cost of reproduction new (without Group D)	$9,871,194	$7,758,916	$9,299,898
Proportion intangible to tangible property, per cent	53.8	36.8	34.0

CONEY ISLAND & BROOKLYN RAILROAD COMPANY.

INVENTORY OF WORK AND EXPENSE ITEMS OF REPRODUCTION NEW AS OF AUG. 31, 1909, OF INTANGIBLE PROPERTY ACQUIRED DURING PROMOTION PERIOD, SUBMITTED BY MR. FORD

PROMOTER'S ORGANIZATION.	*LEGAL DEPARTMENT*	*TECHNICAL DEPARTMENT*
PRELIMINARY		
Study of situation. Preparation of general data. General investigation of laws. Interesting other parties. Meetings and correspondence.	Conferences and correspondence with promoter covering generally State and local transportation laws.	Conferences and correspondence with promoter. General examination and memorandum on situation.
PROMOTER'S SYNDICATE		
Formation. Meetings. Consultations with attorneys and engineers as to general plans and procedure. Conferences and correspondence with engineers on report, revision of plans, supplementary reports, etc. Conferences and correspondence with attorneys on legal procedure, etc. Plans and estimates for early financing. Outline of financial plans.	Conferences and correspondence with promoter as to plans for syndicate, proposed agreement, etc. Draft of agreement and revision. Attendance at meetings of syndicate. Examination of and report on statutes, ordinances, etc., relating to street railways. Consultations with promoter as to plans and legal procedure.	Formal report, involving: Study of population, its growth, density and direction of movement, etc. Study of traffic; other companies, competing and non-competing, and for this situation; possibility of development, etc. Selection of route, with alternatives. Selection of power house and car barn sites. Estimates of cost of construction and equipment under different plans. Estimates of gross earnings and operating expenses under different plans for a period of years. Study of operating agreements with other companies. Maps, profiles, plans, etc.
ARTICLES OF ASSOCIATION AND CERTIFICATE OF INCORPORATION		
Consultations with attorneys. Consultations with engineers. Meetings of incorporators. Meetings of directors. Preparation of papers for filing with Secretary of State. Collection of subscriptions of not less than $1,000 per mile and affidavits thereto.	Examination of statutes. Consultations with promoter and engineers. Organizing and conducting meeting of subscribers to articles of association. Preparation of papers for filing with Secretary of State. Preparation of minutes, by-laws, etc., and conducting regular meetings of directors and stockholders. Attendance at Albany.	Conferences and correspondence with promoter and attorneys. Preparation of papers for filing with Secretary of State.
STATE AND LOCAL AUTHORITIES		
PREPARATORY		
Conferences and correspondence with attorneys and engineers on form and procedure. Planning campaign and organizing force.	Conferences and correspondence with promoter and engineers on form and procedure.	Conferences and correspondence with promoter and attorneys.
BOARD OF ESTIMATE AND APPORTIONMENT. (a) APPLICATION		
Conferences and correspondence, formal and informal, with members of Board and its engineers, other than at regular hearings. Preparation of data and reports on local companies and comparisons in other cities relative to franchises. Revision and amendments of application. Conferences and correspondence with attorneys and engineers relative thereto.	Preparation of application. Conferences and correspondence, formal and informal, with members of Board, etc., other than at regular hearings. Revision and amendments of application. Conferences with promoter and engineers relative thereto.	Conferences with promoter and attorneys.
(b) FIRST PUBLIC HEARINGS		
Publicity campaign, editing newspaper advertisements, circulars, etc.; attending meetings of property owners, commercial bodies and others. Attendance (reference to select committee). Preparation for further hearings, additional data, etc., to meet objections. Conferences and correspondence with attorneys and engineers relative thereto. (The above items for each hearing.) Securing attendance of experts for testimony.	Preparation. Attendance. Conferences and correspondence with promoter on results. Preparation for further hearings.	Preparation of data and papers. Attendance. Conferences and correspondence with Board's engineers. Preparation of additional data. Conferences and correspondence with promoter and attorneys.
(c) MEETINGS OF SELECT COMMITTEE		
Attendance. Preparation of data. Examination of proposed modifications and amendments to franchise, including: Revision of estimates and plans and preparation of counter proposals, etc. Conferences and correspondence with attorneys and engineers relative thereto. Securing attendance of experts for testimony.	Appearance. Preparation of data. Examination of proposed modifications and amendments, etc. Conferences and correspondence with promoter and engineers. Conferences and correspondence with Corporation Counsel.	Attendance. Revision of plans and estimates, maps, etc. Conferences with promoter and attorneys.
(d) FINAL HEARING		
(Same items as for first hearing.)	(Same items as for first hearing.)	(Same items as for first hearing.)
APPROVAL OF MAYOR.		
Attendance before Mayor.	Attendance before Mayor.	Attendance before Mayor.
CERTIFICATE OF PUBLIC SERVICE COMMISSION		
Preparation of petition and papers required. Preparation for hearing. Conferences and correspondence with attorneys and engineers relative thereto. (At this hearing applicant must prove necessity, bona fides of enterprise and financial ability to carry out enterprise.) Attendance at hearing. Attendance at subsequent hearings (adjournments). Preparation of further data and information. Conferences and correspondence with commission, formal and informal. Conferences and correspondence with attorneys and engineers relative thereto.	Preparation of petitions and papers required. Preparation for hearings. Conferences and correspondence with promoter and engineers. Appearances at hearings.	Preparation of data and estimates. Conferences and correspondence with promoter and attorneys. Testimony and attendance at hearings. Conferences and correspondence with commission's engineers.

PROMOTER'S ORGANIZATION.	LEGAL DEPARTMENT.	TECHNICAL DEPARTMENT.
APPROVAL OF CAPITALIZATION BY PUBLIC SERVICE COMMISSION		
Preparation of papers and data for hearing. Conferences and correspondence with attorneys and engineers relative thereto. Conferences and correspondence, formal and informal, with members of commission. Attendance at hearing. Examination of testimony and preparation of additional data and papers for further hearings. Conferences and correspondence with attorneys and engineers relative thereto. Attendance at subsequent hearings.	Preparation for hearing. Conferences and correspondence with promoter and engineers. Conferences and correspondence with members of Commission. Appearance at hearing. Examination of testimony and preparation of additional data. Conferences and correspondence with promoter and engineers. Attendance at subsequent hearings. Attendance in payment of capital stock tax.	Preparation for hearing. Conferences and correspondence with promoter and attorneys. Conferences and correspondence with Commission and its engineers. Attendance at hearing. Examination of testimony and preparation of additional data. Attendance at subsequent hearings.
PROPERTY OWNERS' CONSENTS AND OPTIONS		
PROPERTY OWNERS' CONSENTS		
Attending meetings of property owners. Conferences and correspondence with attorneys. Conferences and correspondence with chief solicitor. Personal attention to large property owners. General supervision of work. Preparation and inspection of tax lists. Conferences with attorneys relative to legal proceedings to secure consents. Preparation for and attendance at trials.	Preparation of petitions and releases. Conferences and correspondence with promoter. Tax lists and preparation, etc. Attending meetings. Preparation for legal proceedings to secure consents. Conferences and correspondence with promoter. Attendance at trials. Organizing solicitors.	General maps showing owners and frontage. Individual plans to accompany transfers.
RIGHT-OF-WAY OPTIONS		
Conferences with engineers and attorneys on recommended private right-of-way routes. Inspection of properties, investigation as to availability, names and location of present property owners, prices of real estate, etc. Conferences and correspondence with attorneys and real estate brokers covering form and securing of options, etc.	Conferences and correspondence with promoter. Form of options, etc. Meetings with vendors' attorneys.	Conferences and correspondence with promoter, inspection of recommended properties, etc.
REAL ESTATE OPTIONS		
Inspection of recommended car barn and power house, etc., sites. Conferences and correspondence with engineers. Conferences and correspondence with real estate brokers. Conferences and correspondence with attorneys on form of options. Meetings with vendors. (Option would probably be obtained on property not used in final design.)	(Same as for right-of-way.)	Surveys to determine availability. Estimates of comparative economy.
OTHER RIGHTS AND CONSENTS		
COMMISSIONER OF BRIDGES		
(The general right to operate over the East River bridges would be covered by Board of Estimate and Apportionment, but details of operation would be arranged and directed by the Commissioner of Bridges.) Application to commissioner, with outline of proposed operation, type and weights of equipment, track and overhead construction. Conferences and correspondence with attorneys and engineers relative thereto. Meetings with commissioner. Conferences and correspondence with other companies using bridges. Examination of contracts.	Conferences and correspondence with promoter and engineers relative thereto. Meetings with commissioner and his attorneys. Conferences and correspondence with other companies using the bridges. Examination and approval of contracts.	Study of bridge operating conditions, with recommended plans for operation, estimates of earnings, maps, plans, etc. Conferences and correspondence with promoter and attorneys. Meetings with commissioner or his engineers. Conferences and correspondence with other companies using bridges. Examination and report on contracts.
COMMISSIONER OF PARKS		
Conferences and correspondence with commissioner to obtain consent to franchise, approval of proposed type of track construction, design and location of poles, paving, grades, etc. Conferences and correspondence with attorneys and engineers relative thereto.	Conferences and correspondence with commissioner and his attorneys. Conferences and correspondence with promoter and engineers.	Conferences and correspondence with commissioner and his engineers. Conferences and correspondence with promoter and attorneys. Plans and estimates.
BOROUGH PRESIDENT		
Conferences and correspondence with borough president and his engineers to obtain approval of proposed type of construction, location of poles, paving, grades, etc., including submission of plans and specifications. Conferences and correspondence with attorneys and engineers relative thereto.	Conferences and correspondence with borough president and his attorneys. Conferences and correspondence with promoter and engineers.	Conferences and correspondence with borough president and his engineers regarding proposed construction, grades, paving, etc. Conferences with promoter and engineers. Maps, plans and estimates.
TRACKAGE AND OTHER AGREEMENTS WITH CORPORATIONS		
Meetings with officials. Conferences and correspondence with attorneys and engineers. Consent of Public Service Commission and Board of Estimate and Apportionment. Estimates of costs, rentals, etc. Preparation and examination of agreements.	Attendance at meetings with officials of other corporations. Conferences and correspondence with promoter and engineers. Consent of Public Service Commission and Board of Estimate and Apportionment. Tentative agreements. Final agreements. Attendance at execution of agreements.	Attendance at meetings with officials of other corporations. Conferences and correspondence with promoter and attorneys. Opinion on form of proposed agreements. Preparation of data for use before Public Service Commission and Board of Estimate and Apportionment. Attendance at hearings. Estimates on equity agreements.
FINANCING		
PROSPECTUS		
Preparation of and editing. Conferences and correspondence with attorneys and engineers relative thereto.	Conferences and correspondence with promoter and engineers. Preparation of condensed opinion for use prospectus.	Conferences and correspondence with promoter and attorneys. Preparation of letter for use in prospectus.
NEGOTIATIONS WITH BANKERS AND INVESTORS		
Detailed plans for financing. Conferences and correspondence with attorneys and engineers relative thereto.	Detailed plans for financing. Conferences and correspondence with promoter and bankers.	Conferences and correspondence with promoter and attorneys as to plans.

PROMOTER'S ORGANIZATION.	*LEGAL DEPARTMENT.*	*TECHNICAL DEPARTMENT.*
(a) STOCK UNDERWRITING SYNDICATE		
Interesting investors. Tentative agreement. Meetings and conferences working toward final agreement. Plans for carrying out provisions of agreement, collection of subscriptions, voting trusts, interim and participation certificates, etc. Conferences and correspondence with attorneys and syndicate relative thereto.	Conferences and correspondence with promoter. Preparation of tentative agreement. Attendance at meetings between promoter and syndicate. Final agreement. Conferences and correspondence on form of certificate and preparation of form. Attendance in execution of agreement. Participation certificates, interim certificates, etc.	Attendance with promoter at meetings. Special estimates.
(b) BOND UNDERWRITING SYNDICATE		
Interesting bankers. Conferences and correspondence with their engineers. Tentative agreement. Meetings and conferences working toward final agreement. Plans for carrying out provision of agreement, collection of subscriptions, voting trust, interim and participation certificates, etc. Conferences and correspondence with attorneys and syndicate relative thereto.	Conferences and correspondence with promoter and engineers. Preparation of mortgage and trust deed. Search of titles. Preparation of tentative agreement. Attendance at meetings between promoter and syndicate. Final agreement; interim certificates, participation certificates, agreements. Attendance in execution of agreement.	Attendance with promoter at meetings. Conferences and correspondence with promoter and attorneys in regard to mortgage and trust deed. Preparation of data for use therein. Special estimates.
FORMAL ENDING OF PROMOTION PERIOD		
Transfer of papers and documents. Execution of releases, assignments, etc.	Transfer of papers and documents, execution of releases, assignments, etc.	

Inventory of Expenses During Promotion Period.

PROMOTER'S ORGANIZATION.	*LEGAL DEPARTMENT.*	*TECHNICAL DEPARTMENT.*
PRELIMINARY		
Assistants' time. Stenographers' time. General office expenses: Rent, light, etc. Postage, telephone and telegrams. Books—record, statistical, legal, etc. Files and office furniture. Miscellaneous. Traveling.	Typewriting. Notary fees. Recording fees. Certified copies. Traveling expenses. Directors' fees. Printing. Miscellaneous. Fees to State. Copies of consents, decrees, etc. Transcripts of minutes. Tax lists. Trustees' legal expenses. Retainers in special suits. Directors' and executive committee fees.	Time and expenses of engineers, draftsmen and other assistants. Typewriting and other expenses.
PROMOTER'S SYNDICATE		
Chief assistant to promoter. Assistant as to engineering. Assistant as to accounting and statistics. Record clerks (including bookkeeping). Stenographers (including filing). Chief consent solicitor. Assistants. Allowance to other members of promoter's syndicate for time and expenses. General office expenses: Rent, light, etc. Postage, telephone and telegrams. Books—record (minutes, etc.; accounts, etc.). Filing system. Office furniture (including typewriters, adding machine, etc.). Printing and stationery. Miscellaneous. Publicity expenses. Traveling. Expenses of promotion syndicate, including their attorneys and engineers. Interest on money raised by promoters. Premium on security bonds, employes and for franchise, etc.	FRANCHISES AND OPTIONS. Payments to property owners for consents. Lump sum payments for franchise. Payments for options on real estate. Commission and expenses of real estate broker in securing options. Payments to title company for lists of property owners and details in connection with properties. Publication required by law.	

Inventory of Cost of Reproduction New, of Intangible Property Acquired During Construction Period. (Except Technical Department and Contractor.)

PERMANENT ORGANIZATION.	*LEGAL DEPARTMENT.*	*TECHNICAL DEPARTMENT.*
STOCKHOLDERS' MEETINGS	GENERAL COUNSEL	
Election of directors and officers; approval of stock and bond issues, agreements, by-laws, seal, etc.	Examination and approval of contracts. Preparation of resolutions, etc., for meetings. Advice and direction in matter of securing permits from authorities. Conferences and correspondence with city officials in regard to permits. Conferences and correspondence with other companies regarding construction, etc. Temporary injunctions and other legal proceedings against interference with construction, etc., by City officials and departments. Other corporations, street railway, steam railway, telephone, electric, gas. Unions on strike. Property owners. Hearings and orders in the above. Defending and instituting suits for damges to property. Conferences and correspondence relative thereto. Suits and other legal proceedings against contractors and others for non-fulfilment of obligations to company. Conferences and correspondence relative thereto. Suits and other legal proceedings in matters of disputed accounts, etc.	(Usual details.)
DIRECTORS' MEETINGS		
Reports of committees and officers; approval of contracts, specifications, etc.; considering and directing in matters affecting the company's plans, etc.		
EXECUTIVE COMMITTEE MEETINGS		
Practically same as above, but with greater detail and more frequent meetings.		
PRESIDENT		
Supervision and direction of all matters in connection with construction, such as: Examination and approval of plans and specifications. Execution of contracts. Conferences and correspondence with city officials in securing permits and removing obstructions to company's plans. Conferences and correspondence with officials of other companies regarding crossings and other matters of mutual interest (grade crossings, etc.). Trips to other cities to examine types of construction, method of operation, etc.		

PERMANENT ORGANIZATION.

Conferences and correspondence with financial syndicates. (Unfavorable markets for securities might necessitate issuance of short-term obligations with attendant expense of Public Service Commission approval, selling, etc.)
Conferences and correspondence with attorneys and engineers on matters of construction.
Securing modifications of franchises, certificate of convenience and necessity and permits, such as extensions of time, alterations of layout and design, etc., including the approval of various city officials and departments.
Signing securities, checks, etc.
Hearing and investigating complaints.

SECRETARY-TREASURER

All duties usual to the office of secretary treasurer.

AUDITOR

All duties usual to the office of auditor.

LEGAL DEPARTMENT.

Conferences and correspondence relative thereto.
Preparation of certificates of expenditures for trustee, etc.
Personal injury suits; employees; public.
Preparation for and appearances in securing modifications of franchises and permits.
Crossing and track elevation controversies and litigation with steam railroads.

TECHNICAL DEPARTMENT.

(Usual Details.)

Inventory of Expenses During Construction Period.

PERMANENT ORGANIZATION.

GENERAL

Fees to directors and executive committee.
Salaries of general officers.
Salaries of clerks.
Rent of offices, light, etc.
Consulting auditor developing accounting system.
General books and records.
Printing and stationery.
Filing system.
Traveling expenses.
Recording fees.
Traveling and other expenses in connection with securing appointive officers.
Traveling and other expenses of appointive officers.
Miscellaneous.

FINANCIAL

Engraving stock certificates, including interim certificates and all expenses of delivery and storage.
Engraving bonds, including interim certificates and all expenses of delivery and storage.
Services of trustee in certification.
Obtaining subscriptions.
Registration books and records (in duplicate in company's and transfer agent's offices).
Issuing certificates.
Listing on stock exchanges.
Discount on securities (to be covered by rate of return).
Commissions to syndicates.
Cost of temporary loans.
Cost of short-term loans.
Exchange.

CITY PERMITS AND INSPECTION

Fees.
Inspectors' salaries.
Water charges.
Payments for special privileges.

LEGAL DEPARTMENT.

Retainers and fees to special counsel.
Fees to experts for testimony.
Court costs and witness fees.
Notary services.
Expenses of special counsel and experts, including traveling.
Payments for damages.

TECHNICAL DEPARTMENT.

(Usual details.)

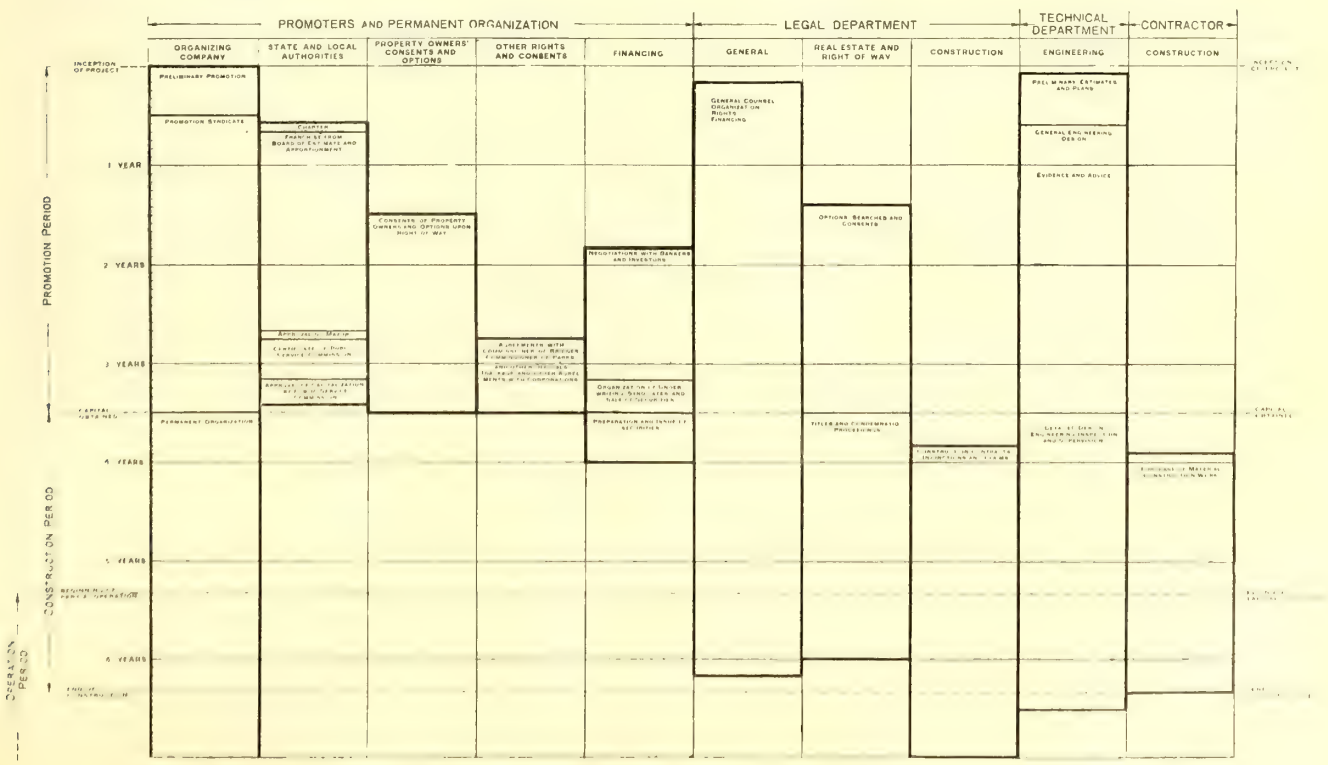
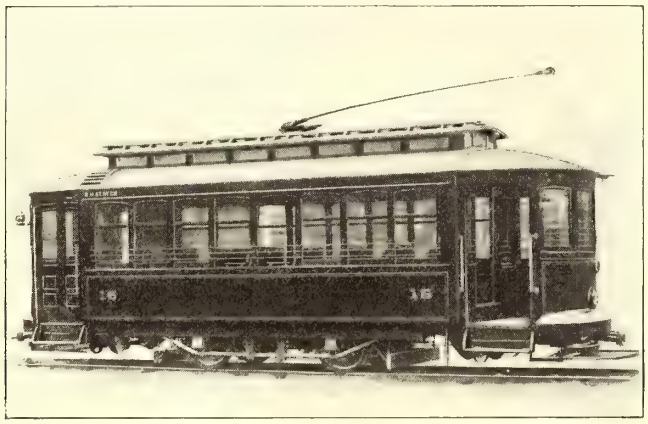


Chart of Estimated Time of Reproduction New of Coney Island & Brooklyn Railroad System as Submitted by Mr. Ford

MEETING OF THE MASSACHUSETTS STREET RAILWAY ASSOCIATION

The regular monthly meeting of the Massachusetts Street Railway Association was held at Young's Hotel, Boston, on Dec. 8, with L. S. Storrs, vice-president, in the chair. The principal speaker was Howard F. Eaton, local manager of the Brockton & Plymouth Street Railway, his subject being the "Rehabilitation of the Blue Hill Street Railway," one of the Stone & Webster properties in the suburban district outside of Boston. Mr. Eaton explained that the Blue Hill Street Railway serves the territory be-



Semi-Convertible Car for Blue Hill Street Railway

tween Mattapan and Stoughton, connecting with the lines of the Boston Elevated Railway at Mattapan and with the Old Colony Street Railway Company at Stoughton. The line was built about 10 years ago at heavy expense for a partially private right-of-way. Through cars were operated over the Boston Elevated system to Dudley Street, and to maintain this service the company was obliged to keep two cars on the Boston lines all the time. The territory served by the company is thinly settled, and the earnings were insufficient up to very recently to prevent a loss in the operation of the property. In February, 1909, the company suffered from a serious fire at its car house, and all the rolling stock except six cars was destroyed. The car house and the shops, with all tools, were a total loss. During the year previous to the fire a 6-cent fare had been charged on the road. This helped the earnings somewhat, but the recent law requiring the New York, New Haven & Hartford Railroad to issue 12-ride ticket books at 15 cents per ride between Canton Junction and Boston reduced the earnings of the Blue Hill Street Railway about 10 per cent. The cost of traveling from Canton Junction to Boston via the street railway lines is 17 cents.

Mr. Eaton said that to meet this situation it became apparent that every possible means must be taken to reduce operating expenses. It was decided first to purchase single-truck cars, with two large motors on each, to replace those destroyed in the fire, and the best possible construction was insisted upon. The old car house was located on a side track, and the entire time of one man was required in shifting cars to and from the main line. The new car house, built after the fire, was therefore located on the main line. The company had not had much chance as yet to obtain extensive comparisons of the power consumption of the new single-truck cars and the double-truck cars formerly operated, but in November single-truck cars were operated exclusively on the line, with the result that the power consumption per car-mile dropped about 1.22 kw-hours. The old double-truck cars were equipped with four motors each.

The new single-truck cars carry the traffic on 350 days of the year without overloading. Seven of these cars were purchased of the semi-convertible type, without air brakes. They were built by the Wason Manufacturing Company, of Springfield, Mass. Five cars are needed to maintain the ordinary schedule. The company also purchased five single-truck, 10-bench open cars. The semi-convertible cars are equipped with two GE-80 motors each, the control being equipped with an auxiliary contactor under the floor, which relieves the controller of arcing. These cars are mounted on Standard trucks, and weigh about 29,000 lb. each, complete. The body length is 21 ft. and the cars have a double floor, which adds somewhat to the weight, but reduces the amount of heating required in the winter season. The semi-convertible cars have a 7-ft. 6-in. wheelbase and steel wheels with 4½-in. axles. The seating capacity is 32 passengers. A schedule speed of about 10 m.p.h. is maintained, with a maximum speed of 30 m.p.h. The aisles are wide and the seats comfortable, and on account of the room inside the cars the conductors have better success in getting all the fares than in the old cars. The open cars are wide enough so that six persons can be seated with reasonable comfort on each seat. All the cars are finished inside with mahogany, which the company found to be the best wood for the purpose, considering both first cost and cost of maintenance. The cars are painted the standard green of the surface cars on the Boston Elevated system, with plain lettering and simple finish. Little side sway is noted in the operation of the single-truck cars, and there is no objectionable amount of galloping.

Before the new cars were put in service the track was overhauled and guard rails were installed on all curves. Many of the joints were rebuilt. The new cars appear to



Interior of Semi-Convertible Car for Blue Hill Street Railway

run as safely as the double-truck cars, and the company has had fewer derailments with them than with the old cars.

The new car house was specially designed for economical operation. It was located on a side hill where the drainage was good, and all the pits were built slanting toward one end, so that water would not accumulate in them, even in very wet weather. The car house proper is 150 ft. long and 100 ft. wide, with a storage house on one side, 200

ft. long and 24 ft. wide. Fifty feet beyond the car house is located the paint shop, 50 ft. long and 23 ft. wide. There is a number of skylights, and artificial light is required only on very dark days. The storage house was put on the north side of the property in order to protect the car house and shop from the north winds and thus reduce the amount of heat required. Three men handle the repair and inspection work in the winter in the shops, compared with a force of seven men in the old shops. There are three pits, and every car on the line can be placed over the pits at night, necessitating no moving of rolling stock in the shop. Among the shop tools are a car body jack, which enables bodies to be handled with ease and speed; a pit jack for wheel renewals, and a trolley carrier above the pits which affords easy and rapid connection with the shop when handling armatures and trucks. One man can handle an armature with this carrier without assistance. The wash room for the cars is well heated.

The office is located in the extreme southwestern part of the building, and is equipped with a fireproof vault for the storage of records. The old house did not have this provision. A special feature is the provision of separate lavatories for conductors and motormen and for shop employees. It was found that the operating men preferred their own lavatory accommodations, and the establishment of separate facilities has resulted in mutual satisfaction. In the new car house stock room material can be handled by the carrier system mentioned above, which serves the blacksmith shop as well as the machine shop.

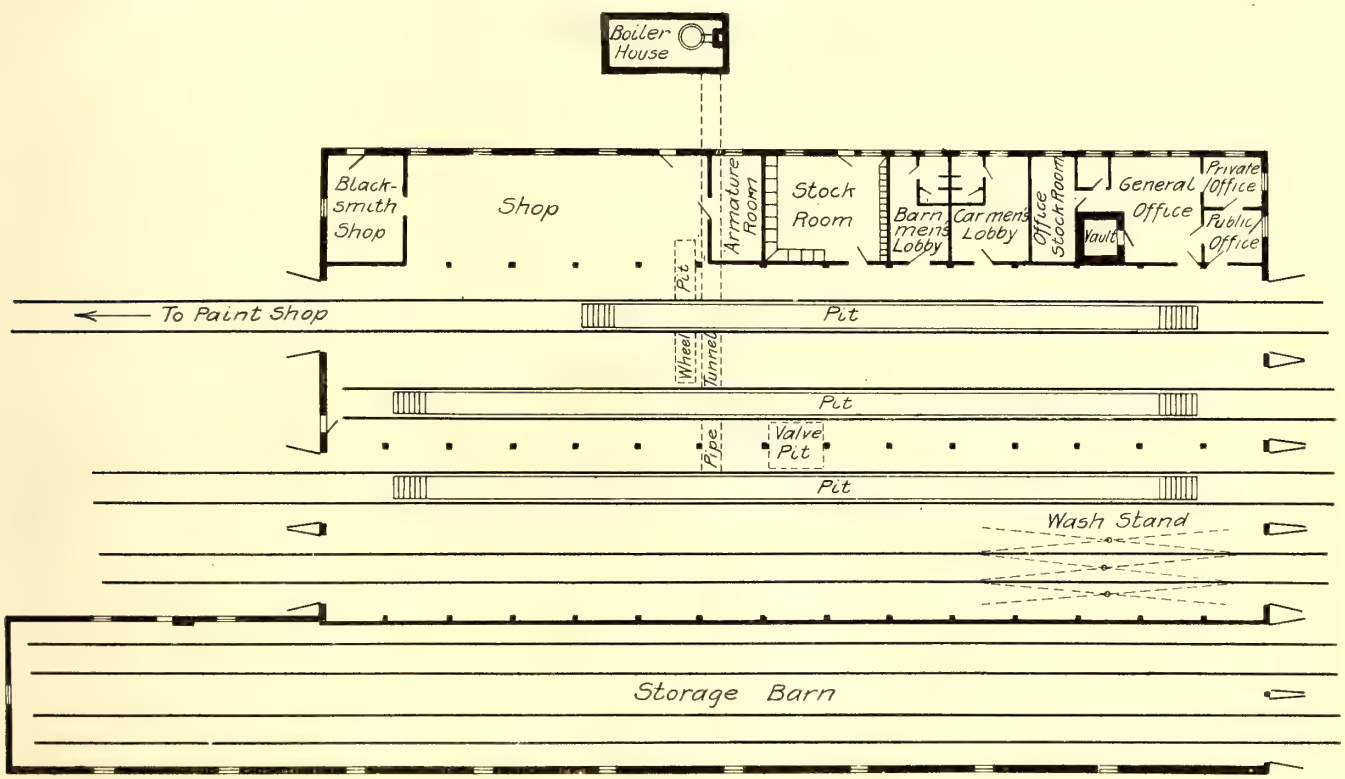
The paint shop is a cheap building, costing only a few hundred dollars. The separation of the paint shop from the other buildings by 50 ft. enabled the company to insure the rest of the property against fire without regard to the paint shop, and thus save a good deal of money. A track is run through to the paint shop, and the latter is readily accessible for the entrance and exit of cars. The paint shop has windows on all sides, a decided contrast to a property which Mr. Eaton once visited, in which the paint shop had windows on one side only, so that in order to paint the second side of the car it was necessary while it was still wet to run it out of the shop to a switch, 4 miles away, turn it around and run it back into the shop for the final work. The car house proper has a capacity of 16 cars, and the storage house a capacity of 12 cars.

The new cars are very popular, and the riding has increased, notably on the Milton end of the line. As a result of the economies instituted, the operating expenses have been reduced from $6,000 to $4,000 for the month of September, 1909, compared with a year ago. The company hopes to more than meet its expenses and fixed charges during the present year. The maximum grade on the road is 8 per cent, and a mile long.

General Superintendent Buchanan spoke briefly of the steam heating system installed in the car house, which has gravity returns from the pits, and which is without traps. An old upright boiler which was not seriously damaged at the time of the fire was used to supply steam.

Mr. Storrs said he believed that the electric railway industry has reached the limit on large cars, and commended the Blue Hill rolling stock as the logical development for suburban line traffic.

Charles C. Peirce, of the General Electric Company, Boston, emphasized the importance of ton-mileage on street railways. He stated that the dead weight per passenger is at present about 1175 lb. in Boston, 1850 lb. in San Francisco and 1350 lb. in Chicago. The electric railway manager has followed the practice of the steam roads too closely in this respect. Touching upon the value of the light car units used in Denver in the daytime, with trailers between 5 p. m. and 7 p. m., Mr. Peirce suggested that the possibilities of trailer operation were by no means reached. The question of speed was also important. Many motors were not properly selected for their work, some being underloaded and others overloaded. The art of electric traction is 30 years old, and yet many of the fundamental points were frequently overlooked. Greater speed means



Plan of New Shops and Car House of Blue Hill Street Railway

greater mileage and reduced platform expense. Lay-over periods were a source of heavy expense.

J. W. Dozier, superintendent, Lynn & Nahant Street Railway, paid a tribute to the management of the Boston & Northern Street Railway Company for its co-operation in the lending of cars for Sunday travel. He suggested that pleasure traffic must be carried in comfort if its volume is to be satisfactory. On the Lynn & Nahant Railway every possible effort is made to seat the passengers in order to secure safe operation and promote pleasure business.

H. S. Knowlton, Boston, reviewed the subject of street railway and steam railroad competition in the suburban field from the standpoint of eliminating all needless stops. If this was done the schedule time on runs over 4 or 5 miles long could be improved greatly. Aside from the increase in revenue, there was a saving in current consumption and physical wear and tear on the cars every time a stop was eliminated. If the advantages of decreased stops were made plain to the public, regular passengers would in most cases co-operate and appreciate the improved service thus made possible. The longest distance that a passenger has to walk to take a car is only half the distance between successive stopping places. By placing neat, pithy placards in the cars, stating the reasons for cutting out stops, the public would soon come to see that the improvement of the service was worth the reduction in stopping places. Among over 200 stops that were cut out on the surface lines of the Boston Elevated system, only a few led to complaints to the public authorities, and in practically every case the Railroad Commission sustained the company in the interests of improved service and shortened time of transit.

TRANSPORTATION OF UNITED STATES MAIL

At the meeting of the Street Railway Association of the State of New York in Albany on Dec. 8 the subject of the transportation of United States mail in closed pouches was discussed by C. Loomis Allen, vice-president and general manager, and J. E. Duffy, superintendent of the Syracuse Rapid Transit Railway Company. This company was requested recently by the United States postmaster at Syracuse to submit a statement showing the amount which would be charged for carrying mails from the main post office in Syracuse to a new substation. Under the conditions named, the mail was to be delivered to and taken from the station by employees of the company. Four round trips were to be made on working days, with one trip on Sundays and holidays. The trips from the main post office were to be made at the hours of about 6 a. m., 11 a. m., 1 p. m. and 6 p. m. About 16 sacks and pouches were to be carried on the 6 a. m. trip and the same number on the 1 p. m. trip, with about four pieces on each of the other two trips. The trips from the substation to the main office were to be made about 7:30 a. m., 11:30 a. m., 1:45 p. m. and 6:30 p. m., and on each of these trips about four pieces were to be carried.

In reply to the request, Mr. Allen wrote to the postmaster at Syracuse that the service would extend over a period of 14 hours per day. Based upon the earnings and expenses of the company for the year ended June 30, 1909, and furnishing a car and necessary crew, the service would be provided for $10,220 per annum. This sum was computed on the basis of car-hour earnings of $2, or at the rate of $28 per day of 14 hours.

No action has been taken by the Post Office Department in relation to this matter.

PENSIONS FOR EMPLOYEES OF BROOKLYN RAPID TRANSIT COMPANY

The board of directors of the Brooklyn Rapid Transit Company on Dec. 14 established a pension department which will be administered in accordance with the following rules and regulations:

I. The administration of the pension department shall be by a board of officers to be known as the "board of pensions." Such board, until otherwise ordered, shall consist of:

Vice-president and general manager of the Brooklyn Rapid Transit System, chairman; secretary and treasurer of the Brooklyn Rapid Transit System, secretary; president of Brooklyn Rapid Transit Employees' Benefit Association.

II. All communications shall be addressed to the secretary of the board of pensions.

III. The board of pensions shall, subject to the approval of the president of the Brooklyn Rapid Transit Company, have power to make and enforce rules and regulations for the efficient operation of the pension department; to determine the eligibility of employees to receive pension allowances; to fix the amount of such allowances, and to prescribe the conditions under which such allowances may inure. They shall make rules for their own government, not inconsistent with these regulations, or the general regulations governing the operation of the system.

IV. No employee in the service of the system Jan. 1, 1910, and no employee who shall enter the service of the system after Jan. 1, 1910 (except as noted below), shall be eligible for retirement and a pension allowance, unless he shall have become a member of the Employees' Benefit Association within one year after that date, or within one year after he shall have become eligible to such membership, nor unless said membership shall have been continuous thereafter. Any employee in the service of the system prior to Jan. 1, 1910, who shall have attained the age of 50 years, and who shall not then be a member of said association, shall nevertheless be eligible to a pension allowance, when he shall have served the company in all other respects as herein provided.

V. The terms "service" and "in the service" will mean employment in the service of any company forming part of the Brooklyn Rapid Transit System, and the service of any employee shall be considered as continuous from the date from which he has become continuously employed in the service of any of the said companies.

VI. In computing service, it shall be reckoned from the date since which the person has been continuously in the service to the date of retirement.

Leave of absence, suspension, dismissal or resignation followed by reappointment within six months, is not to be considered a break in the continuity of service.

VII. The following employees shall be retired and received a pension under the following conditions:

Any employee who has reached the age of 70 years, whether incapacitated or not, and any employee who has reached the age of 65 to 69 years (both inclusive) and who has become incapacitated, and who has made application or has been recommended for retirement, and who has submitted himself to a physical examination by a physician or physicians designated by the board of pensions, and shall be thereafter retired by said board, shall be entitled to a pension as follows:

(A) If in the continuous service of the system for a period of 35 years or more, 50 per cent of the average monthly pay received during the 10 years immediately preceding retirement.

(B) If in the continuous service of the system for a period of 30 years, and less than 35 years, 40 per cent of the average monthly pay received for the 10 years immediately preceding retirement.

(C) If in the service of the system for 25 years and less than 30 years, 30 per cent of the average monthly pay received during the 10 years immediately preceding retirement.

Any employee who has not reached the age of 65 years, but who has been in the continuous service of the system for at least 30 years, and who has become incapacitated, may be

recommended for retirement, and be retired by a vote of the board of pensions upon such examination and conditions as may be imposed by said board and with the amount of pension as fixed by paragraphs A and B of this section.

VIII. When pension allowances shall be authorized by the pension board, they shall be paid monthly during the life of the beneficiary, providing, however, that any such allowance may be revoked for misconduct on the part of the beneficiary, of which misconduct the pension board shall be the sole judge, and providing further that in order that the companies may keep in close touch with its retired employees and be assured that they are enjoying the full benefit of the allowance, no assignment of pension will be permitted or recognized.

IX. Nothing herein provided, nor any action hereafter taken by the pension board, shall be construed as giving to any employee of any company of the system a right to be retained in its service or any legal right or claim to a pension allowance, and the company expressly reserves its right and privilege to discharge, at any time, any employee when the interests of the company in its judgment may require such discharge, without liability for any claim for pension or other allowance other than salary or wages due and unpaid.

X. At the close of each month a payroll showing the names of those to whom allowances have been made and the amounts of such allowances shall be prepared by the secretary of the board of pensions, who shall certify to its correctness. After this payroll has received the approval of the vice-president and general manager, voucher checks shall be prepared, which shall pass through the usual channels for payment.

XI. The secretary of the board of pensions shall keep himself advised as to the whereabouts of those entitled to pension allowances. When any such employee does not reside within the limits of Greater New York, the secretary shall require satisfactory evidence once a month showing that said employee is entitled to such allowance.

XII. No employee whose maximum wages have exceeded $1,500 per annum for a period of more than five years shall be eligible for retirement or consideration under the above regulations.

XIII. The above conditions may be modified from time to time only by and with the consent of the board of directors of the Brooklyn Rapid Transit Company.

XIV. The pension department may be discontinued at the option of the board of directors of the Brooklyn Rapid Transit Company, but in case the department is discontinued, notice of such discontinuance shall be sent to each member receiving a pension under the terms and conditions of the pension board, and the discontinuance of such payment shall not become effective until one year from date of such notice.

XV. These rules and regulations shall take effect and be in full force on and after Jan. 1, 1910.

The following notice to employees was issued by the newly created pension board advising them of the plan:

The board of directors of the Brooklyn Rapid Transit Company has approved a plan of pensioning employees who have rendered long and faithful service to any of the companies comprising the system, on a basis of an apportionment of their wage according to length of service at time of retirement.

The pension thus allowed ranges from 50 per cent of the average monthly wage during the 10 years preceding retirement of those who have served continuously for 35 or more years, to 30 per cent of the average 10 years wage for those who have served continuously for less than 30 and more than 25 years. Under this arrangement many employees upon retirement will receive an income equivalent to 4 per cent per annum upon an investment of $10,000.

The company has from time to time recommended to its employees to take membership in the Employees' Benefit Association, because this association secures to its members for a small yearly outlay a number of privileges in addition to the insurance in case of sickness or death. It is for these reasons that the allowance of pension upon retirement is made contingent upon membership in the Employees' Benefit Association, after specified date, where the employee is eligible to such membership. The enjoyment of the pension does not deprive one of any of the advantages, pecuniary or otherwise, secured by membership in the association, and employees are advised to continue their connection with this organization after being placed on the pension roll.

Such of the employees of the system who are not eligible to membership in the benefit association by reason of age or physical condition, and who shall have been in service with one or more of the companies in the system as in all other respects provided in the pension regulations, will be put in a special class and receive the same pension allowance as if they had been members of the association.

We suggest that those employees who are not members of the benefit association, or familiar with its affairs, communicate with George W. Edwards, president of the benefit association, who will be very glad to furnish them with information as to the workings and advantages of the association.

J. F. CALDERWOOD,
C. D. MENEELY,
G. W. EDWARDS.

DECISION OF ARBITRATOR IN CLEVELAND CONTROVERSY

Judge R. W. Tayler, of the United States Circuit Court, as arbitrator in the Cleveland street railway controversy, rendered his decision on Dec. 18 on the various points involved. The total valuation is slightly over $1,000,000 lower than that found by the Goff-Johnson appraisement, but the physical value is about $3,000,000 higher.

The finding of Judge Tayler is as follows:

FINDING OF THE ARBITRATOR

First—The value of the physical property of the Cleveland Electric Railway Company, as of Jan. 1, 1908, was $17,511,305.64.

Second—The franchise value of the company's franchises, as of that date, was $3,615,843.89.

Third—The total value of all of the property of the Cleveland Electric Railway Company I find, therefore, to be $21,127,149.53, being something more than $1,000,000 less than that which was found by the Goff-Johnson appraisal.

Fourth—I allow nothing for good will. A street railway company which has a monopoly, and especially if it has a franchise value remaining, can have no good will value.

Fifth—I allow nothing for going value, except in so far as that is the result of the necessary expenditure of money in building the road, acquiring its land, power houses and equipment and putting them into successful operation. The expenditures for these purposes are, and necessarily must be, included in the valuation of the physical property.

Sixth—I offset the franchise value of suburban grants, whatever they may amount to, against the burdens of suburban contracts, to whatever extent they may exist, for the reason that all the territory covered by the Cleveland Electric lines is one homogeneous community, destined soon to become one municipality in which a zone system will be intolerable.

Seventh—I am of opinion that there is a moral, and, perhaps, a legal obligation on the community in connection with the guarantee by the Municipal Traction Company of stock of the Forest City Railway Company and of stock of the Cleveland Railway Company sold by the Municipal Traction Company. In view of the fact that the settlement recommended by me, should it become operative, will make the stock of the Cleveland Railway Company, in my opinion, intrinsically worth par, I recommend that the obligation created by the guarantee be adjusted by the payment, to the persons who originally purchased the same on the faith of the guarantee, of an amount equal to 7½ per cent of the par value of such guaranteed stock so owned, and that the principle be applied to fractional shares according to the actual amounts paid thereon; such payments to be in full satisfaction of all liability under the guarantee.

I fix the amount at 7½ per cent, because, prior to Oct. 1, 1908, all such stockholders had received interest or dividends at the rate of 6 per cent per annum.

Something less than 10 per cent of the guaranteed stock has been sold by the original purchasers. To what extent,

if any, these former owners of such stock may be entitled to any reinbursement under the guarantee I am willing to consider hereafter. The amount involved can in no event be a very large sum, as less than 10 per cent of all the guaranteed stock has changed hands.

The practical result of the reduction in the value of the Cleveland Railway Company property will be to make the stock of that company not having an origin in the Municipal Traction Company's guarantee worth, as of Jan. 1, 1910, par and 1½ per cent, being the amount accruing to such stockholders for the quarter ending Oct. 1, 1908, and thus equalizing for that period those stockholders with the stockholders whose stock came under the guarantee.

As to the guaranteed stock still in the hands of the original purchasers, it will be worth, as of Jan. 1, 1910, par and 7½ per cent.

Eighth—The initial rate of fare should be 3 cents and 1 cent for a transfer, without rebate, and the maximum rate should be 4 cents for a single fare, seven tickets for 25 cents and 1 cent for a transfer, without rebate.

Ninth—I approve the suggestion that, if consents of abutting property owners are secured, the company be required to extend its line on Lorain Avenue to the city limits, if no fair arrangement can be made with the interurban company for the use of its tracks.

REASONS FOR THE CONCLUSIONS

In discussing the physical valuation, Judge Tayler stated that he took the Goff-Johnson value as a basis. He considered overhead charges as money spent in the necessary production of the physical property and putting it in operation. Not much was to be allowed afterward for development, he said. He divided overhead charges into two classes, those that applied to specific items and those which applied to the whole. Under the first class he allowed 10 per cent on track, 3 per cent on pavement and 5 per cent on cars, land, buildings, power stations, miscellaneous rolling stock and equipment. This brought the value up to $15,175,565.27. Under the head of a general overhead charge, applicable to the whole investment, including financing, engineering, supervision, insurance, interest during construction, litigation with property owners and incidentals, he allowed 15 per cent. This brought the physical value up to $17,511,305.64.

In discussing the pavement item, Judge Tayler said that argument for its elimination rested upon a purely technical reason at best; that its construction represented money expended, and that the cost should go into the capital account. Incidentally, he asserted that if all the mass of testimony before him counted for anything, the system of the Cleveland Railway could not be reproduced as of Jan. 1, 1908, for the amount which he had allowed.

He stated that the going value was included in the physical value, and that he could allow nothing directly for that, or for good will, as that term was generally defined. A street railway company had a monopoly and could not properly be said to have any good will value, he thought.

A franchise value was based upon the money the company was able to earn over 5¾ per cent on the physical value. The representatives of the city, he said, had insisted that the value of the franchises within the city limits was about $3,000,000, while the company estimated the amount at over $4,000,000. He had considered the lines separately and together, he said, and had fixed the value as given in the foregoing.

The franchises outside the city limits, Judge Tayler said, ought to be offset by the burdens brought upon the company by contracts which were not profitable. He did not attempt to say which contracts were profitable or which were not, nor did he name a value for any of the outlying franchises. He said the system should be treated as serving one community, because all the suburbs would some time be a portion of the city, and under such circumstances a zone system would be intolerable. The settlement now should be broad enough to cover such conditions, because the future could not be foretold.

In discussing the rate of fare, Judge Tayler said that some arrangement should be made to use the tracks of the Cleveland, Southwestern & Columbus Railway to the city limits on Lorain Avenue, or, if this could not be done, the company should build parallel tracks in order to serve the people at one fare.

Concerning his statement that the community was under a certain moral obligation to the holders of guaranteed stock, Judge Tayler said that some of the features of this arrangement did not meet with his approval, and the whole idea was unbusiness-like. But the stockholders put their money into the enterprise, and when the Forest City Railway secured a franchise on Woodlawn Avenue and the West Side it gave a real service, from which the public secured certain benefits. These rights were valuable and the lines had earned money at 3-cent fare, he continued, according to the reports of the receivers. The success of the lines was due to the co-operation of the Cleveland Railway in furnishing power and track connections, tracks in free territory, and all that, but at the same time the rights were valuable. Under the circumstances he thought that the guarantee should be made good to the extent of paying a sum equal to the five dividends which the stockholders had not received.

In discussing the so-called gentlemen's agreement, entered into at the time the Goff-Johnson appraisal was made, Judge Tayler said that the stockholders of the Forest City Railway had become so closely associated with those of the Cleveland Electric Railway when the properties were merged that their interests could not be separated. The agreement could not be carried out, no matter what the will or intention of those interested might be. The interests could not be restored to their original status under any circumstances.

Under agreement the value of the Forest City property will remain as fixed by the Goff-Johnson appraisal, $1,805,500.

NEW ORDINANCE PASSED

At a special session of the city council on Dec. 18 an ordinance embodying the views of Judge Tayler was passed. In addition to containing the matter presented by him in his decision, the ordinance provides for a street railway commissioner who shall represent the city and to whom the books and records of the company shall be open at all times. He is to make reports to the city council, with such recommendations as he sees fit. The salary of $12,000 a year must be paid by the company. The ordinance was signed by Vice-Mayor Lapp and was accepted by the Cleveland Railway Company on Dec. 20. It must also be accepted by the Forest City Railway Company, Low Fare Railway Company and Neutral Traction Company.

Under the ordinance the company must have in use 450 pay-as-you-enter cars within five months after the grant takes effect, and within 18 months all cars, with the exception of 100 trailers, must be of this type. As the ordinance will probably not go into effect until after referendum vote has been taken, the date for securing these cars is uncertain. Petitions for a referendum were put into circulation as soon as the ordinance was passed, but Mayor Johnson favors delaying the vote until April 15.

It is the intention of the company to spend $2,500,000 in

the rehabilitation of the system as soon after the ordinance goes into effect as the money can be secured. The funds may be obtained either by selling stock at par or issuing bonds; the latter method is preferable so far as length of time to sell is concerned. In addition to rebuilding the tracks, more power will be required as the plants are operated to their full capacity now. At first additional units will be installed in the present power houses, but later a new power station will be constructed. When sufficient power is provided a few extensions will be made and one or two more cross-town lines built, but it is believed that these improvements will not be carried out for some time.

Mayor Johnson has made no public comment upon the decision of Judge Tayler, and some people believe he will oppose the approval of the new franchise by the people.

THE ACCIDENT AT THE WINNIPEG WATER PLANT

A short account of the recent accident at the Lac Du Bonnet water-power plant of the Winnipeg Electric Railway was published on page 1163 of the ELECTRIC RAILWAY JOURNAL for Dec. 4. The accident was interesting as showing (1) the rapidity with which normal conditions were restored in the face of the damage done, and (2) as illustrating the extreme dependence of modern cities upon electric current, not only for mechanical and manufacturing energy, but for the comforts of civilized life.

The Lac Du Bonnet plant is situated on the Winnipeg River, about 64 miles from Winnipeg. On the evening of Nov. 23, the bursting of No. 7 penstock just as the load was reaching its peak for lighting and extra car service during the rush hours, resulted in a tieup of the system and considerable damage to the apparatus. The water made a huge breach through the wall of the building between wheel units 7 and 8, and its rush was so great that it was impossible for the employees to reach the governor hand wheels to close down the turbines by way of the floor. They were then lowered by ropes from the windows from the wheelhouse roof and, in about 4 or 5 ft. of water, managed to stop all wheels except units 8 and 9, which could not be reached, owing to the great volume of water. These two machines ran under water for a couple of days. An attempt was then made to lower the headgates, but the flow of water made such a pressure against the gates that they refused to budge.

Meanwhile at Winnipeg the power went off the circuit, and for some time Manager Wilford Phillips was as much in the dark as any one else as to the cause of the trouble. The company has a private telephone to Lac Du Bonnet, but as the entire staff there was at work trying to stop the flow of water, there was no one left to answer the telephone. As soon as it was realized that the interruption of the service was more than trifling the manager issued instructions to have the old steam plant, used to generate power before the Lac Du Bonnet was built, put into commission at once. Three years previously this plant had worked up to an overload of 8000 hp, but although the precaution had been taken of keeping up steam sufficient to turn the wheels over once a day, things there were naturally not in condition to get back to former efficiency, and in any case the power at full capacity was far below the present requirements of Winnipeg. The best that could be done that night was to furnish a partial lighting service, and in the early hours of the morning to take in the cars.

Two hours after the news of the serious nature of the accident reached him, Manager Phillips, C. R. Ross and Donald Ross, the chief electrician and civil engineer of the company, were on their way to the scene of the disaster in a special train. The condition of affairs was found on arrival to be most serious, the attempts to shut off the water having entirely failed. The only means which could be devised for stopping it was driving piles in front of the headgates and sheeting these in front with brush and canvas and bags of sand, by which means the water was eventually checked sufficiently to enable the headgates to be lowered.

On Friday evening an examination was made of the machinery, and work was at once started to get some of the generators again in operation. On the evening of Nov. 29, less than six days after the accident, one generator was sufficiently dried out so that, with temporary winding which was arranged, about 1500 kw was supplied to Winnipeg to assist the overburdened steam plant.

The system followed in the city was to furnish as full a car service as possible from 6 to 8:30 a. m. and light service on as many circuits as possible. From 8:30 to 4:30 the available current was placed at the disposition of users of commercial power. From 4:30 p. m. to 7:30 p. m. cars and light; from 7 p. m. to midnight a full lighting service, and from midnight to 5 a. m. commercial power. This system was adopted at the request of the Board of Trade and City Council, and it was represented that this would allow the factories to run on practically full time. The public generally took the accident most good humoredly, and appeared to realize that the company was doing its best under the circumstances.

At Lac Du Bonnet Manager Phillips stayed with the work of repairs. In inspecting and testing the generators it was found that the most serious damage was near the point where the break occurred. One generator had to be partially rewound on one side, where it took the full force of the water and tore up the insulation. It was not until a fortnight after the trouble occurred that Manager Phillips thought it wise to return to Winnipeg.

Great credit is due to every one concerned for the remarkable recovery which they effected under very adverse conditions in an isolated district, where everything had to be brought in by special train. Particular credit is due to J. H. Smeaton, the superintendent of the plant, and C. R. Ross, chief electrician, for the rapidity with which they got the plant into operation, considering that the cables on the floor were soaked with water and lying under water for three or four days. One generator was started delivering power to Winnipeg on the sixth day after the accident, two inside of a week, and after that the progress was at the rate of one a day. Both from experts and business men Wilford Phillips, the manager, also received deservedly high praise for the energy and perseverance he showed in the emergency. The officials also had the valuable assistance of G. W. Watts, of the Canadian General Electric Company, to make tests and advise as to the generators before they were put into operation again.

The Lac Du Bonnet plant has a somewhat unique record, as with this single exception its previous record was that there had been only a total shutdown of 25 minutes' duration in the three years since it commenced operations. As to the cause of the accident, an examination of the gate rigging of No. 7 turbine showed that five teeth had been stripped from the hand-wheel pinion on the governor, and, in the opinion of experts, when these teeth stripped the turbine gates were allowed to close very suddenly, and this caused the bursting of the penstock.

News of Electric Railways

Results of Detroit Investigation

The Committee of Fifty of Detroit has received reports of sub-committees which have been investigating various features of the railway situation.

The sub-committee on the cost of service, through W. D. Gridley, public accountant, presented figures purporting to show that the cost of carrying a passenger in 1908 was 2.62 cents. Prof. Henry C. Adams stated the present value of the unexpired franchises of the Detroit United Railway as $2,810,615. The present value, assuming an annual net increase of 6 per cent in future net revenue, however, was stated by Professor Adams as $4,246,207.56. The value of the physical property was reported recently by the committee at $11,284,596.09. Reports of the sub-commitees on schedules, taxation and municipal ownership were also presented. A minority report of the last-named sub-committee was presented by W. D. Mahon, favoring municipal ownership.

J. C. Hutchins, president of the Detroit United Railway, gave a letter to the Detroit *Free Press* and the Detroit *News*, in which he said in relation to the reports as published:

"Possibly the people of Detroit may find some food for reflection in the following observations.

"According to published reports, Mr. Barcroft and Professor Adams have submitted to the committee of appraisals their reports—the first claiming that the present physical value of this company's property in Detroit, excluding paving, subways, certain lands, etc., is $11,284,536.88, the latter that its franchise value amount to $2,810,615.24—the two reports combined making a total of $14,095,152.12. Ten years ago such properties as then existed in Detroit were appraised by Governor Pingree's appraisers, including Professor Cooley, Professor Bemis, Mr. Hawke and others, as having a physical value of $7,806,737.42 and a franchise value of $8,478,563.86, or a total value of $16,285,301.28.

"There has been expended for cars, power, track extensions, subways, etc., on capital account, as distinguished from operating expenses, upon these properties since the Pingree appraisal was made, as shown by our records, $6,298,615.49. It is difficult to draw a perfectly straight line between operating expenditures and capital expenditures, but such expenditures have got to be accounted in one or the other.

"Adding $6,298,615.49 to the Pingree appraisal, the sum of $22,583,916.77 results. Take from that sum the amount of the Barcroft-Adams appraisal ($14,095,152.12), and there appears to have melted away into thin air in 10 years the quite considerable sum of $8,488,764.65, not considering the difference between the low values of materials 10 years ago and their 30 per cent higher values of to-day.

"Mr. Gridley's report as an expert accountant to the cost of service committee and as informally published, shows that the cost of carrying a passenger in Detroit last year, without considering depreciation, was 2.62, as deduced from the company's records. Mr. Gridley's figures, not having been checked by other accountants, are erroneous in the particular—first, that he made the mistake of including 854,238 Grosse Pointe passengers paying extra fare outside of the city as city passengers, and the further mistake of deducting as operating expenses the entire gross earnings of the company from freight, express, advertising and mail. This cost for last year, as shown by F. H. Macpherson & Company, public accountants, who have made a very complete study of our records, was 2.70, and not 2.62, as shown by Mr. Gridley.

"The company has carried in Detroit since the Pingree appraisal was made to the end of the year 1908, 773,933,009 passengers. Divide the difference of appraisals referred to above, $8,488,764.65, by the total number of passengers carried, and the added cost is 1.097 per passenger. This cost, added to the cost shown by the Gridley report, makes 3.717, or to the Macpherson report of 2.70, makes 3.797 as the cost of carrying passengers. Should you add to this cost 6 per cent interest upon the $14.095,152.12, as reported by Messrs. Barcroft and Adams, it will be seen it is shown to cost 4.584, or nearly 5 cents, to carry a passenger in Detroit.

"But study the subject with all franchise values left out. Between the Pingree appraisal of $7,806,737.42, plus the $6,298,615.49 expended for betterments, as above stated, and the Barcroft appraisal of $11,284,536.88, there is a difference of $2,820,816.03, not to speak of the difference between the present and the former value of all materials and appurtenances. This difference, $2,820,816.03, must be called 'depreciation.' Applied to each of the 773,933,009 passengers carried, it would represent a cost on depreciation account of .365 per passenger, which added to the Gridley report of cost, would show 2.985 per passenger, or to the Macpherson report of cost 3.065 per passenger, before coming to the question of capital. Add .63 per passenger to the 2.985 in the one case and 3.065 in the other, to pay 6 per cent upon the $11,284,536.88 of the Barcroft appraisal, and you have 3.615 in the one case and 3.695 in the other as the first cost of carrying a passenger, including depreciation and including interest upon the basis of the Barcroft appraisal, but without allowing anything for the millions of dollars that have been expended for bringing the properties up from the beginning of the art to their present standard.

"The increased wages now in effect, and the added taxes now being borne, together with the present higher cost of materials, considered only in connection with the above figures, will make the cost of carrying a passenger something in excess of 4 cents for the year 1910.

"Criticisms have been expressed because the experts of the Committee of Fifty have gotten much of their data from the company's books. We have turned over to the committee or its experts every book, voucher and scrap of paper in our possession, and all of the information in our possession, without reservation of any kind whatever. We could do no more. But the art of electric transportation is not local. It is shown in the annual report upon the railways in Chicago, as produced under the auspices of the government of that city, where the fare is 5 cents, that the first cost of carrying a passenger in Chicago, before coming to the question of capital or profit, is 3.54 per passenger. The difference between that first cost and our first cost—3.54 in the one case and 2.70 in the other—is due in part to the fact that Chicago is a very much larger city than Detroit. This fact proves that the cost will not decrease as Detroit grows larger, and it further proves that if passengers are carried at a loss, the loss will be greater as the number increases.

"The foregoing is a statistical and a very dry statement, but I trust those who have read thus far will see that the studies of the Committee of Fifty are leading in the direction of enlightenment at least, because they deal with the logic of cold mathematics."

The committee on franchises of the City Council of Detroit has decided to recommend that the Council purchase the Barcroft appraisal reports of the Committee of Fifty for $17,500.

Transit Affairs in New York

The new subway system planned by E. J. Farrell and J. J. Hopper provides for an East Side line, starting at Whitehall and Water Streets and running under the latter street to Peck Slip. Thence the route is to New Bowery and under that thoroughfare to Division Street. It will continue under Division Street to Chrystie where the up and downtown local and express tracks will separate. The downtown tracks will be under Chrystie Street and the uptown under Forsythe Street. The Chrystie Street Branch will turn into East First Street at the intersection of Second Avenue and the Forsythe Street branch will turn easterly through East Houston Street and meet the Chrystie Street line at First Avenue and First Street. Then all four tracks continue north under First Avenue to 126th Street where they will pass under the Harlem River in two or four separate tunnels. The tracks for northbound trains will go under Willis Avenue to East 138th Street and thence east under 138th Street to 140th Street and Southern Boulevard, where they join again to the tracks for southbound trains. The line for southbound trains runs from the Harlem River under Alexander Avenue to East 139th Street, and under that street to 140th Street and Southern Boulevard, where they meet the northbound tracks. Continuing, the route is through Southern Boulevard to Westchester Avenue and thence to Cottage Grove Avenue. Through the latter the route is to White Plains Road, thence to Gun Hill Road and through the latter to Jerome Avenue, where the subway takes a southerly direction to the Battery.

The West Side subway is to run under Jerome Avenue and under the Harlem River near the Central Bridge, then under Bradhurst Avenue to Edgecomb Avenue and under the latter to St. Nicholas Avenue, thence to Eighth Avenue, thence to Central Park West and under that thoroughfare to Eighth Avenue again. Under Eighth Avenue, the subway continues to Hudson Street and on under Hudson Street to

West Broadway. Under the latter street the route is to Greenwich Street, under that to Washington Street and on to Battery Park, where it joins the East Side line.

There are five crosstown lines of two tracks each, under Liberty, Fifty-ninth, Eighty-sixth, 125th Streets and Tremont Avenue and Morris Park Avenue, each of which forms a loop connection with the East and West Side subways except that under Eighty-sixth Street, which is a shuttle line. The Fifty-ninth Street line joins only the Eighth Avenue subway line as it has to go under the First Avenue Line to get under the East River, but will be connected with the First Avenue line by elevators and stairways. This line continues under the East River in two tubes following the line of the Blackwell's Island Bridge and passing under Long Island City and through Jackson Avenue to Flushing with stations at Long Island City, Woodside, Winfield, Elmhurst, Corona, Flushing and Broadway, Flushing.

The building of the Brooklyn Extension from Battery Park under the East River, then along Atlantic Avenue where it joins the Fourth Avenue subway would give the Fourth Avenue subway an independent subway entrance into Manhattan Island. An extension from Battery Place to Staten Island via the Fourth Avenue subway, Brooklyn, and Fort Hamilton is provided for and can be built as soon as practicable.

The Board of Estimate and Apportionment has approved the plan of the Coney Island & Brooklyn Railroad to park Coney Island Avenue from the Park Circle, Brooklyn, to Coney Island, a distance of about 5 miles. The tracks of the company are now at the side of the street. The cost of the work is estimated at $300,000.

On Dec. 17, 1909, the Court of Appeals handed down a decision in the case of the subway built by the City of New York under Joralemon Street, Brooklyn, embracing appeals by the City of New York and the Board of Rapid Transit Commissioners from an order of the Appellate Division, which reversed an order of the Special Term as to certain awards of damages. There are also questions as to the allowance to the abutting owners of disbursements, costs, counsel fees and extra allowances. It is held that the commissioners should have received and considered evidence of all physical injuries inflicted upon the property by the proper construction of the work so far as that could be ascertained at the date of the trial, and that the Rapid Transit Act does not authorize the allowance to the abutters "of their disbursements, costs, counsel fees and extra allowances."

A committee of taxpayers has presented informally to the Public Service Commission a plan for a subway from Long Island Sound, at a point slightly above Fort Schuyler, extending across the borough along the route of Tremont Avenue to the Harlem River and thence to the Hudson River.

Chicago Traction Affairs

The ordinance under which the Chicago City Railway and the Chicago Railways are rehabilitating and operating their properties designated that the cars should be rerouted so that at the completion of the rehabilitation period 22 through routes would be in operation between opposite sides of the city. Elevated railway columns, low railroad subways, inadequate capacity over viaducts and the work of reconstructing the several tunnels under the Chicago River have made it impossible to establish more than one through route so far, and the Board of Supervising Engineers of Chicago Traction has been asked by the committee on local transportation of the Chicago City Council to state what action is necessary to bring about the final routing as laid down in the ordinance, including any suggestions of departure from the plans as laid down by the ordinances that would hasten the operation of the through routes. The Chicago Railways has announced that with the sanction of the Board of Supervising Engineers it can operate two through routes between the West and North sides of the city via the business district, substituting them for routes specified in the ordinances.

The cost of rehabilitating the property of the Chicago Railways up to Dec. 1, 1909, was $22,000,000. This expenditure was entailed largely for the following work: Miles of track constructed, 177.23; new pay-as-you-enter cars in operation, 650; other double-truck cars which are being remodeled into pay-as-you-enter cars, 328; new pay-as-you-enter cars under construction, 350; miles of conduit laid, 620; miles of cable installed in ducts, 248; miles of poles set back of street curb, 210.

Senator Samuel A. Ettelson, of Chicago, has introduced in the State Legislature a bill which provides for an amendment of the Cities and Villages Act granting power to incorporated municipalities to "acquire, own, construct, maintain and operate subways, wharves, docks, levees, fix rates and charges for the service rendered by means of such utilities, and to lease the said utilities to any person or corporations authorized under the laws of Illinois to operate the same for any period not longer than 20 years, upon such terms and conditions as the City Council or the president and board of trustees shall deem for the best interests of the public." The bill has been referred to the legislative committee on municipalities for consideration and report.

The discussion regarding obstructions which were said to prevent the operation of through routes on the surface lines has resulted in the announcement that the engineers of the elevated railways in Chicago will report on the feasibility of separating the grades at the northwest corner of the Union Elevated Loop, where the downtown trains of the South Side Elevated Railroad and the Metropolitan Elevated Railway round a sharp curve from Lake Street to Fifth Avenue, and the northbound trains of the Northwestern Elevated Railroad intersect the eastbound trains of the Chicago & Oak Park Elevated Railroad. It is necessary to interlock this intersection because the westbound trains of the Chicago & Oak Park Elevated Railroad branch off from the northbound route of the Northwestern Elevated Railroad and the southbound trains of the latter come onto the Loop on the eastbound track jointly used with the Chicago & Oak Park Elevated Railroad. The separation of grades at this complicated intersection will reduce the time required for the trains of the Northwestern Elevated Railroad and the Chicago & Oak Park Elevated Railroad to encircle the Loop.

The Chicago, Joliet & East St. Louis Electric Railway has been incorporated in Illinois by H. A. Fisher, F. E. Fisher and L. D. Fisher, of the Joliet & Southern Traction Company; S. A. Spray, Chicago, and T. B. Steward, John A. Raymond and John K. Newhall, Aurora, Ill., with offices in the Woman's Temple Building, Chicago, Ill., to build and acquire electric railways over which cars may be operated from Chicago through Joliet to East St. Louis. H. A. Fisher has announced that the company will take over the operating lines of the Joliet & Southern Traction Company, Joliet, Plainfield & Aurora Railroad, Bloomington, Pontiac & Joliet Electric Railway and the Chicago, Joliet & Central Illinois Railway. An article descriptive of these roads and a map of the line of the Joliet & Southern Traction Company were published in the ELECTRIC RAILWAY JOURNAL of March 6, 1909, page 402. With tracks connecting Chicago Heights, near the Illinois-Indiana State line south of Chicago, Joliet and Aurora, it is planned to add a line south from Joliet to Dwight and there connect with the Bloomington, Pontiac & Joliet Electric Railway in operation between Dwight and Pontiac and extend the latter south from Pontiac to Bloomington, where connection will be made with the Illinois Traction System, extending west to Peoria, east to Decatur and Danville and from Decatur to Springfield and St. Louis. Mr. Fisher is quoted as saying that the line from Joliet into Chicago will soon be constructed and that arrangements have been made to use the tracks of the Metropolitan West Side Elevated Railway for entrance to the business district of Chicago. It is also planned to construct an interurban railway from Chicago Heights to Hammond, Ind., thus making possible through electric service from Aurora and Joliet to South Bend and other cities in Northern Indiana without passing through Chicago.

Progress of New York Central Suburban Electrification

The electric service of the Harlem Railroad Division of the New York Central & Hudson River Railroad, which now extends from the Grand Central Station to Mount Vernon, will probably be opened to White Plains by March, 1910. Plans have been approved for new stations at Mount Vernon and White Plains, but they will not be erected until the track changes under way south of Mount Vernon are completed. Later the electric zone will be extended on the Hudson River line north of Yonkers. In anticipation of these extensions the shops at North White Plains and at Harmon and a new suburban station above Ossining have been completed. Two new substations for transforming the 11,000-volt current generated at Port Morris are being built at Tuckahoe and White Plains, and six circuit-breaker houses are practically completed at points where the low-tension line is tapped to feed the third rail.

On the Hudson division the work of eliminating grade crossings at Yonkers is under way and the retaining walls on the west side of the tracks are nearly completed. The work of raising the tracks to the new grade and constructing a new passenger station at Yonkers will be carried out during 1910. At Hastings the work of extending the four tracks and eliminating the grade crossing is well advanced,

and the construction of a new passenger station and freight house will soon be begun.

In the enlarged train yard at the Grand Central Station, New York, the excavation is more than half completed. Twenty-two terminal tracks have been finished on the main level at the Grand Central Station out of a total of 42, and 10 tracks on the suburban level out of a total of 24. The four tracks that remain on the old station level will probably be removed by the spring of 1910.

The Public Service Commission has ordered a hearing to be held on Dec. 24, 1909, on the application of the New York Central & Hudson River Railroad for an extension of the time from Dec. 31, 1909, to June 30, 1911, for depressing its tracks and building the new terminal at the Grand Central Station. The Board of Estimate and Apportionment of New York has already approved the increase in time for completing the work.

Question of Franchise Renewals in Toledo.—It is said that the subject of the renewal of the franchises of the Toledo Railways & Light Company, Toledo, Ohio, will be taken up at the annual meeting of the directors on Jan. 20, 1910.

Blanket Franchise Desired in Richmond.—The Virginia Railway & Power Company has applied to the City Council of Richmond, Va., to change some of its routes and consolidate the franchises of the Richmond Passenger & Power Company and the Richmond Traction Company, under which it operates, and a committee was appointed by the City Council on Dec. 16, 1909, to open negotiations with the company. If a new franchise is granted additional improvements and changes will be made, but their exact nature cannot be defined until the new franchise is acted upon by the Council.

Progress of Pennsylvania Commission.—The State Railroad Commission of Pennsylvania has adjourned until after Christmas when the appointment of a new secretary will be announced and railway and telephone matters will be taken up. The commission has dismissed the complaint in which negligence of the rolling stock of the Schuylkill Valley Traction Company was alleged. The DuBois Traction Company has been instructed not to permit passengers to ride on the front platform of its cars. The complaint of C. H. Lefever, Lancaster, Pa., against the Conestoga Traction company for alleged excessive rates for hauling household goods has been dismissed. The commission is having prepared lists of railroads and street railways in Pennsylvania.

Meeting of the New England Street Railway Club.—The regular monthly meeting of the New England Street Railway Club will be held at the American House, Boston, Mass., on Dec. 30, 1909. Dinner will be served at 6:45 p. m., and at 8 o'clock the regular business meeting will be held. At the conclusion of the business meeting James H. McGraw, president of the McGraw Publishing Company and publisher of the Electric Railway Journal, will address the club on the subject of "Educating the Public in Relation to Electric Railways." Those who propose to attend the dinner are requested to notify John J. Lane, secretary of the club, 12 Pearl Street, Boston, Mass., as early as they can conveniently do so.

Line Between Rochester and Syracuse Opened.—The Rochester, Syracuse & Eastern Electric Railroad, which was opened between Rochester and Port Byron in July, 1908, a distance of 58 miles, was placed in operation between Port Byron and Syracuse, a distance of 23 miles, on Dec. 16, 1909. Twenty regular trains a day each way and 10 limited trains are in operation between Rochester and Syracuse. The running time of the regular trains between the terminals follows: Syracuse to Warner, 25 min.; to Jordan, 35 min.; to Weedsport, 43 min.; to Port Byron, 48 min.; to Savannah, 1 hr.; to Clyde, 1 hr. 9 min.; to Lyons, 1 hr. 23 min.; to Newark, 1 hr. 38 min.; to Palmyra, 1 hr. 55 min.; to Rochester Four Corners, 2 hrs. 50 min.

Electrification of National Transcontinental Railway Discussed.—The electrification of the National Transcontinental Railway in Quebec and New Brunswick, to eliminate forest fires, was discussed at a conference on Dec. 16, 1909, between Sydney Fisher, Minister of Agriculture for the Dominion; Mr. Grimmer, New Brunswick; Jule Allard and Messrs. Tache and Hall, Quebec, and W. S. Calvert, one of the Transcontinental Railway Commissioners. Mr. Grimmer favored electrifying the railway, stating that New Brunswick's greatest asset was in the forests, which produced an annual revenue of $400,000. Sydney Fisher said that the Dominion Government and the commissioners realized the importance of saving the forest wealth of the provinces, and promised that he and his colleagues would consider the question with the National Railway Commissioners.

Kansas City Franchise Extension Ordinance Defeated.—At the referendum in Kansas City, Mo., on Dec. 16, 1909, the proposal to extend the franchise of the Metropolitan Street Railway in accordance with the terms of the ordinance abstracted in the Electric Railway Journal of Dec. 11, 1909, page 1199, was defeated. The total number of votes cast was 30,673, of which 18,917 were against the ordinance. Bernard Corrigan, president of the company, made the following statement after the election: "The result of the franchise is a disappointment to the management of the company. For the purpose of securing money to pay maturing bonds, build extensions, buy new cars and improve the service it became necessary to have an extension of its franchise and the company frankly so stated to the people of Kansas City. The voters did not appreciate the necessities of the company. The company can never make a more favorable proposition than the one defeated. It will have to meet its obligations. What effect this will have on the service cannot be forecasted at this time. The problem of refinancing still confronts us."

Fender Ordinance Passed in San Francisco.—The Board of Supervisors of San Francisco has passed an ordinance prescribing the use of fenders in San Francisco, which says: "Said fender shall be placed upon and attached to the front end of each such car and not attached to the frame of the wheels or truck thereof, and shall be so placed and maintained that the space between the bottom of the front part of the fender and the roadbed or rails shall not exceed 3 in. Each such fender shall extend across the front end of such car and shall be of a width of not less than 68 in. The front edge of the fender shall extend ahead of and beyond the front of the car and the farthest projection thereof. Such fender shall be of such height that it shall extend upward from the rails or roadbed to at least the floor level of the car. Such fender shall form a scoop not less than 3 ft. from front to back, which, upon striking a person, will tilt back and thereby form a cradle or receptacle capable of receiving and securely retaining such person; and its upper portion shall form a shield extending across the entire front of the car to protect persons falling into or upon it from injuries from contact with the rigid projecting portions of the car, such as the bumpers, bumper-beams or drawbars, and such fender shall be constructed of material that will afford ample strength for the purpose for which it is intended, and of yielding or a resilient character so as to cushion or break the impact of a person falling into or struck by it."

Regulation Said to Have Discouraged Construction.—In replying to a committee of 25 business men from Northern New York who visited him in New York to urge the construction of new lines in the territory which they represent, E. R. Thomas, president of the Lehigh Valley Railroad, is quoted as stating that while the territory was attractive he doubted whether it would be advisable to build the new lines in view of the attitude of the Public Service Commission, which has made profits precarious and new railroad enterprises unattractive to capital. Mr. Thomas is reported to have said: "The extension that you ask will entail an outlay of at least $2,500,000. You know, of course, that any investor who puts his money into it must be first assured that the capital invested will earn a fair income. The burden of the cost of this new road cannot be put upon the shoulders of the parent company. Unfortunately, as I have said, capital is not tempted into railroad building these days. It is not that capital fears proper regulation, for it does not. Regulation has been supplanted by administration, and we now have the Federal and State Governments not only regulating but managing the railroads. These commissions, no doubt with the best intentions, are confusing and complicating the work of railroad management. The men who run American railroads have built up a system which transports a ton of freight a mile at a smaller cost than in any other country in the world. The result is proof enough of the ability of the men who have brought it about. There have been many mistakes and occasional deviations from the narrow path of uprightness, as there are in every business; if there had not been, the only suitable place for the railroad manager of this country would be in a land where man's only transportation is by means of wings. I shall be pleased to put your petition before our board, and will see that it is acquainted with the advantages which you claim would follow the extension." Thomas H. Osborne of the commission has declared that despite the recent disturbed financial condition of the country the commission had authorized $250,000,000 of stocks, bonds and other securities to be issued by public service corporations, of which more than $195,000,000 was for steam railroads. He said that applications had been approved for constructing 128 miles of steam railroad and 132 miles of street railway.

Financial and Corporate

New York Stock and Money Market

December 21, 1909.

The stock market during the past week has been irregular and comparatively dull. While the general tone of the market has been good the trading has been confined largely to the professionals, who are buying for quick sales at a profit. The traction stocks continue active and fairly strong.

The condition of the money market is unchanged at home, although there is some evidence of stringency abroad. Quotations to-day were: Call, 4 to 5½ per cent; 90 days, 4½ per cent.

Other Markets

Sales of Philadelphia Rapid Transit have been made at a slightly lower figure than a week ago, but there seems to be little pressure to sell. Storage Battery has been active and has advanced 2 points.

In the Chicago market there has been considerable trading in Series 1 and 2 of the Chicago Railways. Both of these issues have advanced handsomely during the week. There has been little trading in Subway stock and the price remains about 4½.

The chief traction feature of the Boston market has been the activity and strength of Massachusetts Electric. The common stock especially has been traded in. Some small blocks of Boston Elevated and Boston Suburban preferred have also been sold.

In addition to the regular trading in the bonds of the United Railways Company in Baltimore, there has been some transactions in the stock of the same company and also in the stock of the Virginia Railway & Power Company. The latter has been selling around 22½.

In the regular auction of securities in New York last week the following sales were made: 13 shares Sixth Avenue Railroad Company at 123, and $10,000 South Shore Traction Company 5 per cent bonds, at 96⅛.

Quotations of various traction securities as compared with last week follow:

	Dec. 14	Dec. 21
American Railways Company	a47¼	a47¼
Aurora, Elgin & Chicago Railroad (common)	a57	*57
Aurora, Elgin & Chicago Railroad (preferred)	a92	*92
Boston Elevated Railway	a131	a131½
Boston & Suburban Electric Companies	a16	a16
Boston & Suburban Electric Companies (preferred)	75	75
Boston & Worcester Electric Companies (common)	a12	a12
Boston & Worcester Electric Companies (preferred)	a49	a49
Brooklyn Rapid Transit Company	80	80¾
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	86¾	86¾
Capital Traction Company, Washington	a132½	a133
Chicago City Railway	a185	a190
Chicago & Oak Park Elevated Railroad (common)	*2	*2
Chicago & Oak Park Elevated Railroad (preferred)	*10	*10
Chicago Railways, ptcptg., ctf. 1	a105	a110
Chicago Railways, ptcptg., ctf. 2	a31	a34
Chicago Railways, ptcptg., ctf. 3	a15	a16
Chicago Railways, ptcptg., ctf. 4s	a10	*10
Cleveland Railways	*84	*84
Consolidated Traction of New Jersey	a76½	a76½
Consolidated Traction of New Jersey, 5 per cent bonds	a106	a106
Detroit United Railway	*63	*63
General Electric Company	160¼	160½
Georgia Railway & Electric Company (common)	101	a105
Georgia Railway & Electric Company (preferred)	87	*87
Interborough-Metropolitan Company (common)	24	24½
Interborough-Metropolitan Company (preferred)	64¾	61⅛
Interborough-Metropolitan Company (4½s)	83⅞	83¾
Kansas City Railway & Light Company (common)	a42	a34
Kansas City Railway & Light Company (preferred)	a79	*79
Manhattan Railway	*140½	139
Massachusetts Electric Companies (common)	a16	a16½
Massachusetts Electric Companies (preferred)	a78½	a76½
Metropolitan West Side, Chicago (common)	a18½	a19½
Metropolitan West Side, Chicago (preferred)	a56½	a58
Metropolitan Street Railway	*20	*20
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	85⅝	85
Northwestern Elevated Railroad (common)	a17½	a18
Northwestern Elevated Railroad (preferred)	a70	a68
Philadelphia Company, Pittsburg (common)	a50¾	a50¼
Philadelphia Company, Pittsburg (preferred)	a45	a45¼
Philadelphia Rapid Transit Company	a28¼	a27⅞
Philadelphia Traction Company	a89½	a90
Public Service Corporation, 5 per cent col. notes	*100⅛	*100⅛
Public Service Corporation, ctfs.	a100¼	a100¼
Seattle Electric Company (common)	a116½	a115¼
Seattle Electric Company (preferred)	104	104
South Side Elevated Railroad (Chicago)	a53	a55
Third Avenue Railroad, New York	13	16⅝
Toledo Railways & Light Company	*8	9⅜
Twin City Rapid Transit, Minneapolis (common)	111⅛	114
Union Traction Company, Philadelphia	a52¾	a52½
United Rys. & Electric Company, Baltimore	a14	a14½
United Rys. Inv. Co. (common)	42¾	*42¾
United Rys. Inv. Co. (preferred)	73¾	*73¾
Washington Ry. & Electric Company (common)	a44½	42
Washington Ry. & Electric Company (preferred)	a91¾	a91¼
West End Street Railway, Boston (common)	93	a94
West End Street Railway, Boston (preferred)	106	a106
Westinghouse Electric & Mfg. Company	83¼	81½
Westinghouse Elec. & Mfg. Company (1st pref.)	*135	*135

a Asked. * Last Sale.

Decision Defining Powers of Public Service Commission in Delaware & Hudson Case

Reference was made in the ELECTRIC RAILWAY JOURNAL of Dec. 11, 1909, page 1201, to the decision handed down on Dec. 7, 1909, by the Court of Appeals of New York in which it was held that the Legislature did not intend that the Public Service Commission should substitute its judgment and discretion for that of the directors and stockholders of a company as to the wisdom of a transaction and expressing the opinion that in the cases under review the commission should have approved the transactions. An abstract of that part of the decision which relates to the purchase of the securities of the Hudson Valley Railway by the Delaware & Hudson Company follows:

"We do not think the public service legislation was designed to make the commissioners the financial managers of the corporation or that it empowered them to substitute their judgment for that of the board of directors or stockholders of the corporation as to the wisdom of a transaction, but that it was designed to make the commissioners the guardians of the public by enabling them to prevent the issue of stock and bonds for other than the statutory purposes.

"In regard to the notes issued for the purpose of acquiring the stock and securities of the Hudson Valley Railway the learned commission reaches the conclusion that notwithstanding the fact that the transaction was lawful and that the notes were the valid obligations of the corporation, the purchase of the securities of the Hudson Valley Railway was an unfortunate one for the company; that it paid for the securities more than they were worth, and that the property so acquired has not been included in the mortgage. It consequently withheld its consent to the issuing of the bonds, but suggested that a mortgage might be executed by the United Traction Company (owned by the Delaware & Hudson Company), the present owner of the Hudson Valley Railway, upon the property acquired from that company for the retirement of such obligations.

"This, we think, would be substituting the judgment and discretion of the commissioners for that of the directors and stockholders of the corporation. If such was the purpose and intent of the statute a doubt might arise with reference to its constitutionality, for ordinarily the ownership of property carries with it the right of occupancy and management, and should a statute deprive the owner of the right to manage it would, under ordinary circumstances, undermine his right to protect and make his property remunerative. (Lord vs. Equitable Life Ass. Soc., 194 N. Y., 212.)

"Assuming that the purchase was unfortunate and that the company has lost heavily thereby, still the commissioners concede that it was made at a time when no consent of the Railroad Commissioners or of the Public Service Commission was required, and that, therefore, the purchase was legal and one which the company had the right to make.

"The notes which the company had issued bear interest at a high rate. They were given for the acquisition of property, which is one of the four purposes designated by the statute for which bonds may be authorized to issue. Having been given for the acquiring of the property of another railroad they are properly classified as capital and therefore brought within the express provisions of the statute under which the application was made. While, as we have stated, the ownership of property ordinarily carries with it the right of management, the duty devolves upon the owner to so manage as not to have it become a nuisance or unnecessarily infringe upon the rights of others.

"It was therefore evidently the legislative intent in the enactment of this provision that the Commissioners should have supervision over the issuing of long-term bonds to the extent of determining whether they were issued under and in conformity with the provisions of the statute for the purposes mentioned therein; whether they were issued for the discharge of the actual and not the fictitious debts of the company or whether they were issued for the refunding of its actual obligations and not for the inflation of its stock or bonds. Beyond this it appears to us that the power of the Commissioners does not extend, unless it may pertain to the power to determine whether an obligation should be classified as operating expenses and as to whether such expenses should be paid by obligations running beyond a year. We therefore conclude that as to the Hudson Valley Railway securities, so called, the application should have been granted."

The decision is concluded with the opinion of the court regarding the purchase by the Delaware & Hudson Company of coal lands, which purchase the court also upholds, stating that the question in this instance was the same as that presented with reference to the Hudson Valley Railway.

Suggested Segregation of Fourth Avenue Line in New York City

The directors of the New York & Harlem Railroad have applied to the United States Court for a cancellation of the lease of its property known as the Fourth and Madison Avenue line to the Metropolitan Street Railway. The managers of the Metropolitan Street Railway say that the net earnings of the line have not been more than $200,000, while the annual rentals paid to the New York & Harlem Railroad have been $400,000. Since the improvement of the property and the introduction of "pay-as-you-enter" cars, however, the receipts have steadily increased. The Fourth and Madison Avenue line is a most important part of its general scheme of transportation, and Judge Lacombe throughout the various proceedings resultant from the passing of the Metropolitan Street Railway into the hands of a receiver has constantly dwelt on the necessity, so far as it might be possible, of keeping the system intact.

The New York & Harlem Railroad owns no surface cars or power stations, and the Metropolitan Street Railway has spent large amounts of money in laying new tracks. The terms of the 999-year lease of the Fourth and Madison Avenue line to the Metropolitan Street Railway call for the turning back of the property or its equivalent at the expiration of the lease or when it is given up. A director of the New York & Harlem Railroad has expressed himself as confident that if the company should take back the property it would be able to arrange for cars and would have no trouble about adjusting the differences over the cost of laying the new tracks. If the Fourth and Madison Avenue line should be operated separately it would probably mean the abolishment of the transfers now issued between this line and other lines of the Metropolitan Street Railway at Eighth Street, Fourteenth Street, Twenty-third Street, Thirty-fourth Street, Astor Place and Broadway.

Merger of Public Service Corporations in Quebec

An official announcement of the consolidation of the Quebec Railway, Light & Power Company, Quebec Gas Company, Frontenac Gas Company, Quebec Jacques Cartier Electric Company and the Canadian Electric Light Company as the Quebec Railway, Light, Heat & Power Company, Ltd., Quebec, Que., chartered on Nov. 19, 1909, was made in Montreal on Dec. 14, 1909. The company has an authorized capital of $10,000,000 of stock and $10,000,000 of bonds. Of the stock it is intended to issue $9,500,000 and of the bonds $8,654,600. The bonds to be issued will include the amount necessary to retire $2,500,000 of 5 per cent bonds of the Quebec Railway, Light & Power Company due in 1923; $849,000 of 5 per cent bonds of the Quebec Jacques Cartier Electric Company due Dec. 1, 1931, and $310,000 of bonds of the Canadian Electric Light Company. The securities issued will pay for all the properties taken over and provide ample working capital. The bonds are dated Dec. 1, 1909. The Montreal Trust Company will serve as trustee for the bondholders. The following directors have been announced conditionally: W. G. Ross, president; Wm. Price, vice-president; R. Forget, J. N. Greenshields, A. H. Sims, Hon. Dubord, Neuville, Belleau, Lorne C. Webster, L. P. Pelletier, E. H. Ewing and J. W. McConnell.

American Railways, Philadelphia, Pa.—Arrangements have been made by the American Railways to sell a new issue of $1,425,000 of 20-year 5 per cent collateral trust bonds to a syndicate composed of Bioren & Company and Newburger, Henderson & Loeb, the bonds to be a direct obligation of the company secured by the deposit of stock of the Johnstown (Pa.) Passenger Railway, the proceeds of the sale of the bonds to provide funds for paying in cash for such stock of the Johnstown Passenger Railway as is not exchanged for stock of the American Railways in accordance with a plan announced elsewhere in this column.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—The Cedar Rapids & Iowa City Railway & Light Company has recently retired an issue of $300,000 of 5 per cent non-accumulative preferred stock on which dividends of 5 per cent yearly were paid in 1908 and 1909, and authorized in its stead $600,000 of 6 per cent accumulative preferred stock, of which $375,000 is outstanding. A semi-annual dividend of 3 per cent on this new preferred stock will be distributed on Dec. 31, 1909. No dividends have been paid on $1,700,000 of common stock.

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.—The stockholders of the Chambersburg, Greencastle & Waynesboro Street Railway will be called upon to vote on Jan. 10, 1910, to increase the bonded indebtedness of the company from $600,000 to $1,000,000, for the purpose of building extensions to Shippensburg and Blue Ridge Summit.

Chicago (Ill.) City Railway.—The voting trust which controls more than 95 per cent of the stock of the Chicago City Railway will expire by limitation on Dec. 31, 1909. The trustees are John J. Mitchell, P. A. Valentine and Chauncey Keep, and the trust was created when J. P. Morgan in 1905 organized a syndicate which took over the stock of the company at $200 a share. It is said that the trust may be continued in view of the possible merger of all the surface railways, a deal which will be simplified considerably by the reorganization of the Chicago Consolidated Traction Company, plans for which were referred to in the Electric Railway Journal of Dec. 18, 1909, page 1246.

Columbus, Marion & Bucyrus Railroad, Columbus, Ohio.—The receivers of the Columbus, Marion & Bucyrus Railroad have applied to the court for permission to issue certificates for $65,000, proceeds of which are to be used in ballasting the line, to buy new equipment and complete the road according to contract. The application was heard on Dec. 16, 1909.

Denver (Col.) City Tramway.—The $1,219,000 of first mortgage 6 per cent gold bonds of the Denver Tramway, dated Jan. 1, 1890, and due Jan. 1, 1910, will be paid principal and interest at maturity at the Mercantile Trust Company, New York, N. Y. Clark, Dodge & Company, New York, N. Y., and the International Trust Company, Denver, Col., have purchased $1,219,000 of first and refunding sinking fund mortgage bonds of the Denver City Tramway dated Nov. 1, 1908, and issued for the purpose of refunding the 6 per cent bonds previously mentioned. Clark, Dodge & Company offer to exchange the new issue for the maturing bonds on the basis of $1,000 first and refunding 5 per cent bonds and $61.67 in cash for each $1,000 6 per cent maturing bond deposited.

Farmington Street Railway, Hartford, Conn.—The stockholders of the Farmington Street Railway voted to sell the property of the company to the New York, New Haven & Hartford Railroad at a special meeting on Dec. 20, 1909.

International Traction Company, Buffalo, N. Y.—Nine second mortgage bonds of the Buffalo & Niagara Falls Electric Railway, dated July 1, 1896, have been drawn by lot for redemption on Jan. 1, 1910, by the Mercantile Trust Company, New York, N. Y., at 105 and interest.

Interstate Railways, Philadelphia, Pa.—The reorganization committee of the Interstate Railways of which Edward B. Smith & Company, Philadelphia, Pa., were the managers, has ordered the release of the bonds deposited with it, amounting to $7,195,600 upon payment of an assessment of $6 per $1,000 bond. Most of the bonds will be redeposited with the Earle committee.

Johnstown (Pa.) Passenger Railway.—The American Railways, Philadelphia, Pa., has exercised the option given recently by T. C. duPont, Wilmington, Del., president of the Johnstown Passenger Railway, on 25,000 shares of stock of the company, owned by himself and members of the duPont family, of which mention was made in the Electric Railway Journal of Dec. 18, 1909, page 1246. It is stated that the holders of the remaining stock will be permitted to participate in the sale, receiving either cash or stock of the American Railways on a basis of share for share.

Kingston (N. Y.) Consolidated Railroad.—The Public Service Commission, of the Second District of New York, has authorized the Kingston Consolidated Railroad to issue a second mortgage on its property and franchises to secure an issue of $250,000 of 5 per cent, 30-year bonds and to issue $56,000 in bonds to net the company not less than 80 per cent of the par value. The company has also been authorized to issue its corporate notes in the sum of $17,360, the proceeds to be realized from the sale of bonds and notes to be used for reconstruction.

Metropolitan Street Railway, New York, N. Y.—Under a special order of the United States Circuit Court, Otto H. Kahn, as a member of the firm of Kuhn, Loeb & Company, was examined on Dec. 17, 1909, in the hearing on the suit of the Farmers' Loan & Trust Company to foreclose on the property of the Central Park, North & East River Railroad on a mortgage made in 1872 to secure the issue of $1,200,000 bonds. On June 14, 1897, the Metropolitan Street Railway made a general mortgage to the Guarantee Trust Company as trustee, and on March 21, 1902, made a refunding mortgage to the Morton Trust Company as trustee. The lease of the Central Park, North & East River Railroad, which had come into the hands of the Metropolitan Street Railway, was pledged by it as part of the security under these two mortgages. The refunding mortgage provided for the acquisition by the Morton Trust Company, as trustee there-

under, of the $1,200,000 bonds of the Central Park, North & East River Railroad, which became due in 1902, as well as a number of other collateral bonds which, under the provision of the refunding mortgages, were, when deposited with the Morton Trust Company, to remain alive as part of the security for the refunding bonds. Shortly before the maturity of the bonds of the Central Park, North & East River Railroad in 1902 the Morton Trust Company, through the issue of the requisite proportion of the refunding bonds, was placed in funds with which to acquire the bonds of the Central Park, North & East River Railroad in conformity with the procedure prescribed in the refunding mortgage. Mr. Dykman, as counsel for the Central Park, North & East River Railroad, holds that the Morton Trust Company, having bought up the bonds for the Metropolitan Street Railway, really cancelled them legally, if not actually, on the theory that a person cannot hold a debt against himself. The Farmers' Loan & Trust Company contends that the bonds were simply acquired in accordance with the terms of the lease, which required the Metropolitan Street Railway to keep them alive for the protection of the holders of the refunding bonds

New York, West Chester & Boston Railway, New York, N. Y.—The Public Service Commission of the Second District of New York has authorized the New York, West Chester & Boston Railway and the New York & Port Chester Railroad to consolidate as the New York, West Chester & Boston Railway, the capital stock of the consolidated company not to exceed $5,000,000 and the final agreement of consolidation to be submitted to the commission for approval. The company is authorized to abandon such portion of the routes of the companies which are consolidating as are not necessary to form one continuous route from the Harlem River at New York City to Port Chester, with a branch from about 177th Street, New York, to Throgg's Neck and with a branch from Mount Vernon to White Plains or Elmwood, in case the application to abandon that portion of the line extending from White Plains to Elmsford is denied.

Philadelphia (Pa.) Rapid Transit Company.—The stockholders of the Philadelphia City Passenger Railway have approved the proposal to extend the $200,000 of first mortgage 5 per cent bonds of the company which mature on Jan. 1, 1910, to Jan. 1, 1960, without option of prior redemption. These bonds were originally dated May 1, 1861, and were extended in 1880.

Southwestern Traction Company, London, Ont.—The sale of the property of the Southwestern Traction Company under foreclosure to J. E. McDougall and T. H. Purdom having been confirmed by the court, the London & Lake Erie Railway & Transportation Company succeeded the Southwestern Traction Company on Dec. 15, 1909. The London & Lake Erie Railway & Transportation Company has elected the following directors: Murray A. Verner, Pittsburgh; W. S. Dinnick, W. K. George, George B. Woods and S. C. Smoke, Toronto, and T. H. Purdom and John Milne, London, Eng. Reference to the sale of the property of the Southwestern Traction Company was made in the ELECTRIC RAILWAY JOURNAL of Nov. 13, 1909, page 1038.

Spokane & Inland Empire Railroad, Spokane, Wash.—James J. Hill, chairman of the board of directors of the Great Northern Railroad, has announced that the Great Northern Railroad has obtained a controlling interest in the Spokane & Inland Empire Railroad, Mention of negotiation with this end in view was made in the ELECTRIC RAILWAY JOURNAL of Nov. 13, 1909, page 1038.

Third Avenue Railroad, New York, N. Y.—The first of a series of hearings on the modified plan for the reorganization of the Third Avenue Railroad in accordance with the terms outlined in the ELECTRIC RAILWAY JOURNAL of Dec. 11, 1909, page 1203, was held by the Public Service Commission of the First District of New York on Dec. 15, 1909. John M. Bowers, of counsel for the bondholders, said that it was proposed to carry out the reorganization under a section of the general railroad law, and expressed the opinion that as long as the proposed issue of new securities was not inflated as contrasted with the total of securities now outstanding, the commission act did not affect the case of the company. The second hearing was held on Dec. 20. Frederick W. Whitridge was the principal witness. His testimony concerned the earnings of the property and the betterments already carried out.

Toledo, Urban & Interurban Railway, Toledo, Ohio.—An order confirming the sale of the property of the Toledo, Urban & Interurban Railway to the Toledo & Findlay Railway has been issued. It was purchased in August, 1909, by George W. Harvey for $400,000 and was turned over by him to the Toledo & Findlay Railway.

Traffic and Transportation

Decision by Interstate Commission in Omaha Fare Case

In the complaint of the West End Improvement Club against the Omaha & Council Bluffs Railway & Bridge Company, Omaha, Neb., submitted to the Interstate Commerce Commission on June 5, 1908, and decided on Nov. 27, 1909, in which it was alleged that the 10-cent fare charged by the company from Council Bluffs over the bridge to Omaha was unreasonable and unjustly discriminative because longer rides for 5 cents are given on lines which do not cross the bridge, and in which the defendant alleged that as a street railway it was not amenable to the terms of the act under which the Interstate Commerce Commission was created, the commission has held that as the defendant is engaged in interstate transportation of persons it is amenable to the terms and jurisdiction of the Interstate Act; that the record does not disclose justification for ordering the reduction, but that it is unreasonable to charge more than 10 cents for a trip between any point on the company's lines in Council Bluffs and its lines in Omaha, and has entered an order in accordance with these views effective on Feb. 1, 1910. An abstract of the conclusions of the commission follows:

"In the debates in the Congress the paramount questions discussed were abuses in connection with freight transportation; unjust discrimination, unreasonable rates, etc. But this fact does not furnish an argument for excluding from the provisions of the law common carriers engaged solely in the interstate transportation of passengers. It was stated in the debates that the law was not intended to apply to 'street railways.' We must, however, assume that the street railways of that day, and not the interurban lines of this day, were in mind when that statement was made. Some of the largest railroads bear the corporate title 'railway company.' Other roads of identical character and kind use the title 'railroad' or 'railroad company.' The words 'railway' and 'railroad' are completely synonymous of each other and no significance can be attached to the choice of either name or to the use of either word in a statute, decision, or discussion. The words of the act 'any common carrier or carriers engaged in the transportation of passengers or property wholly by railroad' indicate that a common carrier engaged in the interstate transportation of either and not necessarily of both is subject thereto. The relative importance of freight and passenger transportation necessarily increased the attention given to the former and minimized the discussion of the latter.

"With general uniformity throughout the act the use of the words 'passengers or property' clearly denotes that carriers of either the one or the other or both are subject to its provisions. Certainly the words of the statute are broad and comprehensive enough to include interstate interurban railroads, and there is nothing in the law which indicates an intent to exclude them. No one questions the jurisdiction of the act over interurban lines which enter Washington and transport persons to and from adjoining States. The street railways which do not extend beyond the limits of the District of Columbia are governed by other laws. Interurban lines are becoming more and more an important factor in the transportation of freight as well as passengers. It can not be said that the act controls as to the transportation of property but does not apply to the transportation of persons. If interurban lines were to be exempted from the requirements of the act on the ground that they are street railways it would be impossible to so administer the law as to correct the evils and the mischief at which it was aimed.

"It would be a narrow, strained, and illiberal construction to hold that designating an interurban railroad a 'street railway' was sufficient to excuse such railroad, when engaged in interstate transportation, from the operation of the law. So far as the practices of common carriers of passengers are concerned, interurban railroads might as certainly to the same extent and in the same manner as any other carrier or railroad, cause the abuses denounced by the law; they might discriminate as unjustly and charge as unreasonable fares as the railroads denominated as commercial. It follows that they are within the 'mischief felt and the object and remedy in view.' If interstate, they are clearly outside the jurisdiction of the individual state, and where they are 'common carriers engaged in the transportation of passengers or property,' as specified in the act, we entertain no doubt of their amenability to its provisions.

"Defendants argue that for Council Bluffs, a municipality of Iowa, to fix by ordinance or franchise the maximum rate of fare to be charged for a continuous trip from that city to

points in Nebraska would be a regulation of interstate commerce and that such an ordinance could have no extraterritorial effect. Granted; but if the contention is correct that defendants are not subject to the act to regulate commerce, the reasonableness of the fares could be determined only by the common law or by Congress. It is not conceivable that Congress intended to leave the great number of interurban railway companies engaged in the interstate transportation of passengers to regulation by the inadequate remedies of the common law.

"In this particular case, the charter granted March 3, 1887, to the bridge company provides 'and Congress reserves the right, at any time, to regulate, by appropriate legislation, the charges for freight and passengers over said bridge.' Section 26 of the amended act provides 'that all laws and parts of laws in conflict with the provisions of this act are hereby repealed.' The question naturally arises whether this section operates as a repeal of the charter provision.

"Congress reserved the right to regulate the charges of the bridge company by appropriate legislation. Instead of specifically fixing those charges by statute the Congress 'by appropriate legislation,' delegated that function and authority to the commission. So that whether or not it be held that technically the act to regulate commerce repealed the reservation in the act which granted the charter of the bridge company, the present jurisdiction of the commission over the interstate transportation charges of the defendants is clear.

"We now come to a consideration of the reasonableness of the fare. The petition attacks the reasonableness of the fare from Omaha to Council Bluffs or from Council Bluffs to Omaha. The local fare in Omaha and in Council Bluffs is 5 cents. From the west end of the bridge the line in Omaha passes westward on Douglas to Fourteenth Street, south upon that street to Howard, east to Eleventh, north to Douglas, and eastward back to the bridge. The fare from Council Bluffs to any point on this loop is 10 cents, and the fare from any point on the loop to any other point in Omaha is 5 cents. The fare from any point on the loop, across the bridge and to any point in Council Bluffs (with the exception of Courtland Beach, which, on account of the Missouri River changing its course, is on the west side of the river, but within Council Bluffs), is 10 cents. The reasonableness of the 10-cent fare and the reasonableness of confining it to points on the loop are put in issue in these proceedings.

"The complainant contends that the unreasonableness and discriminatory nature of the fare of 10 cents is shown by the fact that for materially greater distances than that from Fourteenth and Farnam Streets in Omaha to any point in Council Bluffs, or the reverse, the fare is but 5 cents; that it is only when the bridge is crossed that the 10-cent fare is charged. It is also contended that at other points of crossing of the Missouri or Mississippi Rivers, where conditions are similar to those involved in this case, a fare of 10 cents entitles passengers to transfer to any point in either city.

"Defendants argue that to reduce the fare to 5 cents would have the effect of abolishing the bridge toll in favor of persons riding in the cars and leave it in force as to the man who elected to walk over the bridge; that along the line from the east bank of the Missouri River to the city of Council Bluffs for a distance of about 3 miles there is a large territory which is but sparsely settled and from which but little revenue is derived; that a reduction of the fare to 5 cents would result in a great reduction of revenue; that notwithstanding the profit for the year 1907 of $49,844.35 on the bridge company's property a reduction of the fare to 5 cents would be disastrous and would result in a net loss of $53,056.55, there being no evidence that a reduction of the fare would be followed by increased travel; that there is greater hazard in the operation of the lines over the bridge than upon the surface; that the commutation tickets are sold on a plan sufficiently liberal to answer the demands of the community; that it is the prevailing custom to charge 10 cents single fare on street-railway lines between cities on the opposite sides of the Mississippi and Missouri Rivers, including bridge fare; that the right to charge a 10-cent fare, including the bridge toll, has been recognized by Council Bluffs in the charters granted to the respective street-railway companies whose franchises and lines compose the present lines operated in Council Bluffs by the defendants, and that the fare across the river on railway bridges between Omaha and Council Bluffs is 25 cents.

"It appears that prior to leasing the bridge company's properties to the street railway company the bridge company was operated at a loss, and that it was operated at a loss during the first two years under the lease. Beginning with 1905, however, the bridge company yielded an annual profit from operation, and that profit increased each year. This is accounted for by economies in management, such as maintenance of one central power house, central shops, one executive organization, etc., and the development of profitable business.

"Comparisons are introduced showing the relative conditions of operation, travel, fares, and service in the instant case and at other places where bridge lines connect cities on opposite banks of the Missouri or Mississippi Rivers. Statements of defendant's capitalization, earnings, and expenses have also been submitted, which show, on the whole, liberally profitable returns.

"The capitalization of the bridge company is entirely separate and distinct from that of the street railway company. If the properties were operated separately neither of them would be expected to charge less than a 5-cent fare. Such combination fare of 10 cents would doubtless, however, entitle passenger to transportation to or from points in Omaha other than those located upon the loop.

"A full hearing has been had in this cause; we have carefully considered the testimony and the record in the case, and we are of the opinion that a reduction of defendants' fare of 10 cents to 5 cents would not be justified, but that limiting the 10-cent fare to points on the loop in Omaha is unjust and unreasonable, and that the fare from Council Bluffs, not including Cortland Beach, to any point on defendants' lines in Omaha or from any point on defendants' lines in Omaha to Council Bluffs, not including Cortland Beach, should not exceed 10 cents for a continuous trip or for a trip upon which passenger conforms to proper and reasonable regulations governing use of transfer tickets if transfer is required."

Accidents on Electric Railways of Indiana for Quarter

The Railroad Commission of Indiana has issued accident Bulletin No. 9, which contains a record of the accidents on railroads and electric railways in Indiana during July, August and September, 1909. Three passengers were killed on the electric railways during this period, as compared with none for the same period in 1908; otherwise, there was a falling off in the number of casualties, the total being 45 as compared with 88 during the preceding three months. The summary of casualties on the interurban railways during July, August and September, 1909, as contained in the report of the commission follows:

PASSENGERS.

WHERE—	1908.	1909.
On passenger trains	51	42
On station grounds	5	1
CAUSES—		
Collisions	12	21
Derailments	0	1
Getting on and off moving trains	27	7
Getting on and off trains after stops are made	1	2
Miscellaneous	16	7
RESULTS—		
Deaths	0	3
Fractures or dislocations	4	4
Sprains	12	10
Cuts and bruises	35	22
Miscellaneous	5	6

TRAVELERS ON HIGHWAYS.

WHERE—	1908.	1909.
Travelers on highways in vehicles	12	11
On foot	2	2
CAUSE—		
Struck on crossings	10	13
Teams frightened	3	0
Miscellaneous	1	0
RESULTS—		
Deaths	5	6
Sprains	1	1
Cuts and bruises	8	6
Miscellaneous	0	0

EMPLOYEES.

EMPLOYMENT—	1908.	1909.
Conductors	3	6
Motormen	5	4
Laborers	6	2
CAUSES—		
Collisions	5	2
Miscellaneous	9	10
RESULTS—		
Deaths	1	2
Fractures or dislocations	1	0
Sprains	1	4
Cuts and bruises	10	5
Miscellaneous	1	1

TRESPASSERS.

WHERE—	1908.	1909.
Trespassers on tracks	4	10
Miscellaneous	0	3
RESULTS—		
Deaths	2	9
Fractions or dislocations	2	4

Collisions, 2. Damage, $750.00.

TOTAL CASUALTIES.

Deaths	8	20
Injured	80	63

The report also contains the following summary of the cost of property of the railroads destroyed or injured in

railway accidents for the two years ended September, 1909:

Date—	Steam	Interurban
July, August, September, 1907	$42,863	$50
October, November, December, 1907	55,384	3,242
January, February, March, 1908	65,973	4,650
April, May, June, 1908	42,074	3,000
July, August, September, 1908	45,597	1,746
October, November, December, 1908	32,824	1,865
January, February, March, 1909	34,176	3,800
April, May, June, 1909	40,569	....
July, August, September, 1909	42,967	....
Total for 27 months	$400,427	$18,353
Grand total	418,780	

A list of 16 steam railroads and electric railways not reporting any accidents for July, August and September, 1909, contains the names of the following electric railways: Southern Michigan Railway; Angola Railway & Power Company; Chicago, South Bend & Northern Indiana Railway; Dayton & Xenia Transit Company; Evansville & Mt. Vernon Electric Railway; Evansville & Southern Indiana Traction Company; Evansville & Eastern Electric Railroad; Kokomo, Marion & Western Electric Railroad; Marion, Bluffton & Eastern Electric Railway; Muncie & Portland Traction Company, and Lima & Toledo Traction Company.

Grade Crossings Authorized and Expenses Fixed by Wisconsin Commission

The Railroad Commission of Wisconsin has recently handed down decisions in two cases in which the apportionment of the expense of constructing, operating and maintaining grade crossings is fixed. The cases are known as No. R-186, covering the petition of the Eastern Wisconsin Railway & Light Company from an order to determine the grade of crossing of its tracks over those of the Chicago, Milwaukee & St. Paul Railway in Fond du Lac and apportioning the expense, and No. R-187, covering the petition of the same company for an order to determine the grade of crossing of its tracks over those of the Chicago & Northwestern Railway in Fond du Lac and apportion the expense. In both cases the commission held that the crossing should be constructed at grade, the cost of construction paid by the petitioner and the cost of maintenance borne equally by both companies. The engineer of the commission studied both cases, and reported that the situation did not demand or justify an attempt to avoid crossings at common grade, the crossings being in a very level section of the city, and recommended that the commission authorize the crossings.

The conclusions of the commission in the petition against the Chicago, Milwaukee & St. Paul Railway, which are substantially the same as those in the case of the Chicago & Northwestern Railway, follow:

"It is obvious from the foregoing report that the crossing in question must be at grade. The cost of the construction of the crossing will be imposed upon the petitioner in accordance with the rule adopted by the commission In re Application of the Wisconsin & Northern Minnesota Railway for approval of its plans and specifications for the construction of its proposed railroad in Douglas County, Wis., 2 W. R. C. R., 362. As one-half the cost of maintaining the crossing will not, in our judgment, impose upon the Chicago, Milwaukee & St. Paul Railway any greater burden than the maintenance of its track at the point of crossing if the crossing had not been constructed, we see no reason for departing in any respect from the rule laid down in the case cited.

"Now, therefore, it is ordered that all the expense of constructing the crossing of the tracks of the Chicago, Milwaukee & St. Paul Railway on Main Street, between McWilliams Street and South Sibley Street in Fond du Lac, Wis., by the double tracks of the Eastern Wisconsin Railway & Light Company, including the necessary grading, rails, frogs, switches and other appurtenances for ordinary grade crossing as well as labor and all material used in constructing the same, be supplied and furnished by the said Eastern Wisconsin Railway & Light Company and that after the construction of such crossing the said Eastern Wisconsin Railway & Light Company and the said Chicago, Milwaukee & St. Paul Railway shall each bear one-half of the expense of maintaining the same.

"It is further ordered that said crossing be constructed at the surface and grade of Main Street, as established by the said city of Fond du Lac, if the said city shall so desire it."

New Express Service in Maine.—The Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine, has established a freight service over its Lewiston-Waterville line.

Gray Uniforms in St. Joseph.—The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., has adopted gray as the standard color of the uniforms of its employees.

Strike in Pennsylvania.—The employees of the Schuylkill & Dauphin Traction Company, Lykens, Pa., are on strike. They demand 20 cents an hour regardless of the length of service. The company has offered a sliding scale of wages.

Through Service Between Columbus and Lima.—The Ohio Electric Railway has decided on through service between Columbus, Ohio, and Lima, Ohio. A two and one-half hour schedule will be established, but it has not yet been decided how many cars will be used in the service.

Baltimore Company Helps Red Cross Movement.—William A. House, president of the United Railways & Electric Company, Baltimore, Md., has ordered a Red Cross placard placed on the front of each car which bears the inscription "Everybody Helps," and below this is a picture of the Red Cross stamp itself.

Commission Has All-Night Service Under Consideration for Washington.—The District Electric Railway Commission has under consideration the question of issuing an order to require the Washington Railway & Electric Company to maintain an all-night service on its lines in the north east section of the city.

Accidents in Canada.—The Department of Railways and Canals of the Dominion of Canada has made public the following summary of accidents on the electric railways in Canada for August, September, October and November, 1909: August, 3 killed and none injured; September, 7 killed and 32 injured; October, 2 killed and 28 injured; November, 18 killed and 7 injured.

Complaint About Fare Between Dunkirk and Fredonia.—The Public Service Commission of the Second District of New York has served upon the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., the complaint of residents of Dunkirk and Fredonia, against that company, as to rate of fare between Dunkirk and Fredonia. The complainants ask that the present charge of 10 cents be reduced to 5 cents.

New Passenger Tariff of Columbus, Delaware & Marion Railway.—The Columbus, Delaware & Marion Railway, Columbus, Ohio, has filed with the Ohio Railroad Commission a new passenger tariff which reduces the commuter's rates from several points but does not change the passenger rate as a whole. The tariff also provides for a new half-hourly service between Columbus and Worthington, Ohio.

Special Holiday Rates on Interurban Lines.—A number of interurban railways which are members of the Central Electric Traffic Association have reduced the rates on interline business for the Christmas and New Year holidays, based upon a one and one-half first-class one-way fare as shown in Joint Passenger Tariff No. 3. Tickets will be sold on Dec. 24, 25 and on 31, 1909, and on Jan. 1, 1910, good returning until Jan. 3, 1910.

Inquiry Into Necessity for Trolley Guards.—In reply to a letter by the Indiana Railroad Commission inquiring about trolley guards where interurban railways cross steam railroads, the commission has learned that there are about 120 places in Indiana where steam railroads and electric railways cross at grade, only six or seven of which are protected by guards. The commission will investigate the necessity of instructing the electric railways to install guards at all such crossings.

Illuminated Display Signs on Cars.—The Tucson (Ariz.) Rapid Transit Company is obtaining revenue from two illuminated display signs, one of which is carried on each side of the monitor deck of its cars. The lamps forming these signs are of 16 cp and are controlled by a three-way switch, so that they may be thrown into circuit in place of the regular headlight resistance. The signs, therefore, are operated without cost for current and are rented for advertising purposes. Customers endorse the plan as a means of obtaining local publicity.

Continuous Service Rewarded in Augusta.—James R. League, general manager of the Augusta-Aiken Railway & Electric Company, Augusta, Ga., has announced that effective Jan. 1, 1910, the pay of the motormen and conductors who have been in the employ of the company for more than three consecutive years will be increased 1 cent an hour, making the wages 18 cents per hour. The wages of the employees of the company under the new schedule follow: Four months at 13 cents an hour; after eight months, 15 cents an hour; for the second year, 16 cents an hour; third year, 17 cents an hour; fourth year, 18 cents an hour.

Veteran Carmen of Quincy, Ill.—The local daily paper of Quincy, Ill., recently published a complimentary article

in which was presented an account of the careers of several carmen who have been in the service of the Quincy Horse Railway & Carrying Company for more than 25 years. This company employs 60 carmen, five of whom entered the service of the company as drivers of mule cars on the main street of the city. In the early days these men worked 16 hours a day six days a week and reported for relief work on their off days. The veteran is Hobart Dinkheller, who has been employed by the company for 34 years. Five other men have been connected with the company for more than 20 years.

Hearings on Side Doors and Platforms for Long Island Railroad Trains.—The Public Service Commission of the First District of New York has adopted two orders calling for hearings, to be held before Commissioner Bassett, beginning Dec. 29, 1909, to determine whether the Long Island Railroad shall be directed to provide station platforms as long as the trains on all lines operated by electricity, or whether the company shall be directed to provide the cars of its electric trains with side doors, platforms, gates, vestibule doors and trap doors, the trap doors to be used to bridge the gap between the car platform and the station platform. At the hearing the commission will determine which of the two orders it finds to be the best.

Fare Complaint Against Westchester Street Railroad Heard.—The complaint against the increase in fare from 5 cents to 10 cents by the Westchester Street Railroad, the successor to the Tarrytown, White Plains & Mamaroneck Railway, between White Plains and Mamaroneck, was heard by Martin S. Decker of the Public Service Commission of the Second District of New York on Dec. 17, 1909. The company has also increased the fare on its line between White Plains and Tarrytown from 5 cents to 10 cents, making the through fare between Tarrytown and Mamaroneck 20 cents instead of 10 cents as previously. Mr. Decker refused the motion of counsel for the company to dismiss the complaint and ordered both sides to file briefs.

Decision by Massachusetts Commission Regarding Transportation of Drunkards.—The Railroad Commission of Massachusetts has issued the following order relative to the transportation of drunkards on the street railways of the State, in connection with a complaint originating in Worcester: "In the cities the police are of sufficient number to preserve order and make arrests when occasion requires; but on long interurban lines a territory is covered where local officers are frequently beyond the call of the employees of the companies. While local officers should be relied upon in town centers to co-operate with the employees of the company to prevent intoxicated persons from boarding the car, the managements of the companies ought themselves at all times to afford protection to their passengers. This does not appear to have been accomplished, and we therefore direct the attention of street railway companies to the provisions of the statute and recommend that reasonable and efficient measures be taken to secure to their patrons the protection to which they are entitled by law."

Circular Outlining Benefits of Improvements.—The new business department of the Albany Southern Railroad, Hudson, N. Y., under date of Dec. 6, 1909, issued a special circular about the improvements being made by the company, particularly the double tracking of the line between Rensselaer and Electric Park, which will greatly increase the efficiency of the service by eliminating delays at turnouts. The contents of the circular follow: "For the past several years there has been talk of double tracking between Rensselaer and Electric Park. This talk has now been replaced by reality. Work was actually begun on Nov. 8, 1909, and the double tracking will be completed by May 1, 1910. No newspaper talk this time. The advantages of the double tracking are clear. Waiting at turnouts will be avoided, and the operation of the cars will be rendered absolutely safe. The roadbed is being generally overhauled, sharp curves are to be eliminated and the facilities of the company for handling passengers are being generally increased. Electric Park is to be improved and will provide attractions which will merit a continuance of the splendid reputation already established. We want your business for the summer season of 1910. All we ask is that you give our representative an opportunity to talk with you before making arrangements for your summer outing. He will arrive early in the season. While it is somewhat unseasonable to talk park business, our action in writing you at this time simply indicates that we are full of good red blood and are going to make the summer season of 1910 the best in the history of the company."

Personal Mention

Mr. C. F. Crane, general passenger agent of the Eastern Pennslyvania Railways, Pottsville, Pa., has just returned from an eight weeks' trip to Italy.

Mr. W. F. Towne, heretofore general agent of the freight department of the Pacific Electric Railway Company, Los Angeles, Cal., now has the title of general freight agent.

Mr. D. A. Munger, heretofore general agent of the passenger department of the Pacific Electric Railway Company, Los Angeles, Cal., has been given the title of general passenger agent of the company.

Mr. G. A. Richardson, superintendent of the Houghton County Traction Company, Houghton, Mich., has been appointed assistant superintendent of transportation of the Seattle (Wash.) Electric Company.

Mr. H. S. Dickey, formerly superintendent of the Winona Interurban Railway, Warsaw, Ind., has been appointed traffic manager of the Chicago, South Bend & Northern Indiana Railway, Michigan City, Ind.

Mr. S. Walter Mower will be retained as general manager of the London & Lake Erie Railway & Transportation Company, London, Ont., which has succeeded to the property of the Southwestern Traction Company.

Mr. John Ralph, Jr., assistant superintendent of the Houghton County Traction Company, Houghton, Mich., has been appointed superintendent of the company, to succeed Mr. G. A. Richardson, who has been appointed assistant superintendent of transportation of the Seattle (Wash.) Electric Company.

Mr. Clarence Wolf, first vice-president of the Philadelphia (Pa.) Rapid Transit Company, will retire on Jan. 1, 1910, as a member of Wolf Brothers & Company, Philadelphia, bankers, and thereafter will devote more of his time to the duties of his office with the Philadelphia Rapid Transit Company.

Mr. G. Louis Boissevain, of Kean, Van Cortlandt & Company, New York, N. Y., has been elected president of the Netherlands Tramways Corporation, New York, N. Y., to succeed Mr. Henry J. Pierce, resigned, and Mr. W. Barklie Henry, Philadelphia, Pa., has been elected vice-president of the company to succeed Mr. Boissevain.

Mr. Clinton E. Palmer, who has been superintendent of railways of the Eastern Pennsylvania Railways, Pottsville, Pa., for two years, has resigned to become general superintendent of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind. Prior to his connection with the Eastern Pennsylvania Railway, Mr. Palmer was associated with the Ohio Electric Railway.

Mr. H. B. Twyford has recently resigned as purchasing agent for the Underground Electric Railways Company of London and the tube lines controlled by that corporation, and is now in this country, where he expects to remain. Mr. Twyford has been purchasing agent for the London corporations for seven years and went to London from Chicago. His future plans have not yet been announced.

Mr. L. C. Nichols has resigned as chief electrician of the Lehigh Valley Transit Company, Allentown, Pa., to become connected with Herrick & Stebbins, New York, N. Y., for whom he will devote his time to investigation and testing work. Prior to his connection with the Lehigh Valley Transit Company, Mr. Nichols was employed by the Utica & Mohawk Valley Railway, Utica, N. Y.

Mr. Robert Robinson has been appointed to the newly created position of chief of transportation of the Houghton County Traction Company, Houghton, Mich., in which he will succeed to the duties of Mr. John Ralph, Jr., as assistant superintendent of the company, a position which was abolished with the advancement of Mr. Ralph to succeed Mr. G. A. Richardson as superintendent of the company.

Mr. A. C. Kennedy has been appointed purchasing agent for the receivers of the Municipal Traction Company, Cleveland, Ohio, vice Mr. F. L. Stockberger, resigned. Mr. Kennedy was formerly chief clerk to Mr. George A. Stanley, purchasing agent of the Cleveland Electric Railway. He began his connection with the purchasing department of the Cleveland Electric Railway under Mr. Chas. W. Wason when the property was controlled by the Everett-Moore syndicate.

Mr. Terrance Scullin, who has been connected with the Rochester (N. Y.) Railway for a year as master mechanic, has been appointed master mechanic of the Cleveland (Ohio) Railway to succeed Mr. Frank R. Phillips, whose resignation was announced in the Electric Railway Journal of Dec. 18, 1909. Mr. Scullin has been connected with the

Andrews-Stanley interests for many years. His success as master mechanic of the Cleveland Electric Railway was marked, but after the Municipal Traction Company took over the Cleveland Electric Railway Mr. Scullin became connected with the Rochester Railway.

Mr. F. F. Espenchied, who has been connected with the West Penn Railways, Pittsburgh, Pa., as consulting engineer and assistant to Mr. W. E. Moore, general manager of the company, has resigned from the company to become general manager of the Interstate Light & Power Company, which is completing a modern steam-driven central station and 60-cycle, three-phase, 33,000-volt transmission system to serve Galena, Ill., and Plattville, Wis., and the intervening mining region. Mr. Espenchied was graduated from Cornell with the degrees of electrical engineer and mechanical engineer. The office which Mr. Espenchied occupied with the West Penn Railways has been abolished.

Mr. Fred H. Lincoln has resigned as assistant general manager of the Philadelphia Rapid Transit Company, to take effect Jan. 1, 1910. He has occupied his present office for the last five years and has been connected with the Philadelphia Rapid Transit Company for the last 17 years. During this time he has served in both the electrical and transportation departments and has also invented a number of improvements, particularly in rolling stock, which have been made standard by the company. Mr. Lincoln has always taken a prominent part in the work of the American Street & Interurban Railway Engineering Association, and at the Denver convention was elected president of the association. His future plans have not yet been announced.

Mr. J. G. Baukat has resigned as assistant superintendent of electrical equipment with the New York Central & Hudson River Railroad, New York, N. Y., to accept the position of consulting engineer of the Miami Valley Construction Company, New York, N. Y., and chief engineer of the Wabash & Northern Railway. Mr. Baukat's connection of four years with the New York Central & Hudson River Railroad covers the period of electric installation, and he was in direct charge of the maintenance of electrical equipment and repair shops. Previous to entering the service of the New York Central & Hudson River Railroad Mr. Baukat was engineer of the Schenectady (N. Y.) Railway, in charge of car equipment, track work, line work, construction work, in which capacity he planned and supervised the building of the Saratoga extension to Ballston. Before accepting the position with the Schenectady Railway Mr. Baukat was connected for three years with the railway department of the General Electric Company at Schenectady. Mr. Baukat was presented a diamond scarf pin as a token of the esteem in which he was held by his associates in the New York Central & Hudson River Railroad.

Mr. Joseph E. Wayne was appointed superintendent of the York (Pa.) Railways on Dec. 15, 1909, to succeed Mr. F. P. Newman, whose appointment to the position of general manager of the Southern Cambria Electric Railway, Johnstown, Pa., was announced in the ELECTRIC RAILWAY JOURNAL of Dec. 4, 1909. Mr. Wayne was born in Philadelphia, Pa. His railway experience was acquired during his connection with several of the large street railways in different parts of the country. He served for three years in the repair shops and power house of the Public Service Corporation of New Jersey and resigned from that company to become connected with the United Railroads, which controls all the lines in San Francisco, and remained in the service of the United Railroads for three years. When Mr. David Young became general manager of the York Railways, Mr. Wayne accepted the position of superintendent of the company, but resigned after two years of service to become superintendent of the Waynesboro, Chambersburg & Greencastle Street Railway. Mr. Wayne resigned from the Waynesboro, Chambersburg & Greencastle Street Railway to take charge of the commercial department of the Edison Electric Light Company, York, Pa., from which position he retired to become connected with the York Railways.



J. E. Wayne

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Chicago, Joliet & East St. Louis Electric Railway, Chicago, Ill.—Incorporated in Illinois to build and acquire electric lines over which electric cars may be operated from Chicago through Joliet to East St. Louis, with branches to Aurora, Ill., and Hammond, Ind. H. A. Fisher has announced that the company will take over the operating lines of the Joliet & Southern Traction Company, the Joliet, Plainfield & Aurora Railroad, the Bloomington, Pontiac & Joliet Electric Railway and the Chicago, Joliet & Central Illinois Railway. With existing tracks connecting Chicago Heights, near the Illinois-Indiana State line south of Chicago, Joliet and Aurora, it is planned to add a line south from Joliet to Dwight and there connect with the Bloomington, Pontiac & Joliet line in operation between Dwight and Pontiac. Also this latter line will be extended south from Pontiac to Bloomington, where connection will be made with the Illinois Traction System, extending west to Peoria, east to Decatur and Danville, and from Decatur through Springfield to St. Louis. Mr. Fisher is quoted as saying that the line from Joliet into Chicago will soon be constructed, and that arrangements have been made for the use of the tracks of the Metropolitan West Side Elevated Railway for entrance to the business district. Capital stock, $100,000. Headquarters, Woman's Temple Building, Chicago. Incorporators: H. A. Fisher, F. E. Fisher and L. D. Fisher; S. A. Spray, Chicago, and T. B. Steward, John A. Raymond and John K. Newhall, Aurora, Ill.

Shore Line Electric Railway, New Rochelle, N. Y.—Incorporated with a capital of $300,000 as a reorganization of the 2-mile Larchmont-Mamaroneck branch of the Tarrytown, White Plains & Mamaroneck Railway, which was sold several weeks ago under foreclosure to Franklin L. Babcock for $100,000. Directors: Franklin L. Babcock, Edward A. Maher, Reune Martin, Dudley Olcott and E. Francis Hyde, all of New York.

Ephrata & Lebanon Street Railway, Ephrata, Pa.—Chartered to build a 22½-mile gasoline motor railway from Lebanon to Ephrata, via Iowa, Reistville, Schaefferstown, Kleinfeltersville, Hopeland, Clay and Lincoln. All the rights-of-way and franchises in Ephrata and Lebanon have been secured. Final location surveys will be made during the winter and construction will be started early in the spring. Capital stock, $425,000. Incorporators: S. D. Erb, Ephrata, president; M. Kinport, Henry Westerhoff, M. H. Shirk, H. B. Hollinger and A. E. Lane. F. H. Shaw, Lancaster, chief engineer. [E. R. J., Oct. 16, '09.]

Phœnixville, Valley Forge & Stafford Street Railway, Phœnixville, Pa.—Chartered to construct an electric railway from Phœnixville to Stafford, via Valley Forge, a distance of 10 miles. Capital stock, $60,000. Incorporators: Thomas E. O'Connell, West Chester, president; O. E. Thomson, John A. Dusmant, C. F. Boden, S. W. Deninger, A. W. Kley, H. H. Gilkyson, E. C. Meir and S. E. Miller. [E. R. J., Dec. 11, '09.]

***Uvalde & Leona Valley Interurban Railway, Uvalde, Tex.**—Chartered in Texas to build a 25-mile interurban railway from Uvalde to Batesville. Capital stock, $50,000. Officers and incorporators: Charles Peterson, president; A. M. Avant, vice-president, San Antonio, Tex.; M. M. McFarland, vice-president and general manager; F. J. Rhiner, secretary and treasurer, Uvalde, Tex.

FRANCHISES

Ashton, Ill.—The City Council has granted a 50-year electric railway franchise to the Chicago, De Kalb & Western Railway, Chicago. This is part of the plan to build an electric railway from Chicago to Rock Island. [E. R. J., Nov. 20, '09.]

Port Byron, Ill.—The Tri-Cities & Northeastern Interurban Railway has been granted a 20-year franchise to build an electric railway on Main Street, Port Byron. J. W. Simonson, Port Byron, president. [E. R. J., Oct. 2, '09.]

Greenfield, Ind.—The City Council has granted a franchise to Perry Fredman, Richmond, and associates, to build an electric railway over certain streets of Greenfield. A company, to be known as the Greenfield & Northern Railway, will be organized to build the line which is also to be extended to Pendleton, a distance of 16 miles. [E. R. J., Nov. 27, '09.]

Monticello, Ind.—A petition has been filed with the County Commissioners for an election to be held in Jack-

son, Honey Creek, Princeton and Union Townships of White County to vote on the proposition of a subsidy in aid of the construction of the Indiana & Northwest Traction Company's line from the Battle Ground to Reynolds. [E. R. J., Dec. 11, '09.]

Hartford, Mich.—William C. Plumb and H. H. Tucker, representing the Chicago, Benton Harbor & Grand Rapids Railroad, Chicago, have applied to the Town Council for an electric railway franchise. [E. R. J., Jan. 2, '09.]

Pittsfield, Mass.—The Board of Aldermen has granted to the Pittsfield Street Railway an extension of its franchise until May 1, 1910, in which to extend its tracks to the Hancock town line.

Kansas City, Mo.—At the election on Dec. 16, 1909, the proposal to extend the franchise of the Metropolitan Street Railway in accordance with the terms of the ordinance abstracted in the Electric Railway Journal of Dec 11, 1909, page 1199, was defeated by 11,756 votes.

East Bend, N. C.—The Yadkin River Valley Railway has been granted a franchise to build an electric railway in East Bend. The proposed line is to be built from East Bend to Donnaha, a distance of 5 miles. It is the ultimate intention to extend it from Donnaha to Winston-Salem. Among those interested are W. A. Martin, George Steelman and J. W. Marler, East Bend. [E. R. J., March 27, '09.]

Fostoria, Ohio.—The City Council has granted an electric railway franchise to the Fostoria & Fremont Railway, which proposes to build an electric railway from Fostoria to Fremont, via Havens, Burgoon, Kansas and Amsden. It will be about 21 miles long. J. D. McDonel, secretary. [E. R. J., Nov. 13, '09.]

Altoona, Pa.—The Johnstown & Gallitzin Railway has formally applied to the City Council for a franchise for an entrance into Altoona for its electric railway. Traffic arrangements will be made with the Altoona & Logan Valley Electric Railway, whereby this company's tracks will be used by the Johnstown & Gallitzin Railway to enter Altoona. U. G. U. Holman, general manager and electrical engineer. [E. R. J., Aug. 14, '09.]

Sherbrooke, Que.—The City Council has approved a by-law granting to the Sherbrooke Street Railway a 40-year franchise. The city will have the privilege of purchasing the property at the end of 20 years. The railway will be extended as soon as additional power is developed.

Montesano, Wash.—The County Commissioners have granted a 50-year franchise to Eldredge Wheeler for the construction of an electric railway from Moclips to Gate City. [E. R. J., Nov. 27, '09.]

La Crosse, Wis.—The Common Council has granted to the La Crosse & Winona Traction Company a 50-year franchise for an electric railway in La Crosse. The company proposes to build an electric railway from Winona to La Crosse, via Galesville. W. J. Ferris, president. [E. R. J., Nov. 13, '09.]

Wheeling, W. Va.—The County Commissioners have granted a franchise to the Rapid Transit Railway to construct an electric railway through Ohio County. A. M. Shenk, president. [E. R. J., July 31, '09.]

TRACK AND ROADWAY

Los Angeles (Cal.) Railway.—This company announces that during 1910 it will build about 80 miles of new track. H. E. Huntington, general manager.

Bakersfield & Ventura Railroad, Oxnard, Cal.—This company will build 5 miles of new track during 1910. T. B. Blackburn, general manager.

Grand Junction & Grand River Valley Railway, Colorado Springs, Col.—S. M. L. McSpadden, purchasing agent, advises that this company has surveyed the route for its proposed electric railway between Grand Junction and Fruita, 20 miles. Grading will begin early next spring. The track will be practically level and laid with 60-lb. rails. The curves on the line will be about 15 deg. Several short trestles will be built across irrigation canals and gulches. The pole bracket type of overhead construction will be installed. Contracts will be awarded within the next few days for material for the reconstruction of a power plant. Orders will also be placed in the near future for three interurban cars and possibly one electric locomotive. Headquarters, Mining Exchange Building, Colorado Springs. [E. R. J., Oct. 30, '09.]

New London & East Lyme Street Railway, New London, Conn.—It is stated that this company will build about 10 miles of new track during 1910. L. S. Rudd, superintendent.

***Tallulah Falls, Ga.**—Louis Magid, Tallulah Falls, is reported to be interested in a project to establish a 4-mile electric railway in the vicinity of Tallulah Falls.

Illinois Central Electric Railway, Canton, Ill.—During 1910 this company will construct 8 miles of new track from Norris to Fairview, Ill. L. W. Morton, purchasing agent.

Quincy Horse Railway & Carrying Company, Quincy, Ill.—During 1910, this company will build 5 miles of new local track. W. A. Martin, purchasing agent.

Gary & Southern Traction Company, Gary, Ind.—It is stated that this company will construct 12 miles of new track connecting Crown Point with Gary during the spring of 1910.

South Bend & Logansport Traction Company, South Bend, Ind.—This company, which proposes to build an electric railway between South Bend and Logansport has placed contracts for all the subgrading to three contracting firms, viz: Southern division, Trinidad Engineering & Construction Company; middle division to U. S. Leitgart; northern division terminating in South Bend, to Redd & Son, Mishawaka. David Pepper, Philadelphia, is the general contractor for building the line, the work being in charge of J. M. McCampbell. The Illinois Steel Company has been awarded the contract for the rails. [E. R. J., Dec. 11, '09.]

Davenport & Manchester Interurban Railway, Davenport, Ia.—The stockholders of this company, which proposes to construct an interurban line between Davenport and Manchester, have voted to increase the capital stock from $15,000 to $650,000. J. W. Cross, promoter. [E. R. J., Oct. 23, '09.]

Des Moines, Council Bluffs & Western Railway, Des Moines, Ia.—This company announces that preparations are being made to start construction of its interurban railway early next spring. It will extend from Des Moines to Council Bluffs, via Adel and Greenfield. Headquarters, 408 Flynn Block, Des Moines. Capital stock authorized, $7,500,000; issued, $100,000. Bonds authorized, $3,000,000. Officers: Robert Pilmer, Norwalk, president; H. A. Smith, Des Moines, secretary; T. F. Flynn, Des Moines, general manager; F. N. Carrs, Des Moines, chief engineer. [E. R. J., Nov. 13, '09.]

Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa.—It is officially announced that during 1910 this company will construct 25 miles of new track. T. E. Rust, purchasing agent.

Atchinson Railway Light & Power Company, Atchinson, Kan.—During 1910, this company will build 3½ miles of new track. J. W. Waggener, general manager.

Louisville, Lincoln Farm & Mammoth Cave Traction Company, Glasgow, Ky.—It is stated that this company has surveys partly made and has partly financed its line. The company proposes to build from Glasgow, via Buffalo, to Hodgenville, Ky., and from Glasgow to Mammoth Cave, a distance of 60 miles. Charles Van-Den-Burgh, promoter. [E. R. J., Oct. 9, '09.]

Frederick (Md.) Railway.—It is announced that this company, which is a consolidation of the Frederick & Middletown Railway, the Washington, Fredericksburg & Gettysburg Railway and the Jefferson & Braddock Heights Railway, will build a number of extensions. The first extension will probably be to Brunswick. A line from Jefferson to Brunswick has been surveyed, and the construction of this section, 7 miles long, may be commenced next season. The extension of the Washington, Frederick & Gettysburg Railway is also in view. This road is now in operation between Frederick and Thurmont, a distance of 17 miles, as a steam railway. Its extension through Emmitsburg to Gettysburg, Pa., is contemplated. At Gettysburg important connections with lines in southern Pennsylvania are in sight which may eventually connect Frederick with York, Lancaster and Harrisburg.

St. Louis, Webster & Valley Park Railway, St. Louis, Mo.—W. C. Riffert, Harrisburg, Pa., secretary, is quoted as saying that construction work on this 17-mile railway has been discontinued until spring. It will traverse the old World's Fair Grounds at St. Louis. Twelve miles of the line will be double tracked.

***Kalispell, Mont.**—E. F. Wheaton and George W. Mathews, Cleveland, Ohio, are said to be promoting a system of electric railways radiating through the Flathead Valley. It also is proposed to run a line from Kalispell into the Flathead Reservation.

Coney Island & Brooklyn Railroad, Brooklyn, N. Y.—The Board of Estimate and Apportionment has approved the plan of this company to park Coney Island Avenue from the Park Circle, Brooklyn, to Coney Island, a distance of about 5 miles. The tracks of the company are now at the side of the street. The cost of the work is estimated at $300,000.

Albany Southern Railroad, Hudson, N. Y.—This company is receiving bids through J. G. White & Company, 43 Exchange Place, New York, for 1800 tons of heavy section rails, deliveries to be made at Rensselaer. The company is also receiving bids for six small bridges requiring 150 tons of steel.

Lima & Honeoye Electric Light & Railroad Company, Lima, N. Y.—About 49 miles of new track will be built by this company during 1910. The new line will pass through Richmond Mills, Honeoye and Atlanta, Rush and Henrietta. E. D. Watkins, chief engineer.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe of the United States Circuit Court has authorized Receivers Joline and Robinson of this company to construct a double-track street railway on Canal Street between Centre Street and the Bowery. This permit gives the company access to the new Manhattan Bridge.

Toledo Urban & Interurban Railway, Toledo, Ohio.—It is announced that during 1910 this company will construct 32 miles of new line. C. F. Smith, purchasing agent.

Arbuckle & Western Railroad, Ardmore, Okla.—The ELECTRIC RAILWAY JOURNAL is advised that this company has been organized to build a railway, to be operated by steam and electricity, from Ardmore to Chickasha and Comanche. Incorporation papers will be filed within the next few weeks. It is the intention to begin the preliminary work about Jan. 1. Oscar Ayres, Ardmore, is interested. [E. R. J., Oct. 30, '09.]

Shawnee (Okla.) Electric Railway.—This company has awarded a contract to J. B. Taylor & Company, New York, N. Y., for the building of its proposed electric railway between Oklahoma City and Shawnee. The line will be about 38 miles long and will also connect Dale, McLoud, Harrah and Choctaw City. C. T. Edwards, president. [E. R. J., June 12, '09.]

Altoona & Logan Valley Electric Railway, Altoona, Pa.—It is stated that this company is about to begin the construction of a new line from Mineral Point to Ebensburg. The company is also preparing to rebuild the line between Bellwood and Tipton.

Delaware County & Philadelphia Electric Railroad, Clifton Heights, Pa.—This company proposes to construct 10 miles of new track during 1910. Fred Haas, purchasing agent.

Irwin-Herminie Traction Company, Herminie, Pa.—This company will construct a 350-ft. steel bridge on its line, which will soon be built, between Hahntown and Irwin, 1 mile. At present the company is operating from Herminie to Hahntown.

Phœnixville, Valley Forge & Stafford Street Railway, Phœnixville, Pa.—Thomas E. O'Connell writes that this company has been chartered for the purpose of building a 10-mile electric railway from Phœnixville to Strafford, which is the terminus of the Philadelphia & Western Railroad's third-rail system. By the completion of this new line direct electric connection will be possible from Phœnixville to Philadelphia. The line will also pass through Valley Forge, William's Corner and King of Prussia. Later it is planned to extend to Bridgeport and Norristown. Application has been made for a charter, and as soon as it is granted the company proposes to start construction. A power plant and repair shop will be built at Valley Forge. Power will be furnished to towns along the route. Capital stock authorized, $60,000; issued, $20,000. Officers: Thos. E. O'Connell, West Chester, president, general manager and purchasing agent; I. E. Miller, Phœnixville, secretary; A. W. Kley, Phœnixville, treasurer; Nathan R. Rambo, West Chester, chief engineer. [E. R. J., Dec. 11, '09.]

Scranton (Pa.) Railway.—About 5 miles of new track will be built by this company during 1910. W. J. Mulholland, purchasing agent.

Stroudsburg & Water Gap Street Railway, Stroudsburg, Pa.—It is officially stated that this company will build 5½ miles of new track in 1910. Frank McCoy, purchasing agent.

Memphis (Tenn.) Street Railway.—This company will build about 2 miles of new track during 1910. T. H. Tutwiler, general manager.

Richmond & Henrico Railway, Richmond, Va.—Application was made to the Law of Equity Court on Dec. 13 by certain creditors of the Richmond & Henrico Railway for the appointment of a receiver for the property. [E. R. J., Nov. 6, '09.]

Richmond & Chesapeake Bay Railway, Richmond, Va.—The State Corporation Commission has issued an amendment to the charter of this company, permitting it to extend its railway from its present terminus at Ashland to the south bank of the Potomac River.

Seattle-Tacoma Short Line Railway, Tacoma, Wash.—This company announces that it is preparing to begin work about Jan. 20 on its proposed interurban railway between Seattle and Tacoma, 65 miles. The company intends to install both the overhead trolley system and gasoline motor cars on its line. Power to operate the electric cars will be purchased. Contractors, Felt & Eastman, 6 Bowes Building, Tacoma, which is also the headquarters of the company. A. E. Rothermel, Tacoma, secretary. [E. R. J., June 12, '09.]

Thunder Creek Transportation & Smelting Company, Tacoma, Wash.—A. M. Richards, president, writes that work will be started next spring on its projected 150-mile electric railway which is to connect cities and towns of northern central Washington and Puget Sound. Plans are about complete for the consolidation of this company with the North Coast Mining & Milling Company, and the absorption of certain other properties, now under active development, into a new corporation known as the Skagit, Cascade & Chelan Railway, with offices in the Bankers' Trust Building, Tacoma, and with a capitalization of $25,000,000. Announcement of this new company and its amplified plans will be made during the next few weeks. [E. R. J., Oct. 16, '09.]

Milwaukee Western Electric Railway, Milwaukee, Wis.—This company is said to have awarded a contract to P. F. Murphy to grade the right of way for its proposed railway from Beaver Dam to Milwaukee, 76 miles.

SHOPS AND BUILDINGS

San Diego (Cal.) Electric Railway.—This company has awarded a contract to R. P. Shields & Son for the erection of a new car house to be located at M Street and Fifteenth Street. The building will be 195 ft. x 270 ft. and will have a capacity of 100 cars. It is estimated to cost $100,000. [E. R. J., Aug. 21, '09.]

Boise & Interurban Railroad, Boise, Idaho.—This company expects to begin work next year on a new passenger and freight station at Seventh Street and Bannock Street. It will cover an area of 122 ft. x 100 ft., will be two stories high and will be constructed of reinforced concrete, brick and stone. It is the intention to add two stories to the building later.

Chicago & Joliet Electric Railway, Joliet, Ill.—This company plans to erect a fire-proof car house at the southwest corner of Archer Avenue and Center Street, Summit. The company has not as yet prepared any plans, but it is probable that the building will be built of reinforced concrete. The storage capacity is to be from 15 to 20 cars.

Illinois Traction System, Peoria, Ill.—The freight house of this company, located in East St. Louis, was destroyed by fire on Dec. 10. The structure was one story high and 100 ft. x 100 ft. in size. The damage is said to have been $4,500.

Peoria Railway Terminal Company, Peoria, Ill.—This company is said to be considering the erection of a new car house and shops at South Bartonville to replace the buildings which were destroyed by fire in October. The new structure is estimated to cost about $20,000.

South Bethlehem & Saucon Street Railway, Bethlehem, Pa.—This company will build a new concrete and steel car house at Bethlehem. Benedict Birkel, South Bethlehem, contractor.

Pittsburgh (Pa.) Railways.—This company has let a contract to D. T. Riffle to erect a second-story addition to its present office building at Frankstown Avenue and Collier Street, near which is located the Homewood car house. This addition will be 20 ft. x 216 ft. in size and is being erected for the use of its employees. It will contain dressing rooms, shower baths and a gymnasium. The addition is estimated to cost about $12,000.

Port Arthur (Tex.) Traction Company.—This company is preparing plans for the erection of a new car house in Port Arthur, to be 113 ft. x 77 ft. in size.

POWER HOUSES AND SUBSTATIONS

Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind.—This company has purchased and is installing two 1500-kw horizontal G. E. turbines in its New Castle power station. The plant will be in operation Jan. 1 Machinery has also been delivered for installation in three substations along the company's line which is to be placed in operation on Jan. 1.

Mount Vernon Railway & Light Company, Mount Vernon, Ohio.—It is stated that this company is considering plans for the erection of a new power station and improvements to its present plant.

AMUSEMENT PARKS

A. L. Salisbury, Oriskany, N. Y., desires to purchase one second-hand miniature railroad.

Manufactures & Supplies

ROLLING STOCK

Rome Railway & Light Company, Rome, Ga., will order two closed cars next year.

Longview & Junction Street Railway, Longview, Tex., will order two small electric cars early next spring.

Oklahoma Union Traction Company, Tulsa, Okla., expects to buy several new cars during 1910.

Lynchburg Traction & Light Company, Lynchburg, Va., will probably buy four double-truck cars early next year.

Oxford, Cochranville & Parkersburg Electric Railway, Oxford, Pa., expects to buy an entire outfit of rolling stock next year.

Mexico, Santa Fé & Perry Traction Company, Mexico, Mo., expects to buy complete passenger and freight equipment during 1910.

Dayton & Troy Electric Railway, Dayton, Ohio, has purchased four flat cars from the Hicks Locomotive & Car Works, Chicago, Ill.

Ottumwa Railway & Light Company, Ottumwa, Ia., recently rebuilt in its own shops three of its single-truck closed cars for city service.

Hocking-Sunday Creek Traction Company, Nelsonville, Ohio, is considering the purchase next year of two 57-ft. double-truck McKeen motor cars.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn., expects to buy complete rolling stock equipment for a 109-mile road.

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, is contemplating the purchase before the end of this year of 10 open cars to have a seating capacity of 60.

Union Street Railway, New Bedford, Mass., has ordered 12 double-truck cars from the Bradley Car Works, Worcester, Mass., to be mounted on Standard Motor Truck Company's type 0-50 trucks.

Columbia Electric Street Railway, Light & Power Company, Columbia, S. C., reported in the Electric Railway Journal of Dec. 18, 1909, as having adopted the pay-as-you-enter system, will buy two pay-as-you-enter cars in the near future.

Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind., mentioned in the Electric Railway Journal of Oct. 23, 1909, as having purchased a number of cars from the Jewett Car Company, will have six new passenger and one motor freight car delivered to them very soon. The passenger cars are 65 ft. long and have three compartments for baggage, smokers and passengers.

Illinois Traction System, Peoria, Ill., has placed an order with the McGuire-Cummings Manufacturing Company, Chicago, Ill., for four combination express and smoking cars, four motor and 32 trail express cars, and one double-truck standard sweeper. The contemplated purchase of the above equipment was mentioned in the Electric Railway Journal of Oct. 30, 1909, and Nov. 27, 1909.

Saginaw & Flint Railway, Saginaw, Mich., mentioned in the Electric Railway Journal of Nov. 27, 1909, as being in the market for two passenger and one express cars, has placed an order with the Niles Car & Manufacturing Company for two 51-ft. interurban passenger cars and one 50-ft. interurban baggage car, all to be mounted on Baldwin Class 78-25 trucks.

TRADE NOTES

United States Electric Company, New York, N. Y., has moved from 95 William Street to 284 Pearl Street.

Power Specialty Company, New York, N. Y., announces the removal of its Boston office to 1031 State Mutual Building, 50 Congress Street.

Harrison Engineering Company, New York, N. Y., has installed a unique heating system in the Claire Avenue car house of the Toronto & York Radial Railway. It consists of an air-tube heater which resembles a sectional water-tube boiler and a fan for forcing the heated air through the distributing pipes.

H. W. Johns-Manville Company, New York, has appointed H. H. Seaman, assistant manager of its New York electrical department. For seven years, Mr. Seaman was associated with the Electric Storage Battery Company at Philadelphia, Detroit and Cleveland, and for the past two years has been manager of that company's Atlanta office.

Lord Electric Company, New York, N. Y., placed on the market only a few months ago a device known as Hydro-Ground, for grounding telephone and telegraph, electric light, power and railway circuits. One large company which tried a few of these grounding devices last summer has recently placed an order for several hundred more in order to equip all of its circuits.

Cameron Electrical Manufacturing Company, Ltd., Ansonia, Conn., has recently opened an office in Cleveland to take care of business in that city and adjoining territory. The office is in the Electric Building and is in charge of H. L. Schneider, whose long experience in this line of work and whose extensive acquaintance with electric railway men eminently fits him for this position.

W. C. Webster has resigned as sales manager of the New York office of the Westinghouse Electric & Manufacturing Company, and will be succeeded by Walter S. Rugg, who has been connected with the general engineering department of the company in charge of the sales department of large lighting interests. Mr. Webster has been with the Westinghouse Electric & Manufacturing Company for about 12 years.

Allis-Chalmers Company, Milwaukee, Wis., has moved its San Francisco office from 599 Mission Street to the Byron Jackson Building, 160 Second Street, corner Natoma Street. The territory is in charge of R. B. Elder, who has been engaged in engineering on the Pacific Coast for the past 14 years. A warehouse in San Francisco contains a complete assortment of small machinery such as brakers, motors, transformers and repair parts.

General Railway Signal Company, Rochester, N. Y., has appointed H. M. Sperry sales manager, with office in Rochester. The change is effective Jan. 1, 1910. Mr. Sperry has had wide experience in railway engineering and signal work. He was for 10 years connected with the Pennsylvania Railroad and later was appointed general agent of the Johnson Railroad Signal Company. From 1899 to 1905 he served as signal engineer and New York agent of the Union Switch & Signal Company, during which time he prepared the plans for the signal system installed in the New York subway. Later he acted in the capacity of consulting signal engineer for the Hudson & Manhattan Railroad and prepared plans for the entire signal system installed in the tunnels of that company. Since February, 1906, Mr. Sperry has been resident manager in New York for the General Railway Signal Company.

ADVERTISING LITERATURE

Ford & Johnson Company, Chicago, Ill., has issued an attractive folder illustrating and describing in detail the car seats which it makes.

Frank Ridlon Company, Boston, Mass., has issued its December list of new and second-hand electric motors, generators and miscellaneous power-house machinery.

Ohio Brass Company, Mansfield, Ohio, prints in its December *Bulletin* a description of the Cascade Tunnel electrification and a continuation of the articles on the plant of the company.

Chicago Concrete Machinery Company, Chicago, Ill., illustrates representative types of concrete mixing and handling machinery which it makes, in a small pamphlet entitled "Success Winning Machinery."

Cincinnati Milling Machine Company, Cincinnati, Ohio, has issued a handsome illustrated catalog of its complete line of horizontal and vertical plain and universal type milling machines and attachments.

General Electric Company, Schenectady, N. Y., in Bulletin 4705, discusses the application of Curtis turbines of the low and mixed pressure types to condensing and non-condensing installations of reciprocating engines.

Graphite Lubricating Company, Bound Brook, N. J., is distributing a circular containing an apt quotation from Sherlock Holmes which points out the value of specialized knowledge. Knowledge of machinery bearings as a result of 20 years' experience is the specialty of this company.

NEW PUBLICATION

Proceedings of the Master Car Builders' Association, Convention of 1909. J. W. Taylor, Secretary: Chicago, 390 Old Colony Building. Cloth, 674 pages.

This is the 43d volume of the Proceedings and is uniform with those issued in previous years. The sheets showing the standards and recommended practice of the association have been redrawn and rearranged in a more logical order. The complete text of the explanatory matter accompanying the drawings of the standards is printed in the body of the book, together with the rules of interchange as revised at the last convention.

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